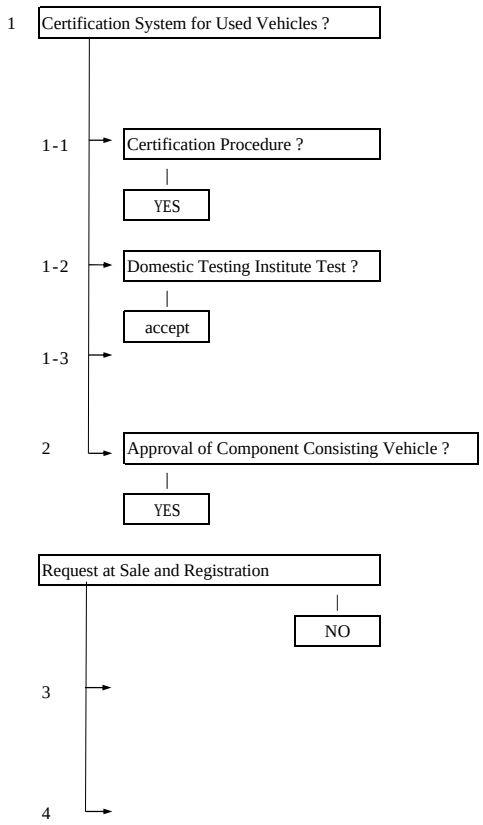
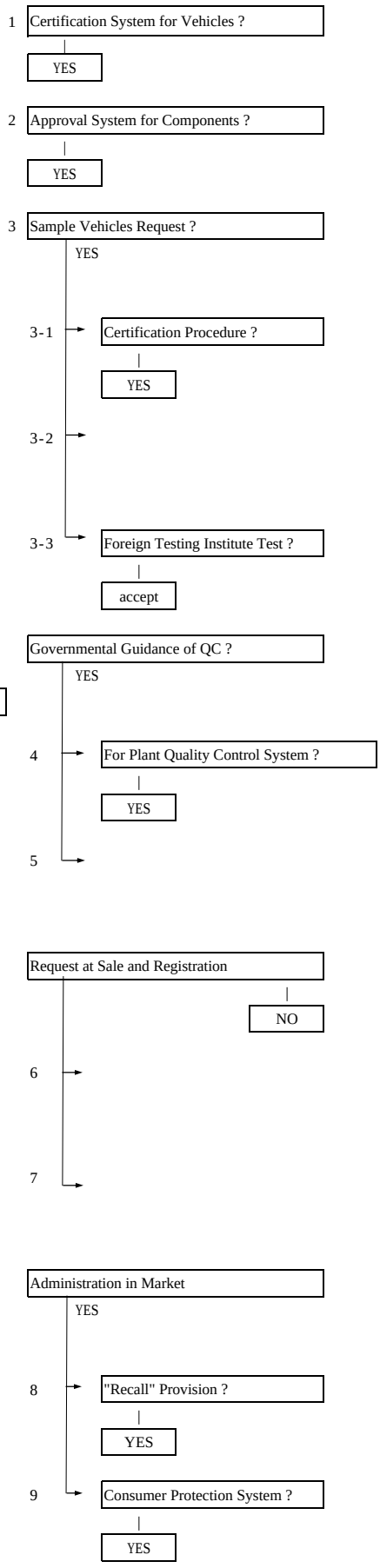
Certification System
of APEC Member Economy

Australia

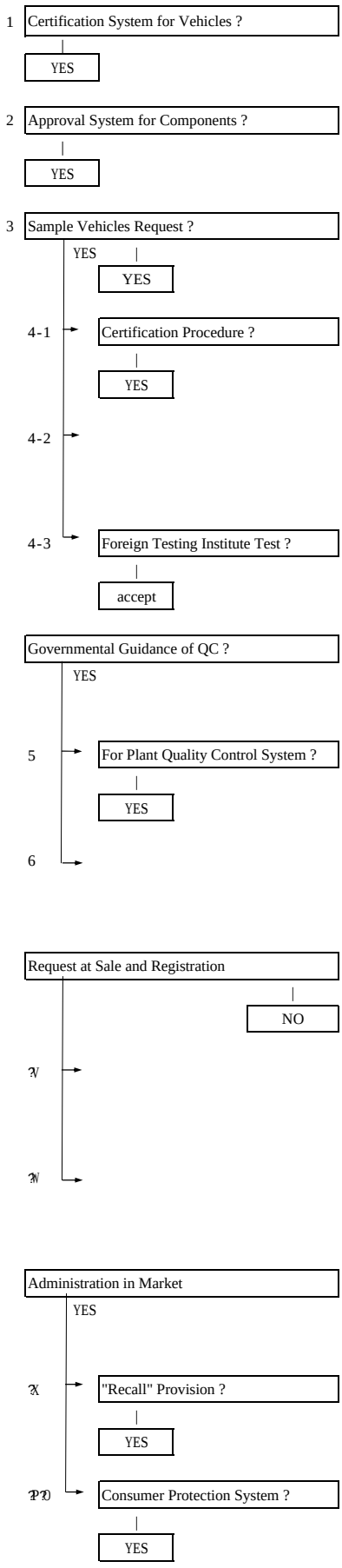
For Used Import Motor Vehicles



For Domestically - Produced Motor Vehicles



For Newly - Produced Import Motor Vehicles



Certification System of APEC Economy

Brunei

For Domestically - Produced Motor Vehicles

No Vehicle Production Industry

For Newly - Produced Import Motor Vehicles

1 Certification System for Vehicles ?
YES

2 Approval System for Components ?
NO

3 Sample Vehicles Request ?
YES

4-1 Certification Procedure ?
YES

4-2

4-3 Foreign Testing Institute Test ?
Accept

Governmental Guidance of QC ?
NO

5

6

Request at Sale and Registration
YES

7 Technical Document ?
YES

8 Confirmation Inspection ?
YES

Administration in Market
NO

9

10

For Used Import Motor Vehicles

1 Certification System for Used Vehicles ?
YES

1-1 Certification Procedure ?
YES

1-2

1-3 Foreign Testing Institute Test ?
Accept

2 Approval of Component Consisting Vehicle ?
NO

Request at Sale and Registration
YES

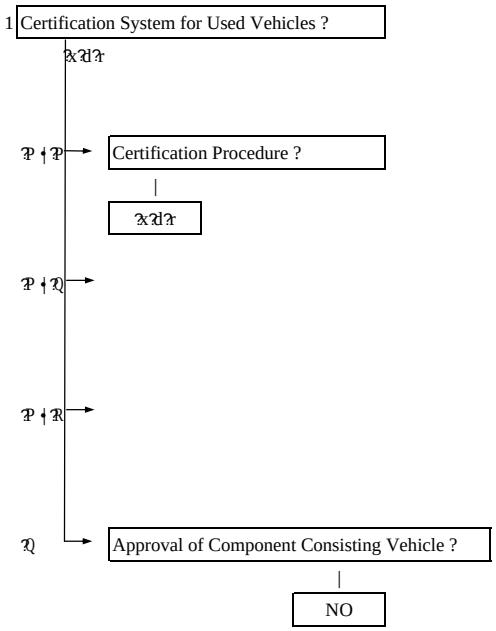
3 Technical Document ?
YES

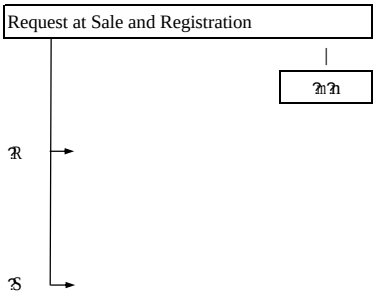
4

Certification System of APEC Member Economy

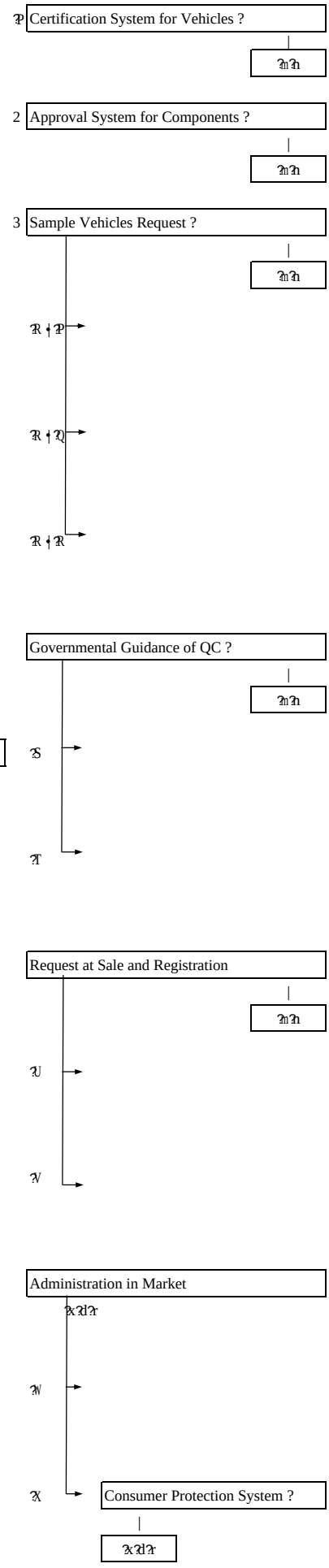
Canada

For Used Import Motor Vehicles

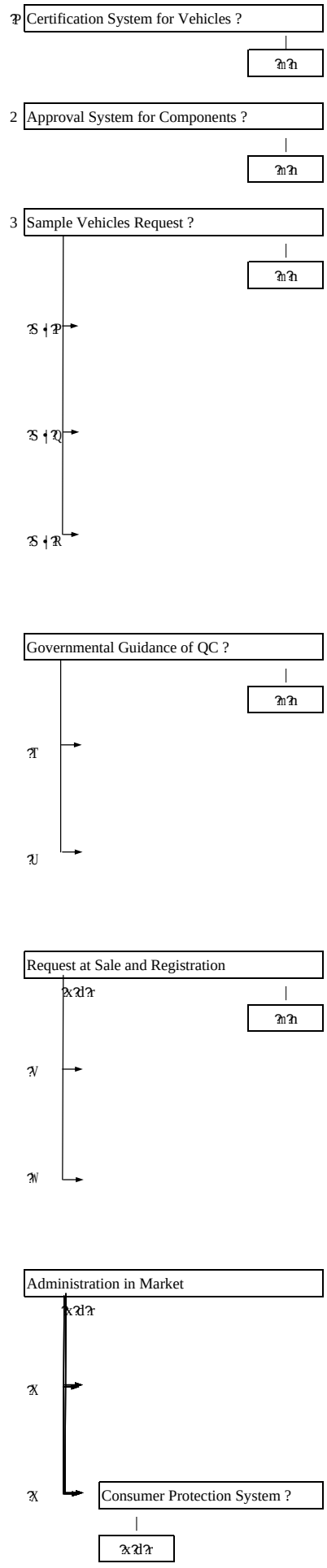




For Domestically - Produced Motor Vehicles



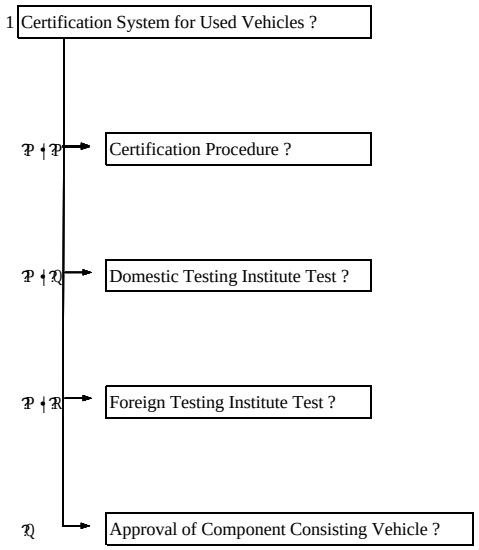
For Newly - Produced Import Motor Vehicles

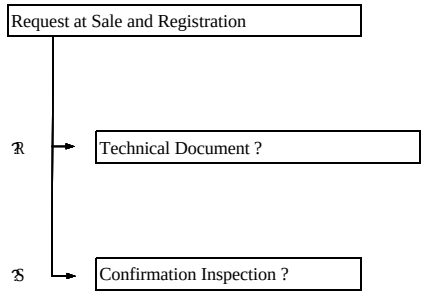


Certification System of APEC Economy

Chili

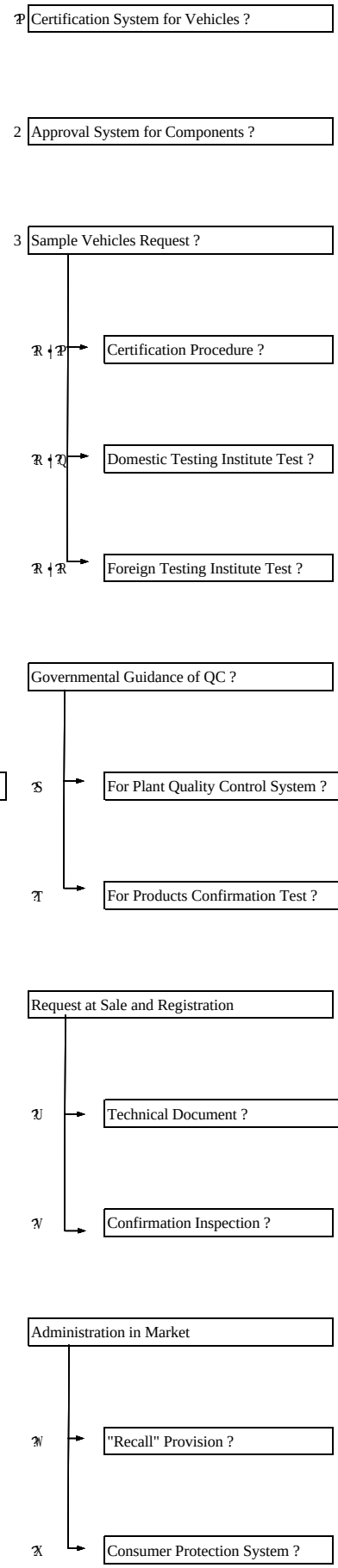
For Used Import Motor Vehicles





not clear

For Domestically - Produced Motor Vehicles



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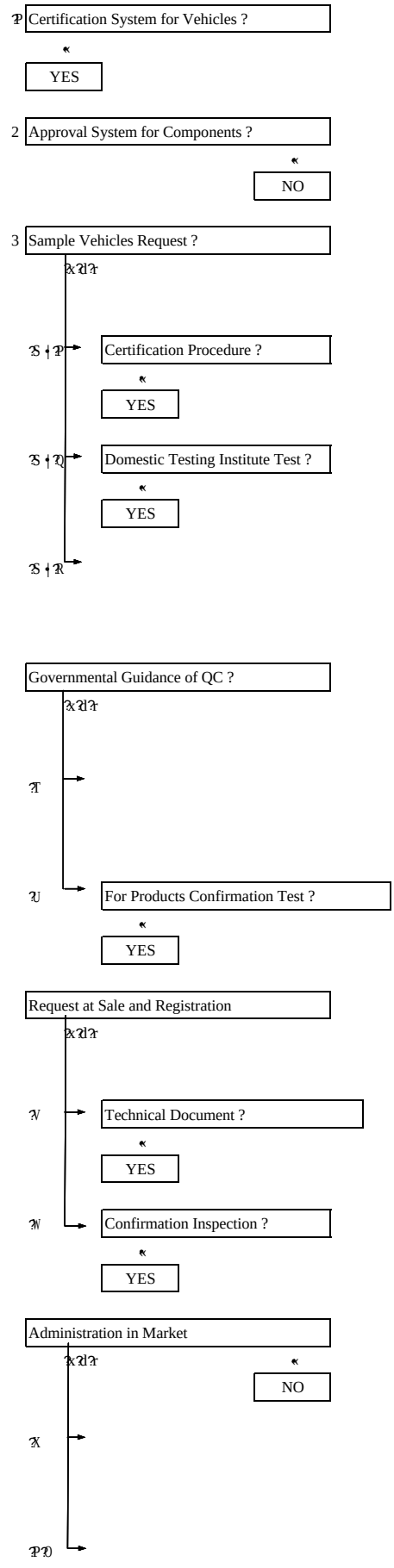
For Newly - Produced Import Motor Vehicles



Certification System of APEC Economy

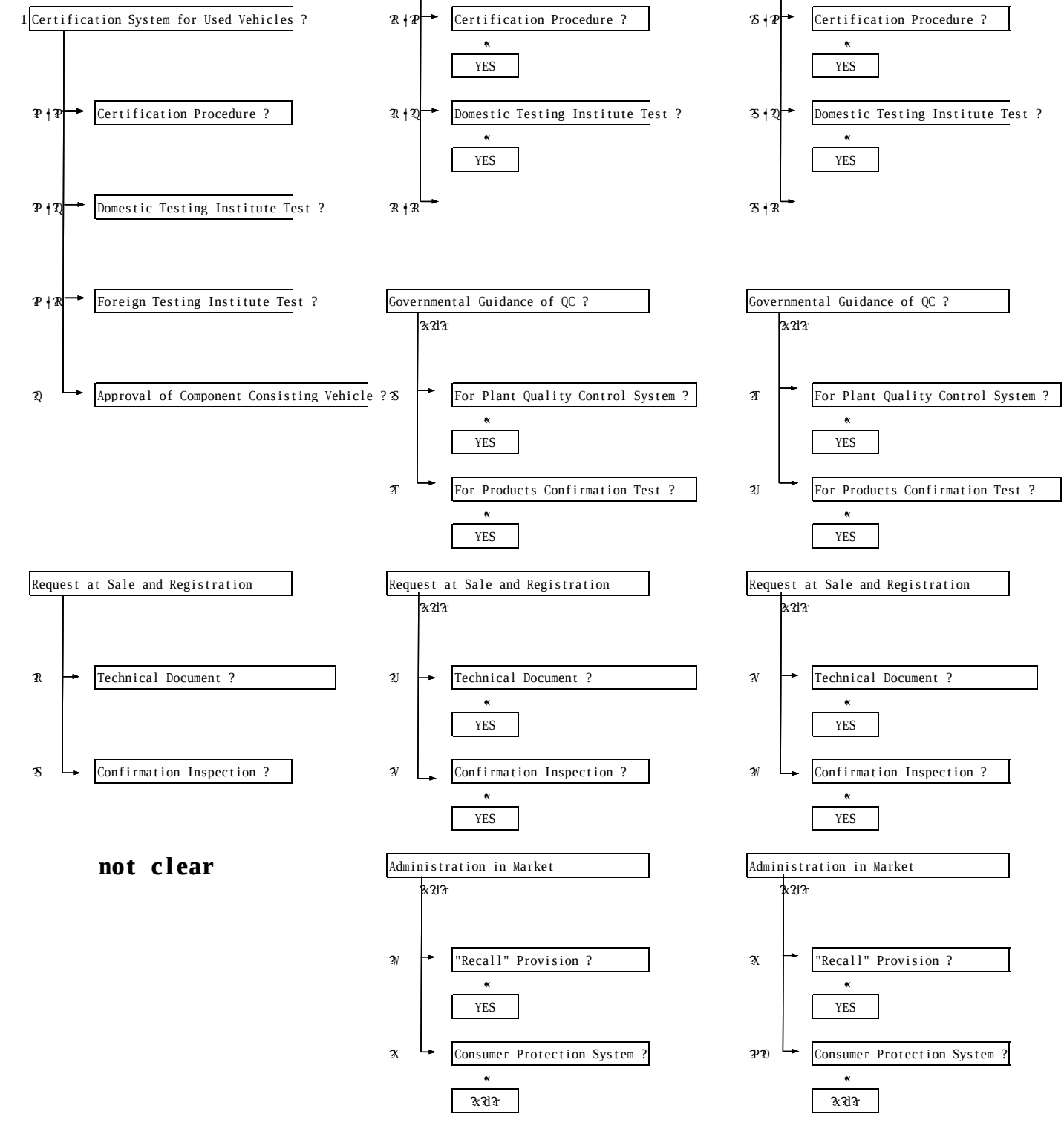
China

Not officially confirmed based on JASIC obtained information

For Domestically - Produced Motor Vehicles

For Newly - Produced Import Motor Vehicles

For Used Import Motor Vehicles



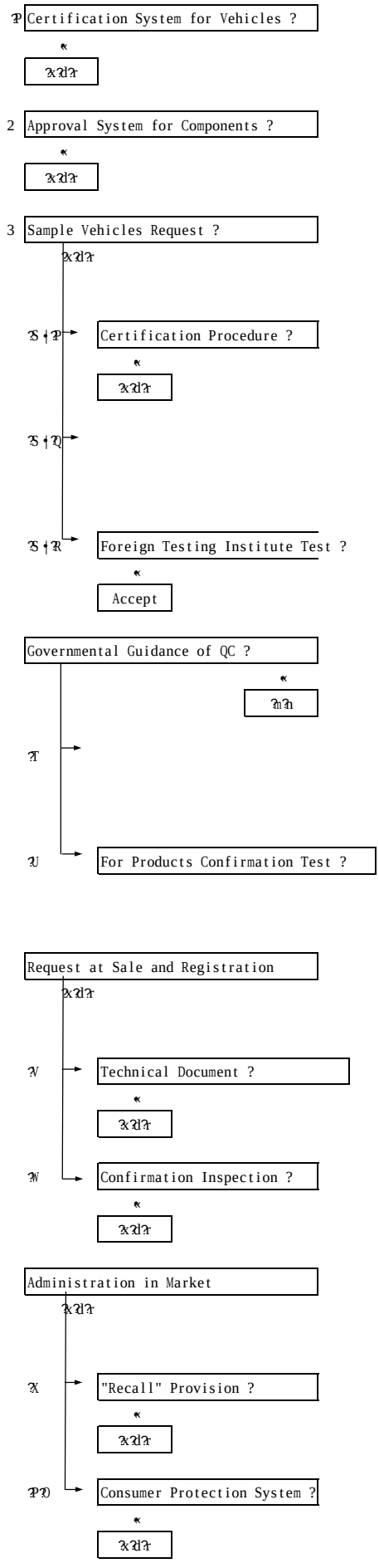
Certification System of APEC Economy

Hong Kong

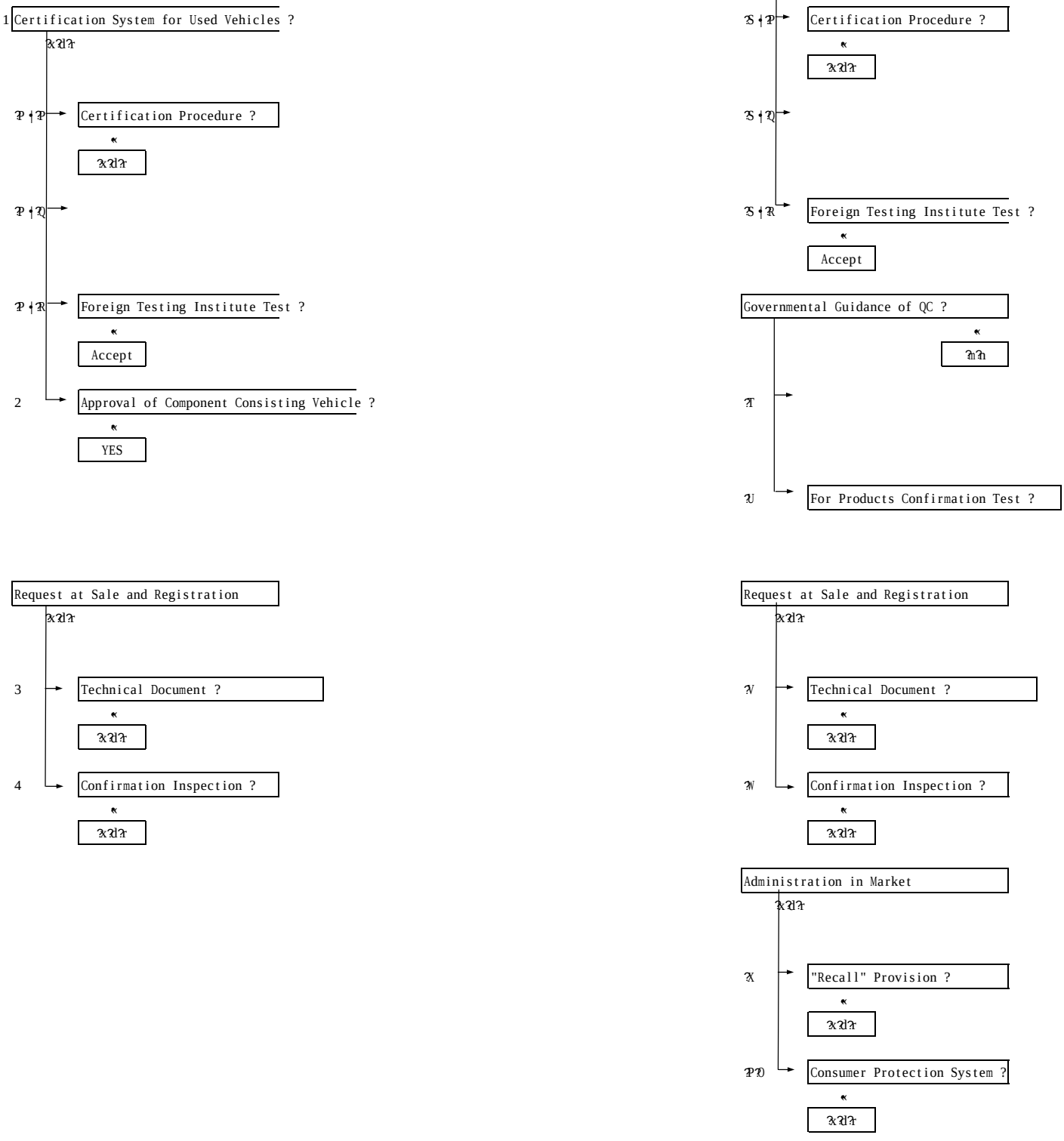
For Domestically - Produced Motor Vehicles

No vehicle production industry

For Newly - Produced Import Motor Vehicles



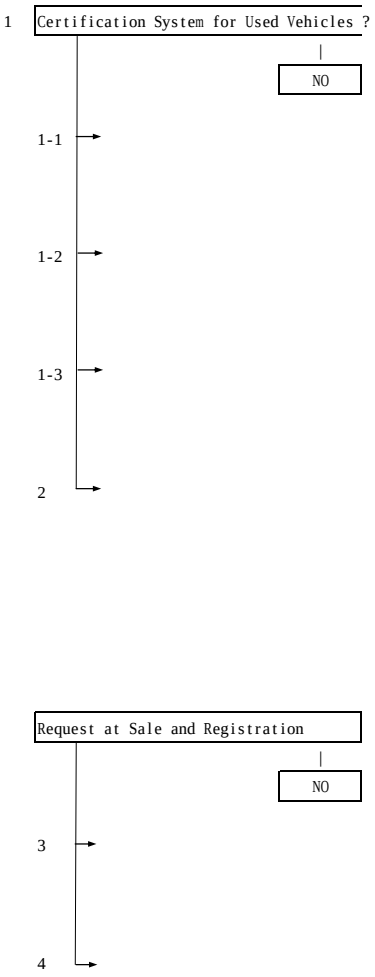
For Used Import Motor Vehicles



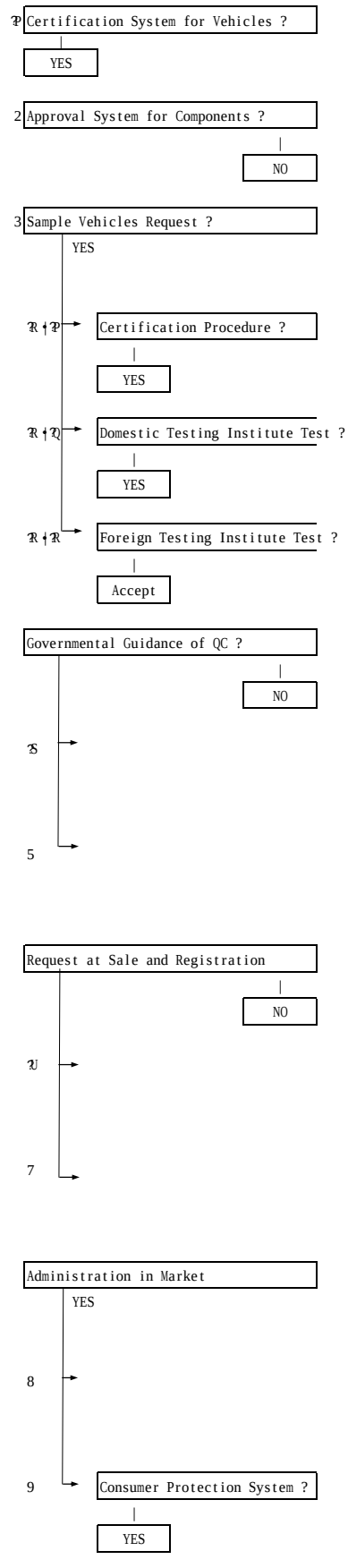
Certification System of APEC Member Economy

Indonesia

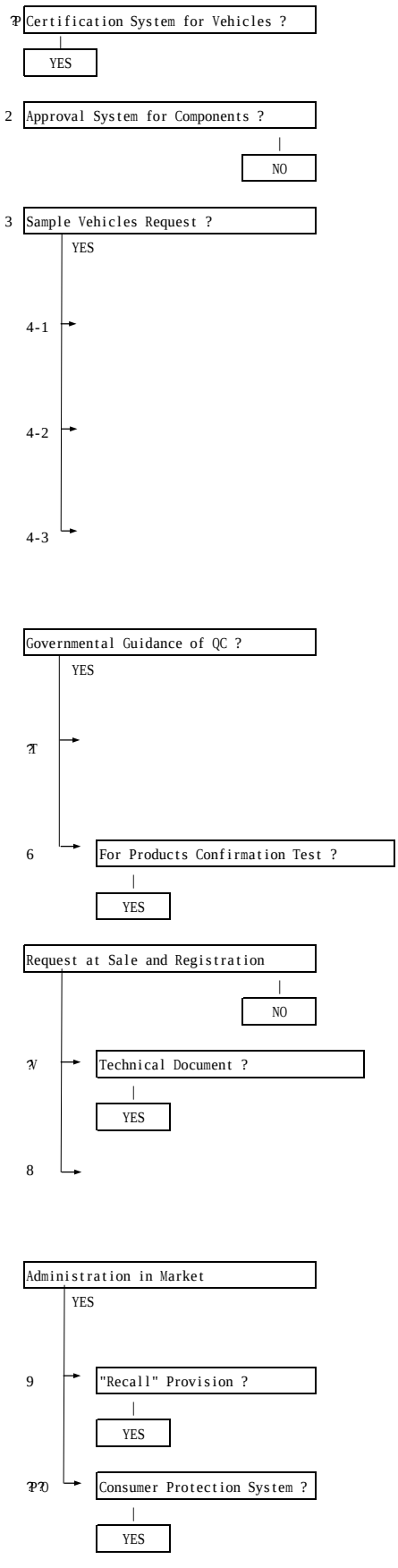
For Used Import Motor Vehicles



For Domestically - Produced Motor Vehicles



For Newly - Produced Import Motor Vehicles



Certification System of APEC Member Economy

Japan

For Domestically - Produced Motor Vehicles

- Certification System for Vehicles ? → YES
- 2 Approval System for Components ? → YES
- 3 Sample Vehicles Request ? → YES
  - Certification Procedure ? → YES
  - Domestic Testing Institute Test ? → YES
- Governmental Guidance of QC ? → YES
  - For Plant Quality Control System ? → YES
  - For Products Confirmation Test ? → YES
- Request at Sale and Registration → YES
  - Technical Document ? → YES
  - Confirmation Inspection ? → YES
- Administration in Market → YES
  - "Recall" Provision ? → YES
  - Consumer Protection System ? → YES

For Newly - Produced Import Motor Vehicles

- Certification System for Vehicles ? → YES
- 2 Approval System for Components ? → YES
- 3 Sample Vehicles Request ? → YES
  - Certification Procedure ? → YES
  - Domestic Testing Institute Test ? → YES
- Governmental Guidance of QC ? → YES
  - For Plant Quality Control System ? → YES
  - For Products Confirmation Test ? → YES
- Request at Sale and Registration → YES
  - Technical Document ? → YES
  - Confirmation Inspection ? → YES
- Administration in Market → YES
  - 9 "Recall" Provision ? → YES
  - 10 Consumer Protection System ? → YES

For Used Import Motor Vehicles

1 Certification System for Used Vehicles ?

- Certification Procedure ? → YES
- Domestic Testing Institute Test ? → YES
- Foreign Testing Institute Test ? → Accept
- Approval of Component Consisting Vehicle ? → YES

Request at Sale and Registration → YES

- Technical Document ? → YES
- Confirmation Inspection ? → YES

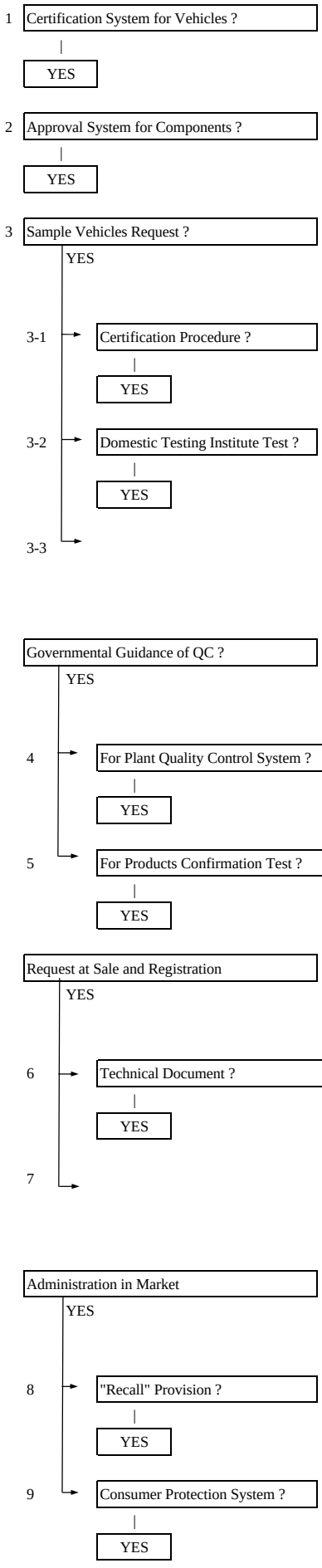
Certification System of APEC Member Economy

Korea

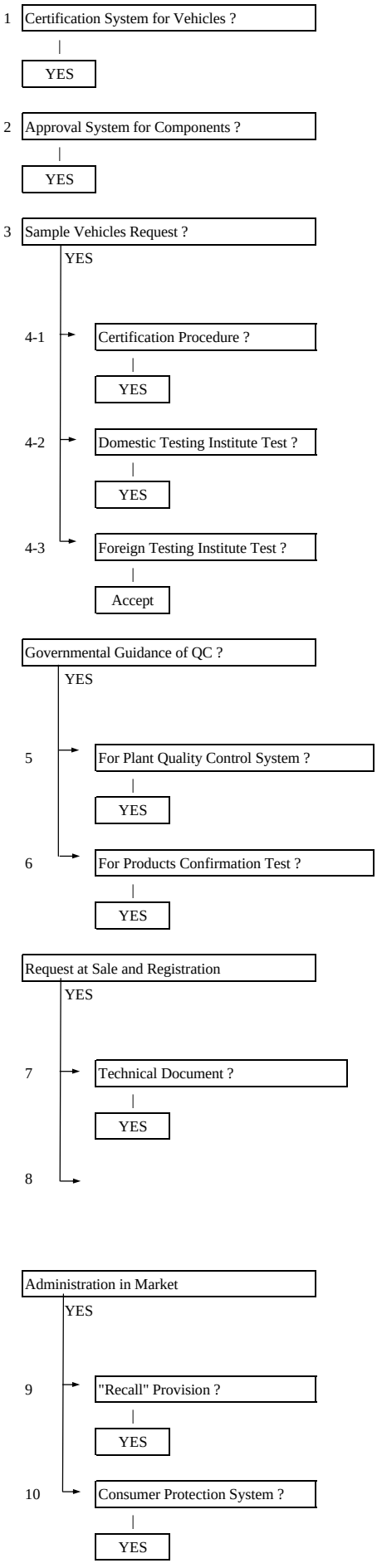
For Used Import Motor Vehicles

Prohibited used vehicle importation

For Domestically - Produced Motor Vehicles



For Newly - Produced Import Motor Vehicles

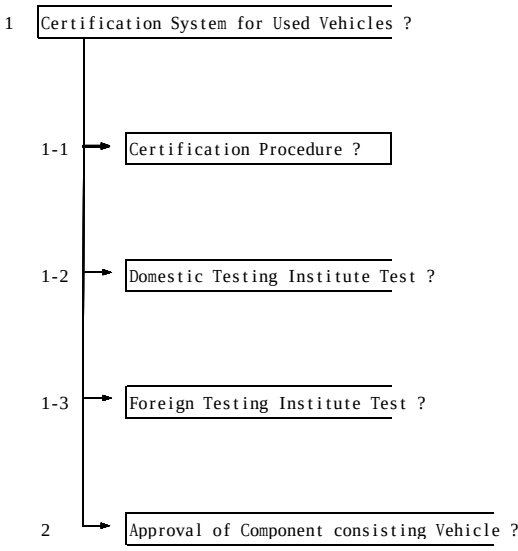


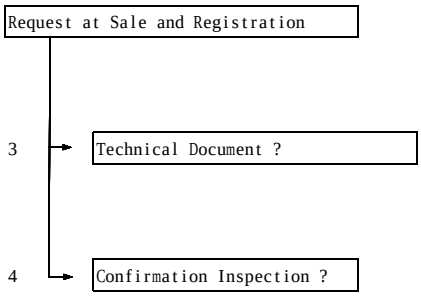
Certification System of APEC Member Economy

Malaysia

not officially confirmed
based on JASIC information

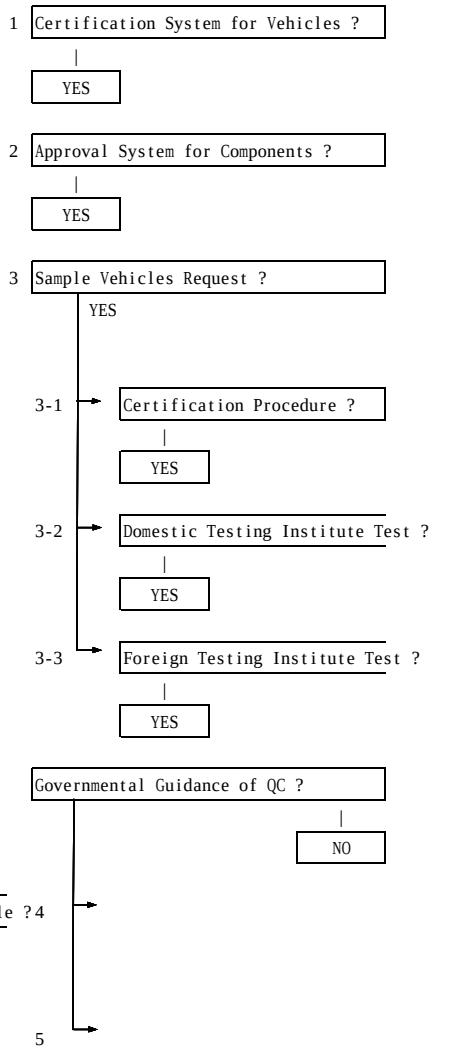
For Used Import Motor Vehicles

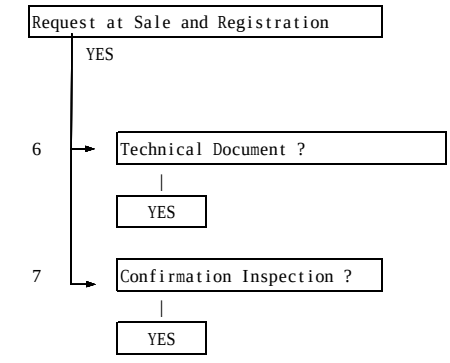




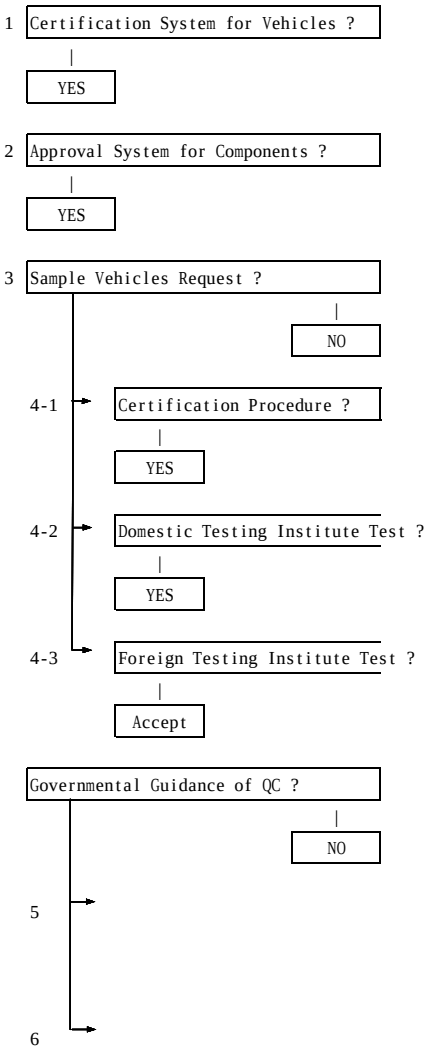
not clear

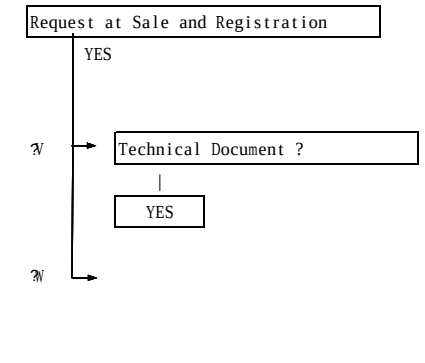
For Domestically - Produced Motor Vehicles





For Newly - Produced Import Motor Vehicles



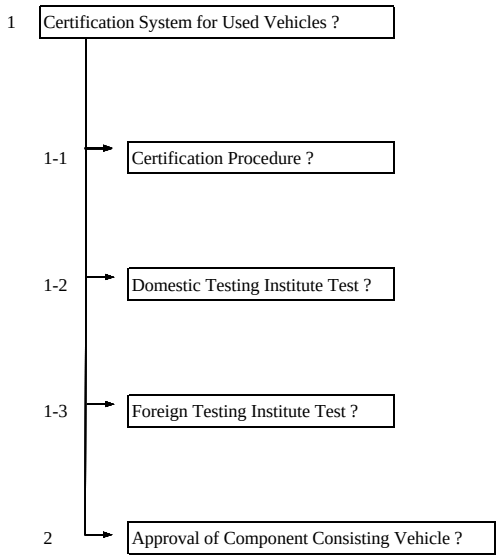


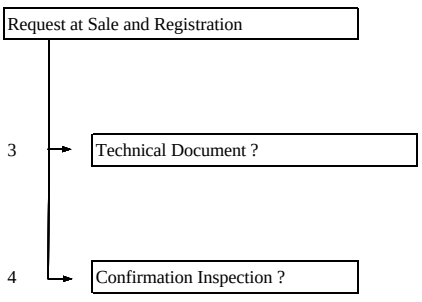
Certification System
of APEC Member Economy

Mexico

not officially confirmed
based on JASIC information

For Used Import Motor Vehicles





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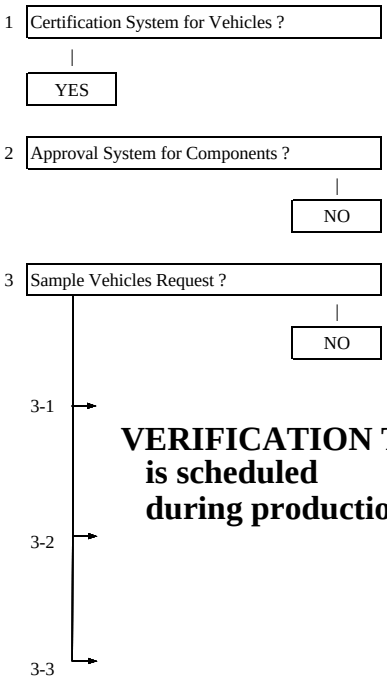
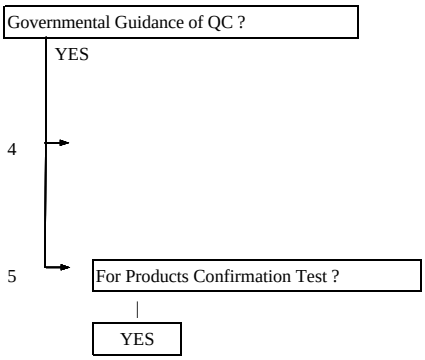
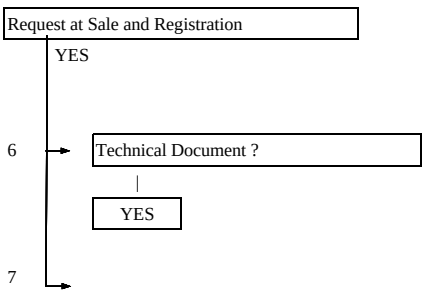
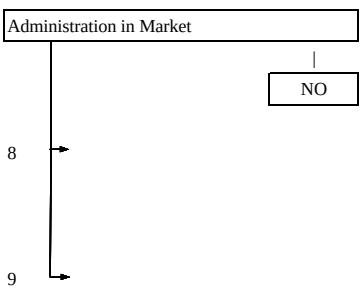
For Domestically - Produced Motor Vehicles



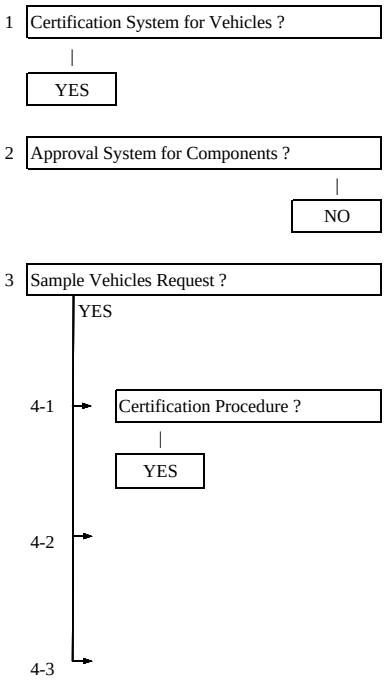
VERIFICATION TEST is scheduled during production

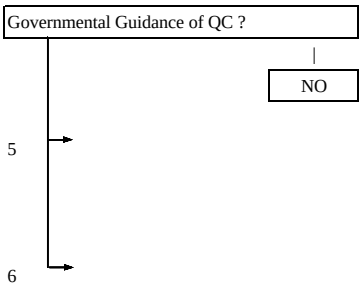


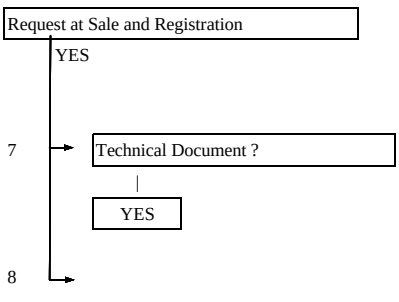


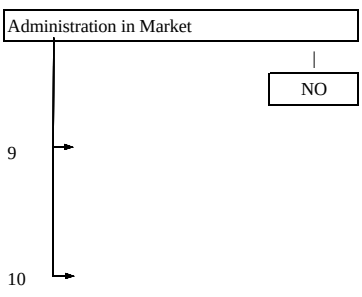


For Newly - Produced Import Motor Vehicles





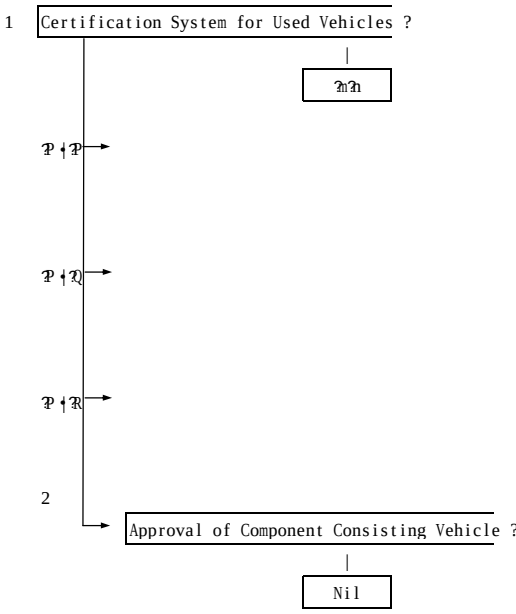


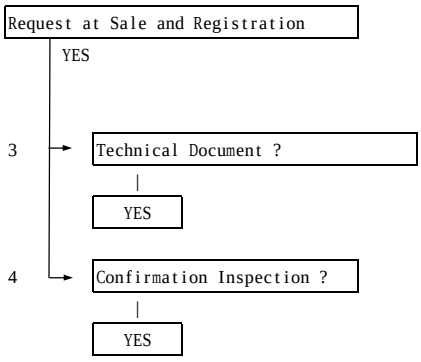


Certification System of APEC Member Economy

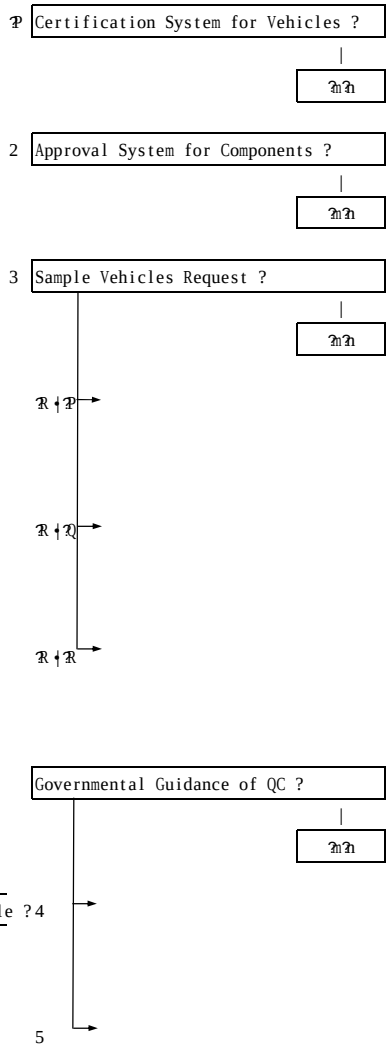
New Zealand

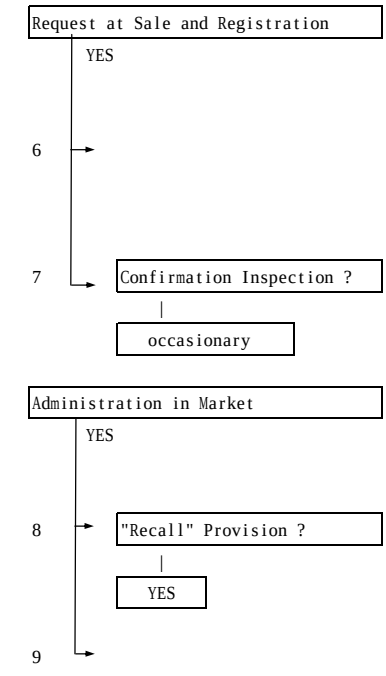
For Used Import Motor Vehicles



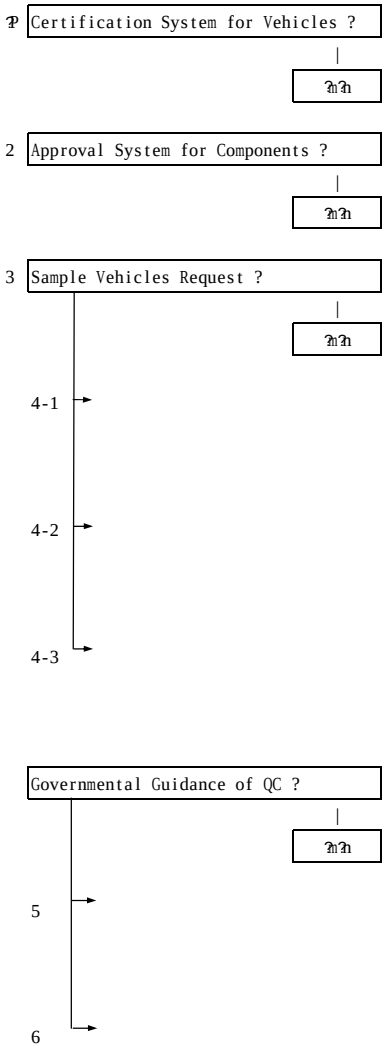


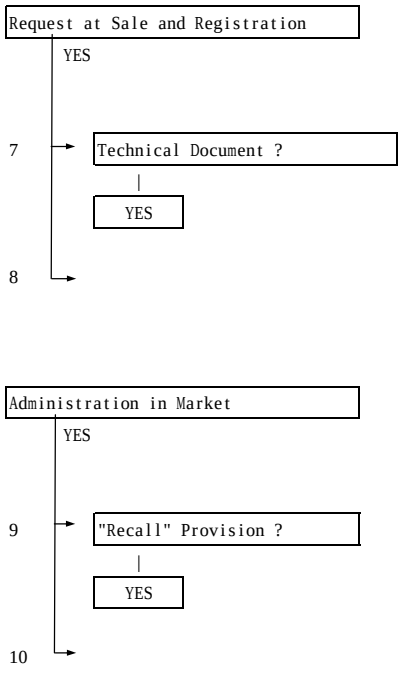
For Domestically - Produced Motor Vehicles





For Newly - Produced Import Motor Vehicles





Certification System of APEC Member Economy

Papua New Guinea

For Domestically - Produced Motor Vehicles

No vehicle production industry

For Newly - Produced Import Motor Vehicles

1 Certification System for Vehicles ?
NO

2 Approval System for Components ?
NO

3 Sample Vehicles Request ?
YES

4-1 Certification Procedure ?
YES

4-2 Domestic Testing Institute Test ?
YES

4-3 Foreign Testing Institute Test ?
Accept

Governmental Guidance of QC ?
NO

5

6

Request at Sale and Registration
YES

7 Technical Document ?
YES

8 Confirmation Inspection ?
YES

Administration in Market
YES

9 "Recall" Provision ?
YES

10 Consumer Protection System ?
YES

For Used Import Motor Vehicles

1 Certification System for Used Vehicles ?
YES

1-1

1-2 Domestic Testing Institute Test ?
YES

1-3 Foreign Testing Institute Test ?
Accept

2 Approval of Component Consisting Vehicle ?
YES

Request at Sale and Registration
YES

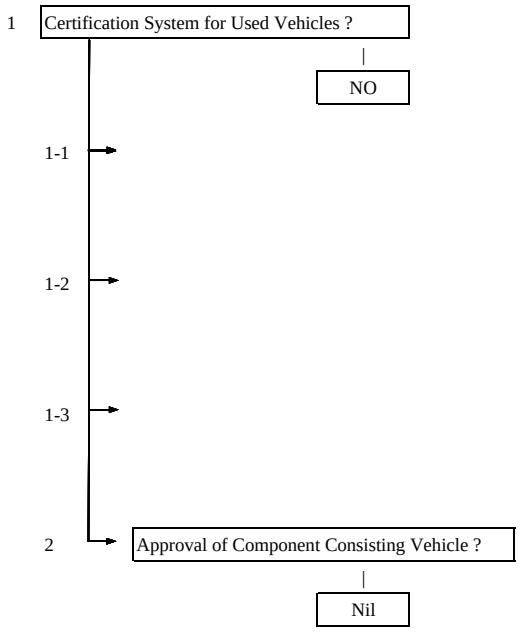
3 Technical Document ?
YES

4 Confirmation Inspection ?
YES

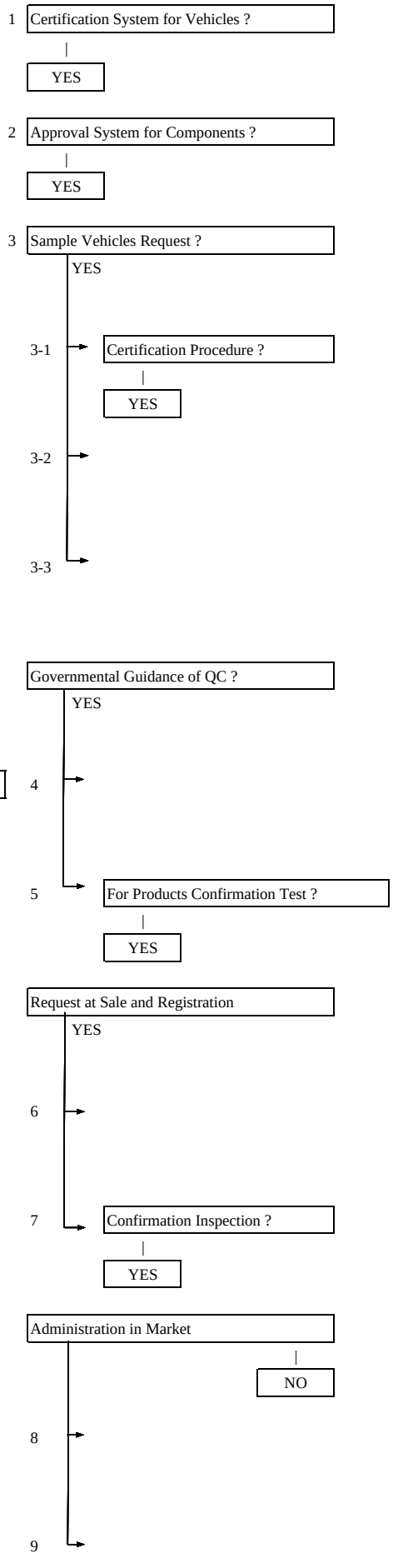
Certification System of APEC Member Economy

Philippines

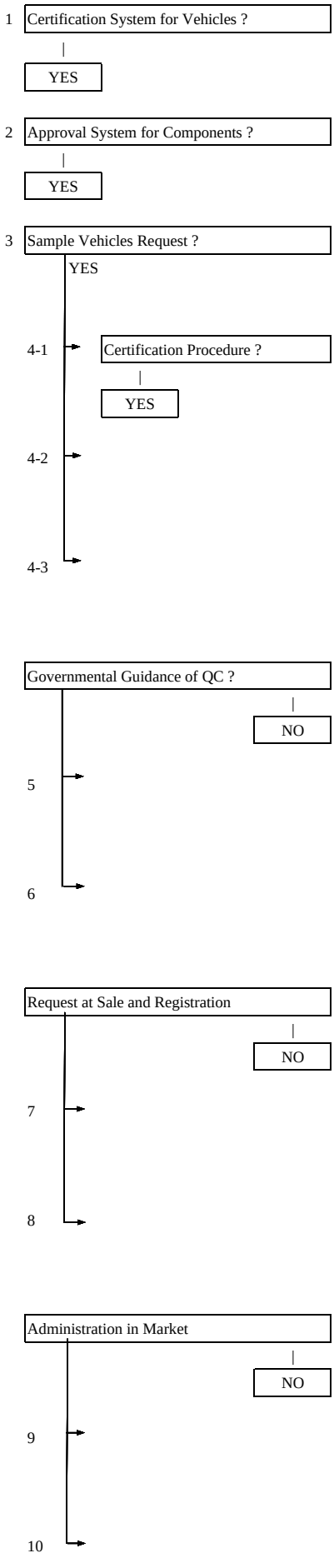
For Used Import Motor Vehicles



For Domestically - Produced Motor Vehicles



For Newly - Produced Import Motor Vehicles



Certification System of APEC Member Economy

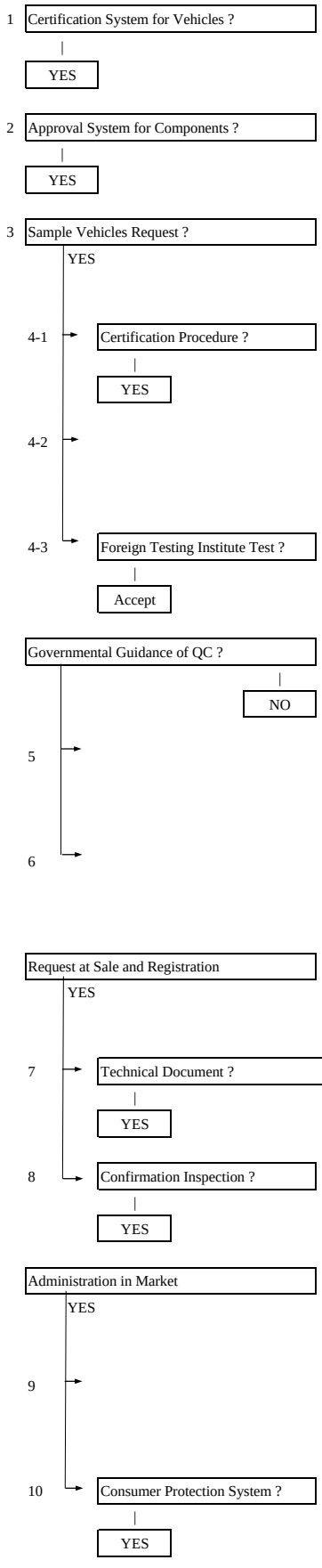
Singapore

For Domestically - Produced Motor Vehicles

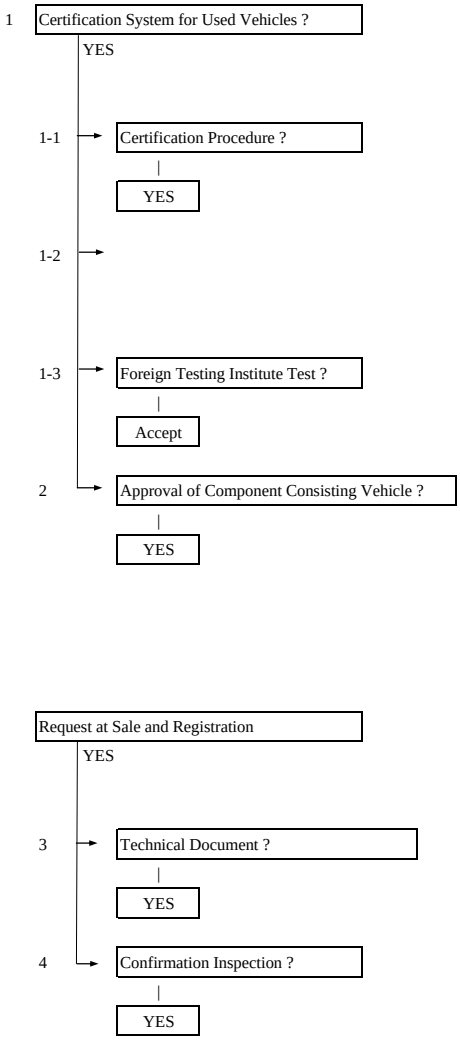
No vehicle production industry

No vehicle production industry

For Newly - Produced Import Motor Vehicles



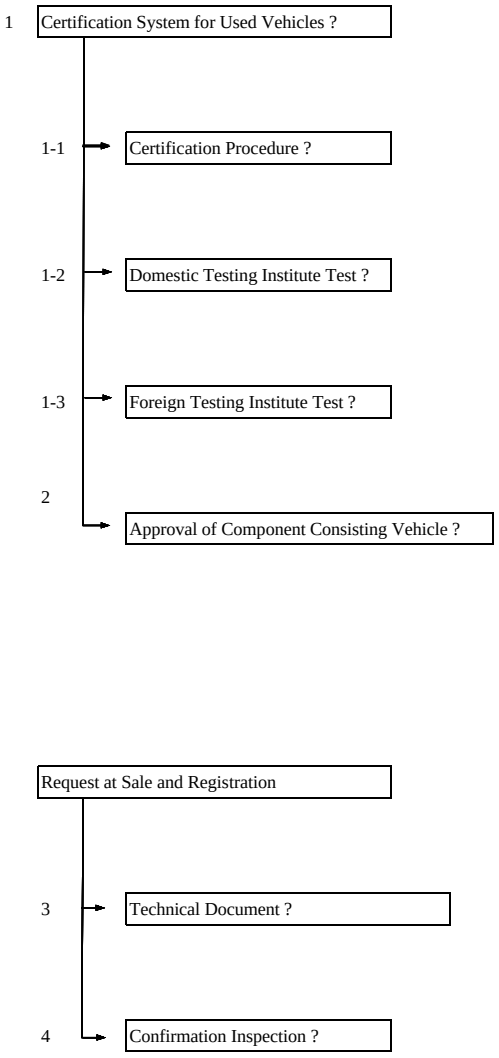
For Used Import Motor Vehicles



Certification System
of APEC Member Economy

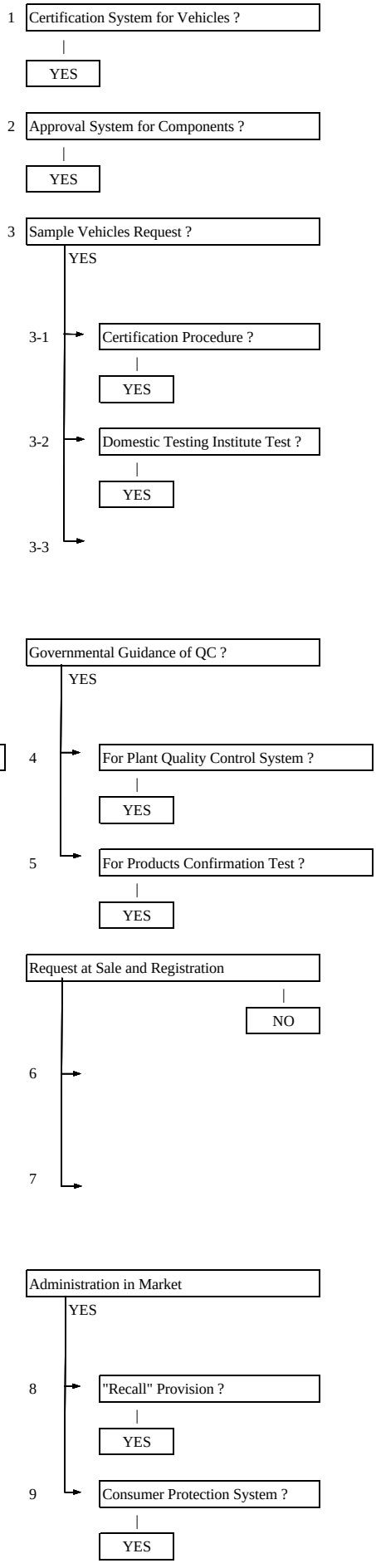
Chines Taipei

For Used Import Motor Vehicles

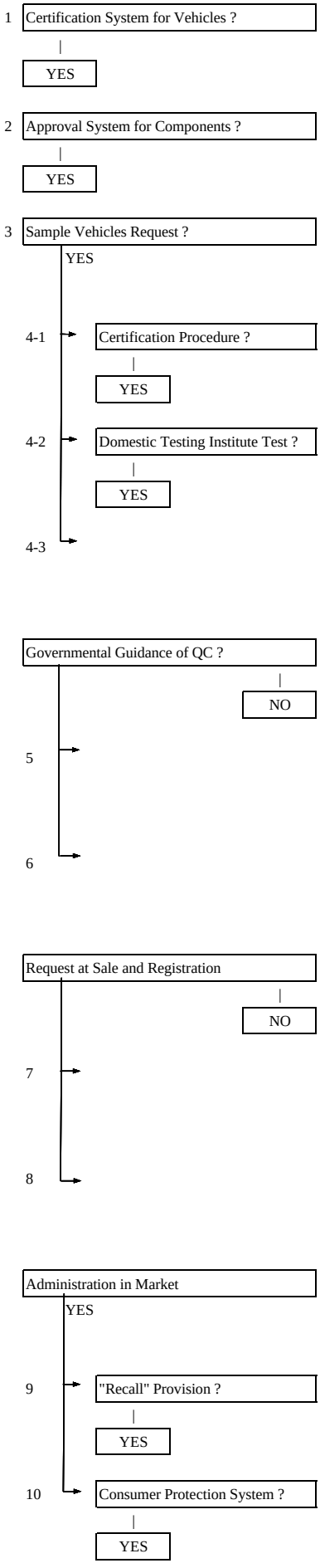


not clear

For Domestically - Produced Motor Vehicles



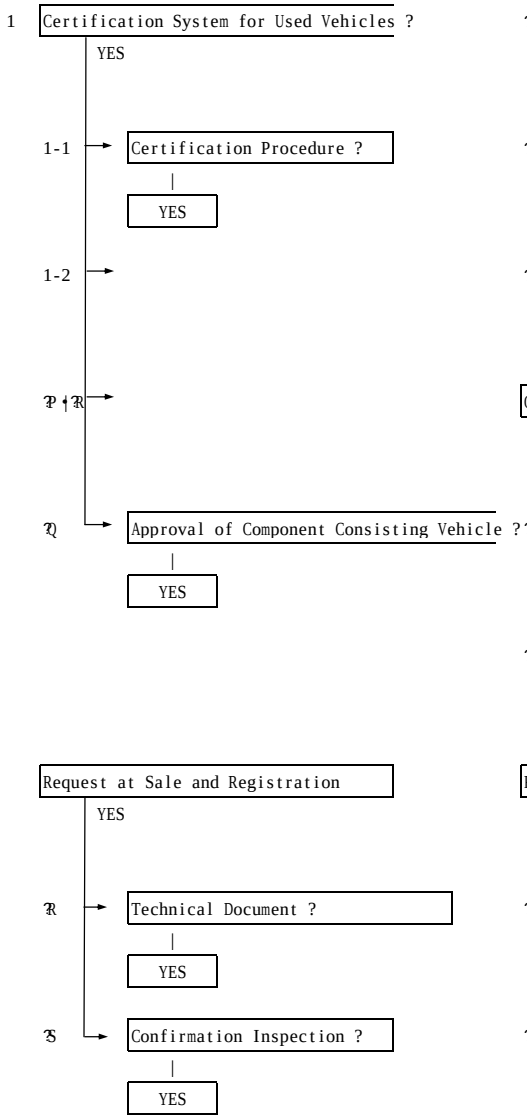
For Newly - Produced Import Motor Vehicles



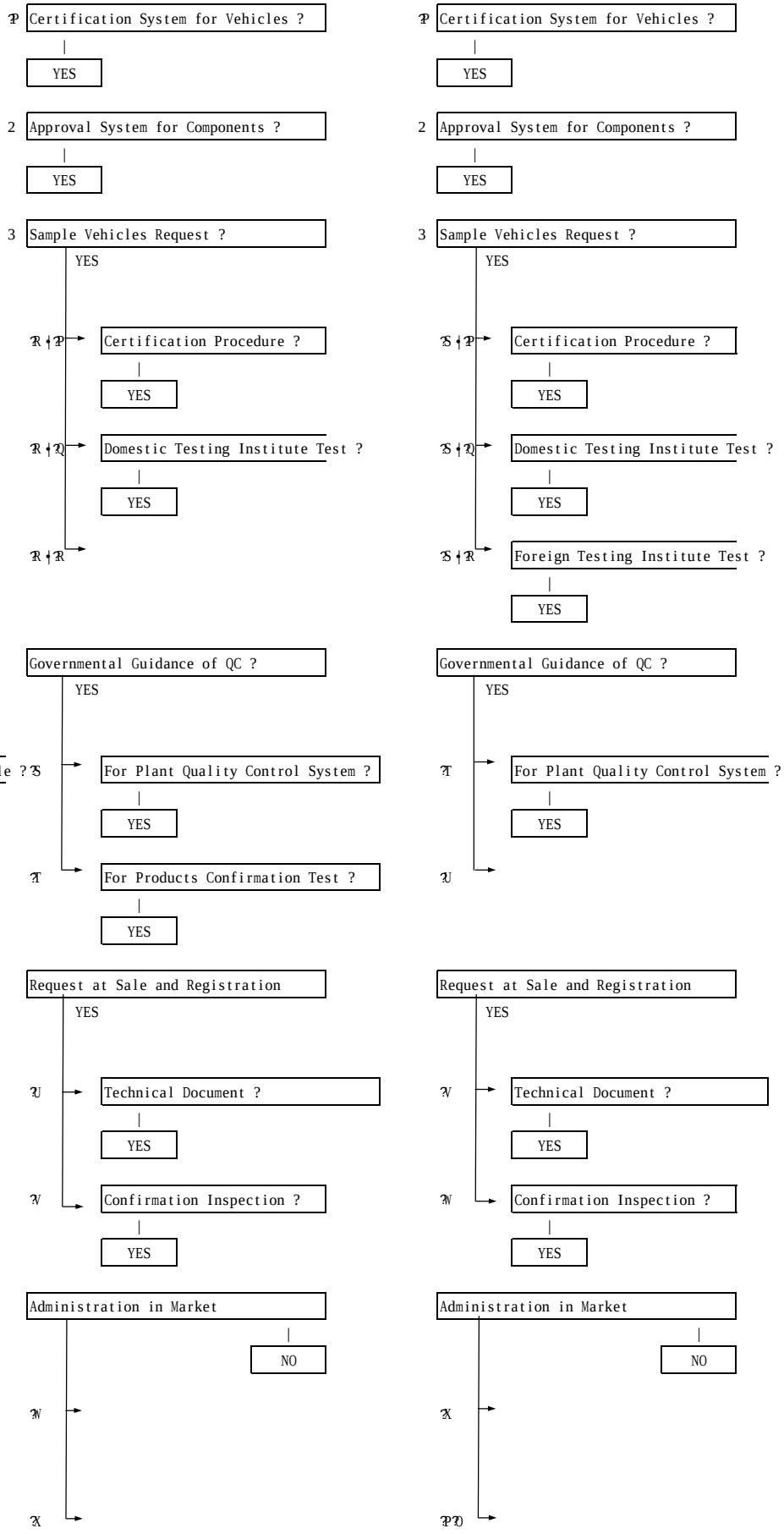
Certification System of APEC Member Economy

Thailand

For Used Import Motor Vehicles



For Domestically - Produced Motor Vehicles



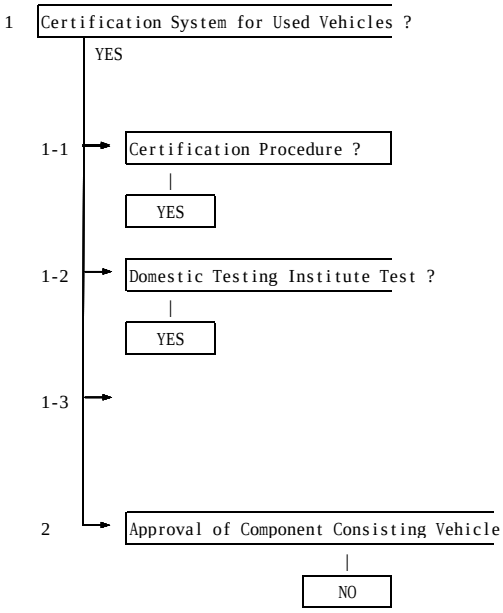
For Newly - Produced Import Motor Vehicles

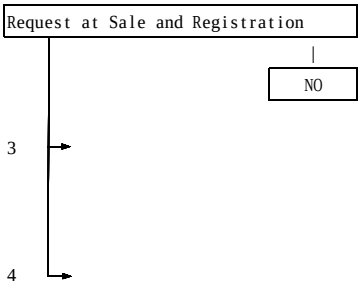
Certification System of APEC Member Economy

U.S.A.

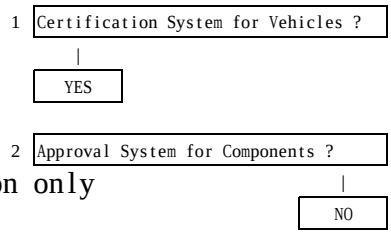
Exhaust emission certification only

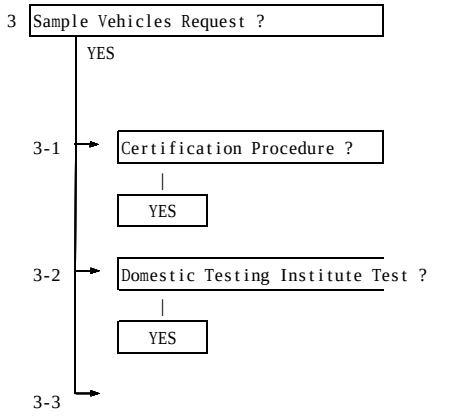
For Used Import Motor Vehicles

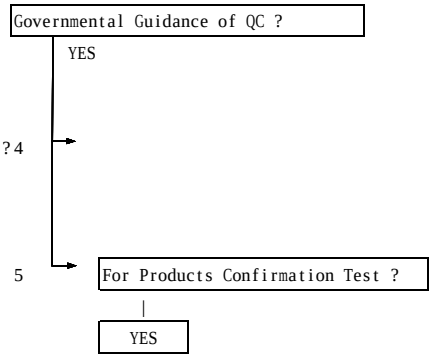


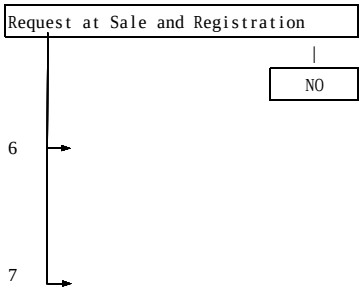


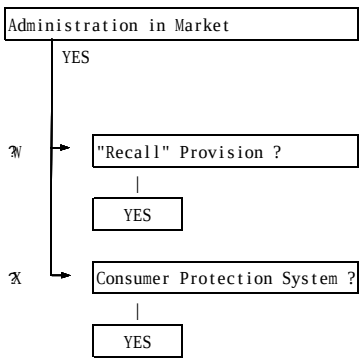
For Domestically - Produced Motor Vehicles



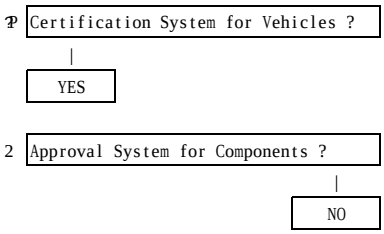


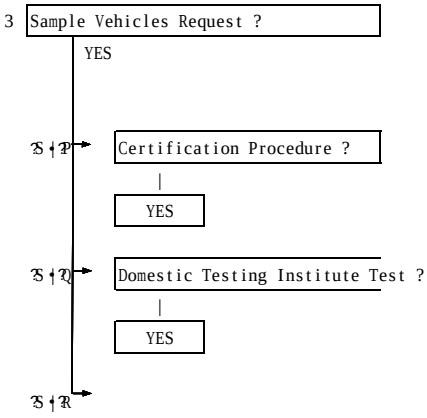


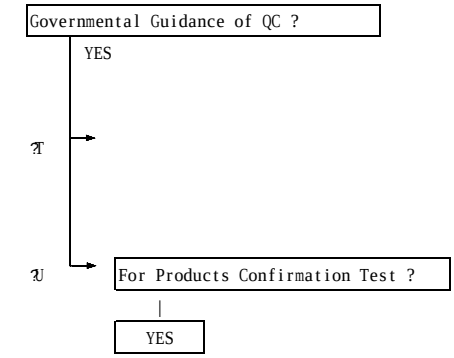


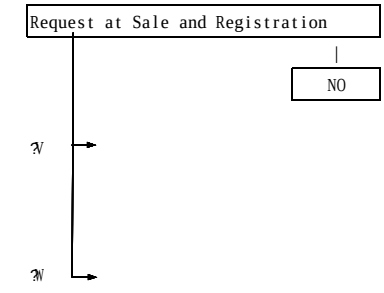


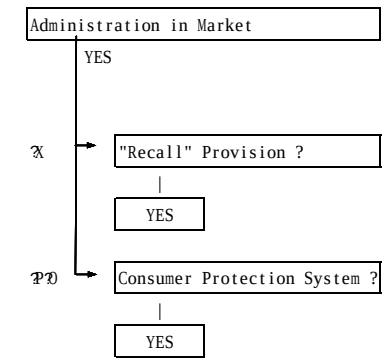
For Newly - Produced Import Motor Vehicles











ATTACHMENT 2 APEC Member Economies' Replying to the Questionnaire
-1 Domestically Produced Motor Vehicles
-2 Newly Produced Import Motor Vehicles
-3 Used Import Motor Vehicles

This attachment presents a summary of explanations attached to written answers received from each APEC member economy in response to the questionnaire issued by JASIC.
Since the material is so large, it has been divided into three categories as indicated above.

Using the search function built into the computer, the relevant page can be displayed by clicking YES or NO as given in the initial configuration.
Excel version 5.0 of the Microsoft Company is used so search can be made with as many computers as possible.

Some of the expressions in the attachment have been changed for greater clarity in understanding. If any of them lead to any misunderstanding, please give notice. Corrections will be made immediately.

1. Case of Domestically produced Motor Vehicles

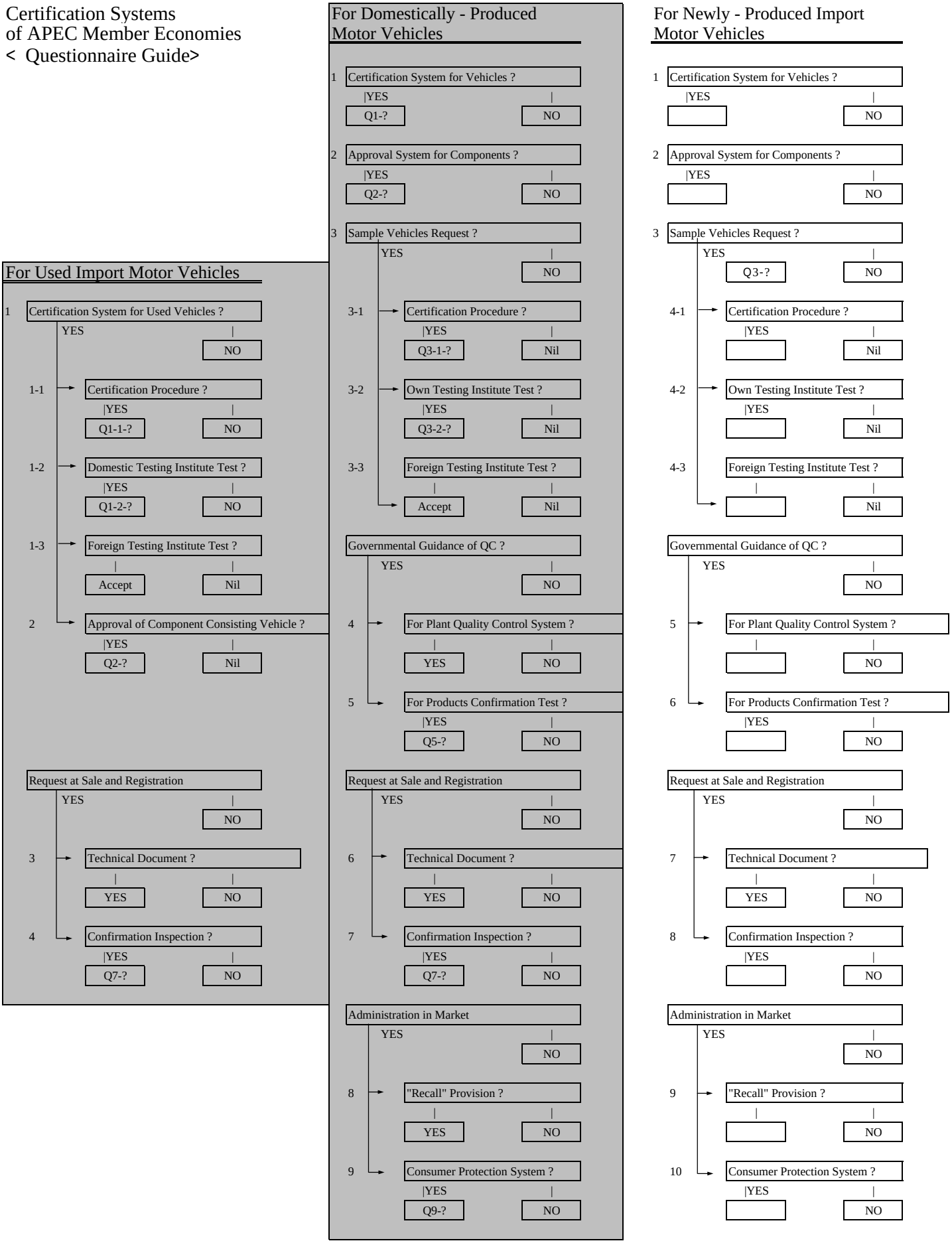
Q8 Are there any laws which make it mandatory for the manufacturers and sales companies to recover and repair the motor vehicles concerned? (When serious defects, such as fuel leakage, malfunctioning brake, failure to comply with exhaust emission standards, are recognized..)

	Q8
Australia	Yes (The Trade Practices Act administered by Department of Industry, Science and Tourism, Consumer Affairs Division.)
Brunei	No (All car dealers must provide at least Class "A" workshop.
Canada	No
Chili	
China	Yes
Hong Kong	Yes
Indonesia	No
Japan	Yes
Korea	Yes
Malaysia	
Mexico	No
New Zealand	Yes (the Fair Trading Act - Ministry of Commerce)
Papua New Guinea	Yes (Motor Car Dealers Act)
Philippines	No
Singapore	Not applicable
Chinese Taipei	Yes (Consumer Protection law.)
Thailand	No
U.S.A.	Yes

Q9 Do governmental authorities have any system that receives complaints from the users?

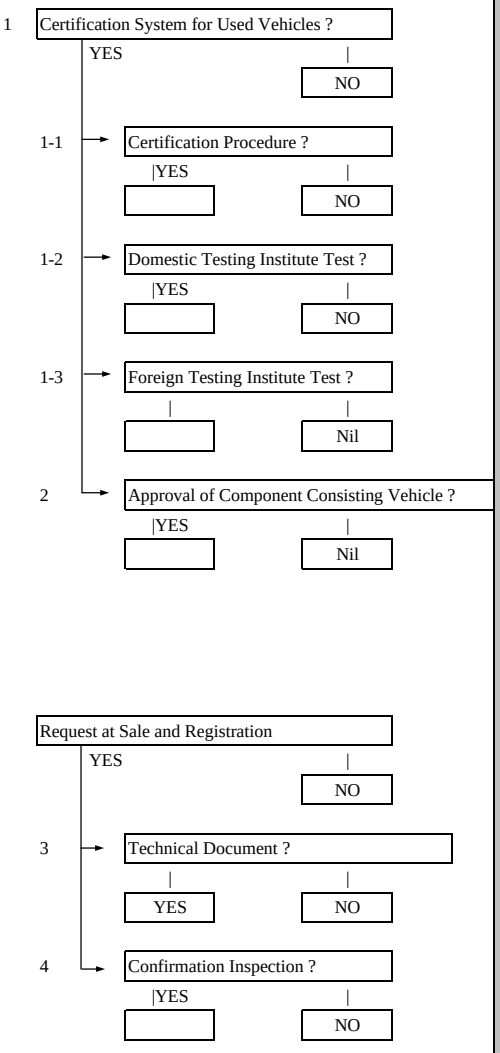
	Q9	Q9-1	Q9-2
		Basic lows	Supervising authority
Australia	Yes (FORS - Safety Investigations and Recalls)	The Trade Practices Act	The Attorney General for performance of duties
Brunei	No (Not available)	———	———
Canada	Yes	Motor Vehicle Safety Act	Federal Department of Transport
Chili			
China	Yes		
Hong Kong	Yes	Road Traffic Ordinance	Transport Department
Indonesia	Yes	Industry and trade Department and private consumer	The authority of YLKI
Japan	Yes	Consumer Protection Act	MOT
Korea	Yes	MVCA	MOCT or Consumer Protection Board (information collection)
Malaysia			
Mexico	No	———	———
New Zealand	No	———	———
Papua New Guinea	Yes	Motor Car Dealers Act	Department of Transport, National Standards Council
Philippines	No	———	———
Singapore	Not applicable	———	———
Chinese Taipei	Yes	Consumer Protection Commission, Executive Yuan	
Thailand	No	———	———
U.S.A.	Yes	Consumer Protection Act	National Highway Traffic Safety Agency (NHTSA), Environmental Protection Agency (EPA)

Certification Systems of APEC Member Economies < Questionnaire Guide>

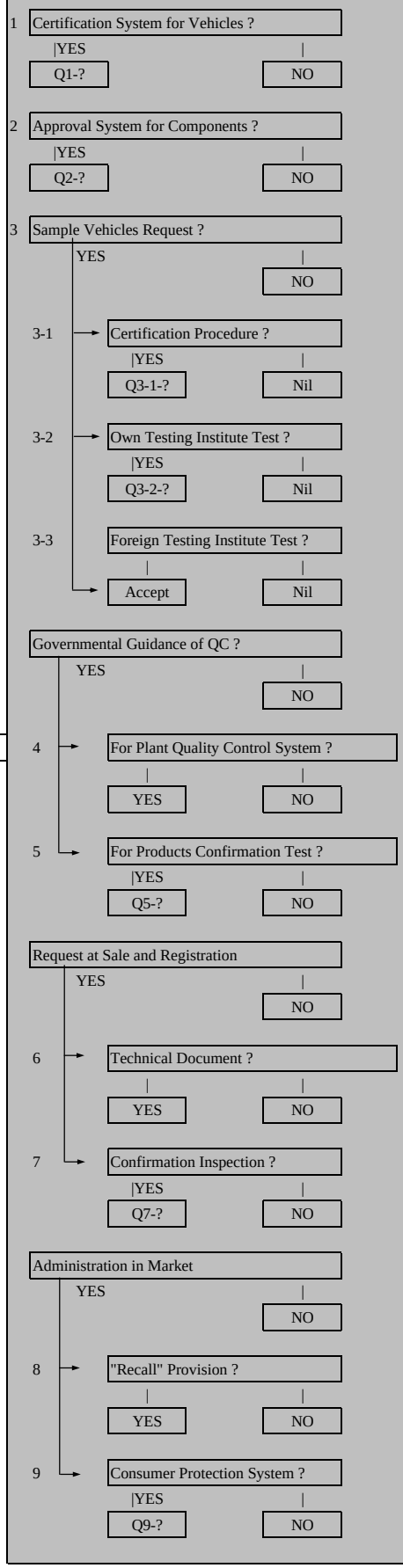


Certification Systems of APEC Member Economies < Questionnaire Guide>

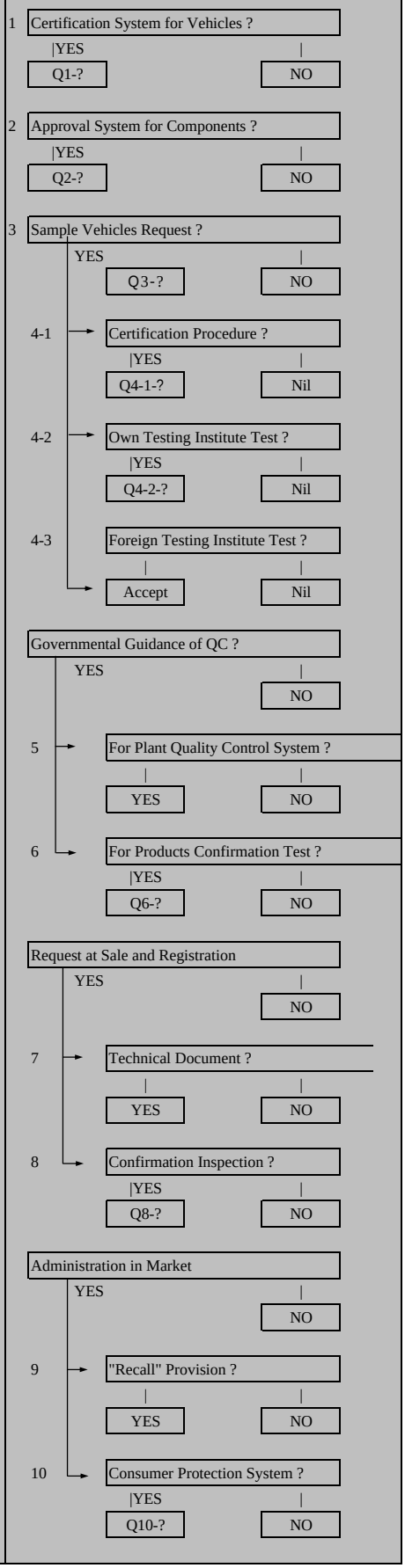
For Used Import Motor Vehicles



For Domestically - Produced Motor Vehicles



For Newly - Produced Import Motor Vehicles



ATTACHMENT 3 Certification Requirements of APEC Member Economies

-1 Application Documents

-2 Testing Items (at Component, System & Vehicle Type Approvals)

-3 Inspection Items (at Vehicle Type Approval or Registration)

This attachment presents a summary of approval-related information attached to written answers from each APEC member economy. It has been compiled to serve as a reference for promoting mutual understanding among each of the APEC member economies.

The information provided is scant and some information obtained at JASIC has been added. Please understand that in many cases, entries were skipped.

1. Application Documents

		Australia	Brunei	Canada	Chili	China	Hong Kong	Indonesia	Japan	Korea	Malaysia	Mexico	New Zealand	Papua New Guinea	Philippines	Singapore	Chinese Taipei	Thailand	U.S.A. (Exh.Em)
1	Application	X	X	-			X	X	X	X						X	X	X	X
2	Vehicle Specification Table	X	X	-			X	X	X	X						X	X	X	X
3	External View Drawings	-	X	-			X	X	X	X						-	-	-	-
4	Compliance Test Reports	X	-	-			-	X	X	X*1						X*4	-	X*3	X
5	Manufacturer's Certificates	X	X*5	-			-	X	-	X*2						-	-	X	-
6	Decralation of Product Assurrance	-	-	-			-	-	X	X						-	-	-	-
7	Photographs	X	X	-			-	-	X	-						X	-	-	-
8	Catalogue	-	X	-			-	-	-	-						X	-	-	-
9	ID Number Stamp Form	-	-	-			-	-	X	-						X	-	-	-
10	Engine/chassis code	-	X	-			-	-	-	-						X	-	-	X
11	Projected Sales	-	-	-			-	-	-	X						-	-	-	X
12	Customs documents	-	X	-			-	-	-	-						X	-	-	-
13	Import/manufacturing Plan	-	-	-			-	-	-	X						-	-	-	-
14	Price list	-	-	-			-	-	-	-						X	-	-	-

Note: *1 for models produced over 1,000 units
*2 for models produced less than 1,000 units
*3 Completion Inspection Tests
*4 Seatbelt, Safety Glazing Material and Emission Compliance Certificates
*5 Safety Glazing Material

2. Testing Items (at Component, System & Vehicle Type Approvals)

			Australia		Brunei	Canada	Chili	China	Hong Kong	Indonesia		Japan		Korea	Malaysia	Mexico	New Zealand	Papua New Guinea	Philippines	Singapore	Chinese Taipei	Thailand	U.S.A.
			Auto-mobile	Motor-cycle						Auto-mobile	Motor-cycle	Auto-mobile	Motor-cycle										
1	Lighting	Installation	X	X					-		-	X	-	X			-			-	-	-	X
2		Headlamp	X	X					-		X	X	X	X			-			-	-	-	X
3		Front fog lamp	X	X					-		-	X	-	X			-			-	-	-	X
4		Reversing lamp	X	X					-		-	X	-	X			-			-	-	-	X
5		Clearance lamp	X	X					-		-	X	-	X			-			-	-	-	X
6		Registration plate lamp	X	X					-		X	X	X	X			-			-	-	-	X
7		Tail lamp	X	X					-		X	X	-	X			-			-	-	-	X
8		Stop lamp	X	X					-		X	X	-	X			-			-	-	-	X
9		Center High mounted Stop Lamp	X	-					-		-	X	-	-			-			-	-	-	X
10		Supplementary stop lamp	X	-					-		-	X	-	X			-			-	-	-	X
11		Turn signal lamp	X	X					-		X	X	-	X			-			-	-	-	X
12		Auxiliary turn signal lamp	X	-					-		-	X	-	X			-			-	-	-	X
13		Rear fog lamp	X	X					-		-	X	-	X			-			-	-	-	X
14	Reflex reflector		X	X					-		-	X	-	X			-			-	-	-	X
15	Driver's visibility		X	-					-		-	X	-	X			-			-	-	-	X
16	Safety Glazing material		X	-					-	-	-	X	-	-			-			-	-	-	X
17	Glare Reduction in Field of View		X	-					-	-	-	-	-	-			-			-	-	-	X
18	Environment	Wiper	X	-					-		-	X	-	X			-			-	-	-	X
19		Washer	X	-					-		-	X	-	X			-			-	-	-	X
20		Defrosting	X	-					-		-	X	-	X			-			-	-	-	X
21		Defogger	-	-					-		-	X	-	X			-			-	-	-	-
22	Service brake system efficiency		X	X					-		-	X	X	X			-			-	-	-	X
23	Parking brake system efficiency		X	-					-		-	X	X	X			-			-	-	-	X
24	Stopping distance		X	X					-		-	X	X	X			-			-	-	-	-
25	Brake fluid leakage warning devices		X	-					-		-	X	-	X			-			-	-	-	X
26	Hydraulic Brake House		X	-					-		-	-	-	-			-			-	-	-	-
27	Compressed air capacity		-	-					-		-	X	-	X			-			-	-	-	-
28	Air brake system efficiency		X	-					-		-	X	-	X			-			-	-	-	X
29	Delay in applying air brake		-	-					-		-	X	-	X			-			-	-	-	-
30	Trailer Brake System		X	-					-		-	-	-	-			-			-	-	-	-
31	Towing devices		X	-					-		-	-	-	X			-			-	-	-	-
32	Engine Power		-	-					-		-	X	X	X			-			-	-	-	-

		Australia		Brunei	Canada	Chili	China	Hong Kong	Indonesia		Japan		Korea	Malaysia	Mexico	New Zealand	Papua New Guinea	Philippines	Singapore	Chinese Taipei	Thailand	U.S.A.
		Auto-mobile	Motor-cycle						Auto-mobile	Motor-cycle	Auto-mobile	Motor-cycle										
33	Electromagnetic compatibility	-	-					-		-	-	-	X			-			-	-	-	-
34	Exhaust Emission Control	X	X					-		-	-	-	-			-			-	-	-	-
35	Fuel economy	-	-					-		-	X	X	X			-			-	-	-	-
36	External Noise	X	X					-		-	X	X	-			-			-	-	-	-
37	Accelerator control system	-	-					-		-	X	X	X			-			-	-	-	X
38	Minimum turning radius	-	-					-		-	X	X	X			-			-	-	-	-
39	Maximum stable inclination angle	-	-					-		-	X	X	X			-			-	-	-	-
40	Maximum Road Speed Limiting	X	-					-		-	-	-	-			-			-	-	-	-
41	Speedometer	X	-					-		-	X	-	X			-			-	-	-	-
42	Safety Rims	X	-					-		-	-	-	-			-			-	-	-	-
43	Tyres	X	-					-		-	-	-	-			-			-	-	-	-
44	Tyre & Rim Selection	X	-					-		-	-	-	-			-			-	-	-	-
45	Anti-Theft Lock	X	-					-		-	-	-	-			-			-	-	-	-
46	Occupant crash protection	X	-					-		-	X	-	X			-			-	-	-	X
47	Impact protection from steering control system	X	-					-		-	X	-	X			-			-	-	-	X
48	Fuel leakage in collision	-	-					-		-	X	-	X			-			-	-	-	X
49	Side door strength	X	-					-		-	-	-	X			-			-	-	-	X
50	Roof crush resistance	-	-					-		-	-	-	X			-			-	-	-	X
51	Rear underside guard strength	-	-					-		-	X	-	X			-			-	-	-	-
52	Seat belt anchorage	X	-					-		-	X	-	X			-			-	-	-	X
53	Child seat anchorage	X	-					-		-	X	-	X			-			-	-	-	-
54	Seat Strength, Seat Anchorage	X	-					-		-	X	-	X			-			-	-	-	X
55	Head restraints	X	-					-		-	X	-	X			-			-	-	-	X
56	Door locks and door retention components	X	-					-		-	X	-	X			-			-	-	-	X
57	Flammability of interior materials	-	-					-		-	X	-	X			-			-	-	-	X
58	Windshield mounting	-	-					-		-	-	X	X			-			-	-	-	X
59	Windshield zone intrusion	-	-					-		-	-	X	X			-			-	-	-	X
60	Instrument panel impact	X	-					-		-	X	-	X			-			-	-	-	X
61	Sun visor impact	X	-					-		-	X	-	X			-			-	-	-	X
62	Inside rearview mirror impact	X	-					-		-	X	-	X			-			-	-	-	X
63	Bumper impact	-	-					-		-	-	-	X			-			-	-	-	X
64	Interior compartment door	X	-					-		-	-	-	X			-			-	-	-	X
65	Vehicle marking	X	-					-		-	X	X	X			-			-	-	-	X

3. Inspection Items (at Vehicle Type Approval or Registration)

			Australia		Brunei	Canada	Chili	China	Hong Kong	Indonesia	Japan		Korea	Malaysia	Mexico	New Zealand	Papua New Guinea	Philippines	Singapore	Chinese Taip		Thailand	U.S.A.
			auto-mobile	motor-cycle							auto-mobile	motor-cycle								auto-mobile	motor-cycle		
A	Specification Measurement	1 exterior dimension : length, width, height	●	●	●					●	●	●	●						▲	▲	▲	▲	▲
		2 interior dimension : length, width, height, number of passengers	▲	▲	▲					▲	●	▲	●						▲	▲	▲	●	▲
		3 engine : power, type, displacement, type of fuel, No. of cyl.	▲	▲	▲					▲	●	▲	●						▲	▲	▲	●	▲
		4 weights : gross vehicle, axle, tare	▲	▲	●					●	●	▲	●						▲	▲	▲	●	▲
		5 wheelbase, tread, ground clearance	●	●	●					●	●	▲	●						▲	▲	▲	▲	▲
		6 type of wheels	▲	▲	●					▲	●	▲	▲						▲	▲	▲	▲	▲
B	Body and Frame Inspection to check any malfunction	1 VIN	●	●	●					▲	●	●	●						▲	▲	▲	●	●
		2 engine number	▲	▲	●					▲	●	▲	▲						▲	▲	▲	▲	▲
		3 engine and power train : starting mechanism, oil leakage	●	●	●					▲	●	▲	●						▲	▲	▲	●	▲
		4 steering system : proper handling, fractures, free play, interference with other systems	●	●	●					▲	●	▲	●						▲	▲	▲	●	▲
		5 controls and displays	●	●	▲					●	●	▲	●						▲	▲	▲	▲	▲
		6 exhaust system	●	●	▲					▲	●	▲	●						▲	▲	▲	●	▲
		7 running gear : tire damage, pressure	●	●	●					▲	●	▲	●						▲	▲	▲	▲	▲
		8 brake system : force, fluid level, leakage	●	●	●					●	●	●	●						▲	▲	▲	▲	▲
		9 suspension : fracture, function, spring and shock absorber	●	●	●					▲	●	▲	●						▲	▲	▲	●	▲
		10 fuel system	●	●	▲					▲	●	▲	●						▲	▲	▲	●	▲
		11 electrical system : insulation, air conditioner	●	●	▲					▲	●	▲	●						▲	▲	▲	●	▲
		12 body and frame : loosening	●	●	▲					▲	●	▲	●						▲	▲	▲	●	▲
		13 goods carriage	▲	▲	●					▲	●	▲	▲						▲	▲	▲	▲	▲
		14 theft prevention : latch, locking mechanism	●	●	▲					▲	●	▲	●						▲	▲	▲	▲	▲
		15 entrance : dimensions, head restraint, seat belt, doors	●	●	▲					▲	●	▲	●						▲	▲	▲	●	▲
		16 window : laminated glass, tempered glass, transparency	●	●	●					▲	●	▲	●						▲	▲	▲	●	▲
		17 lamp system : luminous intensity, photometric axis, color, etc.	●	●	●					●	●	▲	●						▲	▲	▲	▲	▲
		18 field of vision : rear view mirror, wiper, washer	●	●	●					●	●	▲	●						▲	▲	▲	●	▲
		19 horn : sound tone, sound intensity	●	●	▲					●	●	●	●						▲	▲	▲	●	▲
		20 instrument : speedometer, odometer	●	●	●					●	●	●	●						▲	▲	▲	●	▲
		21 child restraint anchorages	●	●	▲					▲	▲	▲	▲						▲	▲	▲	▲	▲
C	Equipment Test	1 side slippage	▲	▲	●					▲	●	▲	●						▲	▲	▲	▲	▲
		2 CO, HC, smoke	▲	▲	●					●	●	●	●						▲	▲	●	●	▲
		3 brake : braking forces, efficiency	▲	▲	●					●	●	●	●						▲	▲	▲	●	▲
		4 headlamp : maximum luminous intensity	▲	▲	●					●	●	●	●						▲	▲	▲	▲	▲
		5 speedometer accuracy	▲	▲	●					●	●	●	●						▲	▲	▲	▲	▲
		6 noise level	▲	▲	●					▲	●	●	●						▲	▲	▲	●	▲
		7 liquefied petroleum gas leakage	▲	▲	▲					▲	●	▲	●						▲	▲	▲	▲	▲

DRAFT FINAL

ITEM 96-1

Direction Indicator Lamps

APEC Regulation Analysis Findings
Item No. 96-1: Direction Indicator Lamps

* The U.S., Canada and Korea have regulation for direction indicator lamps that are equivalent to FMVSS 108.

* Australia's regulation is equivalent to those of ECE R.6 (00 or 01 Series) and ECE R.48.

* New Zealand requires ECE/ADR/ Japanese/ FMVSS as alternatives.

* Other member economies provide only a small number of requirements that are often unique.

* A comparison by each requirement item is made as follows:

(1) Light Distribution (c-a-1): Australia, Canada, Korea, U.S. and ECE establish a specific limit value for light distribution. They can be divided into the ECE light distribution type (Australia, ECE) and the FMVSS type (U.S., Canada, Korea). The FMVSS type requires a slightly higher light distribution value (cd) than the ECE type.

(2) Color (c-a-2): Member economies basically require an amber color for the light of direction indicator lamps. But in addition to amber, the U.S., Canada, Hong Kong, Malaysia, New Zealand, Papua New Guinea, Philippines, Chinese Taipei and Thailand permit white in front or red in rear. All member economies approve an amber light for both front and rear direction indicator lamps.

(3) Illuminating surface area (c-a-3): Canada, Hong Kong, Japan, Korea, Malaysia, New Zealand, Singapore and U.S. establish an area standard, although these values slightly vary among the member economies.

(4) Bulb power (c-a-4): Hong Kong, Japan, Malaysia, New Zealand, Singapore and U.S. set forth a requirement, all ranging between 15W and 36W.

(5) Mechanical performance (c-a-5): Only the U.S. and Canada provide requirements concerning resistance against vibration, humidity, dust and corrosion. These requirements of the two member economies are harmonized with FMVSS 108.

(6) Visibility (c-b-1): Judgment criteria differ between the FMVSS type (specification of an

illumination area value within a visible range), ECE type (specification of a light intensity value within a visible range), and Japan type (specification of simply a visible distance).

FMVSS type - Canada, Korea, New Zealand, U.S.
ECE type - Australia, New Zealand, ECE
Japan type - Japan, New Zealand, Papua New Guinea

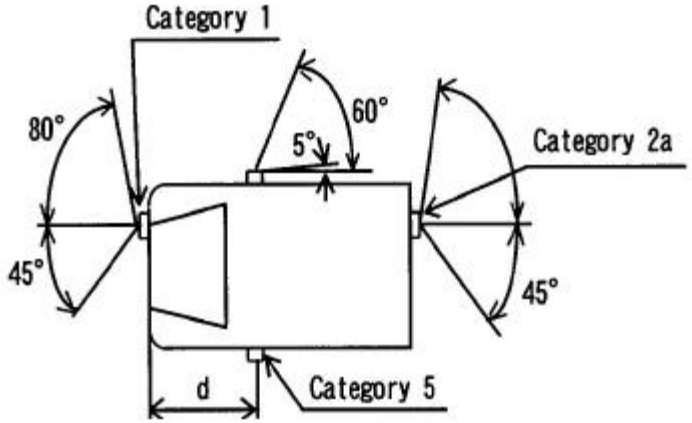
(7) Wiring (c-b-2): The U.S. and Canada provide a wiring requirement for the case where a direction indicator lamp and a stop lamp are combined. ECE and Australia set forth an independent switching requirement, and a synchronous flashing requirement for lateral lamps.

ITEM No. 96-1 Direction indicator lamps

<A: application>→ Passenger Car

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Australia	ECE R6(00 or 01) (F: 175 cd MIN. R: 50 cd MIN.)	Common (Amber)			ECE R6 (General)	ECE R48 (0.3 cd MIN. in the field)*3	ECE R48
Brunei							
Canada	FMVSS 108 (F: 200 cd MIN. R: 80 cd MIN.)	Common (Amber) *1	FMVSS 108 (F:22cm² or more R:50cm² or more)		FMVSS 108 (Vibration, Moisture, Dust and Corrosion)	FMVSS 108 (12.5cm² at 45°out)	FMVSS 108
China							
Hong Kong		Unique (F: Amber or White R: Amber or Red)	Unique (25cm² or more)	Unique (15W to 36W)		Unique (2cm² MIN. in the field)*3	
Indonesia		Unique (Deep yellow)				Unique	
Japan		Common (Amber)	SRRV41 (20cm² or more)*2	SRRV41 (15W or more)*2		SRRV41 (100m in day)*2	

*1: at rear, red is also allowed.
*2: for front and rear lamp
*3: the field is as shown right

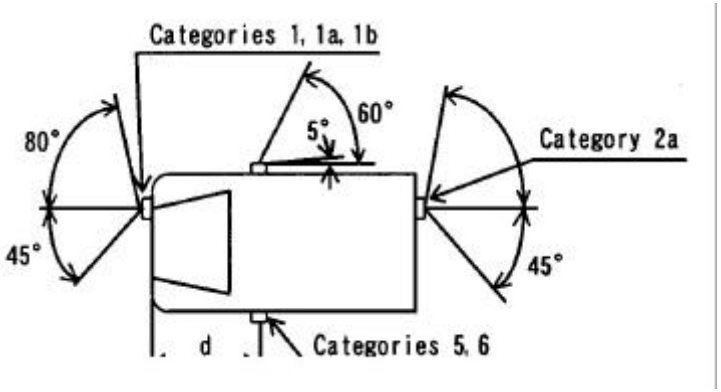


Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Korea	FMVSS 108 (F: 200 cd MIN. R: 80 cd MIN.)	Unique (Yellow or Amber)	Unique (F:22cm² or more R:37.5cm² or more)			FMVSS 108 (12.5cm² at 45°out)	
Malaysia		Unique (F:Amber or White R:Amber or Red)	Unique (22.6cm² or more)	Unique (15W to 36W)			
New Zealand		Unique (F:Amber R:Amber or Red)	Unique (3.5 in^2 or more)	Unique (15W to 36W)		Unique	
Papua New Guinea		Unique (F:Amber or White R:Amber)				Unique (100m in day)	
Philippine		Unique (Yellow, amber or red)					
Singapore		Common (Amber)	Unique (20cm² or more)	Unique (15W to 36W)			
Chinese Taipei		Unique (F:Amber or yellow R:Amber, yellow or red)					
Thailand		Unique (F:Amber or yellow R:Amber or red)					

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
U.S.A.	FMVSS 108 (F: 200 cd MIN. R: 80 cd MIN.)	Common (Amber) *1	FMVSS 108 (F:22cm² or more R:37.5cm² or more)		FMVSS 108 (Vibration, Moisture, Dust and Corrosion)	FMVSS 108 (12.5cm² at 45° out)	FMVSS 108
ECE	ECE R6 (F: 175 cd MIN. R: 50 cd MIN.)	Common (Amber)			ECE R6 (General)	ECE R48 (0.3 cd MIN. in the field)*2	ECE R48

*1: at rear, red is also allowed.

*2: the field is as shown right



ITEM 96-1 Direction indicator lamps

Economy : Australia

Title of Standard : ADR 6/00 and 13/00

A. Application : Moped, Motorcycle, Passenger vehicle, Goods vehicles and Trailers

C-a-1. Photometry :

Category 1: Front direction indicator lamp

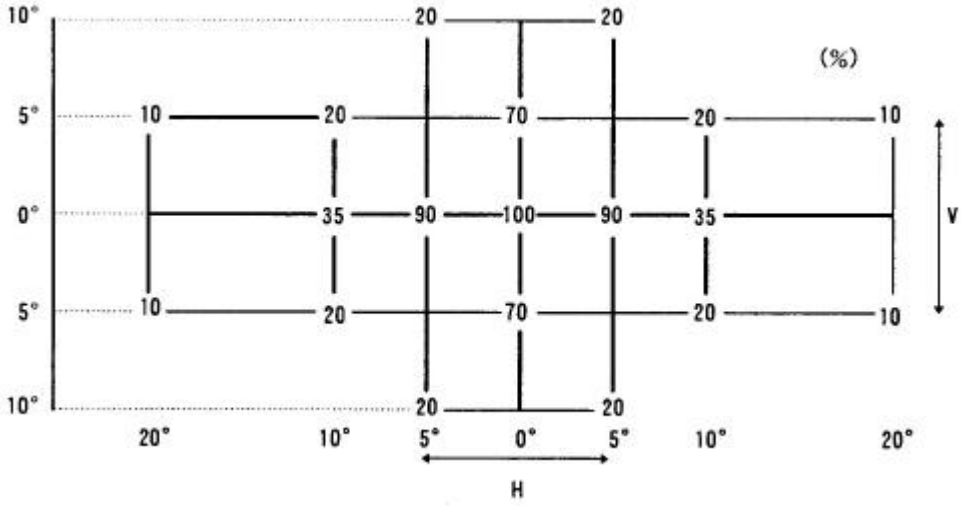
Category 2a: Rear direction indicator lamp (with one level of intensity)

Category 5: Side direction indicator lamp

Direction indicator of category	Minimum intensities (cd) (at H-V point)	Maximum intensities (cd)
1	175	700 (within the Zone defined by ±5°H and ±5°V)
		400 (outside the Zone defined by ±10°H and ±10°V)
2a	50	200
5	0.3	200

< Category 1, 1a, 1b and 2a >

The minimum intensity at each test point is the minimum intensity specified in the above table multiplied by the percentage at each test point shown in the below figure.



< Category 5 >

The minimum values of 0.6 cd is required through out the field defined in C-b-1 “Visibility” below.

In detail, see ADR 6/00

ITEM 96-1 Direction indicator lamps

C-a-2. Color : Amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

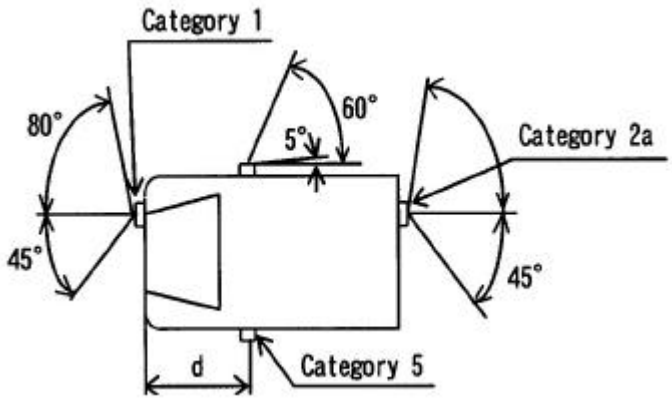
C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-a-6. Others : Flashing rate shall be 90±30 times/min.

C-b-1. Visibility :

Horizontal angles, see figure below.



Vertical angles: 15°above and below the horizontal.

Through the fields defined above, the intensity shall be not less than 0.3 cd.

C-b-2. Electrical Connection :

Direction indicator lamps shall switch on independently of the other lamps. All direction indicator lamps on one side of a vehicle shall be switched on and off by means of one control and shall flash in phase.

ITEM 96-1 Direction indicator lamps

Economy : Canada

Title of Standard : CMVSS No. 108
SAE J588 NOV84, SAE J1395 APR85

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

TABLE1-HOTOMETRIC REQUIREMENTS
(for motor vehicles less than 2032 mm in overall width)

Zone	Test Points (deg)	Minimum Luminous Intensity (cd)								
		Front			Rear					
		Yellow			Red			Yellow		
Lighted Sections		1	2	3	1	2	3	1	2	3
1	10U-5L 5U-20L 5D-20L 10D-5L	130	155	180	50	60	70	80	100	120
2	5U-10L H-10L 5D-10L	250	295	340	100	115	135	165	185	220
3	5U-V H-5L H-V H-5R 5D-V	950	1130	1295	380	445	520	610	710	825
4	5U-10R H-10R 5D-10R	250	295	340	100	115	135	165	185	220
5	10U-5R 5U-20R 5D-20R 10D-5R	130	155	180	50	60	70	80	100	120
Maximum Luminous Intensity (cd)										
Red Lamps Only					300	360	420	750	900	900

In detail, see SAE J588 NOV84

ITEM 96-1 Direction indicator lamps

TABLE2-OTOMETRIC REQUIREMENTS

(for motor vehicles 2032 mm or more in overall width)

Zone	Test Results (deg)	Minimum Luminous Intensity Total for Zone (cd)		
		Front	Rear	
		Yellow	Red	Yellow
1	10U-5L 5U-20L 5D-20L 10D-5L	130	50	84
2	5U-10L H-10L 5D-10L	250	100	165
3	5U-V H-5L H-V H-5R 5D-V	950	380	590
4	5U-10R H-10R 5D-10R	250	100	165
5	10U-5R 5U-20R 5D-20R 10D-5R	130	50	84
Maximum Luminous Intensity (cd)			300	750

In detail, see SAE J1395 APR85

C-a-2. Color :

<Front> Amber

<Rear > Amber or Red

C-a-3. Luminous Area :

<Front>Functional lighted lens area shall be at least 22cm² for motor vehicles less than 2032mm in overall width, and at least 75cm² for motor vehicles 2032mm or more in overall width.

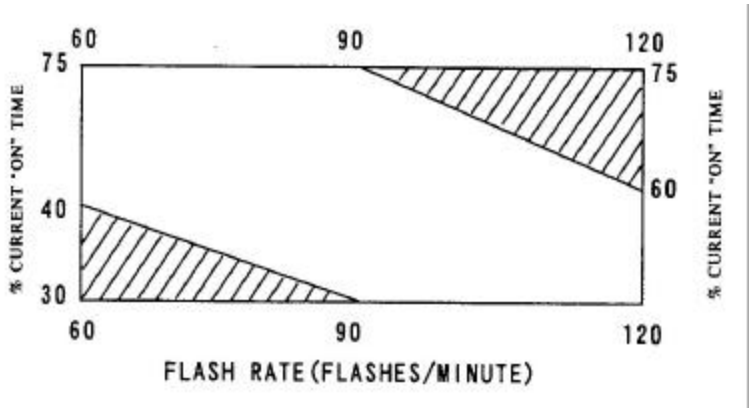
<Rear>Functional lighted lens area shall be at least 50cm² for motor vehicles less than 2032mm in overall width, and at least 75cm² for motor vehicles 2032mm or more in overall width.

ITEM 96-1 Direction indicator lamps

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-a-6. Others : Flash rate and percent current “on” time shall be within the unshaded portion, as shown below.



C-b-1. Visibility :

Signals from the left side lamp shall be visible through a horizontal angle of 45 deg to the left, and signals from the right side lamp shall be visible through a horizontal angle of 45 deg to the right. To be considered visible, the lamp shall have the outer lens surface of at least 12.5cm² measured at 45 deg.

C-b-2. Electrical Connection :

When a stop lamp is optically combined with a direction indicator lamp, the circuit shall be such that the stop lamp can not be turned on if the direction indicator lamp is flashing.

ITEM 96-1 Direction indicator lamps

Economy : Hong Kong

Title of Standard : Road Traffic Regulation No. 114

A. Application : N/A.

C-a-1. Photometry : N/A.

C-a-2. Color :

<Front> Amber or White

<Rear> Amber or Red

<Both front and rear> Amber

C-a-3. Luminous Area :

Every direction indicator other than a flank (side) indicator shall have an illuminated area of; 25 cm^2 or more for either a motor vehicle of which the gross vehicle weight does not exceed 5.5 tones or a passenger vehicle which carry not more than 16 passengers, and 80 cm^2 or more for any other vehicles.

C-a-4. Bulb Wattage : Not less than 15W nor more than 36W

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be not less than 60 nor more than 120 times/min.

C-b-1. Visibility :

Vertical : 15°above and below the horizontal.

Throughout the fields defined above, an illuminated area of at least 2 cm^2 shall be visible.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Indonesia

Title of Standard : Government Regulation No. 44/1993

A. Application : Motorcycle passenger cars, buses, cargo vans and special vehicles

C-a-1. Photometry : N/A.

C-a-2. Color : Deep yellow

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

The lamp shall be visible during the day and in the evening by other road users.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Japan

Title of Standard : Safety Regulation of Road Vehicles, Article 41
Motor Vehicle Inspection Procedures, 4-31
Type Approval Testing Standards, 2-17

A. Application : Vehicles

C-a-1. Photometry : N/A.

C-a-2. Color : Amber

C-a-3. Luminous Area :

<Front>Illuminating surface shall have an area of 40 cm² or more for motor vehicles with a width of 6 m or more, and 20 cm² or more for motor vehicles with a width of less than 6 m.
<Rear>do.
<Side>Illuminating surface shall have an area of 20 cm² or more for motor vehicles with a width of 6 m or more, and 10 cm² or more for motor vehicles with a width of less than 6 m.

C-a-4. Bulb Wattage :

<Front>5 W or more
<Rear> 15 W or more
<Side> 3 W or more

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be between 60 and 120 times/min.

C-b-1. Visibility :

<Front> Visibility distance in day time shall be 100 m.
<Rear> do.
<Side> Visibility distance in day time shall be 30 m.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Korea

Title of Standard : The regulation of the motor vehicle safety standards (KMVSS),
Article 44, 79 and 106

A. Application : Motor vehicles and two-wheeled motorcycles

C-a-1. Photometry :

<motor vehicle>

The luminous intensity per one lamp of direction indicator shall be not less than 50 cd but not more than 1500 cd. The luminous intensity per one lamp of auxiliary direction indicator shall be not less than 0.3 cd but not more than 300 cd.

* Type approval test standards for motor vehicles

1. Direction indicator lamp

(1) Maximum intensity (cd)

One-lamp Type	Two-lamp Type	Three-lamp Type
750	900	1,050

ITEM 96-1 Direction indicator lamps

(2) Minimum intensity (cd)

on the rear

Test Point (deg)	One-lamp Type	Two-lamp Type	Three-lamp Type
20L-5U 5L-10U 5L-10D 20L-5D	80	100	120
10L-5U 10L-H 10L-5D	165	185	220
H-5L H-V H-5R V-5U V-5D	610	710	825
10R-5U 10R-H 10R-5D	165	185	220
20R-5U 5R-10U 5R-10D 20R-5D	80	100	120

ITEM 96-1 Direction indicator lamps

on the front

Test Point (deg)	One-lamp Type	Two-lamp Type	Three-lamp Type
20L-5U 5L-10U 5L-10D 20L-5D	130	155	180
10L-5U 10L-H 10L-5D	250	295	340
H-5L H-V H-5R V-5U V-5D	950	1,130	1,295
10R-5U 10R-H 10R-5D	250	295	340
20R-5U 5R-10U 5R-10D 20R-5D	130	155	180

2. Side Auxiliary Direction indicator lamp

(1) Maximum intensity : 300 cd Max.

(2) Minimum intensity (cd):

Test Point (deg)	Motor Vehicle Length	
	6 meters or more	less than 6 meters
10U~10D V~45R (on the right)	3.0	1.0
15U~15D 45R~45L (on the left)	0.7	0.3

<Two-wheeled motorcycle>

The luminous intensity per one lamp of direction indicator shall be not less than 30 cd but not more than 750 cd.

ITEM 96-1 Direction indicator lamps

C-a-2. Color : Yellow or Amber

C-a-3. Luminous Area : (only applicable to motor vehicle)

<Front> Effective projected luminous area shall be not less than 22.0 cm^2

<Rear> Effective projected luminous area shall be not less than 37.5 cm^2

C-a-4. Bulb Wattage : N/A

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be not less than 60 but not more than 120 times/min.

C-b-1. Visibility : (only applicable to motor vehicle)

The illumination area shall be not less than 12.5 cm^2 when measured at 45°outward on the horizontal.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Malaysia

Title of Standard : Motor Vehicles (Construction and Use) Rules, 1959

A. Application : Motor vehicle and trailer

C-a-1. Photometry : N/A.

C-a-2. Color :

<Front> Amber or White

<Rear> Amber or Red

<Both front and rear> Amber or Red

C-a-3. Luminous Area : (for front and rear)

·not less than 3.5 in.² (22.6 cm²) in extent in the case of a motor vehicle the unladen weight of which does not exceed two tons, or of a motor vehicle constructed or adapted solely for the carriage, of not more than seven passengers, exclusive of the driver, and their effects: provided in either case that the vehicle is not being used, expect in a case of emergency, to draw a trailer other than one with less than four wheels or a four-wheeled trailer having two close-coupled wheels on each side;

·not less than 12 in.² (77.4 cm²) in extent in any other case.

C-a-4. Bulb Wattage : Not less than 15 watts and not more than 36 watts

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be not less than 60 nor more than 120 times / min.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : New Zealand

Title of Standard : Transport Regulations 1990, No. 20
Traffic Regulations 1976, No. 63

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color :

<Front> White or amber
<Rear> Red or Amber
<Side> Red or Amber

C-a-3. Luminous Area : 3.5 in^2

C-a-4. Bulb Wattage : not less than 15 not more than 36

C-a-5. Mechanical : N/A.

C-a-6. Others :

Flashing rate not less than 60 and not more than 120 times/min.
Failure warning indicator required.

C-b-1. Visibility :

Visibility distance shall be 100 m in day time and 200 m in night time, and the visibility angle shall be;

<Front> Horizontal : through 45°inboard to 80°outboard
Vertical : 15°above and below
<Rear> do.
<Side> Horizontal : through 30°ear-ward to 80°rear-ward
Vertical : 60°above and below

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulation, No. 102

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color :

<Front> White or amber

<Rear> Amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be not less than 60 and not more than 120 times/min.

C-b-1. Visibility : Visibility distance in day time shall be 100 m.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Philippine

Title of Standard : Motor Vehicle Inspection System (A0-91-005), Section 8

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color :

<Front> Yellow, amber or red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be not less than 60 or not more than 120 times/min.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Singapore

Title of Standard :

Road Traffic (Motor Vehicles, Construction and Use) Rules, No. 25, 26, 27, 28 and 29.

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : Amber

C-a-3. Luminous Area :

·20 cm^2 Min. for a vehicle adapted to carry not more than 6 persons.

·50 cm^2 Min. for other vehicles

·Not with standing the above, 60 cm^2 Min. for a rear direction indicator lamp of a public service vehicle and goods vehicle.

C-a-4. Bulb Wattage :

·Not less than 25W or not more than 36W for a public service vehicle and a goods vehicles

·Not less than 15W or not more than 36W for other vehicles

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be not less than 60 or not more than 120 times/min.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Chinese Taipei

Title of Standard : Road Traffic Safety Standard, Article 39 Section 12 Annex 7

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color :

<Front> Amber or yellow

<Rear> Amber, yellow or red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-a-6. Others : Flashing rate shall be not less than 60 or not more than 120 times/min.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : Thailand

Title of Standard : Ministerial Regulations No.22 (B.E.2537) issued under the provision of the motor vehicles Act, B.E. 2522 (A.D.1979) No.2(1)(d)

A. Application : Motor vehicle and Trailer

C-a-1. Photometry : N/A.

C-a-2. Color :

<Front> Amber or yellow
<Rear> Amber or red
<Side> Amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

ITEM 96-1 Direction indicator lamps

Economy : U.S.A.

Title of Standard : FMVSS No. 108
SAE J588 NOV84, SAE J1395 APR85

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

TABLE1-PHOTOMETRIC REQUIREMENTS
(for motor vehicles less than 2032 mm in overall width)

Zone	Test Points (deg)	Minimum Luminous Intensity (cd)								
		Front			Rear					
		Yellow			Red			Yellow		
Lighted Sections		1	2	3	1	2	3	1	2	3
1	10U-5L 5U-20L 5D-20L 10D-5L	130	155	180	50	60	70	80	100	120
2	5U-10L H-10L 5D-10L	250	295	340	100	115	135	165	185	220
3	5U-V H-5L H-V H-5R 5D-V	950	1130	1295	380	445	520	610	710	825
4	5U-10R H-10R 5D-10R	250	295	340	100	115	135	165	185	220
5	10U-5R 5U-20R 5D-20R 10D-5R	130	155	180	50	60	70	80	100	120
Maximum Luminous Intensity (cd)										
Rear Lamps Only					300	360	420	750	900	900

In detail, see SAE J588 NOV84

ITEM 96-1 Direction indicator lamps

TABLE2-PHOTOMETRIC REQUIREMENTS

(for motor vehicles 2032 mm or more in overall width)

Zone	Test Results (deg)	Minimum Luminous Intensity Total for Zone (cd)		
		Front	Rear	
		Yellow	Red	Yellow
1	10U-5L 5U-20L 5D-20L 10D-5L	130	50	84
2	5U-10L H-10L 5D-10L	250	100	165
3	5U-V H-5L H-V H-5R 5D-V	950	380	590
4	5U-10R H-10R 5D-10R	250	100	165
5	10U-5R 5U-20R 5D-20R 10D-5R	130	50	84
Maximum Luminous Intensity (cd)			300	750

In de tail, see SAE J1395 APR85

C-a-2. Color :

<Front> Amber

<Rear > Amber or Red

C-a-3. Luminous Area :

<Front>Functional lighted lens area shall be at least 22cm² for motor vehicles less than 2032mm in overall width, and at least 75cm² for motor vehicles 2032mm or more in overall width.

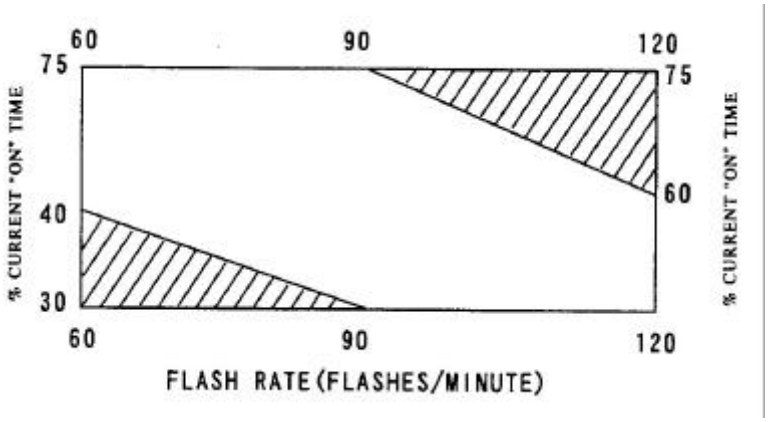
<Rear>Functional lighted lens area shall be at least 50cm² for motor vehicles less than 2032mm in overall width, and at least 75cm² for motor vehicles 2032mm or more in

overall width.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-a-6. Others : Flash rate and percent current “on” time shall be within the unshaded portion, as shown below.



C-b-1. Visibility :

Signals from the left side lamp shall be visible through a horizontal angle of 45 deg to the left, and signals from the right side lamp shall be visible through a horizontal angle of 45 deg to the right. To be considered visible, the lamp shall have the outer lens surface of at least 12.5cm² measured at 45 deg.

C-b-2. Electrical Connection :

When a stop lamp is optically combined with a direction indicator lamp, the circuit shall be such that the stop lamp can not be turned on if the direction indicator lamp is flashing.

ITEM 96-1 Direction indicator lamps

Economy : ECE

Title of Standard : ECE Regulation No.6, 01 series, and No. 48, 01 series

A. Application : N/A.

C-a-1. Photometry :

Category 1: Front direction indicator lamp for use at a distance not less than 40mm from the headlamp

Category 1a: Front direction indicator lamp for use at a distance greater than 20mm but less than 40mm from the headlamp

Category 1b: Front direction indicator lamp for use at a distance less than 20mm from the headlamp

Category 2a: Rear direction indicator lamp (with one level of intensity)

Category 5: Supplementary side direction indicator lamp for all M1 vehicle, and for N1, M2 and M3 vehicles not exceeding 6 m in length.

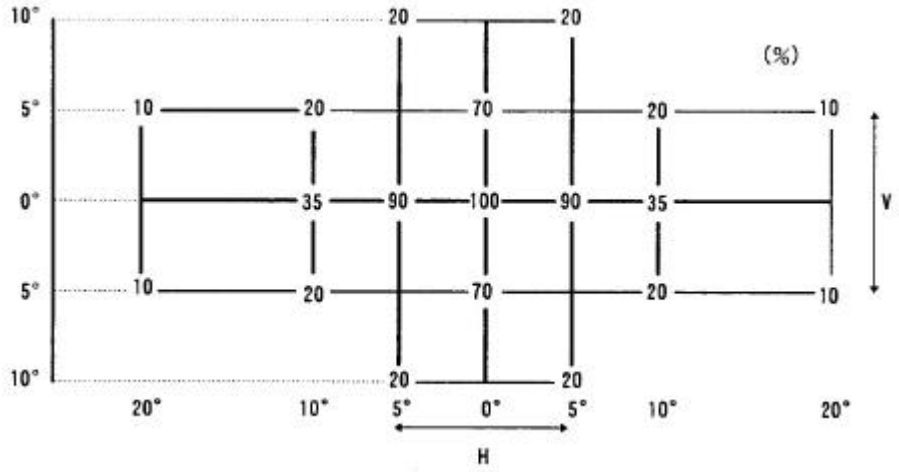
Category 6: Supplementary side direction indicator lamp for all N2 and N3 vehicles, and for N1, M2 and M3 vehicles exceeding 6m in length.

Direction indicator of category	Minimum intensities (cd) (at H-V point)	Maximum intensities (cd)
1	175	700 (within the Zone defined by ±5°H and ±5°V)
		400 (outside the Zone defined by ±10°H and ±10°V)
1a	250	800 (within the Zone defined by ±5°H and ±5°V)
		250 (outside the Zone defined by ±10°H and ±10°V)
1b	400	860 (within the Zone defined by ±5°H and ±5°V)
		400 (outside the Zone defined by ±10°H and ±10°V)
2a	50	350
5	0.6	200
6	50	200

ITEM 96-1 Direction indicator lamps

< Category 1, 1a, 1b and 2a >

The minimum intensity at each test point is the minimum intensity specified in the above table multiplied by the percentage at each test point shown in the below figure.

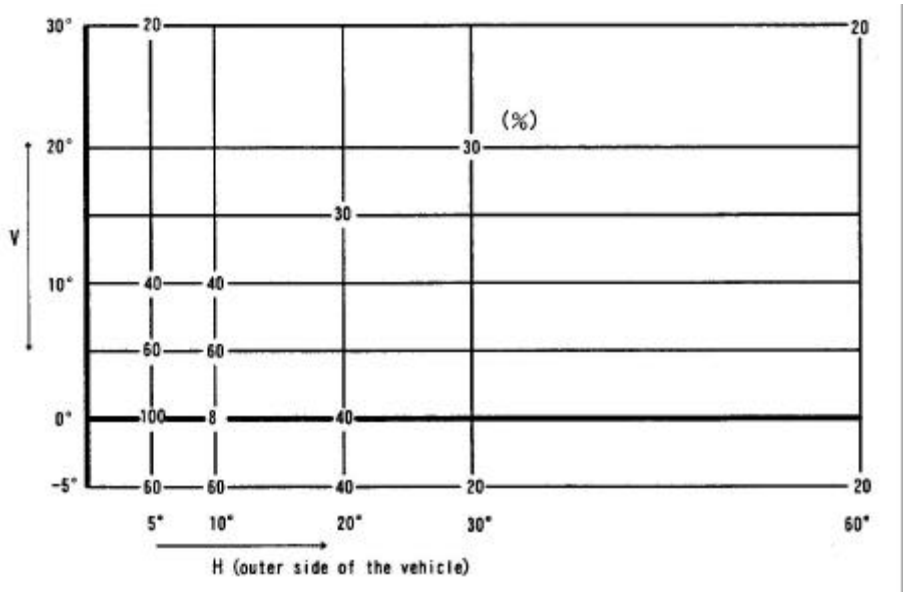


< Category 5 >

The minimum values of 0.6 cd is required through out the field defined in C-b-1 “Visibility” below.

< Category 6 >

The minimum intensity at each test point is the minimum intensity specified in the above table multiplied by the percentage at each test point shown in the below figure.



In detail, see ECE Reg. No. 6

C-a-2. Color : Amber

C-a-3. Luminous Area : N/A.

ITEM 96-1 Direction indicator lamps

C-a-4. Bulb Wattage : N/A.

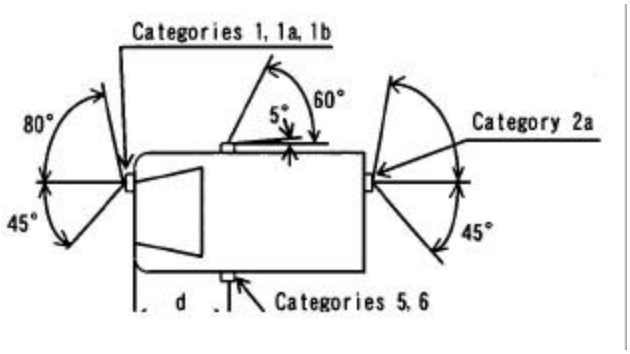
C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-a-6. Others : Flashing rate shall be 90±30 times/min.

C-b-1. Visibility :

Horizontal angles, see figure below.



Vertical angles: 15°above and below the horizontal for categories 1,1a,1b,2a,2b and 5.
30°above and 5°below the horizontal for categories 6.

Through the fields defined above, the intensity shall be not less than the following values;

Category 1: 0.3 (cd)
Category 1a: 0.3
Category 1b: 0.7
Category 2a: 0.3
Category 5: 0.6

C-b-2. Electrical Connection :

Direction indicator lamps shall switch on independently of the other lamps. All direction indicator lamps on one side of a vehicle shall be switched on and off by means of one control and shall flash in phase.

ITEM 96-2

Safety glazing

APEC Regulation Analysis Findings
Item No. 96-2: Safety Glazing

1. Safety glazing regulations of Japan and People's Republic of China are similar to ECE R43.

2. In addition to its own standards, Australia and New Zealand accepts the U.S., Japanese, New Zealand and ECE regulations as alternatives.

3. A comparison of specific requirements for safety glazing is as follows:

(1) Construction requirements - Regarding glazing types (B), Japan, U.S. and Canada allow laminated glass, toughened glass, glass-plastic and plastic. ECE does not allow plastic. In other member economies, only laminated glass and toughened glass are designated as safety glass or safety glazing.

(2) As for safety glazing used as windscreens (C-a), Japan, U.S., Canada and ECE allow laminated glass and glass- plastic. Australia, New Zealand and Korea permit only laminated glass. Other member economies are believed to allow the use of laminated glass and zone-toughened glass for windscreens.

(3) Concerning visible light transmission related to the field of vision, ECE and Australia require a value of 75% or more. Japan, U.S. Canada, New Zealand and People's Republic of China require 70% or more.

(4) With regards to safety glazing tests (C-b), Japan, ECE and People's Republic of China provide nearly identical test methods. On the other hand, the U.S. and Canada require a shot back test to evaluate the impact resistance of toughened glass, and also apply a dart test in the place of a head-form test. Further, the U.S. and Canada do not apply a color identification test to laminated glass.

(5) As for marking (D), Japan, Australia and New Zealand accept FMVSS 205 and ECE R43 (JIS R3211 accepted by Australia) as equivalent regulations, thus allowing the "AS", "E" and "JIS" marks. People's Republic of China will require "CCIB" mark.

Item 96-2 Safety glazing

A Application : Passenger Vehicles

Member Economies	B Structure requirement	C-a Performance requirement	C-b Test method	D Marking	E Reference standards
Australia	com.(Safety glass)	ADR8 1) Laminated glass 2)≥ 75%	ADR8, ANSI Z26 ECER43, SRRV29	ADR8, FMVSS205, ECER43, SRRV29, NZ5443	ADR8, FMVSS205, ECER43, SRRV29
Brunei	com.(Safety glass)	Unique			
Canada	FMVSS205, SRRV29 (Laminated glass, tempered glass, plastics, glass-plastics)	FMVSS205, SRRV29 1) Laminated glass, glass-plastics 2) ≥70%	FMVSS205	FMVSS205	FMVSS205
Chile					
China	com.(Safety glass)	com. 1) Laminated glass, zone-toughened glass 2) ≥70%	ECER43	Unique (After October 1997, “CCIB”)	
Hong Kong	com.(Safety glass or safety glazing)	com.			
Indonesia	com.(Safety glass)	com.			
Japan	SRRV29 (Laminated glass, tempered glass, plastics, glass-plastics)	SRRV29 1) Laminated glass, glass-plastics 2) ≥70%	SRRV29	SRRV29	FMVSS205, ECER43
Korea	com.(Safety glass)	com. 1) Laminated glass			
Malaysia	com.(Safety glass)				
Mexico					
New Zealand	com.(Safety glass)	com.	ADR8, ANSI Z26 ECER43, SRRV29	ADR8, FMVSS205, ECER43, SRRV29, NZ5443	ADR8, FMVSS205, ECER43, SRRV29
Papua New Guinea	com.(Safety glass)	Unique			
Philippines	com.(Safety glazing materials)				
Singapore	com.(Safety glass)	Unique			
Chinese Taipei		Unique			
Thailand					
U.S.A.	FMVSS205, SRRV29 (Laminated glass, tempered glass, plastics, glass-plastics)	FMVSS205, SRRV29 1) Laminated glass, glass-plastics 2) ≥70%	FMVSS205	FMVSS205	FMVSS205
EC	ECER43 (Laminated glass, tempered glass, glass-plastics)	ECER43 1) Laminated glass, glass-plastics 2) ≥75%	ECER43	ECER43	ECER43

Legend

1)Wind screen 2)Visible transmittance = windscreen or zone necessary for driver to comfirm the traffic state

Item No.2 Safety glazing

Comparison of the test methods applicable in Japan, Europe and the U.S.A

Test item \ Nation/standards		Japan/SRRV29	Europe/ECE R43	U.S.A./FMVSS205
1) Thickness	Application	WS, RW, FD, others: L, T	WS, RW, FD, others: L, T	No provision
	Specimen	Products and samples	Products and samples	
	Test method	By micrometer callipers for external measurement (JIS B 7502)		
	Standard values	Nominal thickness ± 0.2 n mm n = number of component panes (only for JIS standards)	Nominal thickness ± 0.2 n mm n = number of component panes	
	Judgment	n=1, c=0		
2) Fragmentation	Application	RW, FD, others: T	RW, FD, others: T	RW, FD, others: T
	Specimen	Product	Product	305 x 305 mm
	Test method	Apparatuses: hammer, punch, support frame No. of impact points : 4 (complex-curved glass) 3 (flat or cylindric-curved glass)	Apparatuses: hammer of a mass of 35 g or equivalent, punch, support frame No. of impact points : 4 (complex-curved glass) 3 (flat or cylindric-curved glass)	Apparatuses: steel ball, dropping device, specimen holding frame Impact point: the steel ball is dropped within 25 mm from the specimen center.
	Standard values	1) Number of fragments = not less than 40 and not more than 400 in the area of 50 mm^2 For the specimen not more than 3.5 mm in nominal thickness, 160 or more in the area of 100 x 100 mm, if the number of fragments is less than 40. 2) Large fragments of 3 to 5 cm^2: 2 or less 3) Elongated fragments of 75 to 150 mm : 5 or less 4) Knife-edge extending to the specimen side with an angle of 45 deg or more: 60 mm or less long * The JIS standard is the same as the European standard	1) Number of fragments = not less than 40 and not more than 400 in the area of 50 mm^2 For the specimen not more than 3.5 mm in nominal thickness, no more than 450 in the area of 50 mm^2: 160 or more in the area of 100 x 100 mm, if the number of fragments is less than 40. 2) Large fragments exceeding 3 cm^2: 3 or less, and 1 or less in any circle of 100 mm in diameter. 3) Elongated fragments of 75 to 150 mm : 5 or less 4) Knife-edge : 45 deg or less and 75 mm or less long	Fragment weight : The weight of the largest fragment shall be less than 0.15 ounce (4.25 g)

WS = Windscreen (Windshield), RW = Rear window, FD = Front door, L = Laminated glass, T = Tempered glass

<table>
<tr><td colspan="2">Test item / Nation/standards</td><td colspan="5">Japan/SRRV29</td><td colspan="5">Europe/ECE R43</td><td colspan="2">U.S.A./FMVSS205</td></tr>
<tr><td rowspan="11">3) Impact, ball (227 g ball)</td><td>Application</td><td colspan="5">WS: L (T) (*1), others: T (L)</td><td colspan="5">WS: L (T) (*2), other than WS: T (L)</td><td colspan="2">WS : L, FD : T(L), others: T(L)</td></tr>
<tr><td>Specimen</td><td colspan="5">about 300 x 300 mm</td><td colspan="5">300 + 10 / -0 x 300 - 10 / -0 mm</td><td colspan="2">305 x 305 mm</td></tr>
<tr><td rowspan="10">Test method</td><td colspan="4">(Laminated glasses A and B)</td><td>(Tempered glass)</td><td colspan="4">(Laminated glass)</td><td>(Tempered glass)</td><td colspan="2" rowspan="3">The specimen is kept at 21 to 29 °C for at least 4 hours. Then, the ball is dropped within 25 mm.
from the specimen center. The drop height is the same regardless of the nominal thickness of specimen</td></tr>
<tr><td colspan="4">The specimen is kept at a temperature listed below (± 2 °C) for at least 4 hours. Then, the steel ball (227 ± 2 g) is dropped freely to the specimen center from a height specified for the nominal thickness (e) of specimen.</td><td>The steel ball (227 ± 2 g) is dropped to the specimen center from a height specified for the nominal thickness (e) of the specimen.</td><td colspan="4">The specimen is kept at a temperature listed below (± 2 °C) for at least 4 hours. Then, the steel ball (227 ± 2 g) is dropped freely to the specimen center from a height specified for the nominal thickness (e) of specimen.</td><td>The steel ball (227 ± 2 g) is dropped to the specimen center from a height specified for the nominal thickness (e) of the specimen.</td></tr>
<tr><td rowspan="2">Classification</td><td colspan="3" rowspan="2">Drop height (m) *3</td><td rowspan="2">Nominal thickness (e) mm</td><td rowspan="2">Drop height m</td><td rowspan="2">Classification</td><td colspan="3" rowspan="2">Drop height (m)</td><td rowspan="2">Nominal thickness (e) mm</td><td rowspan="2">Drop height m</td></tr>
<tr></tr>
<tr><td>Conditioning temp. (°C)</td><td>40°</td><td>-20°</td><td>23°</td><td>Conditioning temp (°C)</td><td>40°</td><td>-20°</td><td>23°</td></tr>
<tr><td>WS Laminated glass A</td><td>e≤4.5
4.5<e≤5.5
5.5<e≤6.5
6.5<e</td><td>9
10
11
12</td><td>8.5
9
9.5
10</td><td></td><td>e≤3.5</td><td>2</td><td>WS Laminated glass A</td><td>e≤4.5
4.5<e≤5.5
5.5<e≤6.5
6.5<e</td><td>9
10
11
12</td><td>8.5
9
9.5
10</td><td></td><td>e≤3.5</td><td>2</td><td rowspan="3">Laminated glass: 9.14 m (30 ft)
Tempered glass: 3.05 m (10 ft)</td></tr>
<tr><td>Laminated glass A</td><td>e≤4.5
4.5<e≤5.5
5.5<e≤6.5
6.5<e</td><td>9
10
11
12</td><td>8.5
9
9.5
10</td><td></td><td>3.5< e</td><td>2.5</td><td></td><td></td><td></td><td></td><td></td><td>3.5<e</td><td>2.5</td></tr>
<tr><td>Laminated glass B</td><td>Not specified</td><td colspan="2">---</td><td>9</td><td></td><td></td><td>Laminated glass other than WS</td><td>e≤5.5
5.5<e≤6.5
6.5<e</td><td colspan="2"></td><td>5
6
7</td><td></td><td></td></tr>
<tr><td>Other than WS</td><td>e≤5.5
5.5<e≤6.5
6.5<e</td><td colspan="2"></td><td>5
6
7</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

(continue to next page)

<table>
<tr><td colspan="2">Nation/standards
Test item</td><td colspan="3">Japan/SRRV29</td><td>Europe/ECE R43</td><td colspan="3">U.S.A./FMVSS205</td></tr>
<tr><td rowspan="4">3) Impact, ball
(227 g ball)</td><td rowspan="4">Standard values</td><td colspan="3">1) The steel ball shall not pass through the specimen.
2) Total mass of the fragments detached</td><td>1) The steel ball shall not pass through the specimen.
2) The specimen shall not be broken into some large pieces.
3) Total mass of detached fragments</td><td>The specimen shall not be fractured.</td><td>(Laminated glass)</td><td>(Tempered glass)</td></tr>
<tr><td>Classification</td><td>Nominal thickness (e) mm</td><td>Maximum (g)</td><td>Classifica-tion</td><td>Nominal thickness (e) mm</td><td>Maximum (g)</td><td rowspan="3">1) The specimen shall not be broken into large pieces.
2) The specimen shall pass through the specimen.
3) The interlayer shall be exposed less than 645 mm^2 (1 sq inch) on the face opposite to the impact.
4) The interlayer shall be exposed less than 1935 mm^2 (3 sq inch) on the face of the impact.</td><td rowspan="3">The specimen shall not be fractured.</td></tr>
<tr><td>WS Laminated glass A</td><td>e≤4.5
4.5<e≤5.5
5.5<e≤6.5
6.5<e</td><td>12
15
20
25</td><td>For WS</td><td>e≤4.5
4.5<e≤5.5
5.5<e≤6.5
6.5<e</td><td>12
15
20
25</td></tr>
<tr><td>Laminated glass B</td><td>Not specified</td><td>20</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>Other than WS</td><td>For all thicknesses</td><td>15</td><td>Other than WS</td><td>For all thicknesses</td><td>15</td><td></td><td></td></tr>
<tr><td></td><td>Judgment</td><td>Classification</td><td colspan="2"></td><td>Classifi-cation</td><td colspan="2"></td><td>n=12, C_1=2
C_2=2
C=C_1+C_2=4
where C_1 corresponds to 1) and C_2 to 2) of the standard values.</td><td>n=12, C=2</td></tr>
<tr><td></td><td></td><td>WS Laminated glass A</td><td colspan="2">n_1=10, C_1=2
When r_1≥3, n_2=10 C_2=0</td><td>WS Laminated glass</td><td colspan="2">(According to conditioning temp.)
n_2=10, C_1=2
When r_1≥3
n_1=10, C_2=0</td><td rowspan="3">n_1=6, C_1=1
When $r_{1≥}$2
n_2=6, C_2=0</td><td rowspan="3">n=12, C_1=2
C_2=2
C=C_1+C_2=4
where C_1 corresponds to 1) and C_2 to 2) of the standard values.</td><td rowspan="3">n=12, C=2</td></tr>
<tr><td></td><td></td><td>Laminated glass B</td><td colspan="2">n_1=6, C_1=1
When r_1≥2, n_2=6 C_2=0</td><td></td><td colspan="2"></td></tr>
<tr><td></td><td></td><td>Other than WS</td><td colspan="2">n_1=4, C_1=0
When r_1=1 or 2, n_2=4 C_2=0</td><td>Other than WS glass</td><td colspan="2">n_1=4, C_1=0
When r_1≥2 or 2, n_2=4 C_2=0</td></tr>
<tr><td colspan="2">Remarks</td><td colspan="3">(*1) The laminated glass B and tempered glass can be used for windscreen in large-size special vehicles and vehicles of maximum speed not exceeding 20 km/h.</td><td colspan="3">(*2) The tempered glass can be used for windscreen of vehicles of maximum speed not exceeding 30 km/h.
(*3) Tolerance : +25 mm -0 (*4) Tolerance : +5 mm -0</td><td colspan="2">The specimen-support frame by ANSI is made of hard wood (while JIS/ECE specifies steel lower frame lined with 3 mm thick rubber).</td></tr>
</table>

Test item	Nation/standards	Japan/SRRV29	Europe/ECE R43	U.S.A./FMVSS205
4) Impact (shot bag)	Application	No provision	No provision	FD (T), others: (T)
	Specimen			305x305 mm (12x12 inch) Flat sample
	Test method			The specimen is kept at 21 to 29 deg C(70 to 85F) for at least 4 hours. The shot bag of 11 lb (4.99 kg) is dropped freely from a height of 2.44 m (8ft), the center of the bottom of the bag striking the specimen within 25 mm of its center.
	Standard values			No crack or break
	Judgment			n=5, c=1
5) Impact (dart)	Application	No provision	No provision	WS (L), others: (L)
	Specimen			305x305 mm (12x12 inch) Flat sample
	Test method			The specimen is kept at 21 to 29 deg C(70 to 85F) for at least 4 hours. The dart of 198 g (7 oz) is dropped freely from a height of 9.14 m (30 ft), the nose of the dart striking the specimen within 25 mm of its center.
	Standard values			The dart may crack or puncture the glass. But, the hole produced shall not permit the passage of the dart.
	Judgment			n=5, c=1
6) Penetration resistance (2260 g steel ball)	Application	WS : L(laminated A)	WS : L, Other than WS : -	WS : L, Other than WS : (L per ANSI)
	Specimen	about 300 x 300 (flat) Can be cut out in an almost flat area of curved product	300+10/-0x300+10/-0 mm (flat) Can be cut out in an almost flat area of curved product	305 x 305 mm (flat)
	Test method	The specimen is kept at 23 ± 2 deg C for at least 4 hours immediately before test. The steel ball of 2260 ± 20 g is dropped freely from a height of 4 m to the center of the specimen. (The hitting point is within 25 mm of the center of specimen)(JIS: +30, -20g)	The specimen is kept at 23 ± 2 deg C for at least 4 hours immediately before test. The steel ball of 2260 ± 20 g is dropped freely from a height of 4 m + 25/- 0 within 25 mm of the center of the specimen.	The specimen is kept at 21 to 29 deg C for at least 4 hours immediately before test. The steel ball(2.254 to 2.282 kg = 2268 ± 14g) is dropped freely from a height of 3.66 m (12 ft) to the center of the specimen.
	Standard values	The steel ball shall not pass through the specimen within 5s after the moment of impact.	The steel ball shall not pass through the specimen within 5s after the moment of impact.	The steel ball shall not pass through the specimen within 5s after the moment of impact.
	Judgment	n_1=6, C_1=0 When r_1=1, n_2=6 C_2=0	n_1=6, C_1=0 When r_1=1, n_2=6 C_2=0	n=10, C=2
Remarks		Comparison between the standards of the U.S.A. and those of Europe and Japan, there is a difference other than those mentioned above. The difference is found in the specimen support frame; wooden frame in the U.S.A., while steel upper and lower frames (both lined with 3 mm thick rubber) in Europe and Japan.		

Test item	Nation/standards	Japan/SRRV29	Europe/ECE R43	U.S.A./FMVSS205
7) Headform impact	Application	WS, L	WS, L	No provision
	Specimen	Product or sample of about 1100x500 mm	Product or sample of about (1100x500) mm + 5mm, - 2mm	
	Test method	The specimen is kept at 23 ± 2 °C for 4 hours or more. The headform of 10 ± 0.2 kg is freely dropped within 40 mm of the specimen center. Drop height Glass category Specimen Drop height L Sample 4 m L Product 1.5 m	The specimen is kept at 23 ± 2 °C for 4 hours or more. The headform of 10 ± 0.2 kg is freely dropped within 40 mm of the specimen center. Drop height Glass category Specimen Drop height L Sample 4 m L Product 1.5 m	
	Standard values	Product: 1) The cracks nearest to the point of impact shall be less than or equal to 80 mm from it. 2) Detachment of fragments less than 4 mm wide is permitted outside a circle of 60 mm diameter centered on the impact point. 3) The interlayer must not be laid bare on the impact side over an area of more than 20 cm^2. 4) Any tear in the interlayer shall be 35 mm or less long. Sample: Not penetrated, free of detachment of large fractures.	Product: 1) The cracks nearest to the point of impact shall be less than or equal to 80 mm from it. 2) Detachment of fragments less than 4 mm wide is permitted outside a circle of 60 mm diameter centered on the impact point. 3) The interlayer must not be laid bare on the impact side over an area of more than 20 cm^2. 4) Any tear in the interlayer shall be 35 mm or less long. Sample: Not penetrated, free of detachment of large fractures. Product: Fractured.	
	Judgment	n_1=4, C_1=0 (Product) When r_1=1, n_2=4 C_2=0 n_2=6, C_1=0 (Sample) When r_1=1, n_2=6 C_2=0	Sample: n_1=6, c=0 When c=$_1$, n_2=6 c_2=0	
8) Abrasion resistance	Application	WS, RW, others	WS (L), FD (L, T), Others: (L)	
	Specimen	100x100 mm flat sample	100x100 mm flat sample	102x102 mm (4x4 inches) flat sample
	Test method	Using the Taber abrasion tester (No.CS-10F), the outside surface of glazing is worn with a load of 500 gf and 1000 cycles; the haze is measured with a hazemeter before and after abrasion. (The windscreens of vehicles other than large-sized, special vehicles may be measured with 100 cycles) Hardness of abrasion wheel : 72 ± 5 IRHD	Using the Taber abrasion tester (No.CS-10F), the outside surface of glazing is worn with a load of 500 gf and 1000 cycles; the haze is measured with a hazemeter before and after abrasion. Hardness of abrasion wheel : 72 ± 5 IRHD	Using the Taber abrasion tester (No.CS-10F), the outside surface of glazing is worn with a load of 500 gf and 1000 cycles; the haze is measured with a hazemeter before and after abrasion. Hardness of abrasion wheel : 72 ± 2 IRHD
	Standard values	Haze value as a result of abrasion : 2% or less	Haze value as a result of abrasion : 2% or less	Haze value as a result of abrasion : 2% or less
	Judgment	n=3, C=0	n=3, C=0	n=3, C=0

Test item	Nation/standards	Japan/SRRV29	Europe/ECE R43	U.S.A./FMVSS205
9) High temperature resistance	Application	WS (L), FD (L), others: (L)	Laminated glass	WS (L), FD (L), others: (L)
	Specimen	300 x 300 mm cut out of product, or sample	300 x 300 mm cut out of product, or sample	Flat specimen of 300 x 300 mm (12 x 12 inches)
	Test method	Immersed, nearly vertically on edges, in boiling water for 2 hours	Immersed, nearly vertically on edges, in boiling water for 2 hours	Immersed, vertically on edge, in water at 66°C (150°F) for 3 minutes and the quickly immersed in boiling water.
	Standard values	No bubbles or other defects shall be found beyond 15 mm from the edges (25 mm from the newly made edges, in the case of a specimen cut out of a product) or 10 mm from any cracks.	No bubbles or other defects shall be found beyond 15 mm from the edges (25 mm from the newly made edges, in the case of a specimen cut out of a product) or 10 mm from any cracks.	No bubbles or other defects shall be found beyond 12.7 mm (0.5") from the edges.
	Judgment	n_1=3, c_1=0 or r_1=1 → re-test n_2=3 c_2=0	n_1=3, c_1=0 or r_1=1 → re-test n_2=3 c_2=0	n=3, c=0
10) Radiation resistance	Application	WS (L), FD (L), others: (L)	Laminated glass	WSL (L), FD (L), others (L)
	Specimen	300x300 mm or 300x76 mm cut out of product or sample	300x76 mm cut out of product or sample	305x305 mm (12"x12") flat sample
	Test method	In an apparatus at 45 ± 5 °C, irradiate ultraviolet rays (750 ± 50W) over the specimen from 230 mm apart from the outside of vehicle for 100 hours. The test zone is limited to the zone used for visible transmittance test.	In an apparatus at 45 ± 5 °C, irradiate ultraviolet rays (750 ± 50W) over the specimen from 230 mm apart from the outside of vehicle for 100 hours.	In an apparatus at 38 to 49 °C, irradiate ultraviolet rays (170V, 4A) over the specimen from 230 mm (9")apart from the outside of vehicle for 100 hours.
	Standard values	After UV irradiation (1) b/a x 100%≥95% (2) b≥70% (3) No remarkable change (color, bubbles, turbidity)	After UV irradiation (1) b/a x 100%≥95% (2) b≥75% (WS) (3) b≥75% (others)	After UV irradiation (1) Transmittance 70 % or more (2) No remarkable change
	Judgment	n_1=3, c_1=0 or r_1=1 ® re-test n_2=3 c_2=0	n_1=3, c=0 or r=1 ® re-test n_2=3 c_2=0	n=3, c=0
11) Resistance to humidity	Application	WS (L), FD (L), others: (L)	Laminated glass	WSL (L), FD (L), others: (L)
	Specimen	300x300 mm or 300x76 mm cut out of product or sample	300x300 mm or 300x76 mm cut out of product or sample	305x305 mm (12"x12") flat sample
	Test method	Visual check after keeping at 50 ± 2 °C, 95 ± 4%RH for 2 weeks	Visual check after keeping at 50 ± 2 °C, 95 ± 4%RH for 2 weeks	Visual check after keeping at 49 to 54 °C (120 to 130 °F), 100%RH for 2 weeks
	Standard values	No remarkable change (color, bubble, turbidity) in the portions beyond 10 mm from the edge of the specimen, or beyond 15 mm from the new edge formed in the specimen cut out of a product.	No remarkable change (color, bubble, turbidity) in the portions beyond 10 mm from the edge of the specimen, or beyond 15 mm from the new edge formed in the specimen cut out of a product.	No separation of materials, except for small spots, extending inward from the adjacent edge of the specimen to a depth of more than 6.35 mm (1/4").
	Judgment	n_1=3, c_1=0 or r_1=1 →re-test n_2=3 c_2=0	n_1=3, c=0 or r=1 → re-test n_2=3 c_2=0	n=3, c=0

Nation/standards		Japan/SRRV29	Europe/ECE R43	U.S.A./FMVSS205
Test item				
12) Visible transmittance	Application	WS, RW, others	WS: L, (T), FD: T (L), others: T (L)	WS: L, RW, FD: T (L), others: T (applicable to the parts influencing the driver's field of view)
	Specimen	Test zone of product or specimen of appropriate size (flat)	Test zone of product or specimen of appropriate size (flat)	305 x 305 mm or 76 x 305 mm (flat)
	Test method	1) Spectrophotometric : transmittance (%) of stimulus value Y to the standard illuminant A 2) Direct: ratio of transmitted flux to incident flux (%)	Ratio of transmitted flux of the exterior side of pane to the incident beam of 0 ± 5° from the illuminant A to the specimen surface. The flux diameter shall be 7 ± 1 mm	Ratio (%) of transmitted flux to normal incidence to the specimen surface from the illuminant A
	Standard values	70% or more : applicable to the test zone B and 1 (not applicable to the parts which do no directly influence the driver's filed of view)	<WS> 75% or more: applicable to test zone B and 1 <other than WS> 70% or more (applicable to the parts influencing the driver's field of view)	70% or more (applicable to the parts influencing the driver's field of view)
	Judgment	n=3, C=0	n³1, C=0	n=3, C=0
13) Optical distortion	Application	WS: L (T), FD: T (L)	WS: L, (T)	WS: L
	Specimen	Product	Product	305x305mm (flat or cut out of curved product)
	Test method	The specimen is mounted at the actual rake angle at 4 m apart from the projector to measure the diameter of the circle projected on a screen 8 m from the projector.	The specimen is mounted at the actual rake angle at r m apart from the projector to measure the diameter of the circle projected on a screen R m from the projector.	The projection lantern shall be focused on the screen 7.62 m (25 ft) distant. The specimen shall be placed close to the screen. The area of each specimen within 25.4 mm (1") shall not be subject to the test.
	Standard values	Maximum admissible optical distortion Test zone A : 2 minutes (8.0=2.3 mm) Test zone B : 6 minutes (8.0=6.9 mm) Test zone I : 2 minutes (8.0=2.3 mm) * 6 minutes for side windows	Maximum admissible optical distortion Test zone A : 2 minutes Test zone B : 6 minutes Test zone I : 2 minutes	No light and dark patches, existent over the entire area, shall appear in the shadow of the unmarked area of the specimen before the specimen has been moved a distance of at least 635 mm from the screen.
	Judgment	n=4, c=0	n=4, c=0	n=3, c=0 (curved), n=10, c=0 (flat)
14) Secondary image separation	Application	WS: L (T), FD: T (L)	WS: L, (T)	WS: L
	Specimen	Product	Product	Product
	Test method	The specimen is mounted at the designed rake angle 7.6 m from the illuminated box.	The specimen is mounted at the designed rake angle 7 or more m from the illuminated box.	The specimen is mounted at the designed rake angle 7.6 m from the illuminated box.
	Standard values	Maximum separation of primary/secondary images Test zone A : 15 minutes (33.2 mm) Test zone B : 25 minutes (55.3 mm) Test zone I : 15 minutes (33.2 mm) * 25 minutes for side windows.	Maximum separation of primary/secondary images Test zone A : 15 minutes (33.2 mm) Test zone B : 25 minutes (55.3 mm) Test zone I : 15 minutes (33.2 mm) * 25 minutes for side windows.	No secondary image shifting to the point of tangency of the inside edge of the 114 mm circle. Identification of colors
	Judgment	n=4, c=0	n=4, c=0	n=3, c=0 (curved), n=10, c=0 (flat)

Nation/standards		Japan/SRRV29	Europe/ECE R43	U.S.A./FMVSS205
~~Test item~~ 15) Identification of colors	Application	WS: L (T), FD: T(L)	WS: L, (T)	No provision
	Specimen	Product	Product	
	Test method	The color plate is observed through the test zone of specimen.	The color plate is observed through the test zone of specimen.	
	Standard values	White, yellow, red, green, blue and orange (amber in JIS) can be identified.	White, yellow, red, green, blue and amber can be identified.	
	Judgment	n=4, c=0	n=4, c=0	

ITEM No. 96-2 Safety glazing

Australia, Australian Design Rule 8

A: Application		MA, MB, MC, MD, ME, NA, NB, NC
B: Structure requirements	Type of glass	Safety glass
C-a: Performance requirements	Windscreen	Laminated glass
	Visible transmittance	[3]75% for windscreen
C-b: Test method		per the test methods given in the reference standards
D :Label	Marking (conformity mark)	Mark of the standard approved to be equivalent
E Reference standards	Equivalent standards	AS (Australia), JIS, ECER, BS, ANSI Z26.1, NZ

ITEM No. 96-2 Safety glazing

Brunei, Road Traffic Regulations S.18

A: Application		Mobile machinery
B: Structure requirements	Type of glass	Safety glass : glass so constructed or treated that if fractured it does not fly into fragments capable of causing severe cuts.
C-a: Performance requirements	Windscreen	
	Visible transmittance	Must ensure visibility of drivers No tinted glass shall be used except with the prior written permission
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

Canada, Consolidation-Motor Vehicle Safety Act-Motor Vehicle Safety Regulations
205 SOR 94-717(Amendment 1)

A: Application		The glazing materials used in all vehicles except trailers other than bus trailers shall meet the requirements of ANS Z26.																			
B: Structure requirements	Type of glass	Laminated glass, tempered glass, plastics, glass-plastics																			
C-a: Performance requirements	Windscreen	Laminated glass, glass-plastics																			
	Visible transmittance	[3]70% (applicable to the all windows of passenger cars and taxis, while to the windows providing visibility of driver)																			
C-b: Test method		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)	20)	21)
	Laminated glass			X		X	X		X	X	X	X	X	X	X							
	Tempered glass		X	X	X				X		X		X									
	Plastics			X		X			X				X				X	X	X	X		X
	Glass-plastics		X	X		X	X		X	X	X	X	X	X	X		X	X	X		X	
D: Label	Marking(conformity mark)	AS																			
E: Reference standards	Standards referred to	ANSI Z26.1																			

Legend:

1) Thickness
2) Fragmentation
3) Impact, ball
4) Impact, shot bag
5) Impact, dart
6) Penetration resistance
7) Headform impact
8) Abrasion resistance
9) High temperature resistance
10) Radiation resistance
11) Resistance to humidity
12) Visible transmittance
13) Optical distortion
14) Secondary image separation
15) Identification of colors
16) Chemical resistance
17) Flammability
18) Weathering
19) Dimensional stability
20) Temperature change
21) Flexibility

ITEM No. 96-2 Safety glazing

China, GB9656

A: Application		Motor vehicles																			
B: Structure requirements	Type of glass	Safety glass: laminated glass, zone-toughened glass, tempered glass																			
C-a: Performance requirements	Windscreen	Laminated glass, zone-toughened glass																			
	Visible transmittance	Only for windscreen:³70%																			
C-b: Test method		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)	20)	21)
	Laminated glass	X		X			X	X	X	X	X	X	X	X	X	X						
	Tempered glass	X	X	X									X									
	Zone-toughened glass	X	X					X					X	X	X	X						
D: Label	Marking (conformity mark)	After October 1997, CCIB is only the approval mark for imported vehicles and parts granted by State Administration of Imp & Exp Commodity Inspection of China. For the domestically manufactured vehicle safety glazing, approval mark is specified.																			
E:Reference standards																					

Legend:

1) Thickness
2) Fragmentation
3) Impact, ball
4) Impact, shot bag
5) Impact, dart
6) Penetration resistance
7) Headform impact
8) Abrasion resistance
9) High temperature resistance
10) Radiation resistance
11) Resistance to humidity
12) Visible transmittance
13) Optical distortion
14) Secondary image separation
15) Identification of colors
16) Chemical resistance
17) Flammability
18) Weathering
19) Dimensional stability
20) Temperature change
21) Flexibility

ITEM No. 96-2 Safety glazing

Hong Kong, Road Traffic Regulations No.28

A: Application		Motor vehicles
B: Structure requirements	Type of glass	Safety glass or safety glazing
C-a: Performance requirements	Windscreen	Safety glass or safety glazing
	Visible transmittance	Transparency not obstructing visibility
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

Indonesia, Vehicles and Drivers 44/1993-82

A: Application		Any motorized vehicle running on the land
B: Structure requirements	Type of glass	Safety glass
C-a: Performance requirements	Windscreen	Safety glass (scratch-proof, transparency which shall not fade, it must not endanger the driver or the passenger, when fragmented)
	Visible transmittance	Transparency
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

Japan, SRRV29

A: Application		Motor vehicles except large-sized special motor vehicles, motor vehicles of the maximum speed less than 20 km/h and trailed vehicles																			
B: Structure requirements	Type of glass	Safety glass: laminated glass, tempered glass, organic glass (plastics), glass-plastics																			
C-a: Performance requirements	(Note 1) Windscreen	1) The material of windscreen, even if broken, shall provide driver's visibility. 2) Cannot be penetrated easily.																			
	(Note 2) Visible transmittance	[3]70%																			
C-b: Test method		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)	20)	21)
	Laminated glass	X		X			X	X	X	X	X	X	X	X	X	X						
	Tempered glass	X	X	X									X	X	X	X						
	Plastics	X		X					X			X	X	X	X	X	X	X	X	X		
	Glass-plastics	X		X			X	X	X	X	X	X	X	X	X	X	X	X			X	
D: Label	Marking(conformity mark)	JIS, AS, E																			
E: Reference standards	Equivalent standards	FMVSS205, ECER43, JISR3211																			

Note 1 : Currently no material other than laminated glass and glass-plastics conforms to the requirements.
Note 2 : Zone necessary for the driver to confirm the traffic state (that is, windscreen and front doors).

Legend:

1) Thickness
2) Fragmentation
3) Impact, ball
4) Impact, shot bag
5) Impact, dart
6) Penetration resistance
7) Headform impact
8) Abrasion resistance
9) High temperature resistance
10) Radiation resistance
11) Resistance to humidity
12) Visible transmittance
13) Optical distortion
14) Secondary image separation
15) Identification of colors
16) Chemical resistance
17) Flammability
18) Weathering
19) Dimensional stability
20) Temperature change
21) Flexibility

ITEM No. 96-2 Safety glazing

Korea, (The regulations of the motor vehicle Safety Standards) KMVSS Article 34

A: Application		Motor vehicles
B: Structure requirements	Type of glass	Laminated glass for windshield, safety glass for other windows Material other than safety glass may be used for a window other than the windshield in a special purpose vehicle, such as convertible.
C-a: Performance requirements	Windscreen	Laminated glass
	Visible transmittance	³70%:for windshield (including a rear window, in the case of passenger vehicles and the windows to the right and left of the driver (*see Note)
C-b: Test method		
D: Label		
E: Reference standards		

Note : This requirement does not apply to the portion of windshield that blocks sunlight except for the portion within the driver's field.
No sticker except ones approved by the Minister of Construction and Transportation or laws shall be attached to the windshield and the windows, to the immediate right or left of the driver, of each motor vehicle.

ITEM No. 96-2 Safety glazing

Malaysia, Motor Vehicles (construction & use) Rules 22

A: Application		
B: Structure requirements	Type of glass	Safety glass (for the glass of all windscreens and windows on the outside of any motor vehicle)
C-a: Performance requirements		
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

New Zealand, Traffic Regulations, The Transport Motor Vehicles (construction & use)
Rules No..73/73A, The Passenger Service Vehicle Construction Regulations No.26

A: Application		Any motor vehicle first registered anywhere after the 1st day of November 1990
B: Structure requirements	Type of glass	Safety glass
C-a: Performance requirements	Windscreen	Laminated glass
	Visible transmittance	Transparent material
C-b: Test method		Per the test methods given in the reference standards
D: Label	Marking	Minimum size of 100 square mm Complied standard Type of glass and thickness Registered number Applicable trade name
E: Reference standards		ECE R43, FMVSS205, ADR8/00, JIS R3211, BS AU178a, BS857, BS5282, NZS5443, AS/Nzs2080, SABS1191-1193

ITEM No. 96-2 Safety glazing

Papua New Guinea, Motor Traffic Regulations R125L

A: Application		Motor vehicles
B: Structure requirements	Type of glass	Safety glass
C-a: Performance requirements	Windscreen	Safety glass (shall not have a safety film)
	Visible transmittance	The exterior glazing of a motor vehicle shall not have a surface film that has a reflecting capability.
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

Philippines (Philippine National Standard) PNS130, PNS187

A: Application		
B: Structure requirements	Type of glass	Glazing materials that shall conform to PNS130.
C-a: Performance requirements		
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

Singapore, Road Traffic Act Road Traffic Rules C21

A: Application		Wheeled vehicles
B: Structure requirements	Type of glass	Safety glass: - glass so constructed or treated that if fractured it does not fly into fragments capable of causing severe cuts. - shall not obstruct the visibility when driving
C-a: Performance requirements	Windscreen	-
	Visible transmittance	No tinted glass shall be used as part of or fitted to the windscreen and window of a motor vehicle except with the prior written permission of the Registrar given in the behalf.
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

Taiwan, Road Traffic Safety Regulations Article39,Section 14

A: Application		
B: Structure requirements	Type of glass	
C-a: Performance requirements		The windows and windscreen of a motor vehicle shall be free of damage, non-transparency, reflective film. The windows of a taxi or the like shall not receive color film.
C-b: Test method		
D: Label		
E: Reference standards		

ITEM No. 96-2 Safety glazing

U.S.A., FMVSS205

A: Application		Passenger cars, multipurpose passenger vehicles, trucks, buses, motorcycles, slide-in campers, and pickup covers designed to carry persons while in motion																			
B: Structure requirements	Type of glass	Safety glass: laminated glass, tempered glass, plastics, glass-plastics																			
C-a: Performance requirements	Windscreen	Laminated glass, glass-plastics																			
	Visible transmittance	[3]70% (all windows of passenger vehicles and taxis; for the other types of vehicles, portions influencing the visibility when driving)																			
C-b: Test method		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)	20)	21)
	Laminated glass			X		X	X		X	X	X	X	X	X	X							
	Tempered glass		X	X	X				X		X		X									
	Plastics			X		X			X				X				X	X	X	X		X
	Glass-plastics		X	X		X	X		X	X	X	X	X	X	X		X	X	X		X	
D: Label	Marking (conformity mark)	AS																			
E: Reference standards	Standards referred to	ANSI Z26.1																			

ITEM No. 96-2 Safety glazing

Legend:

1) Thickness
2) Fragmentation
3) Impact, ball
4) Impact, shot bag
5) Impact, dart
6) Penetration resistance
7) Headform impact
8) Abrasion resistance
9) High temperature resistance
10) Radiation resistance
11) Resistance to humidity
12) Visible transmittance
13) Optical distortion
14) Secondary image separation
15) Identification of colors
16) Chemical resistance
17) Flammability
18) Weathering
19) Dimensional stability
20) Temperature change
21) Flexibility

ITEM No. 96-2 Safety glazing

EUROPE ECE R43

A: Application		ower-driven vehicles and their trailers																			
B: Structure requirements	Type of glass	afety glass: laminated glass, tempered glass, glass-plastics																			
C-a: Performance requirements	Windscreen	aminated glass, glass-plastics																			
	Visible transmittance	indscreen:³75%, other windows:³70%																			
C-b: Test method		1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)	20)	21)
	Laminated glass			X			X	X	X	X	X	X	X	X	X	X						
	Tempered glass		X	X									X									
	Glass-plastics			X			X	X	X	X	X	X	X	X	X	X	X	X			X	
D: Label	Marking(conformity mark)																				
E: Reference standards																					

Legend:

1) Thickness
2) Fragmentation
3) Impact, ball
4) Impact, shot bag
5) Impact, dart
6) Penetration resistance
7) Headform impact
8) Abrasion resistance
9) High temperature resistance
10) Radiation resistance
11) Resistance to humidity
12) Visible transmittance
13) Optical distortion
14) Secondary image separation
15) Identification of colors
16) Chemical resistance
17) Flammability
18) Weathering
19) Dimensional stability
20) Temperature change
21) Flexibility

ITEM 96-3

Steering Columns

APEC Regulation Analysis Findings
Item No. 96-3: Steering Column

1. Steering column regulations in the APEC region mainly provide two types of requirements--body block and barrier requirements. Although there are slight differences in the use of numerical units and limit values, the following member economies have similar requirements as follows:

(1) Body block - Australia, U.S., Canada, Korea, Japan, Philippines, ECE

(2) Barrier - Australia, U.S., Canada, Korea, ECE

2. Japan and the Philippines have only body block requirements, lacking barrier ones.

3. In addition to its body block and barrier requirements, ECE provides as its unique requirements the interior collision requirements (R angle, shape edges) and the requirement to bear an approval number mark.

4. Papua New Guinea and Chinese Taipei have requirements concerning the installation position of steering columns, with the former specifying the position on the righthand side and the latter on the lefthand side.

5. New Zealand recognizes the U.S., Japanese, ECE and Australian regulations as alternatives.

6. A comparison of specific requirements for steering columns is as follows:

(1) Body block (C-a-1) - Australia, U.S., Canada, Korea, Japan, Philippines and ECE set forth specific impact absorption values, which are similar among these member economies.

(2) Barrier (C-b-1) - Australia, U.S., Canada, Korea and ECE provide specific backward displacement values for steering columns, and these values are more or less similar among these member economies.

A: Application : Passenger cars

Item No.3 Steering Column

Member Economies	B-a-1 Sharp or rough edge	B-b-1 Location	C-a-1 Body block (Allowable impact force)	C-b-1 Barrier (Allowable displacement)	D-a-1, D-b-1 Label (An approval Marking)	E Referred standards
Australia			Common (11.1kN at 6.7m/s[24.1km/h])	Common (127mm at 48 km/h)		FMVSS203&204, ECE12-01, 02
Brunei						
Canada			Common (11.1kN at 24.1km/h)	Common (127mm at 48 km/h)		
Chile						
China						
Hong Kong						
Indonesia						
Japan			SRRV11 (11.1kN at 25+/-1km/h)			FMVSS203, ECE12-03
Korea			Unique (1130kg at 24.2km/h)	FMVSS204 (127mm at 48.3km/h)		
Malaysia						
Mexico						
New Zealand						FMVSS203&204, ECE12series,SRRV 11
Papua New Guinea		Unique (The right of the longitudinal center line of the vehicle)				
Philippines			Unique (1135kg at 25km/h)			
Singapore						
Chinese Taipei		Unique (Left side)				
Thailand						
U.S.A.			FMVSS203 (2500 lbs [11,000N] at 15mph[24km/h])	Common (5 inches[127mm] at 30mph[48 km/h])		
ECE	ECE12-03 (Before body block and barrier tests: Less than R2.5mm After body block and barrier tests: No sharp or rough edges)		ECE12-03 (1,111daN at 24.1km/h)	ECE12-03 (12.7cm at 48.3km/h)	ECE12-03 (Label marking approval No. is necessary on the vehicle.)	

ITEM 96-3.Steering Column

AUSTRALIA (ADR10/01)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars (MA, MB, MC) If vehicle meets the requirements of ADR 69 with Driver Airbag or the requirements of ADR 73 with Driver and front outboard occupant's Airbag, the vehicle shall be exempt from the requirement of this rule.	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts (1)Body block test Test method	 The body block, moving at a speed of not less than 6.7m/s in a direction equivalent to a horizontal longitudinal direction relative to the top of the steering column in the vehicle, shall be brought to rest in such a manner that at no time shall the load exerted on the body block by the steering column assembly including the steering device which is actuated by the driver exceed 11.1kN, except for intervals whose cumulative duration is not more than 3 milliseconds. SAE J944 1965/12 or SAE J944a 1968/11 or other approved procedure.	
C-b: Performance of parts installed to the vehicle (1)Barrier collision test Test method	 The speed at the time of impact shall be at least 48km/h. If the speed measured is greater than the nominal speed of 48km/h, the measured displacement of the upper end of the steering column and the steering shaft may be reduced to a value appropriate to the nominal speed by multiplying it by the square of the ratio between the nominal speed and either the measured speed or 53.1km/h, whichever is the lesser. The minimum mass of the test vehicle shall not be less than the unladen mass of the vehicle. The upper end of the steering column and the steering shaft shall not be displaced horizontally rearward parallel to the longitudinal axis of the vehicle relative to an undisturbed point on the vehicle more than 127mm, determined by dynamic measurement. SAE J850 1980/6 or other approved method	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 - ECE12, 12-01, 12-02 - FMVSS203, FMVSS204	

CANADA (CMVSS203)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars, MPV, GVWR ≤ 1000lbs and unloaded vehicle weight ≤ 5500lbs	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R The steering control system of a vehicle shall be constructed in such a manner that, during normal driving maneuvers, no component or attachment, including any horn actuating mechanism and trim hardware, is capable of catching the clothing, watch, rings, bracelets, other than bracelets with loosely attached or dangling members, or other jewelry of the driver.	
C: Performance of requirement C-a: Performance of parts (1)Body block test Test method C-b: Performance of parts installed to the vehicle	 When the steering control system of a vehicle is impacted by a body block at a relative velocity of 24.1km/h, the impact force developed on the chest of the body block and transmitted to the steering control system shall not exceed 11.1kN, except for intervals with a cumulative duration that does not exceed 3 milliseconds. SAE J944 JUN80 N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 FMVSS203	

ITEM 96-3.Steering Column

CANADA (CMVSS204)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars, MPV, GVWR ≤ 4536kg and unloaded vehicle weight ≤ 2500kg	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle (1)Barrier collision test	 N/R Where, for the purpose of conducting a collision test, vehicle is impacted perpendicularly into a fixed collision barrier at a forward longitudinal velocity of 48km/h, the upper end of the steering column and steering shaft shall not be displaced more than 127mm horizontally rearward parallel to the longitudinal axis of the vehicle in relation to an disturbed point on the vehicle.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards	N/R	

ITEM 96-3.Steering Column

CHINESE TAIPEI (39-7)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R Steering column should be located at the left side. Steering column should be equally steered to left and right.	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	CNS D3117, CNS D3136	

ITEM 96-3.Steering Column

JAPAN (ARTICLE 11)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts (1)Body block test C-b: Performance of parts installed to the vehicle	 The resultant impact load applying to the steering system shall not exceed 11.1kN[1135kgf] when the body block is collided against the steering system at a velocity of 25+/-1km/h. N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	- ECE12-02 - FMVSS203	

ITEM 96-3.Steering Column

KOREA (ARTICLE 89)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts (1)Body block test C-b: Performance of parts installed to the vehicle (1)Barrier collision test	 When the steering control system is impacted by a body block at a relative speed of 24.2km/h, the impact force developed on the chest of the body block transmitted to the steering control system shall not exceed 1130kg continuously for more than 3 milliseconds. However, this requirement is not applicable if the angle between the steering column and the horizontal plane is larger than 35 degrees. When a passenger vehicle (except forward control vehicles) is impacted into a fixed collision barrier at a speed of 48.3km/h, the upper end of the steering column and shaft not be displaced more than 127mm in the horizontal rearward direction parallel to the longitudinal axis of the motor vehicle.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards		

NEW ZEALAND (VSR33003)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 The steering column of every motor vehicles shall be designed to minimize injury to the driver in the event of a frontal impact, and shall comply with the appropriate vehicle standard. N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 - ECE12 series - FMVSS203, FMVSS204 - 74/297/EEC, 91/662/EEC - ADR10/00 - Japan Article 11	

PAPUA NEW GUINEA (R125F)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 Except with the written authorization of the Superintendent, a person shall not operate a motor vehicle that has the steering column mounted to the left of the longitudinal center line of the body of the motor vehicle. N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards		

ITEM 96-3.Steering Column

PHILIPPINES (S.10-A0)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	All parts of the steering wheel shall be secured in order that safety and efficient operation of the vessel are ensured. The steering wheel shall be so made that it may be easily handled and secured for maximum maneuverability by the driver from a normal driving position. The steering wheel or any part thereof shall not come in contact with any part of the motor vehicle such as the chassis frame, fender, etc. when steered. The ratio of turning angle of the steering wheel to the left or right shall be of no considerable difference to the steering angle of the tire. The clearance of the steering wheel should not be more than 45 degrees when turned to the left or right position.	
C: Performance of requirement C-a: Performance of parts (1)Body block test C-b: Performance of parts installed to the vehicle	Impact protection for the driver from the steering control system: When the steering system is impacted at a velocity of 25km/h, the impact force developed on the chest shall not exceed 1,135kg. No components or attachments including horn actuating mechanism can catch the driver's clothing or jewelry during normal driving maneuvers.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	N/R N/R	
E: Referred standards	N/R	

ITEM 96-3-3-9

ITEM 96-3.Steering Column

USA (FMVSS203)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars, MPV, ≤ GVWR 1000lbs It does not apply to vehicles that conform to the frontal barrier crash requirements (S5.1) of Standard No. 203 by means of other than seat belt assemblies.	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R The steering control system of a vehicle shall be constructed that no component or attachment, including any horn actuating mechanism and trim hardware can catch the driver's clothing, or jewelry during normal driving maneuvers. The term jewelry refers to watches, rings and bracelets without loosely attached or dangling members.	
C: Performance of requirement C-a: Performance of parts (1)Body block test (2) Test method C-b: Performance of parts installed to the vehicle	 When the steering control system of a vehicle is impacted by a body block at a relative velocity of 15MPH, the impact force developed on the chest of the body block and transmitted to the steering control system shall not exceed 2500 lbs, except for intervals with a cumulative duration that does not exceed 3 milliseconds. SAE J944 of JUN80 N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 N/R	

ITEM 96-3.Steering Column

USA (FMVSS204)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars, MPV, GVWR ≤ 1000lbs and unloaded vehicle weight ≤ 5500lbs	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle (1)Barrier collision test	 N/R When a vehicle is tested under the following test method in a 30MPH perpendicular impact into a fixed collision barrier, the upper end of the steering column and shaft in the vehicle shall not be displaced more than 5 inches in a horizontal rearward direction parallel to the longitudinal axis of the vehicle. The amount of displacement shall be measured relative to an undisturbed point on the vehicle and shall represent the maximum dynamic movement of the upper end of the steering column and shaft during the crash test.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards	N/R	

ITEM 96-3.Steering Column

ECE (ECE12-03)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts (1) Body block test (2) Head form test C-b: Performance of parts installed to the vehicle (1) Barrier collision test	 When the steering control is struck by a body block released against this control at a relative speed of 24.1 km/h (15 mph), the force applied to the body block by the steering control shall not exceed 1,111 daN. When the steering control is struck by an impactor released against this control at a relative speed of 24.1 km/h, in accordance with the procedures of annex 5, the deceleration of the impactor shall not exceed 80 g cumulative for more than 3 milliseconds. The deceleration shall always be lower than 120 g with C.F.C. 600 Hz. When the unladen vehicle, in running order, without a manikin, is collision-tested against a barrier at a speed of 48.3 km/h (30 mph), the top of the steering column and its shaft shall not move backwards, horizontally and parallel to the longitudinal axis of the vehicle, by more than 12.7 cm and also not more than 12.7 cm vertically upwards, both dimensions considered in relation to a point of the vehicle not affected by the impact.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every steering control conforming to a steering control type approved under this Regulation an international approval mark. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation an international approval mark.	
E: Referred standards (1)Alternative standards		

ITEM 96-4

Brakes (Motorcycle)

APEC Regulation Analysis Findings
Item No. 4: Brake (Motorcycle)

Motorcycle brake regulations adopted in the APEC region can be divided into the Japanese, U.S., ECE and Australian regulation groups.

1. Structural Requirements

    * Those member economies which have a motorcycle brake regulation require a brake system with two independent lines to control the front and rear brakes, respectively.

2. Performance Requirements

    * ECE, U.S.(FMVSS), ADR and Japan adopt distinct requirements for brake performance.
    * Canada (CMVSS) has requirements that are similar to those of the U.S.(FMVSS).
    * Australia accepted ECE R78 as an alternative regulation.

3. Labeling Requirements

    * ECE R78 requires the marking of approval numbers.

ITEM No 4 BRAKE(Motorcycles)

A: Application : Motorcycle

Economy	B : Structure Requirements	C : Performance Requirements	D : Labeling Requirements	E : Reference Standards
Australia	ADR 33/00	ADR		ECE R78 is accepted as an alternative standard
Brunei				
Canada	FMVSS 122	FMVSS 122		
Chile				
China				
Hong Kong				
Indonesia				
Japan	SRRV 12	SRRV 12		
Korea				
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei				
Thailand				
U. S. A	FMVSS 122	FMVSS 122		
ECE	ECE R78-02	ECE	ECE	

ITEM96-4 Brakes (Motorcycles)

AUSTRALIA (ADR33/00)		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	*Front wheel and rear wheel must each be provided with two independently operating brake systems. *Same as U.S.A. (3) to (6).	
C: performance Requirement	See Attachment 2.	
D: Labeling requirement		
E: Reference Standard	ECE R78 is accepted as an alternative standard.	

ITEM96-4 Brakes (Motorcycles)

Brunei		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	Front wheel and rear wheel must each be provided with two independently operating brake systems	
C: performance Requirement		
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

CANADA (CMVSS 122)		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	Must satisfy CMVSS 106: Brake hose requirements. Must satisfy CMVSS 116: Hydraulic brake fluid requirements. Same as U.S.A. (5) to (6)	
C: performance Requirement	See Attachment 3	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

HONG KONG		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	*Front wheel and rear wheel must each be provided with two independently operating brake systems. *If one system fails, the remaining brake system must be capable of stopping the machine.	
C: performance Requirement	Brake efficiency *One is at least 30%. *The other is at least 25%.	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Indonesia		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	Front wheel and rear wheel must each be provided with two independently operating brake systems	
C: performance Requirement		
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Japan		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	Must be provided with at least two independent brake systems	
C: performance Requirement	See Attachment 4	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Korea		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle ≤50 cm^3	
B: Structure Requirement	Front wheel and rear wheel must each be provided with two independently operating brake systems.	
C: performance Requirement	Braking distance *35 km/h: > 14 m *20 km/h: > 5 m	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

New Zealand		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	Front wheel and rear wheel must each be provided with two independently operating brake systems.	
C: performance Requirement	Braking distance *30 km/h :<7 m	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Papua new Guinea		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	Front wheel and rear wheel must each be provided with two independently operating brake systems	
C: performance Requirement	Braking distance *30 km/h: < 7 m	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Philippine		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle Regulations for 4-wheeled vehicles	
B: Structure Requirement	Front wheel and rear wheel must each be provided with two independently operating brake systems	
C: performance Requirement	Max. speed: 80 km/h or more within 22 m at 50 km/h Max. speed: 35 km/h <. 80 km/h≤ within 14 m at 35 km/h Max. speed 20 km/h <. 35 km/h≤ within 5 m at 20 km/h Max. speed: 20 km/h or less within 5 m at max. speed	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Singapore		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle ≤50 cm^3	
B: Structure Requirement	Must be provided with two independent brake systems	
C: performance Requirement	The handle and pedal brake efficiency is less than 50% on a roller brake tester. (Inspection Rule)	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Taiwan		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement		
C: performance Requirement		
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Thailand		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	Motor cycle shall be equipped with the efficient brake	
C: performance Requirement		
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

U.S.A		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	(1) Front wheel and rear wheel must each be provided with two independently operating brake systems. (2) Must allow visual inspection of lining wear (without removing drum). (3) FMVSS 106: Brake hose requirements (4) FMVSS 116: Hydraulic brake fluid requirements (5) Volume of brake fluid must be at least 1.5 times that at time when pad is fully worn out. (6) Brake fluid labeling requirements *On reservoir tank or within 4 inches of cap. *Height of letters: 3/32 inch *Engraved, relief, or label Contents: Clean filler cap before removing. Use only DOT 3 fluid from a sealed container	
C: performance Requirement	See Attachment 3	
D: Labeling requirement		
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

ECE		
ITEM	CONTENT	Illustration / supplement
A: application	Motorcycle	
B: Structure Requirement	*Front wheel and rear wheel must each be provided with two independently operating brake systems. *Brake lining must not include asbestos. *Others	
C: performance Requirement	See Attachment 1.	
D: Labeling requirement	Display of approval mark required.	
E: Reference Standard		

ITEM96-4 Brakes (Motorcycles)

Attachment-1

ECE R78-02							
Type (category)	Motorcycle L3 < Max. speed 50 km/h < 50 cm^3						
Test item	Load conditions	Clutch	Applicable brake	Initial speed km/h	Braking distance m	Deceleration m/sec^2	Remarks
1. Type 0	2 riders	Disengaged	Front wheel (F1)	60	≤37.3	-	Max. input
Dry	2 riders	Disengaged	Rear wheel (R1)	60	≤54.0	-	Front wheel: 20 kgf
Efficiency test	1 rider	Disengaged	Front wheel	60	≤61.4	-	Rear wheel : 35 kgf
	1 rider	Disengaged	Rear wheel	60	≤61.4	-	Vmax: Max. machine speed
	1 rider	Engaged	Front/rear wheels	V_1, V_2, V_5	-	-	V_1 = 30% Vmax, V_2 = 80% Vmax, or 160 km/h, whichever is lower. V5 = 55% Vmax
2. Type							V_3 = 70% Vmax or 100 km/h, whichever is lower.
Fade test							No. of brake fades: 10
	Max. permissible						V_4 = 70% Vmax or 80 km/h, whichever is lower.
Base line check	weight	Disengaged	Front wheel (F1)	60	-	-	Interval:
Fade	↑	Engaged	Front wheel (F1)	$V_3 \rightarrow 0$	-	3	1000 m (includes U-turn)
Residual performance	↑	Disengaged	Front wheel (F1)	60	-	-	Requirement:
Base line check	↑	Disengaged	Rear wheel (R1)	60	-	-	Same input as for base line and deceleration is 60% or more.
Fade	↑	Engaged	Rear wheel (R1)	$V_4 \rightarrow 0$	-	3	
Residual performance	↑	Disengaged	Rear wheel (R1)	60	-	-	
3. Type 0							Water volume: 15 liter/h
Wet							Spray area: 1 km or more
Brake test							Requirement:
	Max. permissible						Same input as for base line and deceleration is:
Base line check	weight	Disengaged	Front wheel (F2)	60	-	2.5	A/B≥0.6, C/D≤1.2
Wet performance		Disengaged	Front wheel (F2)	60	-	-	A: Average deceleration speed on wet surface 0.5 sec. and 1.0 sec. after start of braking.
Base line check	↑	Disengaged	Rear wheel (R2)	60	-	2.5	B: Same speed but on dry surface.
Wet performance	↑	Disengaged	Rear wheel (R2)	60	-	-	C: Max. deceleration speed on wet surface.
							D: Same speed but on dry surface.

ITEM96-4 Brakes (Motorcycles)

Attachment-2

Australia (ADR 33/00)		
Series of tests and procedures	Initial vehicle speed (km/h)	Minimum average deceleration (m/s^2)
Instrumentation check	50 (max.)	N.A.
First effectiveness test	"Max. Motor Cycle Speed" ##	5.45
"LMCM" - All service brake systems	45 - 50	5.45
	95 - 100	5.45
Effectiveness test - independently	"Max. Motor Cycle Speed" ##	2.40
actuated service brake systems	45 - 50	2.40
	95 - 100	2.40
First burnish procedure	"Max. Motor Cycle Speed" ##	N.A.
	45 - 50	N.A.
Second effectiveness test	"Max. Motor Cycle Speed" ##	6.85
- All service brake systems	45 - 50	6.85
	95 - 100	6.35
	125 - 130	6.05
	*1	5.45
First base line check	45 - 50	*1
Fade test	95 - 100	*1
Fade recovery procedure	45 - 50	*1
Fade recovery test	45 - 50	*1
Second burnish procedure	"Max. Motor Cycle Speed" ##	N.A.
	45 - 50	N.A.
Third effectiveness test	"Max. Motor Cycle Speed" ##	6.85
- All service brake systems	45 - 50	6.85
	95 - 100	6.35
	125 - 130	6.05
	*1	5.45
Partial failure	"Max. Motor Cycle Speed" ##	3.0
	45 - 50	3.0
	95 - 100	3.0
Parking brake test	N.A.	N.A.
Second base line check	45 - 50	*1
Test with brakes subject to wetting	"Max. Motor Cycle Speed" ##	
	45 - 50	*1

Notes: N.A.: No condition applicable
: Applicable only to motorcycle having a "Maximum Motorcycle Speed" equal to or less than 50 km/h. *1:See ADR 33/00. 33.4 & 33.5

ITEM96-4 Brakes (Motorcycles)

Attachment-3

U.S.A (FMVSS 122)				
Item		Contents of requirements	Conditions	Method
First effectiveness test	Service brake system	48 km/h - 16.5 m (30 mph - 54 ft) 96 km/h - 65.8 m (60 mph - 216 ft)	Gripping force: 2.3-24.0 kg (5-55 lbs) Stepping force: 4.5-40.8 kg (10-90 lbs)	Brake temperature: 54-57°C (130-150°F 6 times from 48 km/h (30 mph) 6 times from 96 km/h (60 mph)
	Partial service brake system	48 km/h - 36.9 m (30 mph - 121 ft) 96 km/h - 147.5 m (60 mph - 484 ft)		
Burnish procedure			Machine weight = Empty machine weight + 90.7 kg (200 lbs)	200 times at 3.7 m/sec^2 (12 ft/sec^2) from 48 km/h (30 mph) Braking distance: Distance when brake temperature reaches 54-66°C (130-150°F) or 1.6 km (1 mile), whichever is shorter.
Second effectiveness test	Service brake system	48 km/h - 13.1 m (30 mph - 43 ft) 96 km/h - 56.4 m (60 mph - 185 ft) 128 km/h - 105.2 m (80 mph - 345 ft) 152 km/h - 164.2 m (95 mph - 485 ft)	Tire pressure: Manufacturer's recommended value	Same as first effectiveness test. Then, 4 times from 128 km/h (80 mph) Machines with max. 152 km/h (95 mph) or more, 4 more times.
Fade test	Base line check	Gripping force: 2.3-24.9 kg (5-55 lbs) or less Stepping force: 4.5-40.8 kg (10-90 lbs) or less		Compute max. average of 3 gripping/ stepping forces at 3.0-3.4 m/sec^2 (10-11 ft/sec^2) from 48 km/h (30 mph).
	Fade	10 times at 4.6 m/sec^2 (15 ft/sec^2) from 96 km/h (60 mph).		Initial temperature 54-56°C (130-150°F); deceleration maintenance 3/4 or more.
	Fade recovery	Stepping force: 40.8 kg (90 lbs) or less Gripping force: First 4 times: 24.9 kg (55 lbs) or less 5th: Average of base line check +9.5/-4.5 kg (+20/-10 lbs) or less		After running 1.6 km (1 mile) at 48 km/h (30 mph) after fade test. 5 times at 3.0-3.4 m/sec^2 (10-11 ft/sec^2) from 48 km/h (30 mph). Braking distance is 1.6 km (1 mile) or less.
Final effectiveness test	Service brake system	Same as second effectiveness test.		
Water recovery	Base line check	Gripping force: 2.3-24.9 kg (5-55 lbs) or less Stepping force: 4.5-40.8 kg (10-90 lbs) or less		3 times at 3.0-3.4 m/sec^2 (10-11 ft/sec^2) from 48 km/h (30 mph). Compute average of gripping/stepping forces.
	Water recovery	First 4 times: Gripping force: 24.9 kg (55 lbs) or less Stepping force: 40.8 kg (90 lbs) or less 5th: Average of base line check +9.5/-4.5 kg (+20/-10 lbs)		Immerse rear wheel in water for 2 minutes, then front wheel in water for 2, then conduct total immersion test for 7 minutes. After taking out, immediately accelerate to 48 km/h (30 mph) and stop 5 times at 3.0-3.4 m/sec^2 (10-11 ft/sec^2).

ITEM96-4 Brakes (Motorcycles)

Attachment-4

Item		Japan (Article 30)			
	Type (category)	250 cm^3 <	125 cm^3 < • ≤250 cm^3	50 cm^3 < • ≤125 cm^3	50 cm^3 ≥
Actual driving test	Braking initial speed km/h	Max. speed: 80 km/h or more: 50 km/h 35-79 : 35 20-35 : 20 Below 20 : Max. speed	Max. speed: 80 km/h or more: 50 km/h 35-79 : 35 20-35 : 20 Below 20 : Max. speed	Max. speed: 35 km/h or more: 35 km/h 20-35 : 20 Below 20 : Max. speed	Max. speed: 20 km/h or more: 20 km/h Below 20 : Max. speed
	Braking distance (test front wheel and rear wheel at same time)	Initial speed 50 km/h : 20 m 35 : 12 20 : 5 Max. speed (below 20): 5	Initial speed 50 km/h : 22 m 35 : 14 20 : 5 Max. speed (below 20): 5	Initial speed 35 km/h : 14 m 20 : 5 Max. speed (below 20): 5	Initial speed 20 km/h : 5 m Max. speed (below 20): 5
	Conditions	Input load : 30 kg or less for lever; 90 kg or less for pedal Load : At riding capacity (55 kg x riding capacity)			
Bench test	Stepping volume is 100 mm or less for both pedal and lever; load is 40 kg or less; braking efficiency must be 0.5 G or more.				

ITEM 96-5

Brakes (Buses, trucks)

APEC Regulation Analysis Findings
Item No. 96-5: Brake (Bus, Truck)

1. Brake regulations for commercial vehicles adopted in the APEC region can be roughly divided into the Japanese Safety Regulation, ECE R13, FMVSS 105/121 and ADR 35 groups.

2. Regulations of other member economies are much more limited in scope.

   The commercial vehicle brake regulation groups are: [ECE], [FMVSS(U.S.)-CMVSS(Canada)], [ADR], [Japan-Korea], [Singapore-Hong Kong], [New Zealand-Papua New Guinea], and [Malaysia-Brunei].

3. Australia recognizes most of the ECE regulation as an alternative, while New Zealand requires to comply one of ECE, EEC, FMVSS, ADR and SRRV.

4. Members economies have distinct vehicle categories applicable to brake and other specific requirements.

5. A comparison of specific requirements for commercial vehicle brakes is as follows:

(1) Australia (ADR 7), Canada, New Zealand, Papua New Guinea and U.S. (FMVSS 106) stipulate requirements for brake hoses and vacuum hoses as units separate from the vehicle.

(2) Japan, U.S., Europe, Australia and New Zealand require service brakes, emergency brakes and mechanical parking brakes, but their specific requirements and performance test procedures vary widely.

(3) Those member economies which provide a failure warning requirement have distinct descriptions and required performance levels.

(4) Only ECE specifies braking force distribution between the front and rear axles.

(5) Only ADR, FMVSS and ECE provide a fade requirement, but their specific fade requirements and test procedures differ considerably.

(6) Only ADR, FMVSS and ECE establish a wear adjustment requirement, with FMVSS requiring automatic adjustment.

(7) Only ECE sets forth a requirement for replacement brake shoes as separate units.

Item No.96-5 Brakes (Buses, Trucks)

A : Application : Buses, Trucks

Member Economies	B : Structural Requirements					
	B-a : Component Requirements	B-b : System Requirements				
		B-b-1 System	B-b-2 Split Brake	B-b-3 Wear Adjust	B-b-4 Failure Warning	B-b-5 Electric Vehicle
Australia		ADR 35/01 Service Emergency Mechanical Parking	ADR 35/01	ADR 35/01 Manual or Automatic	ADR 35/01 Fluid level or pressure loss Air pressure ABS	
Brunei		Unique (a)	Unique (a)		Unique (a)	
Canada	FMVSS 121	FMVSS 105 FMVSS 121	FMVSS 105 FMVSS 121	FMVSS 105 FMVSS 121	FMVSS 105 FMVSS 121	
Chili		Unique (b)	Unique (b)			
China						
Hong Kong		Unique (c)	Unique (c)		Unique (c)	
Indonesia		Unique (d)				
Japan		SRRV 12 Service Emergency Mechanical Parking	SRRV 12		SRRV 12 Fluid level or pressure loss Air or Vacuum ABS	
Korea		Unique (c)			Unique (e)	
Malaysia		Unique (a)	Unique (a)		Unique (a)	
Mexico						
New Zealand	Brake Hose, Vacuum Hose	Unique (f)	Unique (f)		Unique (f)	
Papua New Guinea	Unique (g)	Unique (f)			Unique (g)	
Philippine		Unique (h)	Unique (h)			

Member Economies	B : Structural Requirements					
	B-a : Component Requirements	B-b : System Requirements				
		B-b-1 System	B-b-2 Split Brake	B-b-3 Wear Adjust	B-b-4 Failure Warning	B-b-5 Electric Vehicle
Singapore		Unique (c)	Unique (c)		Unique (c)	
Taiwan		Unique (i)				
Thailand						
USA	FMVSS 121 Air compressor Reservoir	FMVSS 105 Service Emergency Mechanical Parking FMVSS 121 Service (dynamometer) Emergency Mechanical Parking	FMVSS 105 FMVSS 121	FMVSS 105 Automatic FMVSS 121 Automatic	FMVSS 105 Fluid level or pressure loss ABS FMVSS 121 Air pressure ABS	FMVSS 105 Stipulated
ECE (13.09)		Service Emergency Mechanical Parking	Be possible	Manual or Automatic	Oil pressure or level Air or Vacuum ABS	Stipulated

A : Application : Buses, Trucks

Member Economies				C : Performance Requirements		
				C-a : Service, Emergency, Parking		
	B-b-6 Spring Brake	B-b-7 Brake Distribution	B-b-8 ABS	C-a-1 Cold Test	C-a-2 Fade Test	C-a-3 Down Hill Test
Australia	ADR 35/01		ADR 35/01	ADR 35/01	ADR 35/01	
Brunei						
Canada	FMVSS 121			FMVSS 105	FMVSS 105 FMVSS 121	
Chili	Unique (b)			Unique (b)		
China						
Hong Kong				Unique (c)		
Indonesia						
Japan				SRRV 12		
Korea				Partly SRRV		
Malaysia						
Mexico						
New Zealand				Unique (f)		
Papua New Guinea				Unique (f)		
Philippine				Partly SRRV, (c)		

Member Economies				C : Performance Requirements		
				C-a : Service, Emergency, Parking		
	B-b-6 Spring Brake	B-b-7 Brake Distribution	B-b-8 ABS	C-a-1 Cold Test	C-a-2 Fade Test	C-a-3 Down Hill Test
Singapore						
Taiwan						
Thailand						
USA	FMVSS 121		FMVSS 105 FMVSS 121	FMVSS 105 FMVSS 121	FMVSS 105 FMVSS 121 (Dynamometer)	
ECE (13.09)	Not for Service Brake	Brake force among Axles (LSPV Requirements)	Category I Category II Category III EMC	5.0/4.0 m/s2 2.5/2.2 m/s2 18%	80 / 60%	6% 30 kph 7% 30 kph

A : Application : Buses, Trucks

Member Economies					D: Labeling	E: Reference Standards / Equivalent Standards
				C-b : Component		
	C-a-4 Air Response Time	C-a-5 Energy Accumulator	C-a-6 ABS	C-b-1 Lining CD Test		
Australia	ADR 35/01	ADR 35/01	ADR 35/01		ADR 35/01 Reservoir	ECE R13/01 to 13/06 plus ADR 35/01 some requirements
Brunei						
Canada	FMVSS 121	FMVSS 121			FMVSS 105	
Chili		Unique (b)				
China						
Hong Kong						
Indonesia						
Japan		SRRV 12	SRRV 12 Bus (for national highway)			
Korea		Unique (e)				
Malaysia						
Mexico						
New Zealand		Unique (f)				ECE 13, EEC 71/320 FMVSS 105, 121 ADR 35/01 SRRV 12
Papua New Guinea		Unique (f)				
Philippine						

Member Economies					D: Labeling	E: Reference Standards / Equivalent Standards
				C-b : Component		
	C-a-4 Air Response Time	C-a-5 Energy Accumulator	C-a-6 ABS	C-b-1 Lining CD Test		
Singapore						
Taiwan						
Thailand						
USA	FMVSS 121	FMVSS 121	FMVSS 105 FMVSS 121		FMVSS 105 Reservoir	
ECE (13.09)	0.2 / 0.4 sec	Air Brake Vacuum Brake Air Oil	Adhesion utilized μ jump Split	Test for Replacing Lining	Brake Oil LSPV E-Mark	

96-5. Brakes (Buses, Trucks)

Australia ADR 35/01 Commercial Vehicle Brake Systems (1/9)		
ITEM	CONTENT	Illustration / supplement
1. Application	This ADR applies to design and construction of the following vehicle categories : MB, MC, MD, ME, NA, NB and NC.	
2. Design requirement 2.1 Service brake system	2.1.0 General (1) All components are required to meet or exceed applicable standards. (2) Traction control systems which utilize parts of the brake system are permitted. (3) Vehicles with a rated towing capacity of more than 4.5 tons are required to be certified with an optional trailer air brake control system or supplied service brake response data by the manufacturer. (4) Antilock brakes, if fitted, are required to meet performance and interchangeability requirement. 2.1.1 Service brake failure visible indicators (1) The vehicle shall have one or more service brake failure visible indicators. (2) The visible indicator shall operate whenever any of the following conditions occur (i) Hydraulic brake circuit (no brake power unit) One of the followings : a) When a pressure failure occurs in any part of the service brake system, or optionally b) When a drop in the level of brake fluid occurs in the reservoir(s). (ii) One or more brake power units When the supply pressure in any one brake power unit drops to or below 65 percent of the average operating pressure. (iii) In the event of an electrical failure of the Antilock system. (3) Visible indicators shall be activated as a check of function when the ignition (start) switch is in a position between “on” (run) and “start” that is designated by the manufacturer as a check position. (4) At the option of the manufacturer where an indicator lamp is used the lamp shall be labeled with at least the word “BRAKE”, or the symbol for the brake failure specified in ISO 2575 - 1982(E). 2.1.2 Where the service brake system incorporates a single brake power unit an audible indicator shall be provided.	

Australia ADR 35/01 Commercial Vehicle Brake Systems (2/9)		
ITEM	CONTENT	Illustration / supplement
2.2 Parking brake system	2.2.1 The parking brake control shall be designed to minimize the possibility of inadvertent release of the brake. 2.2.2 Parking brake indicator lamp (1) The vehicle, if not fitted with a spring brake system or lock actuators, shall be provided with a lamp which indicates that the parking brake is engaged. (2) The lamp may be common with or distinct and separate from any service brake failure visible indicator lamp.	
2.3 Secondary brake system	2.3.1 The vehicle shall be equipped with a secondary brake system. 2.3.2 Hydraulic service brake systems shall be split service brake systems.	
2.4 Special provisions for all vehicles with hydraulic brake systems	2.4.1 In cases where the service brake system incorporates a master cylinder, each service brake sub-system serviced by the master cylinder shall have a reservoir. A statement specifying the type of fluid to be used in the brake system and displaying at least the words “WARNING. Clean filler cap before removing” shall be permanently affixed, stamped engraved or embossed.	
2.5 Special provisions for systems using stored energy (except spring brake system)	2.5.1 For a system incorporating brake power units, the combined volume of all stored energy devices at positive pressure shall be not less than 12 times the combined volume of all service brake chambers at maximum travel of the pistons or diaphragms 2.5.2 Any device generating energy at positive pressure for a brake power unit shall be of sufficient capacity to increase the pressure in the stored energy device(s) from 85 percent of the average operating pressure to the average operating pressure within a time given by the expression : Actual stored energy capacity X25 / Required stored energy capacity.	

Australia ADR 35/01 Commercial Vehicle Brake Systems (3/9)		
ITEM	CONTENT	Illustration / supplement
	2.5.3 Vehicles equipped to tow a trailer with a air brakes provide additional air compressor capacity 2.5.4 For service brake systems incorporating brake power unit and operating at positive pressure a gauge(s) shall be fitted to indicate the pressure in each independent storage system. 2.5.5 Pressure measuring points for maintenance checking are required. 2.5.6 Preferential charging of energy storage devices servicing the brake system is required.	
3. Performance requirements	The vehicle shall be capable of meeting the range of performance test set out in Table 1, subject to the general test conditions of 3.1 and the particular test conditions of 3.2.	
3.1 General test conditions	3.1.1 For all effectiveness, secondary brake and partial failure tests, no part of the vehicle shall not exceeding 3.7 meters in width. 3.1.2 Test conditions for vehicles fitted with retractable axles are specified.	
3.2 Particular test conditions	3.2.1 The vehicle shall be deemed to safety the requirement of each of the following tests (modes) if all the parameters specified in Table 1 for each test (mode) are met in at least one test (mode) within the number of tests (modes) that shall not exceed 6. Items : 3, 4, 5, 6, 7, 8, and 15 3.2.2 Secondary brake test (1) Where the secondary brake is not applied by the service brake control, the vehicle shall be decelerated using only the secondary brake system. Where the secondary brake is applied by the service brake control, the vehicle shall be decelerated using the secondary brake system for each single failure of a fluid system, including where appropriate : (i) each sub-system of a split service brake, and (ii) failure of energy assistance in a brake power assist unit	

Australia ADR 35/01 Commercial Vehicle Brake Systems (4/9)

ITEM	CONTENT	Illustration / supplement

3.2.3 Partial failure test

This requirement shall apply only to a vehicle fitted with a brake system where the secondary brake system where the secondary brake is applied by the service brake control for each single type of partial failure, including :

(i) inoperative antilock system ; and

(ii) inoperative variable proportioning brake system

3.2.4 Service brake fade test

Service brake fade testing shall be carried out in accordance with the requirement of either (1) or (2).

(1) Vehicle service brake fade test

(i) Successive deceleration tests shall be conducted in accordance with the following :

Vehicle Category	Initial Speed (km/h)	Final Speed at End of Deceleration (km/h)	Minimum Stabilizing Time at Initial Speed (seconds)	Maximum Interval between Applications (seconds)	Minimum Number of Applications	
MB,MC, MD, NA	V1	V2	10	55	15	$(V1)^2 - (V2)^2 \geq 7500$
ME, NB, NC	V1	V2	10	70	20	$(V1)^2 - (V2)^2 \geq 2700$

(ii) Vehicles shall attain a sustained deceleration of not less than $3m/s^2$ during the first deceleration mode. Subsequent deceleration shall be conducted employing a control force not less than that established during the first deceleration mode.

Australia ADR 35/01 Commercial Vehicle Brake Systems (5/9)		
ITEM	CONTENT	Illustration / supplement
	3.2.5 Service brake fade effectiveness check The test carried out in accordance with item 10 of Table 1. 3.2.6 Service brake water conditioning procedure Service brake water conditioning shall be carried out in accordance with requirements of either (1) or (2) : (1) Water immersion The vehicle shall be driven through water of the depth of not less than 60 percent of the static loaded tyre radius of tyres fitted, for a period of at least 2 minutes. (2) Water spray The braking surfaces of all brake assemblies fitted to the vehicle shall be simultaneously and continuously wetted for a period of not less than 5 minutes. 3.2.7 Service brake water recovery procedure Three stops shall be conducted as following conditions Initial speed : Item 10 of Table 1 Deceleration : 2.0 m/s^2 3.2.8 Service brake water effectiveness check This check shall be repetition of the service brake fade effectiveness check as specified in 3.2.5 except the deceleration achieved is not less than that specified in item 13 of Table 1. 3.2.9 Service brake spike stop procedure Ten spike stops shall be conducted as specified in item 14 of Table 1. Spike stop : A stop resulting from the application of a pedal effort of at least 885N on the service brake control attained within 500 milliseconds from the instant at which the control leaves the initial brake location.	

Australia ADR 35/01 Commercial Vehicle Brake Systems (6/9)		
ITEM	CONTENT	Illustration / supplement
	3.2.10 Service brake spike stop effectiveness check The vehicle shall be deemed to pass this check if all the parameters specified for each set of conditions listed in item 15 of Table 1 are met. 3.2.11 Parking brake test The vehicle shall be deemed to pass this test if : (i) for 5 minutes in both forward and reverse directions it remains stationary on a 18 percent grade ; and (ii) the force required to actuate the parking brake does not exceed 685N for a foot-operated system and 590N for a hand-operated system. 3.2.12 Service brake actuating time test (1) This test is applicable only to vehicle using air at positive pressure as the operating fluid and incorporating one or more brake power units. (2) The pressure at the slowest reacting brake chamber must attain a level not less than 65 percent of the average operating pressure within a period not exceeding 600 milliseconds measured from the instant the control leaves the initial brake control location. (3) Within 500 milliseconds of the control being released the pressure in the slowest reacting brake chamber must fall below the lesser of either (i) 5 percent of the average operating pressure or (ii) to a pressure at which the friction materials cease to contact each other.	
4. Alternative Standards	The technical requirements of ECE R13/01 to 13/06 shall be deemed to be equivalent to the technical requirements of this rule, provided that the certain requirements of this rule shall be met.	

96-5. Brakes (Buses, Trucks)

Australia ADR 35/01 Commercial Vehicle Brake Systems (7/9)

TABLE 1

Item No.	Test and Procedures	Vehicle Category	Initial Speed (km / h)	Minimum ‘ Average Deceleration’ (m / s²)	Vehicle Mass	Gear Selector	Maximum ‘Control’ Force (N)
1.	Pre - test Instrumentation Check	All	40 Max	See Text	--	--	--
2.	Service Brake Burnishing Procedure (optional)	All	See Text	See Text	--	--	--
3.	Service Brake Lightly Laden Effectiveness Test	MB, MC, MD, ME	100	4.19	L	N	685
		NA, NB, NC, LEG	100	3.78			
4	Lightly Laden Secondary Brake Test	MB, MC, MD, ME	60	2.10			590 (hand)
		NA, LEG	70	2.0			
		NB	50	1.85	L	N	685 (foot)
		NC	40	1.80			
5.	Lightly Laden Partial Failure Test	MB, MC, MD, ME	60	2.10			
		NA	70	2.0			
		NB	50	1.85	L	N	685
		NC	40	1.80			
6.	Service Brake Lightly Laden Effectiveness Test	MB, MC, MD, ME	100	4.19	M	N	685
		NA, NB, NC, LEG	100	3.78			

Australia ADR 35/01 Commercial Vehicle Brake Systems (8/9)

TABLE 1 (continued)

Item No.	Test and Procedures	Vehicle Category	Initial Speed (km / h)	Minimum ‘ Average Deceleration’ (m / s²)	Vehicle Mass	Gear Selector	Maximum ‘Control’ Force (N)
7.	Laden Secondary Brake Test	MB, MC, MD, ME	60	2.10			590 (hand)
		NA, LEG	70	2.0			
		NB	50	1.85	M	N	685 (foot)
		NC	40	1.80			
8.	Laden Partial Failure Test	MB, MC, MD, ME	60	2.10			
		NA, LEG	70	2.0			
		NB	50	1.85	M	N	See Text
		NC	40	1.80			
9.	Service Brake Fade Test	All	See Text	See Text	M	D	See Text
10	Service Brake Fade Effectiveness Check	MB, MC, MD, ME	60	3.02			
		NA, LEG	70	2.84			
		NB	50	2.63	M	N	685
		NC	40	2.47			
11	Service Brake Water Conditioning Procedure	MB, MC	See Text	--	M	D & R	--
12	Service Brake Water Recovery Procedure	MB, MC	See Text	--	M	D	685
13.	Service Brake Water Effectiveness Check	MB, MC	60	2.27	M	N	685

96-5. Brakes (Buses, Trucks)

Australia ADR 35/01 Commercial Vehicle Brake Systems (9/9)

TABLE 1 (continued)

Item No.	Test and Procedures	Vehicle Category	Initial Speed (km / h)	Minimum ‘ Average Deceleration’ (m / s²)	Vehicle Mass	Gear Selector	Maximum ‘Control’ Force (N)
14.	Service Brake ‘Spike Stop 35/01’ Procedure	All without a ‘ Brake Power Unit 35/01 ‘	40	--	M	N	Refer Def
15.	Service Brake 'Spike Stop 35/00' Effectiveness Check (applicable only to vehicles without a 'Brake Power Unit 35/01 ')	MB, MC, MD, ME NA, LEG NB NC	60 70 50 40	3.02 2.84 2.63 2.47	M	N	685
16.	Parking Brake Test	All	--	--	M	N	590 (hand) 685 (foot)
17.	Service Brake Actuating Time Test	See Text	N.A.	N.A.	N.A.	N.A.	See Text
18.	Service Brake Compatibility Test	See Text	60	See Text	Table 2	N	685

“ M ” means ' Maximum Loaded Test Mass 35/01 '

“ L ” means ' Lightly Loaded Test Mass 35/01 '

“ D ” means transmission control in “drive” position appropriate to test speed

“ N ” means transmission control in “neutral” position.

“ R ” means transmission control in “reverse” position

“ N.A.” means not applicable.

96-5. Brakes (Buses, Trucks)

Brunei		(1/1)
ITEM	CONTENT	Illustration / supplement
Road Traffic Regulations 12	* Every motor vehicle shall have two means of operation so designed that, even in case of the failure of any part, the brakes can still be applied to not less than half the number of the vehicle's wheels (exceptions: vehicle with 1-ton or less unladen weight, 2- or 3-wheeled vehicle). * For a vehicle having more than three wheels, at least one means of operation shall be capable of causing brakes to be applied to all the wheels. * The application of one means of operation shall not affect the other means of operation. The braking system shall not be rendered ineffective by the non-rotation of the engine. * At least one means of operation shall be mechanical. * At least one means of operation shall be capable of causing brakes to be applied directly, not through the transmission gear, to not less than half the number of wheels. (Exception: vehicles having more than four wheels not equipped with differential.) * Every motor vehicle shall have a parking brake system which acts on at least two wheels, but one wheel in case of a 3-wheeled vehicle. * A brake system that uses negative or positive servo pressures shall have a warning device readily visible to the driver indicating any failure in the pressure system.	

96-5. Brakes (Buses, Trucks)

CANADA (1/1)

ITEM	CONTENT	Illustration / supplement
CMVSS 105	Hydraulic brake systems This standard is generally harmonious with the U.S. FMVSS 105 Hydraulic brake system.	
CMVSS 121	Air brake systems This standard is generally harmonious with the U.S. FMVSS 121 Air brake systems	

96-5. Brakes (Buses, Trucks)

Chile (122: 3-20.3 and 4-12)		(1/1)
ITEM	CONTENT	Illustration/supplement
1. Application 2. Brake system Article 3, para. 20.3	Buses for public transit service in designated urban areas: [Exceeding 26 in seating capacity including driver, and not less than 10 tons in GVW] The brake system shall consist of the following mutually independent subsystems: * Service brake * Parking brake * Automatic engine brake (exhaust brake?) a) The service brake shall be of totally air pressure control type consisting of two independent circuits—one for front wheels and the other for rear wheels. b) The parking brake shall be capable of holding the vehicle laden to its maximum payload stationary on a 22% grade even in the absence of the driver. The parking brake shall be spring-activated and released by air pressure supplied from an independent air reservoir of which capacity is large enough for eight (8) complete parking brake applications and releases with the air compressor disconnected. In an emergency, the parking brake shall be capable of providing 2 m/sec^2 deceleration from the initial speed of 50 km/h at maximum payload on a flat, dry pavement with the gear in neutral. [26 or less in seating capacity including driver, and less than 10 tons in GVW]:	
Article 4, para. 12	The brake system shall meet the requirements of Article 3, paragraph 20.3, except that the service brake system shall be of totally air pressure control type equipped with engine brake (exhaust brake?).	

96-5. Brakes (Buses, Trucks)

Hong Kong

(1/1)

ITEM	CONTENT	Illustration/supplement
Road Traffic Regulations 16 Brakes	(1) (2) With the exception of split brake system, every motor vehicle shall be equipped with either an efficient braking system having 2 means of operation or 2 efficient braking systems each having a separate means of operation. No account shall be taken of multi-pull means of operation unless otherwise specified. (3) Not withstanding the failure of any part, the braking system shall be capable of bringing the vehicle to rest within a reasonable distance. (4) At least one means of operation shall be capable of causing brakes to be applied directly to all the wheels. The other means shall be capable of causing brakes to be applied directly, not through the transmission to at least one wheel of a vehicle with not more than 3 wheels, and to at least half the number of wheels of a vehicle with more than 3 wheels. (Axle shaft is not deemed a part of the transmission.) (5) The application of one of the means of operation shall not affect the other means. (6) (7) Braking system shall not be rendered ineffective by the non-rotation of the engine. A moving shaft to which any part of a braking system is attached is deemed part of that system.	
17 Parking brake	• An independent braking system with 50 % or more efficiency, applied by mechanical action, capable of holding the vehicle stationary on a gradient of at least 1 in 6.25.	
18 Vacuum or pressure braking system	• This braking system shall be provided with a warning device readily visible or audible to the driver in case of any failure in the vacuum or pressure system. (There are some exceptions for a vehicle with vacuum brakes and no greater than 5.5 tones in GVW, and also conditional exception for vehicles using pressure braking system.	
18A Hydraulic braking system	• This braking system shall be provided with a warning device readily visible or audible to the driver in case of fluid loss. The warning device shall detect the differential in fluid pressure or a drop in fluid level in a split braking system, and a loss in the applied fluid pressure, or a drop in fluid level in case of a non-split braking system.	
19 Braking efficiency	• Every vehicle shall have brakes acting on all the wheels with no less than 50% total braking efficiency. • Brakes applied by a second independent means of operation and a split brake system shall have no less than 25% total efficiency.	

96-5. Brakes (Buses, Trucks)

Indonesia 44/1993-18, 19, 20, 21, 22 (1/1)		
ITEM	CONTENT	Illustration/supplement
II Motor Vehicle Regulations 1. Brake (efficiency) - Service brake b. Bus & cargo car - Parking brake With hand brake * Bus & cargo car With foot brake * Bus & cargo car	 With brake force ≤ 700N, E ≥ 60% With brake force ≤ 500N, E ≥ 12% With brake force ≤ 700N, E ≥ 12%	
Vehicles & Drivers Article 18 Article 19 Article 20 Article 21 Article 22	 Every vehicle must be equipped with main brake and parking brake. Main brake shall be able to be controlled by the driver without taking his hands off the steering wheel. It shall work on all the wheels of the vehicle, and even in a partial failure shall work at least on the wheels on either side of the vehicle. Parking brake shall be equipped with a mechanical lock and shall be able to hold the vehicle stationary on both flat road and slope. The braking instrument performing the function as the main brake and the parking brake may possess double components. A bus with its weight less than 7 tons (comment by the excerpt editor: perhaps should read “7 tons or more”) and a cargo van in excess of 12 tons must also be equipped with a decelerating brake.	

96-5. Brakes (Buses, Trucks)

Japan Safety Regulations for Road Vehicles (1/3)

ITEM	CONTENT	Illustration / supplement
1. Article 12 Brake System	12.1 The brake system shall consist of at least two separate lines which can function independently. 12.2 The service brake system shall be capable of braking the wheels, the number of which is half the number of wheels of the motor vehicle or more and which include all the rear wheels. 12.3 The brake performance shall conform to the following requirements under an application force of 90 kg or less in the case of a foot operation type and 30 kg or less in the case of a hand operation type.	

Maximum speed of motor vehicle (km / h)	Initial speed (km / h)	Stopping distance (m)
80 or more	50	20 or less
35 or more and less than 80	35	14 or less
20 or more and less than 35	20	5 or less
Less than 20	Maximum speed thereof	5 or less

12.4 The service brake system shall be constructed so that even if a part of the brake piping is damaged, at least two wheels still may be braked. However this provision shall not apply to the service brake system of motor vehicle provided with an emergency brake system.

12.5 The parking brake shall be operated mechanically.
Parking brake performance

~~Gradient~~	~~Vehicle weight~~	~~Application force (kg)~~
1 / 5	Unloaded	40 or less hand operated 60 or less foot operated

12.6 The service brake system shall be provided with buzzer or other warning devices to give warning to the driver when the brake system encounters a trouble affecting the braking effect because of leaking brake fluid.

96-5. Brakes (Buses, Trucks)

Japan Safety Regulations for Road Vehicles (2/3)		
ITEM	CONTENT	Illustration / supplement
	12.7 The braking system shall have an adequate capacity of accumulating pressure for braking. The braking system shall be provided with a buzzer or other warning devices to give warning to the driver when the brake system encounters a trouble affecting the braking effect because of the change in pressure. However, this provision shall not apply to a brake system which still conforms to the requirement of itemn12.3, even when the air pressure is reduced to null. 12.8 Buses for high-speed national highway, with a GVW exceeding 12 tons. The service brake system shall be provided with anti-lock brake systems. The service brake system shall be provided with a buzzer or other warning device to give warning to the driver when the anti-lock brake systems fail to function properly.	

96-5. Brakes (Buses, Trucks)

Japan Technical Standards and TRIAS (3/3)		
ITEM	CONTENT	Illustration / supplement
Technical Standards Type Approval Testing Standard	1. Technical standard for brake fluid leakage warning devices. (Jisha 899, 1983) (TRIAS : Traffic Safety and Nuisance Research Institute's Automobile Type Approval Test Standard) TRIAS 11 - 1993 Braking test procedure for motor vehicles TRIAS 12 - 1993 Service brake system efficiency test procedure for motor vehicles TRIAS 13 - 1993 Parking braking system efficiency test procedure for motor vehicles TRIAS 14 - 1993 Test procedure for measuring the drop in motor vehicle braking performance TRIAS 15 - 1993 Test procedure for air capacity for braking motor vehicles TRIAS 18 - 1993 Test procedure for emergency brake for motor vehicles TRIAS 19 - 1993 Test procedure for braking performance during brake alarm setting of period for motor vehicles TRIAS 19 - 2 - 1975 Brake fluid leakage warning device test procedure	

96-5. Brakes (Buses, Trucks)

Korea Safety Standards, Article 15, 90 (1/2)		
ITEM	CONTENT	Illustration/supplement
Motor Vehicle Safety Standards Article 15	(1) A vehicle shall be equipped with both service brake and parking brake systems which can be operated independently. Service brake shall act on all wheels. But one brake system alone is acceptable if the vehicle's maximum speed is less than 25 kmh. Service brake performance (typical case in Appendix 3): Stopping distance ≤ 22 m from 50 kph initial speed with a foot effort of ≤ 90 kg or hand effort ≤ 30 kg at unladen weight plus one occupant. Service brake capability (typical case in Appendix 4): 50% of GVW or more for a vehicle with ≥80 kph maximum speed and GVW greater than 1.2 times the curb weight, the sum of braking force of each axle ≥ 50% of GVW LH/RH difference in braking force: ≤ 8% of that axle weight Recovery: Braking force shall drop to 20% of that axle weight or less within 3 sec after the brake pedal is released. (Excerpt editor's comment: Meaning not clear.) Parking brake capability (Appendix 5): Capable of holding the vehicle stationary on a 11.5 deg or 20% grade with the operation force of ≤ 70 kg for foot or ≤ 50 kg for hand. (3) A vehicle shall have a readily visible warning device that alerts the driver when the brake fluid or air pressure level has dropped below the safe level.	
Test Standards for Motor Vehicles Article 90	(Excerpt editor's comment: Identical with Article 15 with the exception of the following.) (1) Service brake performance (typical case in Appendix 7): Stopping distance ≤ 20 m in loaded state. Service brake capability (typical case in Appendix 8): Operating force ≤70 kg loaded. LH/RH difference ≤ 6% of that axle weight. Parking brake capability (Appendix 9): Capable of holding the vehicle stationary for at least 5 minutes on a 11.5 degrees grade (9 degrees, in the case of a vehicle with 4.5 ton or more GVW).	

96-5. Brakes (Buses, Trucks)

Korea		(2/2)
ITEM	CONTENT	Illustration/supplement
	(2) Different requirements are applicable to a warning device for a hydraulic brake system except for one common with that for parking brake. A warning lamp color shall be red and shall have luminous intensity readily visible from the driver's position, and warning sound level shall be 75 decibels at the location of the driver's ear. (3) Braking efficiency of the air brake system shall be not less than 0.35 after the brake pedal has been fully depressed and released for 15 times at every 10 seconds. It shall not be less than 0.35 when the warning system is activated.	

96-5. Brakes (Buses, Trucks)

Malaysia (Motor Vehicles (Construction and Use) Rules-15, 1959) (1/1)		
ITEM	CONTENT	Illustration / supplement
15. Brakes	(2) Every motor vehicle shall have two means of operation so designed that, even in case of the failure of any part, the brakes can still be applied to not less than half the number of the vehicle's wheels. (exceptions: vehicle with 1-ton or less unladen weight, 2- or 3-wheeled vehicle) (3) For a motor vehicle having more than three wheels, at least one means of operation shall be capable of causing brakes to be applied to all the wheels. (4) The application of one means of operation shall not affect the other means of operation. (5) The braking system shall not be rendered ineffective by the non-rotation of the engine. (6) At least one means of operation shall be mechanical. (7) At least one means of operation shall be capable of causing brakes to be applied directly, not through the transmission gear, to not less than half the number of wheels. (Exception : vehicle having more than four wheels not equipped with differential) (8) A moving shaft to which any part of a braking system is attached is deemed part of that system. (9) Every motor vehicle shall have a parking brake system which acts on at least two wheels, but one wheel in case of a 3-wheeled vehicle. (10) A brake system that uses negative or positive servo pressures shall have a warning device readily visible to the driver indicating any failure in the pressure system.	

96-5. Brakes (Buses, Trucks)

New Zealand		(1/2)
ITEM	CONTENT	Illustration/supplement
Traffic Regulation 68	(1) Each vehicle shall be equipped with both a service brake and a parking brake system. (2) The service brake shall be capable of stopping a laden vehicle within 7 m from the initial speed of 30 kph. The parking brake shall be capable of stopping a laden vehicle within 17 m from the same initial speed, or holding the vehicle stationary on 1/5 slope. (9) (10) About equal braking effect shall act on wheels on a common axis. The system shall be easy to adjust and shall be well maintained. (11) Air and vacuum hoses shall be those approved.	
The Transport (Vehicle Standards) Regulations13	(1) Every vehicle shall be equipped with at least 2 independent braking systems which provide the functions of a service brake, emergency brake and parking brake. (2) The service brake shall act on all wheels of the vehicle. (3) The emergency brake shall act on half or more of the wheels without interposition of gears when practicable. May be combined with the parking brake function. (4) The parking brake shall act on half or more of the wheels and shall be capable of holding the vehicle at rest, when fully laden, on a slope of 1 in 5. (5) (6) With the exception of ABS, the brake shall be designed such that the braking effect on a common axis is commensurate with the load applied to each wheel. (7) Hoses for air, hydraulic oil, or vacuum brake shall comply with applicable safety standard or shall be approved ones. (8) The brakes shall meet appropriate vehicle standards (ECE13, EEC 71/320-75/524, FMVSS 105-122, ADR 31 - 38, Safety Regulations for Motor Vehicles Art. 12, 13).	

96-5. Brakes (Buses, Trucks)

New Zealand (2/2)

ITEM	CONTENT	Illustration/supplement
The Goods Service Vehicle (Constructional) Regulations 2	(1) In cases where brake connection loss would render brakes on more than one wheel inoperative or where the connection forms part of brake system which acts directly on two wheels only or through a gear only shall be secured by an approved locking device or an approved hardened bolt with castellated nut and split pin. (4) Air reservoir capacity shall be such that a minimum of 5 full service-brake applications with full release after each application before the low-pressure warning operates, and 2 subsequently. The compressor shall be capable of recovery within 3 minutes from the time the low-pressure warning ceases to operate or from the time the emergency braking operates, and within 1 1/2 minutes from the aforementioned 5 full applications. The air gauge, one each for each subsystem in case of a split brake system, shall be readily visible to the driver. Continuous warning shall be set off when the reservoir pressure has dropped below the level recommended by the manufacturer, or when no such recommendation exists, below 50% of the compressor-governor cut-out pressure. The first call upon the supply and store of energy shall be that of the braking system and the brake shall have first call upon the supply from the compressor. No auxiliary air-operated device shall be connected to the air-braking system except with the approval of the vehicle manufacturer (conditions omitted).	
Passenger Service Vehicle Construction Regulations 6	(1) The service brake shall be capable of stopping the vehicle within 7 m from the initial speed of 30 kph (unladen). (2) (The same requirements as in item 2 (4) on the preceding page except that there is no requirement for recovery within 3 minutes.) (3) The braking system with a hydraulic pump shall be equipped with an audible warning and either a visible warning or a suitable gauge so that the driver may at all times become aware immediately the minimum pressure for safe operation is reached. (4) The vacuum braking system shall provide a continuous audible warning when the vacuum is less than 200 mm. The vehicle shall be equipped with a vacuum gauge which indicates to the driver the vacuum in millimeters of mercury. This clause is not applicable to taxicabs, rental cars, or school vehicles.	

96-5. Brakes (Buses, Trucks)

Papua New Guinea		(1/1)
ITEM	CONTENT	Illustration/supplement
Motor Traffic Act Regulation 125 A	(1) A vehicle shall be equipped with a service brake and a parking brake which are mutually independent. (3) (c) The service brake shall be capable of stopping the vehicle within 7 m from the initial speed of 30 kph.	
(4) through (10) not distributed; details unknown.		
	(11) The compressor shall be capable of raising the pressure to the point at which it unloads in not more than 1.5 minutes from the moment the pressure has fallen after full application. (12) The reservoir shall be equipped with a gauge readily visible to the driver, as well as an audible low-pressure warning device. (13) Operation of auxiliaries shall not lower the pressure below two thirds of the maximum operational pressure. (14) Air or vacuum hoses shall be those specifically designed for the purpose.	

96-5. Brakes (Buses, Trucks)

Philippines Regulation:S11-AO, S34b ra 4136, AUV(PNS)718 (1/1)		
ITEM	CONTENT	Illustration/supplement
Republic Acts Sec. 34 (b)	Hydraulic brake system shall be dual and shall act on either the front or rear wheels in case of hydraulic line failure. In the absence of the dual system, safety valve devices shall be provided that will enable the brakes to be applied to either the two front wheels or two rear wheels. This requirement is not applicable to a vehicle equipped with pneumatic braking system.	
Administrative Order Sec. 11	The braking force shall be no less than the axle weight. RH/LH differential shall be no greater than 10% of the axle weight. The brake system shall be solid enough not to affect the vehicle's steering. The service brake shall be effective on at least half the vehicle wheels including rear wheels. f. Typical service brake performance: Shall be capable of stopping the vehicle within 22 m from the speed of 50 kph under an application force of 90 kg or less for a foot brake and 30 kg or less for a hand brake. The service brake system shall be effective on half or more of the vehicle wheels even in a partial failure of pipings (except the part of the piping serving two or more wheels). This is not applicable to emergency brake system. h. Brake fluid shall not cause corrosion or formation of bubbles. i. The brake system shall mechanically hold an unloaded vehicle on a 1/5 gradient. Braking force shall be 90 kg or less for foot and 50 kg or less for hand operation.	
PNS 718	Brake requirements for AUV's (omitted).	

96-5. Brakes (Buses, Trucks)

Singapore (1/1)

ITEM	CONTENT	Illustration/supplement
Road Traffic Rules Brakes C12	(1) Except with a split braking system, a vehicle shall have a braking system having two means of operation, or with two effective braking systems each having a separate means of operation. (3) The braking system shall be so designed that, despite a failure of any part of the system, braking can still be effective on half or more wheels and capable of stopping the vehicle within a reasonable distance, but effective on one wheel only for a vehicle having two or less vehicle of which unladen weight is 1 ton or less. (5) A vehicle having more than 3 wheels shall be equipped with at least one means of operation capable of braking all the wheels. (8) Application of one means of operation shall not affect the other means of operation. (9) The braking system shall not be rendered ineffective by the non-rotation of engine. (10) All the brakes which are operated by one of the means of operation shall be capable of being applied by direct mechanical action without the intervention of any hydraulic, electric or pneumatic devices. (11) (12) At least one means of operation shall be capable of braking half or more of the wheels without intervention of transmission gear. (Exception for vehicles with more than 3 wheels but without differential.) A rotating shaft to which any brake part is fitted shall be regarded as a part of the braking system. (14) A system that can be applied only with successive application is not deemed as a braking system with the exception specified. (15) (16) A braking system using vacuum or pressure reservoir shall have a readily visible warning device that warns the drive of system failure. This device is not required for a vacuum system for a vehicle no greater than 3 tons in unladen weight if, despite the failure, the vehicle can still be stopped within a reasonable distance. (17) A goods vehicle shall be equipped with a split braking system.	
Parking Brake C13	The parking brake shall be able to prevent at least two wheels (one wheel for a vehicle with only 3 wheels) from revolving when the vehicle is parked.	
Public Service Vehicle C63, C65	63 One of the braking systems shall be applied by pedal. Every public service vehicle shall have a split braking system. 65 Where the brake and steering connections are secured with bolts or pins, the bolts or pins shall be effectively locked and their heads shall be always uppermost.	

96-5. Brakes (Buses, Trucks)

Chinese Taipei		(1/1)
ITEM	CONTENT	Illustration/supplement
Article 39-9	9 Do the efficiency of the brakes and hand brake system meet the specified requirements? (Excerpt editor's comment: A copy of the Regulation is not yet available.)	

96-5. Brakes (Buses, Trucks)

U. S. A. FMVSS 105 Hydraulic brake systems (1/8)		
ITEM	CONTENT	Illustration / supplement
1. Application	This standard applies to passenger cars, multipurpose passenger vehicles, trucks, and buses with hydraulic service brake systems. The vehicle category applicability is shown in Table I.	
2. Service brake system	2.1 Stopping distance. The service brakes shall be capable of stopping each vehicle in the specified effectiveness tests within the distance and from the speeds specified in Table II. 2.2 Partial failure - Split service-brake system In the event of a failure in a single subsystem, the remaining portion(s) of the service brake system shall be capable of stopping the vehicle from 60 mph within the corresponding distance specified in Table II. 2.3 Inoperative brake power assist unit or brake power unit. The service brakes on a vehicle equipped with one or more brake power assist units or brake power units, with one such unit inoperative, shall be capable of stopping the vehicle from 60 mph in either of the following requirements I, II, or III.	

U. S. A. FMVSS 105 Hydraulic brake systems (2/8)

ITEM	CONTENT		Illustration / supplement
	Vehicle with power assist unit(s)	Vehicle with power unit(s)	
I	Stopping distances in feet [a]: 456 [b] and [c]: 517 [d] and [e]: 613	The same to the left	
II	Average deceleration, FPSPS Stop No. / [a] / [b], [c], [d], [e] 1 / 16.0 / 14.0 2 / 12.0 / 12.0 3 / 10.0 / 10.0 4 / 9.0 / 8.5 5 / 8.5 / 7.5 6 / 7.5 / 6.7 7 / 7.0 / 6.0	Average deceleration, FPSPS Stop No. / [a] / [b], [c], [d], [e] 1 / 16.0 / 13.0 2 / 13.0 / 11.0 3 / 12.0 / 10.0 4 / 11.0 / 9.5 5 / 10.0 / 9.0 6 / 9.5 / 8.5 7 / 9.0 / 8.0 8 / 8.5 / 7.5 9 / 8.0 / 7.0 10 / 7.5 / 6.5 11 / 7.0 / 6.0	
III	15 consecutive stops with an average deceleration for each stop that is not lower than 12 fpsps.	The same to the left	
Note : [a] Passenger cars [b], [c], [d] and [e] vehicles other than passenger cars			

U. S. A. FMVSS 105 Hydraulic brake systems (3/8)

ITEM	CONTENT		Illustration / supplement
	2.4 Fade and recovery The service brakes shall be capable of stopping each vehicle in two fade and recovery tests as specified below. Fade and recovery		
	GVWR ≤ 10,000 lbs	GVWR > 10,000 lbs	
	Fade stops, 60 mph 5 stops (10 stops on the second test) at 15 fpsps 5 stops, at 5 to 15 fpsps	10 fade snubs (20 fade snubs on the second test) at 10 fpsps	
	5 recovery stop at 10 fpsps control force Max. 1st to 4th stops, 150 lbs 5th stop, *A + 20 lbs Min. A - 10 lbs or 0.60 × *A, Whichever is lower (but in no case lower than 5 lbs) *A = average control force for the baseline check	5 recovery snubs, 40 to 20 mph at 10 fpsps control force The same to the left	

U. S. A. FMVSS 105 Hydraulic brake systems (4/8)

ITEM	CONTENT	Illustration / supplement

2.5 Water recovery

After being driven for 2 minutes at a speed of 5 mph through a trough having a water depth of 6 inches, each vehicle shall be capable of making five recovery stops from 30 mph at 10 fpsps.
Control force :

Max. 1st - 4th stops - 150 lbs
5th stop - *A + 45 lbs (but in no case more than 90 lbs) : GVWR ≤ 10,000 lbs
*A + 60 lbs (but in no case more than 110 lbs) : GVWR > 10,000 lbs
Min. *A - 10 (lbs) or 0.60 × *A (lbs), whichever is lower (but in no case lower than 5 lbs)

*A = average control force for the baseline check

2.6 Spike Stops

10 stops, 30 - 0 mph, 200 lbs pedal force in 0.08 sec.
Stopping distance : Column I of Table II

3. Parking brake system

Hold vehicle stationary for 5 minutes, uphill and downhill.

	Control force (lbs)		Grade (%)
	Foot	Hand	
Passenger Car	125	90	30
School Bus (GVWR ≤ 10,000 lbs)	125	90	
Vehicle (GVWR ≤ 10,000 lbs)	125	90	20
School Bus (GVWR > 10,000 lbs)	150	125	

U. S. A. FMVSS 105 Hydraulic brake systems (5/8)		
ITEM	CONTENT	Illustration / supplement
4. Brake system indicator lamp	An indicator lamp shall he activated whenever any of the conditions (a), (c), or (d) occurs, or, at the option the manufacturer, whenever any of the conditions (b), (c), or (d) occurs : (a) A gross loss of pressure (b) A drop in the level of brake fluid in any master cylinder reservoir compartment (c) A total functional electrical failure in an antilock or variable proportioning brake system (d) Application of the parking brake.	
5. Reservoirs	(1) Reservoir capacity Reservoir, whether for master cylinder or other type system, shall have a total minimum capacity equivalent to the fluid displacement resulting when all the wheel cylinders or caliper pistons serviced by the reservoirs move from a new lining, fully retracted position to a fully worn, fully applied position. Each brake power unit reservoir servicing only the brake the brake system shall have minimum capacity equivalent to the fluid displacement required to charge the system piston(s) or accumulators(s) to normal operating pressure plus the displacement resulting when all the wheel cylinders or caliper piston serviced by the reservoir or accumulators(s) move from a new lining fully retracted position to a fully worn, fully applied position. (2) Reservoir labeling Each vehicle shall have a brake fluid warning statement.	
6. Antilock and variable proportioning brake systems	In the event of failure in an antilock or variable proportioning brake system the vehicle shall be capable of meeting the stopping distance requirements specified in Item 2.2 for service brake system partial failure. Effective March 1, 1999 Each vehicle with a GVWR greater than 10,000 lbs, shall be equipped with an antilock brake system.	
7. Brake system integrity	Test completion inspection requirements No fracture of any components such as brake springs, brake shoe, or disc pads facing. All mechanical components shall be intact and functional. No visible brake fluid or lubricant on the friction surface of the brake . No leakage at any system reservoir cover, seal, or filler opening etc.	

U. S. A. FMVSS 105 Hydraulic brake systems (6/8)		
ITEM	CONTENT	Illustration / supplement
8. Test conditions	8.1 Vehicle weight The vehicle weight is shown in Table I 8.2 Transmission selector control The transmission selector control is shown in Table I 8.3 Road surface Road tests are conducted on 12 - foot - wide, level roadway having a skid number of 81. For vehicle with a GVWR greater than 10,000 lbs : Peak friction coefficient of 0.9 8.4 Vehicle position and wheel lockup restrictions Stops, other than spike stops, are made without any part of the vehicle leaving the roadway. Permissible wheel lockup (1) GVWR ≤ 10,000 lbs Vehicle speed > 10mph controlled wheel lockup on an antilock-equipped axle Vehicle speed ≤ 10mph any wheel may lockup (2) GVWR > 10,000 lbs Vehicle speed > 20mph nonsteerable axle may lockup Vehicle speed ≤ 20mph any wheel may lockup (3) Unlimited wheel lockup : Spike stops, partial failure stops and inoperative brake power or power assist stops 8.5 Control Forces Unless otherwise specified, the force applied to brake control is not less than 15 lbs and not more than 150 lbs.	
9. Test procedures and sequence	Each vehicle shall be capable of meeting all the applicable requirements when tested according to the procedures and in the sequence set forth in the standard. The sequence is shown in Table I.	

96-5. Brakes (Buses, Trucks)

U.S.A. FMVSS 105 Hydraulic brake systems (7/8)

TABLE I

Brake Test Sequence and Vehicle Category Applicability

SEQUENCE	PASS. CAR	MPV, BUS, TRUCK (< 8K)	MPV, BUS, TRUCK (8K -10)	SCHOOL BUSES (<10K)	MPV, BUS, TRUCK (>10K)	SCHOOL BUSES (> 10K)	TEST LOAD		TRANSMISSION	REQUIREMENT
							Light	GVWR		
Speed Determination	X	X	X	X	X	X			D	
1st Effectiveness	X	X	X	X		X		X	N	2.1
Burnish	X	X	X	X	X	X		X	D	
2nd Effectiveness	X	X	X	X	X	X		X	N	2.1
1st Reburnish	X	X	X	X		X		X	D	
Parking Brake	X	X	X	X		X	X	X	--	3.
3rd Effectiveness	X	X		X	X	X	X		N	2.1
Partial Failure	X	X	X	X	X	X	X	X	D	2.2
Inoperative Brake Power, Power Assist	X	X	X	X	X	X		X	D	2.3
1st Fade and Recovery	X	X	X	X				X	D	2.4
2nd Reubrish	X	X	X	X		X		X	D	
2nd Fade and Recovery	X	X	X	X		X		X	D	2.4
3rd Reburnish	X	X	X	X		X		X	D	
4th Effectiveness	X	X	X	X				X	N	2.1
Water Recovery	X	X	X	X		X		X	D	2.5
Spike Stops	X	X	X	X				X	N	2.6
Final Inspection	X	X	X	X	X	X		-	-	7

96-5. Brakes (Buses, Trucks)

U.S.A. FMVSS 105 Hydraulic brake systems (8/8)

TABLE II - STOPPING DISTNACES

Vehicle test speed (miles per hour)	Stopping distance in feet for tests indicated															
	I - 1st (preburnished) and 4th effectiveness : spike effectiveness check				II - 2nd effectiveness				III - 3rd (lightly loaded vehicle) effectiveness					IV - Inoperative brake power and power assist unit ; partial		
	(a)	(b)	(c)	(d)	(a)	(b) and (c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)and (c)	(d) and (e)
30	[1]57	[1,2]65	[1,2] 69 (1st) [1,2] 65 (4th and spike) [1]72	[1,2] 88	[1]54	[1]57	[1,2] 78	70	51	57	65	84	70	114	130	170
35	74	83	91	132	70	74	106	96	67	74	83	114	96	155	176	225
40	96	108	119	173	91	96	138	124	87	96	108	149	124	202	229	288
45	121	137	150	218	115	121	175	158	110	121	137	189	158	257	291	358
50	150	169	185	264	142	150	216	195	135	150	169	233	195	317	359	435
55	181	204	224	326	172	181	261	236	163	181	204	281	236	383	433	530
60	[1]216	[1]242	[1]267	[1,2] 388	[1]204	[1]216	[1]310	280	[1]194	[1]216	[1]242	[1]355	280	[1]456	[1]517	[1]613
* 80	[1]405	[1]459	[1]510	NA	[1]383	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
* 95	[1]607	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
* 100	[1]673	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Distances for specified tests. [2] Applicable to school buses only. NA = Not applicable.

Note : (a) Passenger cars ; (b) vehicles other than passenger cars with GVWR of less than 8,000 lbs ; (c) vehicles with GVWR of not less than 8,000 lbs and not more than 10,000 lbs ; (d) vehicles with GVWR greater than 10,000 lbs ; (e) buses, including school buses, with greater than 10,000 lbs.

* Speed attainable in 2 miles (mph)	Required to stop from (mph)
Not less than 84	80

96-5. Brakes (Buses, Trucks)

Not less than 99 but less than 104	95
104 or more	100

96-5. Brakes (Buses, Trucks)

U. S. A. FMVSS 121 Air brake systems (1/5)		
ITEM	CONTENT	Illustration / supplement
1. Application	This standard applies to trucks, buses, and trailers equipped with air brake systems. Air - over - hydraulic brake subsystem means a sub system of air brake system.	
2. Required equipment	Each truck and bus shall have the following equipment : 2.1 Air compressor * An air compressor of sufficient capacity to increase air pressure in the supply and service reservoirs from 85 psi to 100 psi within a time, in seconds, determined by the quotient (Actual reservoir capacity X 25) / Required reservoir capacity * The air compressor cut-in pressure shall be 100 psi or greater. 2.2 Reservoirs * The combined volume of all service reservoirs and supply reservoirs shall be at least 12 times the combined volume of all service brake chambers. * Each reservoir shall be capable of withstanding internal hydrostatic pressure of five times the compressor cut-out pressure or 500 psi, whichever is greater, for 10 minutes. * Each service reservoir system shall have check valves or equivalent devices to be protected against loss of air pressure. * Each reservoir shall have a condensate drain valve. 2.3 Pressure gauge A pressure gage indicates the service reservoir system air pressure. 2.4 Warning signal A signal that gives a continuous warning when the air pressure in the service reservoir system is below 60 psi.	

U. S. A. FMVSS 121 Air brake systems (2/5)		
ITEM	CONTENT	Illustration / supplement
	2.5 Antilock brake system Each vehicle shall be equipped with an antilock brake system Effective Mar. 1, 1998 ... single-unit vehicle Mar. 1, 1997 ... truck tractor 2.5.1 Antilock malfunction signal Each vehicle shall be equipped with a indicator lamp which is activated whenever there is a malfunction in the vehicle's antilock brake systems. 2.6 Service brake stop lamp switch A switch that lights the stop lamps when the service brake control is statically depressed. 2.7 Brake distribution and automatic adjustment (a) Brake adjuster The service shall have a system of automatic adjustment. (b) Brake indicator For each brake equipped with external automatic adjustment mechanism and having an exposed pushrod, the condition of service brake under-adjustment shall be displayed by a brake-adjustment indicator.	

U. S. A. FMVSS 121 Air brake systems (3/5)

ITEM	CONTENT	Illustration / supplement
3. Service brakes	3.1 Service brakes - road tests 3.1.1 Stopping distance Each vehicle shall stop in not more than the distance specified in Table I Loading condition : a. GVWR b. Unloaded vehicle weight plus up to 500 lbs.	

Table I Stopping distance in feet (PFC 0.9)

Vehicle speed mph	Service brake				Emergency brake	
	(1)	(2)	(3)	(4)	(5)	(6)
60	280	310	335	355	613	720

Note : (1) Loaded and unloaded buses ; (2) Loaded single unit trucks
(3) Unloaded truck tractors and single unit trucks
(4) Loaded truck tractors tested with an unbraked control trailer
(5) All vehicles except truck tractors
(6) Unloaded truck tractors

3.2 Brake actuation time - trucks and buses

With an initial service reservoir system air pressure of 100 psi, the air pressure in each brake chamber shall reach 60 psi in not more than 0.45 second.

3.3 Brake release time - trucks and buses

With an initial service brake chamber air pressure of 95 psi, the air pressure in each brake chamber shall fall to 5 psi in not more than 0.55 second.

U. S. A. FMVSS 121 Air brake systems (4/5)

ITEM	CONTENT	Illustration / supplement
	3.4 Service brake system - dynamometer tests (1) Brake power When mounted on an inertia dynamometer, each brake shall be capable of making 10 consecutive decelerations at an average rate 9 fpsps from 50 mph to 15 mph, at equal intervals of 72 seconds, and shall be capable of decelerating to a stop from 20 mph at an average deceleration rate 14 fpsps 1 minute after the 10th deceleration. (2) Brake recovery Starting two minutes after completing the tests required by 3.3.(1), a vehicle's brake shall be capable of making 20 consecutive stops from 30 mph at an average deceleration rate of 12 fpsps, at equal intervals of one minute measured from the start of each brake application.	
4. Antilock system	4.1 Antilock system failure On a vehicle equipped with an antilock system, electrical failure of any part of the antilock system shall not increase the actuation and release times of the service brakes.	
5. Parking brake system	5.1 Static retardation force During a static drawbar pull in a forward or rearward direction, the static retardation force produced by the application of the parking brake shall be such that the quotient Static retardation force / GAWR is not less than 0.28 for any axle other than a steerable front axle. 5.2 Grade holding With all parking brakes applied, the vehicle shall remain stationary facing uphill or facing downhill on a roadway with a 20-percent grade.	

U. S. A. FMVSS 121 Air brake systems (5/5)		
ITEM	CONTENT	Illustration / supplement
	5.3 Application and holding The parking brake system shall be capable of achieving the minimum performance specified either in 5.1 or 5.2 with any single leakage- type failure in any other brake system. 5.4 Parking brake control - trucks and buses The control shall be identified in a manner that specifies the method of control operation. 5.5 Release Performance - trucks and buses At all times after an application actuation of the parking brake control, control, no reduction in parking brake retardation force shall result from a release actuation of the parking brake control.	
6. Emergency brake system	6.1 Emergency brake system performance With a single failure in the service brake system, the vehicle shall stop in not more than the distance specified in Table I. 6.2 Emergency brake operation The emergency brake system shall he applied and released, and be capable of modulation, by means of the service brake control.	
7. Final inspection	Inspect the service brake system for the condition of adjustment and for the brake indicator display.	

96-5. Brakes (Buses, Trucks)

ECE Regulation 13.09 S1 (1/10)		
ITEM	CONTENT	Illustration / supplement
A : Application	M, N & O (However followings are excerpt of requirements on M_2, M_3, N_1, N_2 & N_3)	
B : Structural Requirements 5. SPECIFICATIONS		
5.1.1.2.	Braking system shall be able to resist the corroding and aging.	
5.1.1.3.	Brake linings shall not contain asbestos.	
5.1.2.1.	Service braking The service braking must make it possible to control the movement of the vehicle and to halt it safely, speedily and effectively, whatever its speed and load, on any up or down gradient. It must be possible to graduate this braking action. The driver must be able to achieve this braking action from his driving seat without removing his hands from the steering control.	
5.1.2.2.	Secondary braking The secondary braking must make it possible to halt the vehicle within a reasonable distance in the event of failure of the service braking. It must be possible to graduate this braking action. The driver must be able to obtain braking action from his driving seat while keeping at least one hand on the steering control.	
5.1.2.3.	Parking braking The parking braking must make it possible to hold the vehicle stationary on an up or down gradient even in the absence of the driver, the working parts being then held in the locked position by a purely mechanical device. The driver must be able to achieve this braking action from his driving seat.	
5.2.1.2.	Service, secondary and parking braking may have common components if following conditions are fulfilled.	
5.2.1.2.1.	There must be at least two controls, independent of each other and readily accessible to the driver from his normal driving position. Except M_2 and M_3, every brake control (excluding a retarder control) shall be designed such that it returns to the fully off position when released.	
5.2.1.2.2.	The control of the service braking system must be independent of the control of the parking braking system.	
5.2.1.2.4.	If the service braking system and the secondary braking system have the same control, the parking braking system must be so designed that it can be actuated when the vehicle is in motion.	

ECE Regulation 13.09 S1		(2/10)
ITEM	CONTENT	Illustration / supplement
5.2.1.2.5.	In the event of breakage of any component other than the brakes or listed components, or of any other failure of the service braking system the secondary braking system or that part of the service braking system which is not affected by the failure, must be able to bring the vehicle to a halt in the conditions prescribed for secondary braking.	
5.2.1.2.6.	Requirements where the secondary braking system and the service braking system have a common control and a common transmission.	
5.2.1.4.	The service braking system must, whether or not combined with the secondary braking system, in the failure of transmission a sufficient number of wheels are still braked by actuation of the service brake control ; the residual performance of the service braking system must satisfy the requirements laid down in Annex 4.	
5.2.1.4.2.	The failure of hydraulic transmission system shall be signaled to the driver by a red tell-tale lamp on actuation of the control and remain lit. Red tell-tale lamp lighting up when the fluid in the reservoir is below a certain level is permitted.	
5.2.1.5.1.	In the event of energy failure in the transmission of a braking system, the feed to the part not affected by the failure must continue to be ensured for residual and/or secondary braking.	
5.2.1.5.2.	Furthermore, storage devices located down-circuit of this device must be such that in the case of a failure in the energy supply after four full-stroke actuations of the service brake control, it is still possible to halt the vehicle at the fifth application for secondary braking.	
5.2.1.7.	The service braking system must act on all the wheels of the vehicle.	
5.2.1.8.	The action of the service braking system must be appropriately distributed among the axles.	
5.2.1.10.	The service braking system and the parking braking system must act on braking surfaces permanently connected to the wheels through components of adequate strength.	
5.2.1.11.	Wear of the brakes must be capable of being easily taken up by means of a system of manual or automatic adjustment.	

ECE Regulation 13.09 S1		(3/10)
ITEM	CONTENT	Illustration / supplement
5.2.1.11.1.	Wear adjustment shall be conditionally automatic for the service brakes.	
5.2.1.11.2.	It shall be possible to easily check this wear on service brake linings from the outside or underside of the vehicle. Alternatively, acoustic or optical devices are acceptable.	
5.2.1.12.	In hydraulic-transmission braking systems, the level of the reserve fluid can be easily checked without the receptacles having to be opened or warning signal must draw the driver's attention to any fall in the level of reserve fluid. The type of fluid shall be identified by the symbol of ISO Standard 9128-1987. The symbol must be affixed within 100 mm of the filling ports.	
5.2.1.13.	Warning device	
5.2.1.13.1.	Any vehicle fitted with a service brake actuated from an energy reservoir must, where secondary braking performance cannot be obtained without the use of the stored energy, be provided with a warning device, in addition to a pressure gauge, where fitted, giving an optical or acoustic signal.	
5.2.1.15.	Power-driven vehicle to which the towing vehicles is authorized.	
5.2.1.18.	Vehicle authorized to two a trailer of category O_3 or O_4, must satisfy prescribed conditions.	
5.2.1.22.	M_2, M_3, N_2 and N_3 with not more than four axles shall be equipped with anti-lock systems of category 1 in accordance with Annex 13.	
5.2.1.24.	Vehicles authorized to tow a trailer equipped with an anti-lock system shall be fitted with a separate optical warning signal for the anti-lock system of the trailer. They must also be equipped with a special electric connector.	
5.2.1.25.1.	Electric vehicles of category A	
5.2.1.25.2.	Electric vehicles of category B	

96-5. Brakes (Buses, Trucks)

ECE Regulation 13.09 S1		(4/10)
ITEM	CONTENT	Illustration / supplement
C : Performance Requirements Annex 4	BRAKING TESTS	
1.2.7. .	The prescribed performance must be obtained without locking of the wheels, deviation, and abnormal vibration.	
1.4.	Type - O Test (test with brakes cold)	
1.4.1.1.	The temperature on the disc or on the outside of the drum must be below 100°C	
1.4.1.2.1.	The vehicle must be laden.	
1.4.1.2.2.	Every test must be repeated on the unladen vehicle.	
1.4.3.1.	Tests must also be carried out at various speeds, between 30% of the maximum speed and 80%.	
2.1.1.	Service brake with engine disconnected (connected) Initial speed : 60, 80 kph (90 - 120 kph) Stopping distance $\leq 0.15V + V^2 / 150$ $(0.15V + V^2 / 103.5)$ Control force $\leq$ 70 daN	Figures vary by veh. Category
2.2.	Secondary brake with engine disconnected Initial speed : 40 - 70 kph Stopping distance $\leq 0.15V + 2V^2 / (130$ or $115)$ Control force $\leq$ 60 daN (hand), 70 daN (foot)	
2.3.	Parking brake 18% up and down gradient (12% when combined) Control force $\leq$ 60 daN (hand), 70 daN (foot)	
2.3.6.	Type -O test must be carried out with the engine disconnected at initial speed of 30 km/h. The deceleration of the parking brake shall not be less than 1.5 m/s^2 . The test shall be carried out with the laden vehicle.	

96-5. Brakes (Buses, Trucks)

ECE Regulation 13.09 S1 (5/10)

ITEM	CONTENT	Illustration / supplement
2.4.1.	Residual performance of service brake in the event of transmission failure with engine disconnected. Initial speed : 40 ~ 70 kph Stopping distance ≤ 0.15V + 10V² / (345 or 390) at laden ≤ 0.15V + 10V² / (287.5 ~ 390) at unladen Control force ≤ 70 daN	
1.5.	Type - I test (fade test)	
1.5.1.	With repeated braking	
1.5.1.1.	The service brakes of all power-driven vehicles must be tested by successively applying and releasing the brakes a number of times, the vehicle being laden, in the conditions shown in the table below using highest T/M gear. Initial speed (V1) end speed Δt sec n 80% V max. ≤ 60 ~ 120 1/2 V1 55 or 60 15 or 20	
1.5.1.3	The force applied to the control must be of 3 m/s² at the first brake application ; this force must remain constant throughout the succeeding brake applications.	
1.5.1.5.	For regaining speed after braking, maximum acceleration allowed by the engine and gear - box.	
1.5.1.6.	Alleviation for electric vehicles.	
1.5.3.	Hot performance	
1.5.3.1.	At the end of the Type- I test the hot performance of the service braking system must be measured in the same conditions (at a constant control force no greater than the mean force actually used) as for the Type- 0 test with the engine disconnected.	
1.5.3.1.1.	Performance must not be less than 80% of that prescribed for the category, nor less than 60% of the figure recorded in the Type- 0 test with the engine disconnected.	
1.5.3.1.2.	Electric vehicles fitted with an electric regenerative braking system .	

96-5. Brakes (Buses, Trucks)

ECE Regulation 13.09 S1 (6/10)		
ITEM	CONTENT	Illustration / supplement
1.6.	Type- II test (downhill test M_3, N_3)	
1.6.1.	The energy input is equivalent to that of a laden vehicle driven at 30 km/h on a 6% down-gradient for 6 km, with the appropriate gear engaged and the retarder.	
1.6.3.	At the end of the test, the hot performance of the service braking system must be measured in the same conditions as for the Type- 0 test with the engine disconnected. Stopping distance $\leq 0.15V + 1.33V^2 / 130$ or 115 Control force $\leq$ 70 daN	
4.1.1.	In an emergency, the response time between control device begins and braking force on the least favourably placed axle reaches the prescribed performance must not exceed 0.6 seconds.	
4.1.2.	Compressed air braking systems are considered to be satisfied for response time if the vehicle complies with the provisions of Annex 6.	
Annex 5	TYPE - IIA TEST (downhill test) M_3 interurban motor coaches and long-distance touring motor coaches. N_3 which are authorized to tow O_4.	
Annex 6	MEASURING THE RESPONSE TIME ON VEHICLES WITH COMPRESSED - AIR BRAKING SYSTEMS	
1.1.	The response times of the service braking system shall be measured at the intake to the cylinder of the least favourably placed brake. (rest is omitted)	
Annex 7	ENERGY SOURCES AND ENERGY STORAGE DEVICES (Energy Accumulators)	
A.	COMPRESSED - AIR BRAKING SYSTEMS	
B.	VACUUM BRAKING SYSTEMS	
C.	HYDRAULIC BRAKING SYSTEMS WITH STORED ENERGY	

96-5. Brakes (Buses, Trucks)

ECE Regulation 13.09 S1		(7/10)
ITEM	CONTENT	Illustration / supplement
Annex 8	SPRING BRAKING SYSTEMS	
2.1.	A spring braking system shall not be used as a service braking system. However, in failure of the transmission of the service braking system a spring braking system may be used to achieve the residual performance. The spring braking system shall not be the sole source of residual braking. (rest is omitted)	
Annex 9	PARKING BRAKING SYSTEMS WITH A MECHANICAL BRAKE - CYLINDER LOCKING DEVICE (Lock actuators)	
Annex 10	DISTRIBUTION OF BRAKING AMONG THE AXLES	
1.	GENERAL REQUIREMENTS Vehicles not equipped with an anti-lock system shall meet all the requirements of this Annex with some additional requirements.	
3.1.	Two - axled vehicles	
3.1.1.	For all categories of vehicles for k values between 0.2 and 0.8 : $Z \geq 0.1 + 0.85\ (k- 0.2)$	
3.1.2.	For all states of load of the vehicle, the adhesion utilization curve of the front axle shall be situated above that for the rear axle :	
3.1.2.2.	For braking rates between 0.15 and 0.50 in case of N_1 with some exceptions.	
3.1.2.3.	For braking rates between 0.15 and 0.30 in case of other categories with some exceptions.	
3.1.3.	Power - driven vehicle authorized to tow O_3 or O_4 fitted with compressed air braking systems.	
3.1.4.	Manufacturer shall provide the adhesion utilization curves for the front and rear axles for laden and unladen conditions.	
3.1.4.3.	Electric vehicles fitted with category B	
3.1.5.	Vehicles other than tractors for semi-trailers	

ECE Regulation 13.09 S1		(8/10)
ITEM	CONTENT	Illustration / supplement
3.1.6.	Tractors for semi-trailers	
3.2.	Vehicles with more than two axles. The requirements of 3.1. shall apply to vehicles with an annotation.	
6.	IN CASE OF FAILURE OF THE BRAKING DISTRIBUTION SYSTEM	
	When the requirements of this Annex are fulfilled by means of a special device (e.g. controlled mechanically by the suspension of the vehicle), it shall be possible, in the event of the failure of its control, to stop the vehicle under the conditions specified for secondary braking.	
Annex 12	INERTIA (OVERRUN) BRAKING SYSTEMS	
Annex 13	ANTI - LOCK BRAKE SYSTEMS	
4.	GENERAL REQUIREMENTS	
4.1.	Any electrical failure or sensor anomaly shall be signaled to the driver by a specific optical warning signal.	
4.1.1.	The warning signal shall light up when the anti-lock system is energized and with the vehicle stationary and it shall be verified that none of the defects are present before extinguishing the signal.	
4.2.	Vehicles equipped with an anti-lock system and authorized to tow a trailer equipped with such a system, shall be fitted with a separate optical warning signal for the anti-lock system of the trailer.	
4.4.	Except for N_1 the electrical connections shall be a special connector conforming to ISO Standard 7638-1985.	
4.5.	In failure of the anti-lock system, the residual braking performance must be that prescribed for the failure of a part of the transmission of the service braking system. It shall not be construed as a departure from the requirements concerning secondary braking.	
4.6.	The operation of the anti-lock system must not be adversely affected by magnetic or electrical fields.	
4.7.	A manual device may not be provided to disconnect or change the control mode of the anti-lock system, except on off-road N_2 and N_3, where some conditions must be met.	

96-5. Brakes (Buses, Trucks)

ECE Regulation 13.09 S1		(9/10)
ITEM	CONTENT	Illustration / supplement
5.	SPECIAL PROVISIONS	
5.1.	ENERGY CONSUMPTION Braking systems with anti-lock systems must maintain their performance when the service braking control device is fully applied for long periods. Compliance shall be verified by means of the following tests : (rest is omitted)	
5.2.	UTILIZATION OF ADHESION	
5.2.1.	The utilization of adhesion by the anti-lock system takes into account the actual increase in braking distance beyond the theoretical minimum. This anti-lock system shall be deemed to be satisfactory when the condition $\varepsilon \geqq 0.75$ is satisfied, where ε represents the adhesion utilized.	
5.2.2.	The adhesion utilization ε shall be measured on road surfaces with a coefficient of adhesion of 0.3 or less, and of about 0.8 (dry road), with an initial speed of 50 km/h.	
5.2.5.	The condition $\varepsilon \geqq 0.75$ shall be checked with the vehicle laden and unladen.	
5.3.	ADDITIONAL CHECKS The following additional checks shall be carried out with the engine disconnected, with the vehicle laden and unladen.	
5.3.1.	The wheels directly controlled by an anti-lock system must not lock when the full force is suddenly applied on the control device at 40 kph and at 0.8 V max. ($\leqq$ 70 ~ 120 kph)	
5.3.2.	When an axle passes from a high-adhesion surface (k_H) to a low-adhesion surface (k_L) where $k_H \geqq 0.5$ and $k_H / k_L \geqq 2$ with the full force applied on the control device, the directly controlled wheels must not lock. The instant of applying the brakes shall be that the anti-lock system is fully cycling on the high-adhesion surface, the passage from one surface to the other is made at high and at low speed.	
5.3.3.	When a vehicle passes from k_L to k_H where $k_H \geqq 0.5$ and $k_H / k_L \geqq 2$, with the full force applied on the control device, the deceleration of the vehicle must rise to the appropriate high value within a reasonable time and the vehicle must not deviate from its initial course. The passage occurs at approximately 50 km/h.	

96-5. Brakes (Buses, Trucks)

ECE Regulation 13.09 S1 (10/10)		
ITEM	CONTENT	Illustration / supplement
5.3.4.	This paragraph shall only apply to vehicles with categories 1 or 2. When the right and left wheels of the vehicle are situated on surfaces with differing coefficients of adhesion (k_H and k_L), where $k_H \geqq 0.5$ and $k_H / k_L \geqq 2$, the directly controlled wheels must not lock when the full force is suddenly applied on the control device at a speed of 50 km/h.	
5.3.5.	Furthermore, laden vehicles with category 1 shall, under the conditions of paragraph 5.3.4. satisfy the prescribed braking rate in Appendix 3.	
5.3.7.	During the tests in 5.3.4. and 5.3.5, steering correction is permitted, if the angular rotation of the steering control is within 120 ° during the initial 2 seconds, and not more than 240 ° in all. Furthermore, during these tests no part of the (outer) tyres must cross this high-and low adhesion surface boundary.	
Annex 13 - Appendix 2	UTILIZATION OF ADHESION	
Annex 13 - Appendix 3	PERFORMANCE ON DIFFERING ADHESION SURFACES	
Annex 13 - Appendix 4	METHOD OF SELECTION OF THE LOW ADHESION SURFACE	
Annex 15	INERTIA DYNAMOMETER TEST METHOD FOR BRAKE LININGS	
D : Labeling	Load sensing device label.	
E : Conformity of production	Suitable controls of the production shall be carried out. (rest is omitted)	
F : Type approval	Official test by technical service is needed. After confirmation of compliance, type approval number is issued by the MOT.	

ITEM 96-6

Door Latched and Hinges

APEC Regulation Analysis Findings
Item No. 96-6: Door Latches and Hinges

1. Although there are some differences in door latch and hinge requirements including limit value units and edge rounding, the general requirements and performance specifications are similar among Australia, Canada, Japan, Korea, U.S. and ECE.

2. The general requirements define installation positions and operation conditions. New Zealand and Australia set forth their unique general requirements.

3. Member economies have similar durability load requirements for door latch and hinge parts, although they adopt distinct limit value units and edge rounding methods.

4. In addition to its door latch and hinge requirements that are similar to those of the economies mentioned in the above paragraph 1, the U.S. has a unique requirement for back-door latches and hinges.

5. In addition to the general requirements and performance requirements, ECE provides a unique requirement for the marking of approval numbers.

6. As for alternative regulations, Australia accepts the ECE Regulation as an alternative, and New Zealand accepts the U.S., Japanese, ECE, EEC and Australian regulations.

7. Although Chinese Taipei does not have detailed requirements of its own, it accepts the CNS Regulation as an alternative.

8. A comparison of specific requirements for door latches and hinges is as follows:

(1) With regard to installation positions (B-b-1) in the general requirements, Australia, Canada, Japan, Korea, U.S. and ECE specify both "a fully and a secondary latched positions."

(2) Also in general requirements, those requirements concerning operation conditions (B-b-2) are adopted by Australia, Canada, Japan, Korea, U.S., ECE and New Zealand. All these member economies, except New Zealand, require that the latches and hinges be operative from inside the vehicle compartment. New Zealand requires that they be operative from both inside and outside the compartment.

(3) Concerning performance requirements (C-b), member economies have similar requirements for longitudinal load and transverse load, although there are slight differentials in limit value units and edge rounding methods. The U.S. provides a unique requirement related to back-door latches and hinges.

ITEM No. 96-6　Door Latches and Hinges

A: Application ：Passenger cars

Member Economies	B-b-1 Position of a door latch & striker assembly	B-b-2 Operation			C-b-1 Durable longitudinal load		
		General	Front door locks	Rear door locks	for a door latch & striker assembly	for a door hinge system	for back door latches
Australia	ADR 02/00 (2, at a fully and a second-ary latched positions)	ADR 02/00 (Being operated in the interior of the vehicle)	ADR 02/00 (Being inoperative outside handle or other outside latches release control during engaging of front locks)	ADR02/00 (Being inoperative outside handle and inside handles or other outside latches engaging of rear locks) (Being inoperative outside door handles in event of rollover or vehicle impact) (Being inoperative inside door handles during engaging of CRS	ADR02/00 (11.11kN at a fully latched position , and 4.44kN at a secondary latched position)	ADR02/00 (11.11kN)	
Brunei							
Canada	FMVSS206 (2, at a fully and a second-ary latched positions)	FMVSS206 (Being operated in the interior of the vehicle)	FMVSS206 (Being inoperative outside handle or other outside latches release control during engaging of front locks)	FMVSS206 (Being inoperative outside handle and inside handles or other outside latches engaging of rear locks)	FMVSS206 (2500 lbs at a fully latched position , and 1000 lbs at a secondary latched position)	FMVSS206 (2500 lbs)	
China	Common (2, at a fully and a second-ary latched positions)				SRRV25 (1130kg* at a fully latched position , and 450kg** at a secondary latched position) *:910kg for mini. vehicles *:360kg for mini. vehicles	SRRV25 (1130kg)	
Hong Kong							
Indonesia							
Japan	SRRV25 (2, at a fully and a second-ary latched positions)	SRRV25 (Being operated in the interior of the vehicle)	SRRV25 (Being inoperative outside handle or other outside latches release control during engaging of front	SRRV25 (Being inoperative outside handle and inside handles or other outside latches engaging of rear locks)	SRRV25 (1130kg[11,100N] at a fully latched position , and 450kg[4,410N] at a secondary latched position)	SRRV25 (1130kg)	

Member Economies	B-b-1 Position of a door latch & striker assembly	B-b-2 Operation			C-b-1 Durable longitudinal load		
		General	Front door locks	Rear door locks	for a door latch & striker assembly	for a door hinge system	for back door latches
Korea	Common (2, at a fully and a second- ary latched positions)				SRRV25 (1130kg* at a fully latched position , and 450kg** at a secondary latched position) *:910kg for mini. vehicles *:360kg for mini. vehicles	SRRV25 (1130kg)	
Malaysia							
Mexico							
New Zealand		Unique (Being operated from both inside and outside of the vehicle)					
Papua New Guinea							
Philippines							
Singapore							
Chinese Taipei							
Thailand							
U.S.A.	FMVSS206 (2, at a fully and a second- ary lached positions)	FMVSS206 (Being operated in the interior of the vehicle)	FMVSS206 (Being inoperative outside handle or other outside latches release control during engaging of front locks)	FMVSS206 (Being inoperative outside handle and inside handles or other outside latches engaging of rear locks)	FMVSS206 (11,000N[2500 lbs] at a fully latched position , and 4,450N[1000 lbs] at a secondary latched position)	FMVSS206 (11,000[2500 lbs])	FMVSS206 (11,000N[2500 lbs] at a fully latched position , and 4,450N[1000 lbs] at a secondary latched position)
ECE	ECE11-02 (2, at a fully and a inter- mediate lached positions)				ECE11-02 (1111daN at a fully latched position , and 444daN at a intermediate latched position)	ECE11-02 (1111daN)	

Member Economies	C-b-2 Durable transverse load			C-b-3 Durable inertia load;		D-a-1, D-b-1 Label (An approval Marking)	E Referred standards
	for a door latch & striker assembly	for a door hinge system	for a back door latches	for a door latch	for a back door latches		
Australia	ADR02/00 (8.89kN at a fully latched position , and 4.44kN at a secondary latched position)	ADR02/00 (8.89kN)		ADR02/00 (30g, any of longitudinal or transverse load)			ECE11, 11-01, 11-02
Brunei							
Canada	FMVSS206 (2000 lbs at a fully latched position , and 1000 lbs at a secondary latched position)	FMVSS206 (2000 lbs)		FMVSS206 (30g, any of longitudinal or transverse load)			
Chile							
China	Unique (905kg at a fully latched position , and 450kgat a secondary latched position)	SRRV25 (910g)		Common (30g, any of longitudinal or transverse load)			
Hong Kong							
Indonesia							
Japan	SRRV25 (910kg[8,920N] at a fully latched position , and 450kg[4,450N] at a second -ary latched position)	SRRV25 (910kg[8920N])		SRRV25 (30g, any of longitudinal or transverse load)			
Korea	Unique (905kg at a fully latched position , and 450kgat a secondary latched position)	SRRV25 (910g)		Common (30g, any of longitudinal or transverse load)			

Member Economies	C-b-2 Durable transverse load			C-b-3 Durable inertia load;		D-a-1, D-b-1 Label (An approval Marking)	E Referred standards
	for a door latch & striker assembly	for a door hinge system	for a back door latches	for a door latch	for a back door latches		
Malaysia							
Mexico							
New Zealand							ECE11, 70/387/EEC, FMVSS206, ADR02/00, Japan Article 25
Papua New Guinea							
Philippines							
Singapore							
Chinese Taipei							CNS D2098, CNS D2107, CNS D3102, CNS Z3192,
Thailand							
U.S.A.	FMVSS206 (8,900N[2000 lbs] at a fully latched position , and 4,450N[1000 lbs] at a secondary latched position)	FMVSS206 (8,900N[2000 lbs])	FMVSS206 (8,900N[2000 lbs] at a fully latched position , and 4,450N[1000 lbs] at a secondary latched position)	FMVSS206 (30g, any of longitudinal or transverse load)	FMVSS206 (30g, any of longitudinal or transverse load)		
ECE	ECE11-02 (889daN at a fully latched position , and 444daN at a intermediate latched position)	ECE11-02 (889daN)		ECE11-02 (30g, any of longitudinal or transverse load)		ECE11-02 (Label marking approval No. is necessary on the vehicle)	

AUSTRALIA (ADR02/00)

ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars (MA, MB, MC)	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle 1. A door latch and striker assembly (1) Position 2. Door locks (1) Operation	 N/R N/R 2 (at a fully and a secondary latched positions) <General> Being operated in the interior of the vehicle <Front door locks> Being inoperative outside handle or other outside latches release control, when front door locks are engaged. <Rear door locks> Being inoperative both outside and inside handles or other latches release controls, when rear door locks are engaged, or being inoperative the inside door handles when child safety locks are engaged.	
C: Performance of requirement C-a: Performance of parts 1. A Door latch and striker assembly (1) Durable longitudinal load (2) Durable transverse load (3) Durable inertia load (4)Test methods 2. Door hinges (1) Durable longitudinal load (2) Durable transverse load (3) Test methods C-b: Performance of parts installed to the vehicle	 11.11kN at a fully latched position, and 4.44kN at a secondary latched position 8.89kN at a fully latched position, and 4.44kN at a secondary latched position 30g at fully latched position (a longitudinal or transverse load) 17.8kNat a fully latched position (Slide door) -SAE J839b of 1965/5 or 1972/1 The outward transverse load of 8.89kN is applied to the load-bearing members at opposite edges of the door (17.8kN total).(slide door) 11.11kN 8.89kN -SAE J934 of 1965/7, paragraph 4 -SAE J934a of 1969/9, paragraph 5 -SAE J934 of 1982/7 For piano type hinges, spacing requirement of the above SAEs are not applicable. And also alteration of test fixture arrangement is accepted. N/R	
D: Label marking requirements D-a: Label marking its own requirements	 N/R	

AUSTRALIA (ADR02/00)		
ITEM	CONTENT	Illustration / supplement
D-b: Label marking installed to a vehicle	N/R	
E: Referred standards	ECE11-00, ECE11-01, ECE11-02	

CANADA (CMVSS206)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars, MPV (side door, back door)	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle 1. A Door latch and striker assembly (1) Position 2. Door locks (1) Operation	 N/R N/R 2 (at a fully and a secondary latched positions) <General> Being operated in the interior of the vehicle <Front door locks> Being inoperative outside handle or other outside latches release control, when front door locks are engaged. <Rear door locks> Being inoperative both outside and inside handles or other latches release controls, when rear door locks are engaged.	
C: Performance of requirement C-a: Performance of parts 1. A door latch and striker assembly (1) Durable longitudinal load (2) Durable transverse load 2. A door latch (1) Durable inertia load 3. A door hinge system (1) Durable longitudinal load (2) Durable transverse load 4. Test method (1)A door latch and a striker assembly (2)A door latch (3)A door hinge C-b: Performance of parts installed to the vehicle	 11000N(2500 lbs) at a fully latched position, and 4450N(1000 lbs) at a secondary latched position 8900N(2000lbs) at a fully latched position, and 4450N(1000lbs) at a secondary latched position 17800N(4000lbs) at a fully latched position (Slide door) 30g at fully latched position (a longitudinal or transverse load) 2500 lbs 2000 lbs -SAE J839b of 1968/1, paragraph 4 and 5 -SAE J839b of 1968/1, paragraph 4 and 5 -other approved method -SAE J934 of 1982/7, paragraph 4 For piano type hinges, spacing requirement of the above SAEs are not applicable. And also alteration of test fixture arrangement is accepted. N/R	

CANADA (CMVSS206)		
ITEM	CONTENT	Illustration / supplement
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	N/R N/R	
E: Referred standards	N/R	

KOREA (ARTICLE 104)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts 1. A door latch and hinge assembly (1)Position B-b: Construction of parts installed to the vehicle	 2 (at a fully and a secondary latched positions) N/R	
C: Performance of requirement C-a: Performance of parts 1. A door latch and hinge assembly (1)Durable longitudinal load (2)Durable transverse load (3)Durable inertia load 2. Door hinges (1)Durable longitudinal load (2)Durable transverse load 3. Sliding doors (3)Durable inertia load C-b: Performance of parts installed to the vehicle	 1110 N at a fully latched position, and 4440 N at a secondary latched position 8890 N at a fully latched position, and 4440 N at a secondary latched position 294.2m/s2 (30g) (a longitudinal or transverse load) 1110 N 8890 N shall not separate from the sliding track when a transverse force of 8890N is applied simultaneously to each corner of the door. (except doors of mini vehicles, the track and slide combination or other supporting parts, when in a fully closed position) N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 N/R	

CHINA		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts 1. A door latch and hinge assembly (1)Position B-b: Construction of parts installed to the vehicle	 2 (at a fully and a secondary latched positions) N/R	
C: Performance of requirement C-a: Performance of parts 1. A door latch and hinge assembly (1)Durable longitudinal load (2)Durable transverse load (3)Durable inertia load 2. Door hinges (1)Durable longitudinal load (2)Durable transverse load 3. Sliding doors (3)Durable inertia load C-b: Performance of parts installed to the vehicle	 1130kg at a fully latched position, and 450kg at a secondary latched position (in case of mini. vehicles, the former is 910kg and a latter is 360kg) 905kg at a fully latched position, and 450kg at a secondary latched position (in case of mini. vehicles, the former is 730kg and a latter is 360kg) 30g (a longitudinal or transverse load) 1130kg (in case of mini. vehicles, 910kg) 905kg (in case of mini. vehicles, 730kg) shall not separate from the sliding track when a transverse force of 905kg is applied simultaneously to each corner of the door. (except doors of mini vehicles, the track and slide combination or other supporting parts, when in a fully closed position) N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 N/R	

HONG KONG (Construction and maintenance of vehicle regulation 5)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 The side door latches and hinges of all vehicles shall be of adequate strength. N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	N/R	

INDONESIA (44/1993)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 The hinge of the side door, with the exception of a sliding door, at the side of a motorized vehicle must be fitted at the front side of the door in the direction taken by the vehicle. N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	N/R	

JAPAN (ARTICLE 25)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle 1. General requirements	 N/R The entrance of passenger compartment shall be provided with a door which can be securely closed. The entrance of a motor vehicle shall be constructed so that it may unlikely open easily in the case of collision, etc. of motor vehicles concerned.	
C: Performance of requirement C-a: Performance of parts 1. A door latch system (1) Durable longitudinal load (2) Durable transverse load (3) Durable inertia load 2. A door hinge system (1) Durable longitudinal load (2) Durable transverse load C-b: Performance of parts installed to the vehicle	 (Followings are the durable loads when a transverse load of 91kg[892N] is applied to the door latch and striker opening.) 1130kg[11100N] at a fully latched position, and 450kg[4410N]at a intermediate latched position 910kg[8920N] at a fully latched position, and 450kg[4410N] at a secondary latched position 30g [294m/s2](a longitudinal or transverse load) 1130kg[11100N] 910kg[8920N] N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards	FMVSS206, ECE11	

KOREA (ARTICLE 104)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts 1. A door latch and hinge assembly (1)Position B-b: Construction of parts installed to the vehicle	 2 (at a fully and a secondary latched positions) N/R	
C: Performance of requirement C-a: Performance of parts 1. A door latch and hinge assembly (1)Durable longitudinal load (2)Durable transverse load (3)Durable inertia load 2. Door hinges (1)Durable longitudinal load (2)Durable transverse load 3. Sliding doors (3)Durable inertia load C-b: Performance of parts installed to the vehicle	 1130kg at a fully latched position, and 450kg at a secondary latched position (in case of mini. vehicles, the former is 910kg and a latter is 360kg) 905kg at a fully latched position, and 450kg at a secondary latched position (in case of mini. vehicles, the former is 730kg and a latter is 360kg) 30g (a longitudinal or transverse load) 1130kg (in case of mini. vehicles, 910kg) 905kg (in case of mini. vehicles, 730kg) shall not separate from the sliding track when a transverse force of 905kg is applied simultaneously to each corner of the door. (except doors of mini vehicles, the track and slide combination or other supporting parts, when in a fully closed position) N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 N/R	

NEW ZEALAND (VSR32001)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 70/387/EEC, ECE R11, FMVSS206, ADR 2/00, Technical Standard for Door Retention System, Jisha Circular No.92	

PAPUA NEW GUINIA (R125B)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts 1.Door hinges and locks B-b: Construction of parts installed to the vehicle	 Door hinges and locks be in good working condition. N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	N/R	

CHINESE TAIPEI (-)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	 N/R N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 CNS D2098, CNS D2107, CNS D3162, CNS Z3192	

USA (FMVSS206)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars, MPV (side door, back door)	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle 1. Door latches (1) Position 2. Back Door latches (1) Minimum equipment of latches 3. Door Locks (1) Operation	 N/R 2 (at a fully and a secondary latched positions) Having at least one primary latch and a striker assembly <General> Being operated in the interior of the vehicle. <Front door locks> Being inoperative the outside handle or other outside latch release controls, when locks are engaged. <Rear door locks> Being inoperative both the outside handle and inside handles or other latch release controls, when locks are engaged.	
C: Performance of requirement C-a: Performance of parts 1. A door latch and striker assembly (1) Durable longitudinal load (2) Durable transverse load (3) Durable inertia load 2. Door hinges (1) Durable longitudinal load (2) Durable transverse load 3.Back door latches (1) Durable loads	 11000N(2500 lbs) at a fully latched position, and 4450N(1000 lbs) at a secondary latched position 8900N(2000lbs) at a fully latched position, and 4450N(1000 lbs) at a secondary latched position 17800N(4000lbs) at a fully latched position (Slide door) 30G (a longitudinal or transverse load) 11000N(2500 lbs) 8900N(2000lbs) 11000N(2500 lbs) at a fully latched position, and 4450N(1000 lbs) at a secondary latched position, to the direction perpendicular to the face of the latch. (This corresponds to the longitudinal load test for door latches other than for the back door.) 8900N(2000lbs) at a fully latched position, and 4450N(1000 lbs) at a secondary latched position, to the direction of forkbole opening and parallel to the face of the latch. (This corresponds to the transverse load test for door latches other than for the back door.)	

USA (FMVSS206)		
ITEM	CONTENT	Illustration / supplement
[(1) Durable loads (cont'd)]	For back doors equipped with a latch and a striker assembly at the bottom of the door, durable load is 8900N (2000 lbs) at a fully latched position, to the both directions mentioned above.	
(2) Durable inertia load	30g at fully latched position, to the directions mentioned above.	
4. Back door hinges		
(1) Durable loads	11000N(2500 lbs) applied perpendicular to the hinge face plate (This corresponds to the longitudinal load test for door latches other than for the back door.) 8900N(2000 lbs) applied perpendicular to the axis of the hinge pin and parallel to the hinge face plate (This corresponds to the transverse load test for door latches other than for the back door.) For back doors opened upward, durable load is 8900N(2000 lbs) applied in the direction of the axis of the hinge pin.	
5. Test method		
(1) Door latches	SAE J839 of 1991/6, paragraph 5. (for longitudinal and transverse load test) SAE J839 of 1991/1, paragraph 6. (for inertia load test)	
(2) Door hinges	SAE J934 of 1982/7, paragraph 4 or 5. (for piano-type hinges, the hinges spacing requirements of SAE J934 shall not be applicable and arrangement of the test fixture shall be altered as required so that test load will be applied to the complete hinge.)	
(3) Hinged back door latches	SAE J839 of 1991/6, paragraph 5 (for durable loads tests) SAE J839 of 1991/6, paragraph 6 (for inertia load test)	
(4) Slide door	The outward transverse load of 8900N(2000lbs) is applied to the load-bearing members at opposite edges of the door (17800N (4000lbs) total).	
(5) Hinged back door hinges	SAE J934 of 1982/7, paragraph 4 or 5	
C-b: Performance of parts installed to the vehicle	N/R	
D: Label marking requirements D-a: Label marking its own requirements	N/R	
D-b: Label marking installed to a vehicle	N/R	
E: Referred standards	N/R	

ECE (ECE11)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars (side door)	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle 1. Door latches (1) Position	 N/R 2 (at a fully and an intermediate latched positions)	
C: Performance of requirement C-a: Performance of parts 1. A door latch and striker assembly (1) Durable longitudinal load (2) Durable transverse load (3) Durable inertia load (4) Slide door 2. Test method C-b: Performance of parts installed to the vehicle 1. Retention components of each door (1) Durable longitudinal load (2) Durable transverse load	 1111daN at a fully latched position, and 444daN at a intermediate latched position 889daN at a fully latched position, and 444daN at a intermediate latched position 30g (a longitudinal or transverse load) The outward transverse load of 889daN is applied to the load-bearing members at opposite edges of the door (17.8kN total). See Fig. 1 to 3 1111daN 889daN	Attach Fig. 1 to 3
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 A circle surrounding the letter "E" followed by the distinguish number of the country which has granted approval. The approval mark shall be clearly legible and be indelible. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every steering control conforming to a steering control type approved under this Regulation an international approval.	
E: Referred standards	N/R	

ITEM 96-7

External Projection

APEC Regulation Analysis Findings
Item No. 96-7: External projections

1. ECE, Australia and Japan have a regulation stipulating sharp edge and radius requirements. People's Republic of China adopts ECE R26.

New Zealand accepts the ECE, Australian and Japanese regulations.

Item 96-7 External Projection

A: Application: Passenger Car

Member Economies	B-b-1 No sharp edges	B-b-2 Radius Requirements	D Marking	E Reference standard Alternative regulation
Australia	ADR42/02	ADR42/02		
Brunei	**N/A**	**N/A**		
Canada	**N/A**	**N/A**		
Chile	**N/A**	**N/A**		
China	ECE-26	ECE-26		
Hong Kong	**N/A**	**N/A**		
Indonesia	**N/A**	**N/A**		
Japan	SRRV18	SRRV18		
Korea	**N/A**	**N/A**		
Malaysia	**N/A**	**N/A**		
Mexico	**N/A**	**N/A**		
New Zealand	ADR42, SRRV18 , ECE26	ADR42, SRRV18 , ECE26		ADR42, SRRV18, ECE26
Papua New Guinea	**N/A**	**N/A**		
Philippines	**N/A**	**N/A**		
Singapore	**N/A**	**N/A**		
Chinese Taipei	**N/A**	**N/A**		
Thailand	**N/A**	**N/A**		
United States	**N/A**	**N/A**		
ECE	ECE-26	ECE-26		

7. External Projections

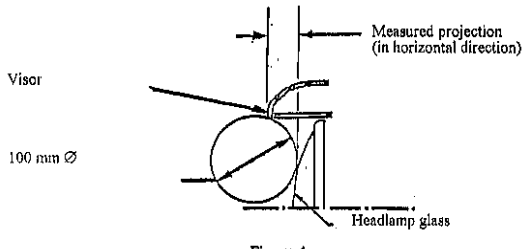
Economy: Australia	Regulation no: ADR 42/02	Categories: M1
ITEM	CONTENTS	Illustration/supplement
A. General specifications	No vehicle shall be equipped with: 1) any object or fitting, not technically essential to such vehicle, which protrudes from any part of the vehicle so that it is likely to increase the risk of bodily injury to any person; 2) any object or fitting technically essential to such vehicle unless is design, construction and conditions and the manner in which it is affixed to the vehicle are such as to reduce to a minimum the risk of bodily injury to any person; or 3) any object or fitting which, because it is pointed or has a sharp edge, is likely to increase the risk of bodily injury to any person.	
B. Particular specification a. Ornaments	N/A	
b. Head lights	N/A	
c. Grills and gaps	N/A	
d. Windscreen wipers	N/A	
e. Bumpers	The end of any bumper bar shall be turned towards the body of the vehicle to a sufficient extent to avoid any risk of hooking or grazing.	
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	N/A	
g. Wheel nuts, hub cap and wheel discs.	N/A	
h. Sheet metal edges	N/A	
I. Body panels	N/A	

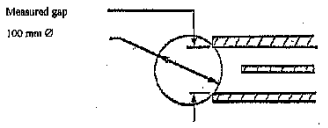
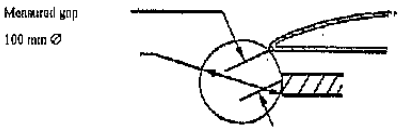
Economy: Australia	Regulation no: ADR 42/02	Categories: M1
ITEM	CONTENTS	Illustration/supplement
j. Lateral air or rain deflectors	N/A	
k. Jacking brackets and exhaust pipe.	N/A	
l. Air intake and outlet flaps	N/A	
m. Roof(include sun roof)	N/A	
n. Windows	N/A	
0. Registration plate brackets	N/A	
p. Luggage racks and ski racks	N/A	
q. Radio receiving or transmitting aerials	N/A	
r. Assembly instructions	N/A	
s. Air spoiler	N/A	

7. External Projections

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
A. General specifications	1) The provisions of this regulation shall not apply to those parts of the external surface which, with the vehicle in the laden condition ,with all doors, windows and access lids etc., in the closed position, are either at a height of more than 2 meters, or below the floor line, or so located that, in their static condition as well as when in operation, they cannot be contacted by a sphere 100 mm in diameter. 2) The external surface of vehicle shall not exhibit, directed outwards, any pointed or sharp parts or any predictions of such shape, dimensions, direction or hardness as to be likely to increase the risk or seriousness of bodily injure to a person hit by the external surface or brushing against it in the event of a collision. 3) The external surface of vehicle shall not exhibit, directed outwards, any parts likely to catch on pedestrians, cyclists or motor cyclist. 4) No protruding part of the external surface shall have a radius of curvature less than 2.5 mm. This requirement shall not apply to parts of the external surface which protrude less than 5mm, but the outward facing angle of such parts shall be blunted, save where such parts protrude less than 1.5mm. 5) Protruding parts of the external surface, made of a material of hardness not exceeding 60 shore A, may have a radius of curvature less than 2.5mm. The hardness measurement shall be taken with the component as installed on the vehicle. Where it is impossible to carry out a hardness measurement by the Shore A procedure, comparable measurement shall be used for evaluation.	

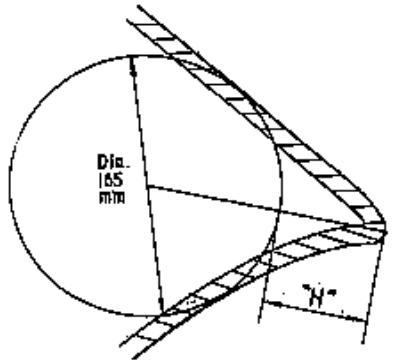
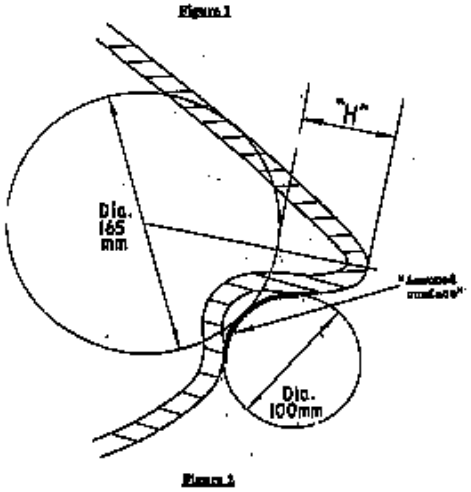
Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
	6) The provision of the above paragraphs a. to e. shall apply in addition to the particular specifications expressly provide otherwise.	
B. Particular specification a. Ornaments	1) Added ornaments which project more than 10mm from their support shall retract, become detached or bend over under a force of 10 daN excerted at their most salient point in any direction in a plane approximately parallel to the surface on which they are mounted. These provisions shall not apply to ornament on radiator grilles, to which only the general requirement of paragraph A. shall apply. To apply the 10 daN force a flat-ended ram of not more than 50mm diameter shall be used. Where this is not possible, an equivalent method shall be used. After the ornaments are retracted, detached or bent over, the remaining projections shall not project more than 10mm. These projections shall in any case satisfy the provisions of paragraph A-2). If the ornament is mounted on a base, this base is regarded as belonging to the ornament and not to the supporting surface. 2) Protective strips or shielding on the external surface shall not be subject to the requirements of paragraph B-a-1).above, however, they shall be firmly secured to the vehicle.	

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
b. Head lights	1) Projecting visor and rims shall be permitted on headlight, provided that their projection, as measured in relation to the external transparent surface of the headlight does not exceed 30mm and their radius of curvatures is at least 2.5mmthroughout. 2) In the case of a headlight mounted behind an additional trans-parent surface, the projection shall be determined according to the method described in supplement column(right side),item3).	1) Retracting headlights shall meet the requirement described in left column in both the operative and retracted positions. 2) This provisions do not apply to headlights which are sunk into the bodywork or which are "Over--hung" by the bodywork, if the latter complies with the requirement of "Body panel" described below.(item I.) 3) Method of determining the projection of head light visors and rims. --The projection from the external surface of the headlight shall be measured horizontally from the point of contact of a 100mm diameter sphere as shown in figure 4, below. 

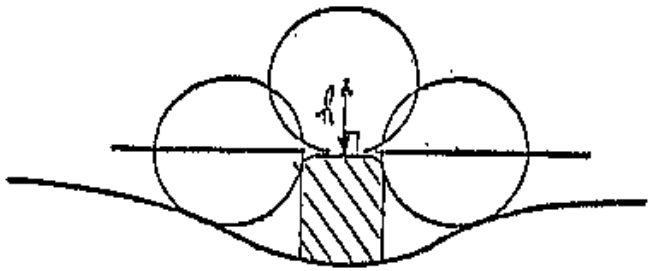
Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
c. Grills and gaps	1) The requirement of General specification, item 4) shall not to gaps between fixed or movable elements, including those forming part of air intake or outlet grills and radiator grills, provided that the distance between consecutive elements does not exceed 40mm and provided that the grills and gaps have a functional purpose. For gaps of between 40mm and 25mm the radii of curvature shall be 1mm or more. 2) However, if the distance between two consecutive element is equal to or less than 25mm, the radii of curvature of external faces of the elements shall not be less than 0.5mm. The distance between two consecutive elements of grills and gaps shall be determined according to the method described in right side column (supplements).	1) The junction of the front with the side faces of element forming a grille or gap shall be determined. 2) METHOD OF DETERMINING THE DIMENSION OF A GAP OR THE SPACE BETWEEN ELEMENTS OF A GRILLE. The dimension of a gap or space between elements of grille shall be determined by the distance between two planes passing through the points of contact of the sphere and perpendicular to the line joining those points of contact. Two figures 5,below show example of use of this procedure.  Figure 6  Figure 5
d. Windscreen wipers	The windscreen wiper fittings shall be such that the wiper shaft is furnished with a protective casing which has a radius of curvature meeting the requirement of above general specification and an end surface area of not less than $150mm^2$. In the case of rounded covers, these shall have a minimum projected area of $150mm^2$ when measured not more than 6.5mm from the point projecting furthest.	1) These requirement shall also be met by rear window wipers and headlamp wipers. 2) Requirement of general specification above shall not apply to the wiper blades or to any support--ing members. However, these units shall be so made as to have no sharp angles or pointed or cutting parts.

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
e. Bumpers	The end of the bumper shall be turned in toward the external surface in order to minimize the risk of folding. This requirement is considered to be satisfied if either the bumper is recessed or integrated within the bodywork or the end of the bumper is turned in so that it is not contactable by a 100mm sphere and the gap between the bumper end and the surrounding bodywork does not exceed 20mm. If the line of the bumper which corresponds to the outline contour of the car vertical projection is on a rigid surface, that surface shall have a minimum radius of curvature of 0.5mm at all its points lying from the contour line to 20mm inward, and a minimum radius of curvature of 2.5mmin all other cases.	The requirement of paragraph of left column shall not apply to parts on or of the bumper or to bumper insets which have a projection of less than 5mm, with special reference to joint covers and jets for headlamp washers; but the outward facing angles of such parts shall be blunted, save where such parts protrude less than 1.5mm.
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	1) The projection shall not exceed 40mm in the case of door or luggage compartment handle and 30mm in all other cases. 2) If lateral door handles rotate to operate, they shall meet one or other of the following requirement; 3) In the case of handles which rotate parallel to the plane of the door, the open end of handles must be directed toward the rear. The end of such handles shall be turned back toward the plane of the door and fitted into a protective surround or be recessed. 4) Handles which pivot outwards in any direction which is not parallel to the plane of the door shall, when in the closed position, be enclosed in a protective surround or be recessed. The open end shall face either rear-wards or downwards. Nevertheless, handles which do not comply with this last condition may be accepted if; (a) they have an independent return mechanism, (b) should the return mechanism fail, they can not project more than 15mm,	

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
	(c) they comply, in such opened position, with the provisions of general specifications described above, and (d) their end surface area, when measured not more than 6.5mm from the point projecting furthest, is not less than 150mm^2.	
g. Wheel nuts, hub cap and wheel discs.	1) The requirement of general specification described above shall not apply. 2) The wheels, wheel nuts, hub caps and wheel discs shall not exhibit any pointed or sharp projections that extended beyond the external plane of the wheel rim. 3) When the vehicle is traveling in a straight part of the wheel other than the tyres, situated above the horizontal plane passing through their axis of rotation shall project beyond the vertical projection, in a horizontal plane, of the external surface or structure. However, if functional requirements so warrant, wheel discs which cover wheel and hub nuts may project beyond the vertical projection of the external surface or structure on condition that the radius of curvature of the surface of the projecting part is not less than 30mm and that the projection beyond the vertical projection of the external surface or structure in no case exceeds 30mm.	Wing nuts shall not allowed.
h. Sheet metal edges	Sheet-metal edges, such as gutter edges and the rails of sliding doors, shall not be permitted unless they are folded back or are fitted with a shield meeting the requirements of this Regulation which are applicable to it.	An unprotected edge shall be considered to be folded back either if it is folded back by approximately 180°, or if it is folded towards the bodywork in such a manner that it cannot be contacted by a sphere having a diameter of 100mm.

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
I. Body panels	Folds in body panels may have a radius of curvature of less than 2.5mm, provided that it is not less than one-tenth of the height "H" of the projection, measured in accordance with the method described below. METHOD OF DETERMINING THE HEIGHT OF THE PROJECTION OF FOLDS IN BODY PANELS. 1) The height H of a projection is determined graphically by reference to the circumference of a 165 diameter circle, internally tangential to the external outline of the external surface at the section to be checked. 2) H is the maximum value of the distance, measured along a straight line passing through the center of a 165mm diameter circle, between the circumference of the aforesaid circle and the external contour of the projection.(see figure 1 in right column) 3) In case where it is not possible for a 100mm diameter circle to contact externally part of the external outline of the external surface at the section under consideration, the surface outline in this area will be assumed to be that formed by the circumference of the 100mm diameter circle between its tangent points with the external outline.(see figure 2 in right column) 4) Drawings of the necessary sections through the external surface shall be provided by the manufacture to allow the height of the projections referred to above to be measured.	 
j. Lateral air or rain deflectors	Lateral deflectors shall have a radius of curvature of at least 1mm on edges capable of being directed outwards.	

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
k. Jacking brackets and exhaust pipe.	The jacking brackets and exhaust pipe(s) shall not more than 10 mm beyond the vertical projection of the floor line lying vertically above them. As an exception to this requirement an exhaust pipe may project more than 10mm beyond the vertical projection of the floor line, so long as it terminates in rounded edges, the minimum radius of curvature being 2.5mm.	
l. Air intake and outlet flaps	Air intake and outlet flaps shall meet the requirement of 2),3) and 4) of general specifications described afore column.	
m. Roof (incld. sun roof)	1) Opening roof shall be considered only in the closed position. 2) Convertible vehicles shall be examined with the hood in both the raised and lowered positions. * With the hood lowered, no examination shall be made of the vehicle inside an imaginary surface formed by the hood when in the raised position. * Where a cover for the linkage of the hood when folded is provided as standard equipment, the examination shall be made with the cover in position.	
n. Windows	Windows which move outwards from the external surface of the vehicle shall comply with the following provisions in all positions of use.	* no exposed edge shall face forwards. * no part of the window shall project beyond the extreme outer edge of the vehicle.
0. Registration plate brackets	Supporting brackets provided by the vehicle manufacturer for registration plates shall comply with the requirements of 4) of general specification described in afore column if they are contactable by a 100mm diameter sphere when a registration plate is fitted in accordance with the vehicle manufacturer's recommendation.	

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
p. Luggage racks and ski racks	1) luggage racks and ski racks shall be so attached to the vehicle that positive locking exists in at least one direction and that horizontal, longitudinal and transverse forces can be transmitted which are at least equal to the vertical load-bearing capacity of the rack as specified by manufacturer. For the test of the luggage rack or ski rack fixed the vehicle according to the manufacturer's instructions, the test loads shall not be applied at one point only. 2) Surface which, after installation of the rack, can be contacted by a sphere of 165mm diameter shall not have parts with a radius of curvature less than 2.5mm, unless the provisions of paragraph " c. Grills and gaps " can be applied. 3) Fastening elements such as bolts that are tightened or loosened without tools shall not project more than 40mm beyond the surface referred to in item 2) of this column, the projection being determined according to the method described in right side column, but using a sphere of 165mm diameter in those cases where the method prescribed in paragraph 2. of this method, is employed.	METHOD OF DETERMINING THE DIMENSION OF THE PROJECTION OF A COMPONENT MOUNTED ON THE EXTERNAL SURFACE. 1.The dimension of the projection of a component which is mounted on a surface other than convex surface may be determined either directly or by reference to a drawing of an appropriate section of this component in its installed condition. 2.If the dimension of the projection of a component which is mounted on a surface other than convex cannot be determined by simple measurement, it shall be determined by the maximum variation of the distance of a 100mm diameter sphere from the nominal line of the panel when the sphere is moved over and is in constant contact with that component. Figure 3, shows an example of the use of this procedure.  Figure 3

Economy: China	Regulation no: GB 11566-1995	Categories: M1
ITEM	CONTENTS	Illustration/supplement
q. Radio receiving or transmitting aerials	1) Radio receiving and transmitting aerial shall be fitted to the vehicle in such a way that if their unattached end is less than 2m from the road surface in any position of use specified by the manufacture of the aerial, it shall be inside the zone bounded by the vertical planes which are 10cm inside the extreme outer edge of the vehicle as defined in explanation of right side column. 2) Further more, aerial shall be so fitted to the vehicle, and if necessary their unattached ends so restricted, that no part of the aerial protrude beyond the extreme outer edge of the vehicle as defined by the definition as well as item 1) above. 3) Shafts of aerials may have radii of curvature of less than 2.5 mm. However, the unattached ends shall be fitted with fixed cappings, the radii of curvature of which are not less than 2.5mm. However, the unattached ends shall be fitted with fixed cappings, the radii of curvature of which are not less than 2.5 mm. 4) The bases of aerial shall not project more than 30mm when determined according to the procedure prescribed in the supplement column of paragraph " p. Luggage racks and ski racks ". However, in the case of aerials with amplifiers built into the base, these bases may project up to 40mm.	DEFINITION OF EXTREME OUTER EDGE. "Extreme outer edge " of the vehicle means, in relation to the side of the vehicle, the plane parallel to the median longitudinal plane of the vehicle coinciding with its outer lateral edge, and, in relation to the front and rear ends, the perpendicular account not being taken of the projection.
r. Assembly instructions	Luggage racks, ski racks and radio receiving or transmitting aerials that have been approved as separate technical units may not be offered for sale, sold or purchased unless accompanied by assembly instructions. The assembly instructions shall contain sufficient information to enable the approved component to be mounted on the vehicle in a manner that complies with the relevant provisions of paragraph " General specifications" and " Each Particular specification" which are prescribed. In particular, the position of use must be indicated for telescopic aerial.	

7. External Projections

Economy: JAPAN	Regulation no: Safety Regulations & Structural Standards Article 18	Categories:
ITEM	CONTENTS	Illustration/supplement
A. General specifications	(Safety Regulation ; Article 18-1-(3)) The external shape of a motor vehicle body shall not have any sharp edge or rotating protrusions which are likely to endanger other traffic.	(Application) This regulation shall apply to motor vehicle. However this regulation shall not apply to large-sized special motor vehicles and small-sized special motor vehicles.
B. Particular specification a. Ornaments	None	
b. Head lights	None	
c. Grills and gaps	None	
d. Windscreen wipers	None	
e. Bumpers	None	
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	None	
g. Wheel nuts, hub cap and wheel discs.	None	
h. Sheet metal edges	None	
I. Body panels	None	
j. Lateral air or rain defrectors	None	
k. Jacking brackets and exhaust pipe.	None	
l. Air intake and outlet flaps	None	
m. Roof (incld sun roof)	None	

Economy: JAPAN	Regulation no: Safety Regulations & Structural Standards Article 18	Categories:
ITEM	CONTENTS	Illustration/supplement
n. Windows	None	
0. Registration plate brackets	None	
p. Luggage racks and ski racks	None	
q. Radio receiving or transmitting aerials	None	
r. Assembly instructions	None	
s. Air spoiler	(Structural Standard) 1. The air spoiler shall not constitute the most forward point or the most backward point of the motor vehicle at any point of the front part or the rear part of the motor vehicle. However, this provision shall not apply to those parts that are situated below the lower edge of each bumper and where the curvature radius of the corner parts of those areas where a 100 mm diameter sphere can make static contact (except for its parts lower than the floor line, which is a cone with a vertical axis and with a half angle of 30° successively positioned around a vehicle in such a way that it contacts, continuously and as low as possible, the external surface of the bodywork) 5 mm or more, or where the hardness of corner parts is 60 shore (A) or less. 2. The air spoiler (except for its parts lower than the lower edge of each bumper and its parts higher than a 1.8 m high point above the ground) shall not have any corner parts with a curvature radius of less than 2.5 mm at those areas where a 100 mm diameter sphere can make static contacts. However, this provision shall not apply to cases where the hardness of the corner parts is 60 shore (A) or less, or the height of the corner parts is less than 5 mm, or the distance between the adjacent corner parts (referring to the distance between the contact points when a 100 mm diameter sphere makes static contacts with the two corner parts concerned) is 40 mm or less and the corner parts concerned comply with the requirements regarding the shapes of the corner parts set forth in the next table. (Refer to the examples.)	(Application) This structural standard shall apply to air spoilers on ordinary-sized motor vehicles and small-sized motor vehicles exclusively for the carriage of passengers, with a passenger capacity of 10 persons or less, ordinary-sized motor vehicles and small-sized motor vehicles for the carriage of goods with a GVW of 2.8 tons or less and mini-sized motor vehicles (except for air spoilers on two-wheeled motor vehicles with or without sidecars and mini-sized motor vehicles with caterpillar tracks and sleds).

Economy: JAPAN	Regulation no: Safety Regulations & Structural Standards Article 18	Categories:
ITEM	CONTENTS	Illustration/supplement

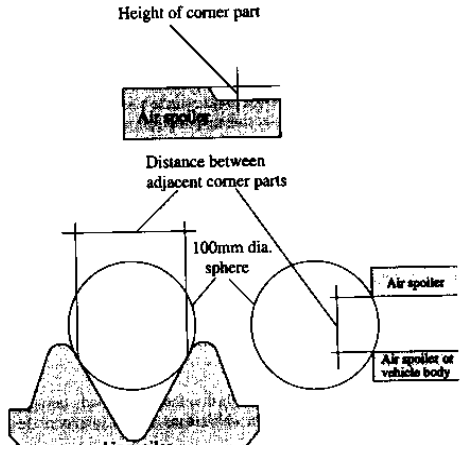
Height of corner parts (h)	Shape of corner parts	Distance of adjacent corner parts (δ)	Shape of corner parts
h < 5mm	The corner parts shall not have any parts pointed outward or sharp edge.	25mm < δ ≤ 40mm	The curvature radius of the corner parts shall be 1.0mm or more.
		δ ≤ 25mm	The curvature radios of the corner parts shall be 0.5 mm or more.

3. The air spoiler shall not constitute the outermost part of the vehicle body at its adjacent sections (the outermost part of the motor vehicle for the parts below the upper edge of each bumper).

4. The air spoiler shall have no wing-shaped overhangs extending to the side(hereinafter referred to as the "Wings"). However, this provision shall not apply to cases where the gap between the side edge of the wing and the vehicle body is extremely small or the side edge of the wing is situated 165 mm or more inward from the outermost part of the body of the motor vehicle concerned, or the parts of the wing whose side edge is not situated 165 mm or more inward from the outermost part of the vehicle body is constructed so they my reduce the impact in the event of contact with pedestrians.

5. The air spoiler shall be securely attached to the vehicle body by welding, bolts, nuts, adhesive agents and so forth.

(Example 2) Examples of Height and Distance Concerning Corner Parts



7. External Projections

Economy: Korea	Regulation no: Safety standards, article 4.	Categories: M1
ITEM	CONTENTS	Illustration/supplement
A. General specifications	N/A	
B. Particular specification a. Ornaments	N/A	
b. Head lights	N/A	
c. Grills and gaps	N/A	
d. Windscreen wipers	N/A	
e. Bumpers	N/A	
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	N/A	
g. Wheel nuts, hub cap and wheel discs.	N/A	
h. Sheet metal edges	N/A	
I. Body panels	N/A	
j. Lateral air or rain deflectors	N/A	
k. Jacking brackets and exhaust pipe.	N/A	
l. Air intake and outlet flaps	N/A	

Economy: Korea	Regulation no: Safety standards, article 4.	Categories: M1
ITEM	CONTENTS	Illustration/supplement
m. Roof(incld sun roof)	N/A	
n. Windows	Outward-opening windows shall not protrude 25cm more than the outermost part of a passenger vehicles, 30cm more than those of other vehicle except passenger vehicle.	
0. Registration plate brackets	N/A	
p. Luggage racks and ski racks	N/A	
q. Radio receiving or transmitting aerials	N/A	
r. Assembly instructions	N/A	
s. Rear view mirror	When drawn vehicle is wider than a drawing vehicle, the rear view mirror of the drawing vehicle shall not protrude 10 cm more than the outermost part of the drawn vehicle.	

7. External Projections

Economy: New Zealand	Land Transport Rule 32008	Categories:
ITEM	CONTENTS	Illustration/supplement
A. General specifications	The following requirements must be complied with: (a) ornamental objects and fittings must not protrude from the vehicles if they could injury any person; and (b) protruding objects and fittings which have a functional purpose must ,if installed and operated on vehicles that are used on any public road, be such that their risk of causing injury to any person is minimized; and (c) protruding objects and fittings must not adversely affect driver vision or driver control; and (d) components of the vehicles, including damaged or corroded body panels, must be such that their risk of hooking any vehicle, or grazing any person is minimized .	
B. Particular specification	External projections must comply with the following approved vehicle standards: (a) 74/483/EEC, (b) ECE 26, (c) ADR 42/00 or (d) Jisha Circular No.1079 (Outside Rearview Mirrors) and Jisha Circular No.896 (Air Spoilers).	

7. External Projections

Economy: Papua New Guinea	Regulation no: R125 "O" (body work)	Categories:
ITEM	CONTENTS	Illustration/supplement
A. General specifications	* Not be equipped with fittings which have such sharp corners or edges, or which extend in such a way, as is likely to cause injury to passengers or damage to property. * In respect of entrance, exit and aisles, be free from obstruction. * In respect of steps, door hinges, handles and locks, be in good working condition.	
B. Particular specification a. Ornaments	N/A	
b. Head lights	N/A	
c. Grills and gaps	N/A	
d. Windscreen wipers	N/A	
e. Bumpers	N/A	
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	N/A	
g. Wheel nuts, hub cap and wheel discs.	N/A	
h. Sheet metal edges	N/A	
I. Body panels	N/A	
j. Lateral air or rain defrectors	N/A	
k. Jacking brackets and exhaust pipe.	N/A	
l. Air intake and outlet flaps	N/A	

Economy: Papua New Guinea	Regulation no: R125 "O" (body work)	Categories: M1
ITEM	CONTENTS	Illustration/supplement
m. Roof(incld sun roof)	N/A	
n. Windows	N/A	
0. Registration plate brackets	N/A	
p. Luggage racks and ski racks	N/A	
q. Radio receiving or transmitting aerials	N/A	
r. Assembly instructions	N/A	
s. Air spoiler	N/A	

7. External Projections

Economy: Philippines	Regulation no: S9,ra4136	Categories:
ITEM	CONTENTS	Illustration/supplement
A. General specifications	No regulation referred to external projection exist.	
B. Particular specification a. Ornaments	N/A	
b. Head lights	N/A	
c. Grills and gaps	N/A	
d. Windscreen wipers	N/A	
e. Bumpers	N/A	
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	N/A	
g. Wheel nuts, hub cap and wheel discs.	N/A	
h. Sheet metal edges	N/A	
I. Body panels	N/A	
j. Lateral air or rain defrectors	N/A	
k. Jacking brackets and exhaust pipe.	N/A	
l. Air intake and outlet flaps	N/A N/A	
m. Roof(incld sun roof)	N/A	
n. Windows	N/A	
0. Registration plate brackets	N/A	
p. Luggage racks and ski racks	N/A	
q. Radio receiving or transmitting aerials	N/A	
r. Assembly instructions	N/A	
s. Air spoiler	N/A	

7. External Projections

Economy: Singapore	Regulation no: Road Traffic Rule. Cap.276,R9.C128	Categories:
ITEM	CONTENTS	Illustration/supplement
A. General specifications	(1) No mascot shall be carried by a motor vehicle in any position where it is likely to strike any person with whom the vehicle may collide unless the mascot is not liable to cause injury to such person by reason of any projection thereon. (2) No part or accessory of a vehicle shall project beyond the body of the vehicle in such a manner or position as to cause or be likely to cause danger to any person on a road.	
B. Particular specification a. Ornaments	N/A	
b. Head lights	N/A	
c. Grills and gaps	N/A	
d. Windscreen wipers	N/A	
e. Bumpers	N/A	
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	N/A	
g. Wheel nuts, hub cap and wheel discs.	N/A	
h. Sheet metal edges	N/A	
I. Body panels	N/A	
j. Lateral air or rain defrectors	N/A	
k. Jacking brackets and exhaust pipe.	N/A	
l. Air intake and outlet flaps	N/A	
m. Roof (incld sun roof)	N/A	
n. Windows	N/A	
0. Registration plate brackets	N/A	

Economy: Singapore	Regulation no: Road Traffic Rule. Cap.276,R9.C128	Categories:
ITEM	CONTENTS	Illustration/supplement
p. Luggage racks and ski racks	N/A	
q. Radio receiving or transmitting aerials	N/A	
r. Assembly instructions	N/A	
s. Air spoiler	N/A	

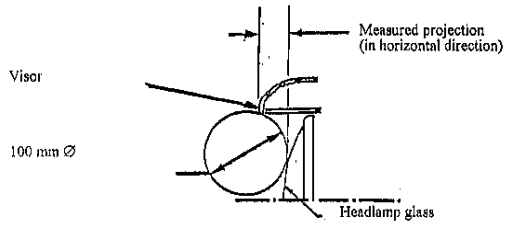
7. External Projections

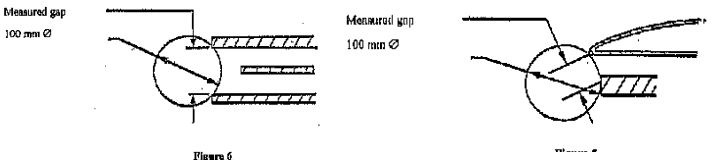
Economy: Chinese Taipei	Regulation no: 39-17	Categories:
ITEM	CONTENTS	Illustration/supplement
A. General specifications	* Wiper and back mirror should be in good condition. * Front mirror should be equipped for the large truck which has plane front surface.	
B. Particular specification a. Ornaments	N/A	
b. Head lights	N/A	
c. Grills and gaps	N/A	
d. Windscreen wipers	* See the column "General specification"	
e. Bumpers	N/A	
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	N/A	
g. Wheel nuts, hub cap and wheel discs.	N/A	
h. Sheet metal edges	N/A	
I. Body panels	N/A	
j. Lateral air or rain defrectors	N/A	
k. Jacking brackets and exhaust pipe.	N/A	
l. Air intake and outlet flaps	N/A	
m. Roof(incl. sun roof)	N/A	
n. Windows	N/A	
0. Registration plate brackets	N/A	
p. Luggage racks and ski racks	N/A	
q. Radio receiving or transmitting aerials	N/A	
r. Assembly instructions	N/A	
s. Air spoiler	N/A	

7. External Projections

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
A. General specifications	1) The provisions of this regulation shall not apply to those parts of the external surface which, with the vehicle in the laden condition ,with all doors, windows and access lids etc., in the closed position, are either at a height of more than 2 meters, or below the floor line, or so located that, in their static condition as well as when in operation, they cannot be contacted by a sphere 100 mm in diameter. 2) The external surface of vehicle shall not exhibit, directed outwards, any pointed or sharp parts or any projections of such shape ,dimensions, direction or hardness as to be likely to increase the risk or seriousness of bodily injure to a person hit by the external surface or brushing against it in the event of a collision. 3) The external surface of vehicle shall not exhibit, directed outwards, any parts likely to catch on pedestrians, cyclists or motor cyclist. 4) No protruding part of the external surface shall have a radius of curvature less than 2.5 mm. This requirement shall not apply to parts of the external surface which protrude less than 5mm, but the outward facing angle of such parts shall be blunted, save where such parts protrude less than 1.5mm. 5) Protruding parts of the external surface, made of a material of hardness not exceeding 60 shore A, may have a radius of curvature less than 2.5mm. The hardness measurement shall be taken with the component as installed on the vehicle. Where it is impossible to carry out a hardness measurement by the Shore A procedure, comparable measurement shall be used for evaluation.	

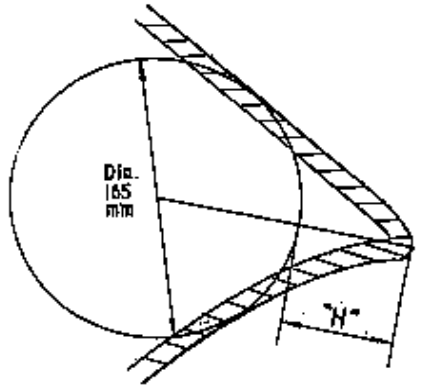
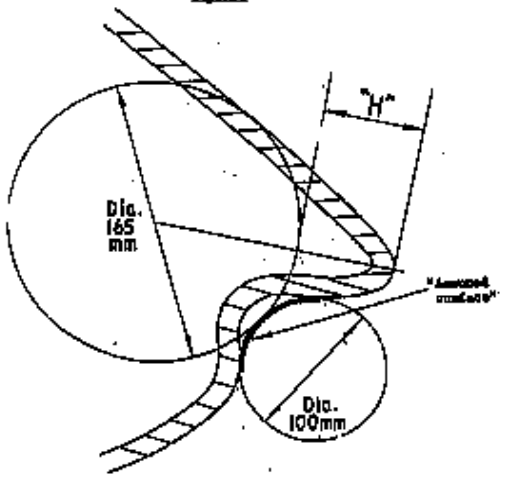
Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
	6) The provision of the above paragraphs a. to e. shall apply in addition to the particular specifications expressly provide otherwise.	
B. Particular specification a. Ornaments	1) Added ornaments which project more than 10mm from their support shall retract, become detached or bend over under a force of 10 daN excerted at their most salient point in any direction in a plane approximately parallel to the surface on which they are mounted. These provisions shall not apply to ornament on radiator grilles, to which only the general requirement of paragraph A. shall apply. To apply the 10 daN force a flat-ended ram of not more than 50mm diameter shall be used. Where this is not possible, an equivalent method shall be used. After the ornaments are retracted, detached or bent over, the remaining projections shall not project more than 10mm. These projections shall in any case satisfy the provisions of paragraph A-2). If the ornament is mounted on a base, this base is regarded as belonging to the ornament and not to the supporting surface. 2) Protective strips or shielding on the external surface shall not be subject to the requirements of paragraph B-a-1).above, however, they shall be firmly secured to the vehicle.	

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
b. Head lights	1) Projecting visor and rims shall be permitted on headlight, provided that their projection, as measured in relation to the external transparent surface of the headlight does not exceed 30mm and their radius of curvatures is at least 2.5mmthroughout. 2) In the case of a headlight mounted behind an additional transparent surface, the projection shall be determined according to the method described in supplement column(right side),item3).	1) Retracting headlights shall meet the requirement described in left column in both the operative and retracted positions. 2) This provisions do not apply to headlights which are sunk into the bodywork or which are "Over--hung" by the bodywork, if the latter complies with the requirement of "Body panel" described below.(item I.) 3) Method of determining the projection of head light visors and rims. --The projection from the external surface of the headlight shall be measured horizontally from the point of contact of a 100mm diameter sphere as shown in figure 4, below. 

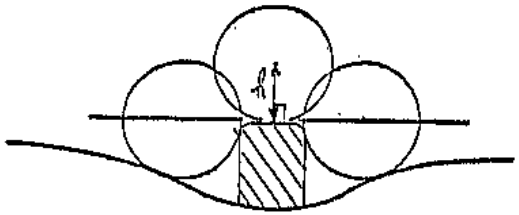
Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
c. Grills and gaps	1) The requirement of General specification, item 4) shall not to gaps between fixed or movable elements, including those forming part of air intake or outlet grills and radiator grills, provided that the distance between consecutive elements does not exceed 40mm and provided that the grills and gaps have a functional purpose. For gaps of between 40mm and 25mm the radii of curvature shall be 1mm or more. 2) However, if the distance between two consecutive element is equal to or less than 25mm, the radii of curvature of external faces of the elements shall not be less than 0.5mm. The distance between two consecutive elements of grills and gaps shall be determined according to the method described in right side column(supplements).	1) The junction of the front with the side faces of element forming a grille or gap shall be determined. 2) METHOD OF DETERMINING THE DIMENSION OF A GAP OR THE SPACE BETWEEN ELEMENTS OF A GRILLE. The dimension of a gap or space between elements of grille shall be determined by the distance between two planes passing through the points of contact of the sphere and perpendicular to the line joining those points of contact. Two figures 5,below show example of use of this procedure.  Figure 6
d. Windscreen wipers	The windscreen wiper fittings shall be such that the wiper shaft is furnished with a protective casing which has a radius of curvature meeting the requirement of above general specification and an end surface area of not less than $150mm^2$. In the case of rounded covers, these shall have a minimum projected area of $150mm^2$ when measured not more than 6.5mm from the point projecting furthest.	1) These requirement shall also be met by rear window wipers and headlamp wipers. 2) Requirement of general specification above shall not apply to the wiper blades or to any support--ing members. However, these units shall be so made as to have no sharp angles or pointed or cutting parts.

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
e. Bumpers	The end of the bumper shall be turned in toward the external surface in order to minimize the risk of folding. This requirement is considered to be satisfied if either the bumper is recessed or integrated within the bodywork or the end of the bumper is turned in so that it is not contactable by a 100mm sphere and the gap between the bumper end and the surrounding bodywork does not exceed 20mm. If the line of the bumper which corresponds to the outline contour of the car vertical projection is on a rigid surface, that surface shall have a minimum radius of curvature of 0.5mm at all its points lying from the contour line to 20mm inward, and a minimum radius of curvature of 2.5mmin all other cases.	The requirement of paragraph of left column shall not apply to parts on or of the bumper or to bumper insets which have a projection of less than 5mm, with special reference to joint covers and jets for headlamp washers; but the outward facing angles of such parts shall be blunted, save where such parts protrude less than 1.5mm.
f. Handle, hinges and push buttons of doors, Fuel tank filler cap and covers. Luggage compartment and flaps.	1) The projection shall not exceed 40mm in the case of door or luggage compartment handle and 30mm in all other cases. 2) If lateral door handles rotate to operate, they shall meet one or other of the following requirement; 3) In the case of handles which rotate parallel to the plane of the door, the open end of handles must be directed toward the rear. The end of such handles shall be turned back toward the plane of the door and fitted into a protective surround or be recessed. 4) Handles which pivot outwards in any direction which is not parallel to the plane of the door shall, when in the closed position, be enclosed in a protective surround or be recessed. The open end shall face either rear-wards or downwards. Nevertheless, handles which do not comply with this last condition may be accepted if; (a) they have an independent return mechanism, (b) should the return mechanism fail, they can not project more than 15mm,	

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
	(c) they comply, in such opened position, with the provisions of general specifications described above, and (d) their end surface area, when measured not more than 6.5mm from the point projecting furthest, is not less than 150mm^2.	
g. Wheel nuts, hub cap and wheel discs.	1) The requirement of general specification described above shall not apply. 2) The wheels, wheel nuts, hub caps and wheel discs shall not exhibit any pointed or sharp projections that extended beyond the external plane of the wheel rim. 3) When the vehicle is traveling in a straight part of the wheel other than the tyres, situated above the horizontal plane passing through their axis of rotation shall project beyond the vertical projection, in a horizontal plane, of the external surface or structure. However, if functional requirements so warrant, wheel discs which cover wheel and hub nuts may project beyond the vertical projection of the external surface or structure on condition that the radius of curvature of the surface of the projecting part is not less than 30mm and that the projection beyond the vertical projection of the external surface or structure in no case exceeds 30mm.	Wing nuts shall not allowed.
h. Sheet metal edges	Sheet-metal edges, such as gutter edges and the rails of sliding doors, shall not be permitted unless they are folded back or are fitted with a shield meeting the requirements of this Regulation which are applicable to it.	An unprotected edge shall be considered to be folded back either if it is folded back by approximately 180°,or if it is folded towards the bodywork in such a manner that it cannot be contacted by a sphere having a diameter of 100mm.

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
I. Body panels	Folds in body panels may have a radius of curvature of less than 2.5mm, provided that it is not less than one-tenth of the height "H" of the projection, measured in accordance with the method described below. <u>METHOD OF DETERMINING THE HEIGHT OF THE PROJECTION O FOLDS IN BODY PANELS.</u> 1) The height H of a projection is determined graphically by reference to the circumference of a 165 diameter circle, internally tangential to the external outline of the external surface at the section to be checked. 2) H is the maximum value of the distance, measured along a straight line passing through the center of a 165mm diameter circle, between the circumference of the aforesaid circle and the external contour of the projection.(see figure 1 in right column) 3) In case where it is not possible for a 100mm diameter circle to contact externally part of the external outline of the external surface at the section under consideration, the surface outline in this area will be assumed to be that formed by the circumference of the 100mm diameter circle between its tangent points with the external outline.(see figure 2 in right column) 4) Drawings of the necessary sections through the external surface shall be provided by the manufacture to allow the height of the projections referred to above to be measured.	 
j. Lateral air or rain deflectors	Lateral deflectors shall have a radius of curvature of at least 1mm on edges capable of being directed outwards.	

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
k. Jacking brackets and exhaust pipe.	The jacking brackets and exhaust pipe(s) shall not more than 10 mm beyond the vertical projection of the floor line lying vertically above them. As an exception to this requirement an exhaust pipe may project more than 10mm beyond the vertical projection of the floor line, so long as it terminates in rounded edges, the minimum radius of curvature being 2.5mm.	
l. Air intake and outlet flaps	Air intake and outlet flaps shall meet the requirement of 2),3) and 4) of general specifications described afore column.	
m. Roof(include sun roof)	1) Opening roof shall be considered only in the closed position. 2) Convertible vehicles shall be examined with the hood in both the raised and lowered positions. * With the hood lowered, no examination shall be made of the vehicle inside an imaginary surface formed by the hood when in the raised position. * Where a cover for the linkage of the hood when folded is provided as standard equipment, the examination shall be made with the cover in position.	
n. Windows	Windows which move outwards from the external surface of the vehicle shall comply with the following provisions in all positions of use.	* no exposed edge shall face forwards. * no part of the window shall project beyond the extreme outer edge of the vehicle.
0. Registration plate brackets	Supporting brackets provided by the vehicle manufacturer for registration plates shall comply with the requirements of 4) of general specification described in afore column if they are contactable by a 100mm diameter sphere when a registration plate is fitted in accordance with the vehicle manufacturer's recommendation.	

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
p. Luggage racks and ski racks	1) luggage racks and ski racks shall be so attached to the vehicle that positive locking exists in at least one direction and that horizontal, longitudinal and transverse forces can be transmitted which are at least equal to the vertical load-bearing capacity of the rack as specified by manufacturer. For the test of the luggage rack or ski rack fixed the vehicle according to the manufacturer's instructions, the test loads shall not be applied at one point only. 2) Surface which, after installation of the rack, can be contacted by a sphere of 165mm diameter shall not have parts with a radii-us of curvature less than 2.5mm, unless the provisions of para-graph " c. Grills and gaps " can be applied. 3) Fastening elements such as bolts that are tightened or loosened without tools shall not project more than 40mm beyond the surf-ace referred to in item 2) of this column, the projection being determined according to the method described in right side col-umn, but using a sphere of 165mm diameter in those cases where the method prescribed in paragraph 2. of this method, is employed.	METHOD OF DETERMINING THE DIMENSION OF THE PROJECTION OF A COMPONENT MOUNTED ON THE EXTERNAL SURFACE. 1.The dimension of the projection of a component which is mounted on a surface other than convex surface may be determined either directly or by reference to a drawing of an appropriate section of this component in its installed condition. 2.If the dimension of the projection of a component which is mounted on a surface other than convex cannot be determined by simple measure-ment, it shall be determined by the maximum variation of the distance of a 100mm diameter sphere from the nominal line of the panel when the sphere is moved over and is in constant contact with that component. Figure 3, shows an example of the use of this procedure.  Figure 3

Economy: ECE	Regulation no: ECE-26	Categories: M1
ITEM	CONTENTS	Illustration/supplement
q. Radio receiving or transmitting aerials	1) Radio receiving and transmitting aerial shall be fitted to the vehicle in such a way that if their unattached end is less than 2m from the road surface in any position of use specified by the manufacture of the aerial, it shall be inside the zone bounded by the vertical planes which are 10cm inside the extreme outer edge of the vehicle as defined in explanation of right side column. 2) Further more, aerial shall be so fitted to the vehicle, and if necessary their unattached ends so restricted, that no part of the aerial protrude beyond the extreme outer edge of the vehicle as defined by the definition as well as item 1) above. 3) Shafts of aerials may have radii of curvature of less than 2.5 mm. However, the unattached ends shall be fitted with fixed cappings, the radii of curvature of which are not less than 2.5 mm. However, the unattached ends shall be fitted with fixed cappings, the radii of curvature of which are not less than 2.5 mm. 4) The bases of aerial shall not project more than 30mm when determined according to the procedure prescribed in the supplement column of paragraph " p. Luggage racks and ski racks ". However, in the case of aerials with amplifiers built into the base, these bases may project up to 40mm.	DEFINITION OF EXTREME OUTER EDGE. "Extreme outer edge " of the vehicle means, in relation to the side of the vehicle,the plane parallel to the median longitudinal plane of the vehicle coinciding with its outer lateral edge, and, in relation to the front and rear ends, the perpendicular account not being taken of the projection.
r. Assembly instructions	Luggage racks, ski racks and radio receiving or transmitting aerials that have been approved as separate technical units may not be offered for sale, sold or purchased unless accompanied by assembly instructions. The assembly instructions shall contain sufficient information to enable the approved component to be mounted on the vehicle in a manner that complies with the relevant provisions of paragraph " General specifications" and " Each Particular specification" which are prescribed. In particular, the position of use must be indicated for telescopic aerial.	

ITEM 96-8

Interior impact protection

APEC Regulation Analysis Findings
Item No. 96-8: Interior impact protection

1. Requirements for internal protrusions exist mainly in Europe, Australia, U.S. and Japan. Korea and Canada adopt the FMVSS regulation.

2. Korea accepts ADR 21/00 as an alternative.

3. New Zealand accepts the ECE, Australian and Japanese regulations.

Item No. 96- 8 Interior impact protection

A: Application: Passenger Vehicle

Member Economies	B-b-1 Instrument Panel Impact test	B-b-2 Sun Visor		B-b-3 Interior compartment Door Impact test	B-b-4 Armrest Construction
		Impact test	Construction (Impact absorbent, Radius)		
Australia	ADR 21/00	ADR 11/00	←	ADR 21/00	N/A
Brunei	N/A	←	←	←	←
Canada	N/A	FMVSS-201	←	N/A	FMVSS-201
Chile	N/A	←	←	←	←
China	N/A	←	←	←	←
Hong Kong	N/A	←	←	←	←
Indonesia	N/A	←	←	←	←
Japan	SRRV20	SRRV45	←	N/A	←
Korea	FMVSS-201	←	←	N/A	FMVSS-201
Malaysia	N/A	←	←	←	←
Mexico	N/A	←	←	←	←
New Zealand	N/A or Unique	←	←	←	←
Papua New Guinea	N/A	←	←	←	←
Philippines	N/A	←	←	←	←
Singapore	N/A	←	←	←	←
Chinese Taipei	N/A	←	←	←	←
Thailand	N/A	←	←	←	←
United States	FMVSS-201	←	←	←	←
ECE	ECE21-01	←	←	←	←

Member Economies	B-b-5 Seat Back Impact test	B-b-6 Control lever & Knobs Material & Radius	B-b-7 Others Material & Radius	D Marking	E Reference Standard Alternative Regulation
Australia	←	←	←		ADR11 accepts ECE21/01
Brunei	←	←	←		
Canada	N/A	←	←		
Chile	←	←	←		
China	←	←	←		
Hong Kong	←	←	←		
Indonesia	←	←	←		
Japan	←	←	SRRV 22		
Korea	N/A	←	←		ADR21/00
Malaysia	←	←	←		
Mexico	←	←	←		
New Zealand	←	←	←		ECE21,ADR11,21,42, FMVSS201,SRRV20,45
Papua New Guinea	←	←	←		
Philippines	←	←	←		
Singapore	←	←	←		
Chinese Taipei	←	←	←		
Thailand	←	←	←		
United States	←	N/A	←		
ECE	←	←	←		

8. Interior impact protection		
Economy: Australia	Regulation no: ADR 11/00,21/00	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
A. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.	**Instrument panels (ADR 21/00)** When that area of the instrument panel that is within the head impact area is impacted by a 6.8 kg, 165 mm diameter head form at a relative velocity of 24.1 km/h (19.2 km/h for vehicles that meet ADR 69), the deceleration of the head form shall not exceed 80g continuously for more than 3 milliseconds.	Test procedure: SAE RP J921, June 1965
B. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points, excluding the side doors and pedals.	N/A	
C. Other interior fittings in the passenger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats.	**Sun visors (ADR 11/00)** 1.Each sun visor mounting shall present no rigid material edge radius of less than 3 mm that is statically contactable by a spherical 165 mm diameter head form. 2.Each edge of a contactable mirror attached to a sun visor shall be covered with a thickness of at least 1.5 mm of energy absorbing material. Glazing material shall be so constructed as to prevent the particles formed on fracture from becoming detached from the sun visor. 3.The sun visor shall be constructed of or covered with energy absorption materials nominally over the whole area.	Test Procedure 1.The dynamic testing equipment shall consist of a rigid moving head having an effective mass of 6.8 kg and a rigid anvil having a mass of at lest 300 kg. The moving head must be of spherical shape with a diameter of 165 mm. 2.The moving head shall impact the test sample at a velocity of not less than 3.5 m/s.

8. Interior impact protection		
Economy: Australia	Regulation no: ADR 11/00,21/00	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
	4.when tested in accordance with the procedure, the test sample shall arrest the moving in such a way that the deceleration does not exceed 80 times the acceleration due to gravity ,except during a period of less than 3 milliseconds when no peak shall exceed 200 times the acceleration due to gravity. **Interior compartment doors** an instrument panel shall remain closed when tested in accordance with (a) and (b) or (a) and (c). Any interior compartment door located in an instrument panel shall remain closed when the instrument panel is tested.	Test procedure (a)Subject the door latch system to an inertia load of 10g in a horizontal transverse direction and in a vertical direction in accordance with SAE RP J839b. (b)Impact the vehicle perpendicularly into a fixed collision barrier at a forward longitudinal velocity of 48 km/h. (c)Subject the door latch system to a horizontal inertia load of 30g in a longitudinal direction.
D. Roof	N/A	
E. Vehicle with an opening roof.	N/A	
F. Convertible vehicles	N/A	
G. Rear parts of seats anchored to the vehicle.	N/A	
H. Other not mentioned fittings.	N/A	

8. Interior impact protection

Economy: Canada	Regulation no: MVSR 201	Categories: M1
ITEM	CONTENT	Illustration/supplement
A. General specification	Most of part of this regulation describe the impact test for inner part of compartment so call as; "Occupant Protection" which are different concept compare to the concept of interior impact protection (interior projection) of ECE regulation ,except sun-visor, arm rest.	
B. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.		
C. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points, excluding the side doors and pedals.		
D. Other interior fittings in the pass-enger compartment in front of the transverse plane passing through the Torso Reference line of Mannequin placed on the rear most seats.	* <u>The sun visor</u> The sun visor shall be provided at each front outboard designated seating position on every vehicle and shall be constructed of, or covered with, energy absorbing material and so mounted that each mounting shall not have a rigid material edge with a radius of less than 3mm(0.125 inch) that is statically contactable by a spherical head form with a diameter of 165mm(6.5 inch)	

8. Interior impact protection

Economy: Canada	Regulation no: MVSR 201	Categories: M1
ITEM	CONTENT	Illustration/supplement
	* <u>The arm rest</u> The arm rest installed on a vehicle, other than an arm rest shall meet at least one of the following performance requirements. 1. Be constructed of energy absorbing material that collapses laterally at least 50mm(2 inches) 2. Be constructed, 1) of energy absorbing material that collapses to within 32mm(1.25 inches) of a rigid test panel surface without permitting contact with any rigid material and; 2) so that the vertical height of any rigid material between 13mm(0.5inches) and 32mm(1.25inches) from the panel surface is not less than 25mm (2 inches). - In case of the arm rest that folds into the seat back or between two seat backs of a vehicle shall; 1) comply with description above; or 2) be constructed of or covered with energy absorbing material.	
E. Roof		
F. Vehicle with an opening roof.		
G. Convertible vehicles		
H. Rear parts of seats anchored to the vehicle.		
I. Other not mentioned fittings.		

8. Interior impact protection

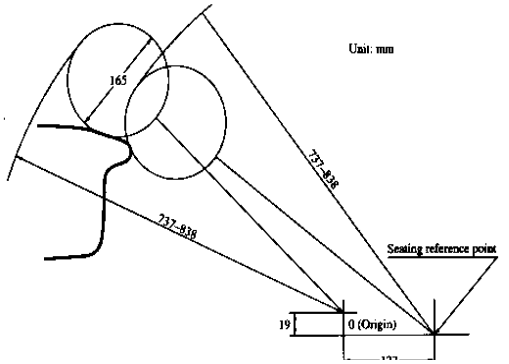
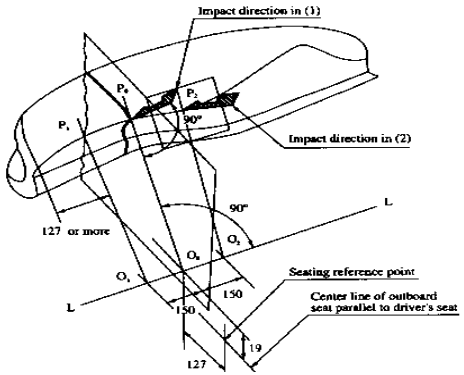
Economy: Hong Kong	Regulation no: Road traffic Regulation No.36, 37	Categories: M1
ITEM	CONTENT	Illustration/supplement
A. General specification	N/A	
B. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.	N/A	
C. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points,excluding the side doors and pedals.	N/A	
D. Other interior fittings in the pass-enger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats.	N/A	
E. Roof	N/A	
F. Vehicle with an opening roof.	N/A	
G. Convertible vehicles	N/A	
H. Rear parts of seats anchored to the vehicle.	N/A	

8. Interior impact protection

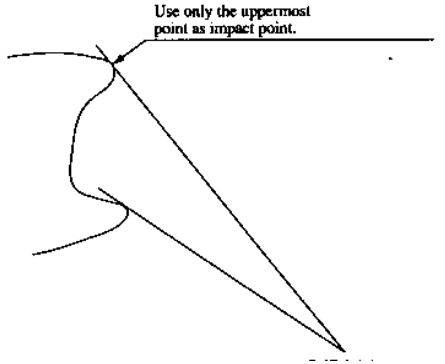
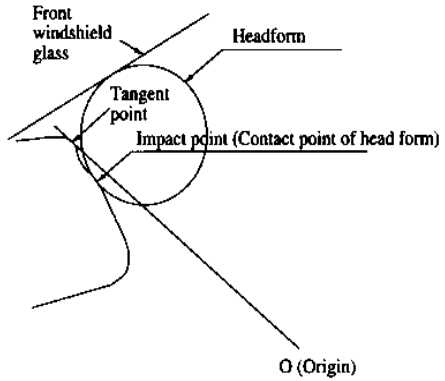
Economy: Hong Kong	Regulation no: Road traffic Regulation No.36, 37	Categories: M1
ITEM	CONTENT	Illustration/supplement
I. Other not mentioned fittings.	a. Mascot and other attachments. No mascot or other unnecessary attachment shall be carried by a motor vehicle and no motor vehicle in any position where it is likely to strike any person with whom the vehicle may collide unless the mascot or attachment is not liable to cause injury to such person by reason of any projection thereon. b. Mirror. The edge of any mirror fitted internally to the vehicle to assist any person, if he so desires, to become aware of traffic to the rear of the vehicle shall be surrounded by some material such as will make it unlikely that severe cuts will be inflicted in the events of the mirror or that material being struck by any occupant of the vehicle. c. Television set. Television set installed in the motor vehicle is reffered in this regulation , but from different concept that is not to be obstacle of field vision. therefor, no detail is describe in this column.	

8. Interior impact protection

Economy: JAPAN Regulation No: Safety Regulations & Technical Standards Article 20,22,45

ITEM	CONTENT	Illustration/supplement
A. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.	Instrument panel (Safety Regulation ; Article 20-5) The instrument panel shall be constructed so that it may unlikely give occupants excessive impact on the head, etc. of the occupants in the case of collision, etc. of the motor vehicle concerned. (Technical Standard) 1.Test Procedure 1-1. Installation of test specimens The instrument panel assembly shall be mounted on a fixture that is at least as rigid as the actual vehicle mounting. However, any parts or items which do not affect the test may be excluded. 1-2. Location of impact Impact points for the instrument panel shall be established within the head impact area in such a way that the maximum impact can be obtained, or impact points shall be determined, following the procedure given in (1) and (2) below. However, in instances where impact points can not be obtained within the head impact area by means of the above-described procedure, establish impact points as follows: Place the center of the headform in the vertical planes that are parallel to the vehicle longitudinal center line and that also include those points of O0,O1,or O2,respectively. Then, place the headform such that it contacts the front windshield as well as the instrument panel. Those points where the headform contacts the instru-ment panel within the head impact area shall be determined as impact points.(See Figs. 2 through 4.) (1) Establish the point O0, that is 127 mm horizontally forward and 19 mm (or a distance equivalent to the rise due to the seat slide inclination)vertically above the seating reference point located in the vertical plane including the center line of the outboard passenger's seat parallel to the driver's seat. Draw the horizontal line L-L passing this point of O0, perpendicular to the vehicle longitudinal center line.	(Application) This regulation shall apply to instrument panels of motor vehicles exclusively for carriage of passengers. This regulation does not apply to motor vehicles with a riding capacity of 11 persons or more, two-wheeled motor vehicles with or without sidecar, mini-sized motor vehicles with caterpillar or sled and motor vehicles with a maximum speed of l(Fig. 1  Fig. 2 

8. Interior impact protection

Economy: JAPAN	Regulation No: Safety Regulations & Technical Standards Article 20,22,45	
ITEM	CONTENT	Illustration/supplement
	(2) On the L-L line, obtain points O1 and O2 that are 150 mm apart from the point O0, to the right and left respectively. Then, with the points of O0, O1 and O2 ,as the origin, draw the tangents to the upper instrument panel assembly in a direction perpendicular to the L-L line. The thus-obtained-points of P0, P1 and P2 shall be impact points. Furthermore, if the extreme outboard impact point should lie outside of the point 127 mm inside from the outermost juncture of the instrument panel attachment to the body side inner structure, use a point 127 mm inside from the outermost junction as the impact point. A1so, in the case that there are two or more tangents for each origin of O0, O1 and O2,use only the points of contact on the upper most tangents as the impact points. 1-3. Direction of impact The direction of impact shall be determined in accordance with either (1) or (2)below. (l) A direction perpendicular to the tangent at the impact point in the vehicle longitudinal vertical plane including each impact point. (2) A direction perpendicular to the tangent plane including each impact point.	Fig. 3  Fig. 4 

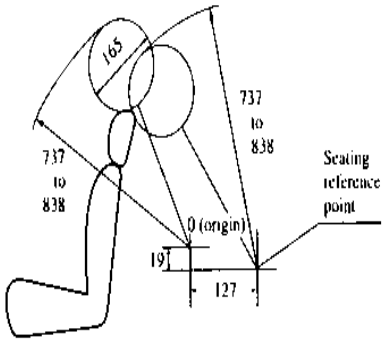
8. Interior impact protection

Economy: JAPAN	Regulation No: Safety Regulations & Technical Standards Article 20,22,45	
ITEM	CONTENT	Illustration/supplement
	1-4. Impact test Collide the headform (a 165 mm diameter spherical or hemispherical rigid headform with an effective mass of 6.8 kg) in the direction as determined in 1-3 above, aiming at the impact points as specified in 1-2 above,and at a velocity of 25•}1 km/h. Measure the deceleration of the headform. However, the impact velocity of the headform may be 20•}1 km/h in the case of instrument panels equipped with an air bag which adequately protects the head, etc. of an occupant seating on the seat parallel to the driver's seat by preventing the head, etc.of the occupant from coming into direct contact with the instrument panel. (Here, the air bag means an auxiliary occupant-protecting device which sustains the occupant by being inflated instantly if an impact occurring in the vehicle body is detected when subjected to impacts during frontal collision.)	
B. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points,excluding the side doors and pedals.	None	

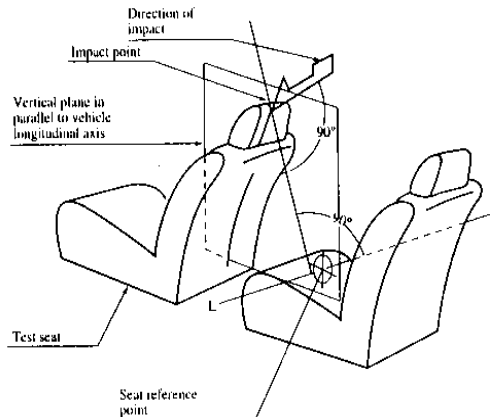
8. Interior impact protection

Economy: JAPAN	Regulation No: Safety Regulations & Technical Standards Article 20,22,45	
ITEM	CONTENT	Illustration/supplement
C. Other interior fittings in the passenger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats.	Sunvisor (Safety Regulation ; Article 45-3) The sunvisor shall be so constructed that the occupants are unlikely to severely bang their heads on it in the case of a vehicle collision, etc. (Technical Standard) 1. Test procedure 1-1. Apply a force to the sunvisor using one's palm to check contact feeling. 1-2. With the sunvisor installed on the vehicle, measure every section of the sunvisor which is contacted statically from all dirctions by a 165 mm diameter spherical rigid headform. 1-3. Measure the radius of every hard section of the sunvisor where the headform has made static contacts, when tested in accordance with the test procedure prescribed in 1-2 above. 2. Requirements 2-1. The sunvisor shall be made of an impact-absorbing material or be covered with such material. Moreover the sunvisor shall be constructed such that there is no spotcontact-feeling of an inner hard structure, when tested in accordance with the test procedure prescribed in 1-1 above. 2-2. The radius shall be 3.2 mm or more, when tested in accordance with the test procedure as prescribed in 1-3 above. However, as for the radius of the corner of the ,mounting base for attaching the sunvisor shall be acceptable when the radius is 15 % or more of the plate thickness.	(Application) This regulation shall apply to devices in the motor vehicle compartments which are designed to protect the driver from the glare of direct sunrays (hereinafter referred to as the "sunvisor"). This regulation does not apply to motor vehicles with a passenger capacity of 11 persons or more, large-sized special motor vehicles and motor vehicles with a maximum speed of less than 20km/h.
D. Roof	None	
E. Vehicle with an opening roof.	None	

8. Interior impact protection

Economy: JAPAN	Regulation No: Safety Regulations & Technical Standards Article 20,22,45	
ITEM	CONTENT	Illustration/supplement
F. Convertible vehicles	None	
G. Rear parts of seats anchored to the vehicle.	(Safety Regulation ; Article 22-7) The back of a seat and head rest shall be constructed so that they may unlikely cause injuries to the heads, etc. Of occupants seating in the seat behind in case of collisions involving the motor vehicle. (Technical Standard) 1.Test procedure 1-1. Installation and adjustment of test seat The seat shall be set at the most rearward position for adjustable seats in a fore-and-aft direction; the lowest position for adjustable seats in an up-and-down direction ; the design reference angle for seats where the seat back angle and seat floor mounting angle are adjustable. Furthermore, the head restraint shall set at the lowest position, if so equipped. The test seat shall be mounted on a fixture to obtain secure mounting at least as rigid as the actual vehicle mounting. 1-2. Impact points (1) Draw a horizontal line which is perpendicular to the vehicle longitudinal center line passing the seating reference point of the seat which is located immediately behind the seat. (2)Draw a tangent from each point on the above -established horizontal line, at right angles with this line, to the surface of the test seatback. Obtain each contact point to the surface.	(Application) This Regulation shall apply to seatback areas of seats(including their head restraints. Hereinafter the same.) of motor vehicles exclusively for carriage of passengers (except motor vehicles with a passenger capacity of 11 persons or more, two-wheeled motor vehicles with or without sidecar, and motor vehicles with a maximum speed of less than 20km/h). However, this standard does not apply to the following seats. (1) Saddle-type seats (2)Folding seats which are provided at aisles, loading platform, or floors other than those designed exclusively for installing seats (3)Single seats at the side of the drivers seat of three-wheeled motor vehicles where the rotational angle of the steering wheel or bar is less than seven times the rotational angle of the steering tire. (4)Side-facing seats. (5)Seats installed near emergency exits. (6)Seats which must be removed for pre-operation checks. Fig. I Unit: mm 

8. Interior impact protection

Economy: JAPAN	Regulation No: Safety Regulations & Technical Standards Article 20,22,45	
ITEM	CONTENT	Illustration/supplement
	(3)Among those contact points, the impact point for the individual-type seat shall be a point which is on the vertical plane including the center line of the individual-type seat (hereinafter referred to as the ‡ central plane ‡). In the case of the bench type seat, etc. in which plural seats are located side by side, the impact point shall be a point which is on the central plane of the rear outboard seat. However, for the test seat equipped with head restraints, a point which is on the central plane including the head restraints may be selected at the impact point. 1-3. Direction of impact The direction of impact shall be determined in accordance with either of following (1) or (2). (1)A direction perpendicular to the tangent at the impact point in the vertical plane which is in parallel to the vehicle longitudinal center line and which includes impact point. (2)A direction perpendicular to the tangent plane including each impact point. 1-4. Test procedure Collide the headform (a 165 mm diameter sphere or hemisphere rigid headform with an effective weight of 6.8kg) in the direction as determined in Paragraph 1-3 above, aiming at the impact points as established in Paragraph 1-2 above, and at a velocity of 25}1 km/h. Measure the deceleration of the headform. 2. Requirement When the test specimen is impacted in accordance with the test procedure as prescribed in Paragraph 1 above, the deceleration of the headform shall not exceed 80G continuously for 3 milliseconds or more.	Fig. 2 
H. Other not mentioned fittings.	None	

8. Interior impact protection

Economy: Korea	Regulation: Article 88,100,101.	Categories: M1 and bus, truck.
ITEM	CONTENT	Illustration/supplement
A. General specification		
B. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points including side doors.	The area of the instrument panel which is within the head impact area is impacted by a 6.8 kg, 165mm diameter head form at 24.2 km/h(19.2km/h for vehicle with an air bag), the deceleration of the head form shall not exceed 80 times the gravitational acceleration continuously for more than 3mmsec', and if a vehicle equipped with interior compartment doors, those doors shall not open if those doors are impacted in the above procedure.	The description in left column shall be excepted for following cases. 1. Console areas where a radio, a transmission shift lever and ash tray are installed. 2. Area less than 127mm inboard from the body side inner structure. 3. Areas outboard of any point of tangency on the instrument panel of a head form tangent to and inboard of a vertical longitudinal plane tangent to the inboard edge of the steering wheel. 4. Area closer to the windshield juncture from the contact point when the head form contacts the windshield and the instrument panel simultaneously. 5. Area below the rearmost surface of the instrument panel.
C. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points, excluding the side doors and pedals.		

8. Interior impact protection

Economy: Korea	Regulation: Article 88,100,101.	Categories: M1 and bus, truck.
ITEM	CONTENT	Illustration/supplement
D. Other interior fittings in the passenger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats.	* <u>The sun visor</u> The sun visors which meet each of the following items shall be installed in front of the driver's seat and passenger seat next to the driver's seat (except the seat in the middle). 1. The sun visor shall be covered with energy-absorbing material. 2. The radius of the rigid part edge within the head impact area statically contactable by a 165mm diameter head form shall be not less than 3.2mm. * <u>The arm rest</u> The arm rest shall meet at least one of the following items. However, this requirement does not apply to arm rests made with energy absorbing material. 1. The arm rest shall be made with energy absorbing material and shall deflect or collapse 50mm or more laterally while the loading object is not in contact with any underlying rigid material when loaded laterally. 2. The portion more than 50mm vertically of the arm rest shall be continuously longer than 50mm horizontally within the pelvic impact area.	
E. Roof		
F. Vehicle with an opening roof.		

8. Interior impact protection

Economy: Korea	Regulation: Article 88,100,101.	Categories: M1 and bus, truck.
ITEM	CONTENT	Illustration/supplement
G. Convertible vehicles		
H. Rear parts of seats anchored to the vehicle.		
I. Other not mentioned fittings.		

8. Interior impact protection

Economy: New Zealand	Land Transport Rule 32002	Categories: M1
ITEM	CONTENT	Illustration/supplement
A. General specification	The fittings, controls and surfaces in the passenger compartments of motor vehicles must be designed so that the likelihood of injury to occupants is minimized.	
B. Vehicle standards	The fittings, controls and surfaces must comply with the following approved vehicle standards; (a) 74/60/EEC and 71/127/EEC, (b) ECE 21, (c) FMVSS 201, (d) ADR 11/00 ,ADR 21/00, and ADR 42/00 or (e) Jisha Circular No.899 and92	

8. Interior impact protection

Economy: Singapore	Regulation no: Road Traffic Rules, Cap.276,R9	Categories: M1
ITEM	CONTENT	Illustration/supplement
I. Other not mentioned fittings.	* The sun visor 1) Every motor vehicle shall, unless the construction of the vehicle makes it implacticable, be fitted with an efficient sun visor forward of the driver's position. 2) The design and construction of any sun visor required by this regulation shall be such as to minimise the prospect of injury to the occupants, and shall comply with the appropriate vehicle standard.	

8. Interior impact protection

Economy: Singapore	Regulation no: Road Trafic Rules, Cap.276,R9	Categories: M1
ITEM	CONTENT	Illustration/supplement
A. General specification	N/A	
B. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.	N/A	
C. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points,excluding the side doors and pedals.	N/A	
D. Other interior fittings in the pass-enger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats.	N/A	
E. Roof	N/A	
F. Vehicle with an opening roof.	N/A	
G. Convertible vehicles	N/A	
H. Rear parts of seats anchored to the vehicle.	N/A	
I. Other not mentioned fittings.	a. Accessories. (1) No mascot shall be carried by a motor vehicle in any position where it is likely to strike any person with whom the vehicle may collide unless the mascot is not liable to cause injury to such person by reason of any projection thereon.	

8. Interior impact protection			
Economy: Taiwan	Regulation no: Road Traffic Safety Standards, Article 39	Section 18	Categories: M1
	(2) No part or accessory of a vehicle shall project beyond the body of the vehicle in such a manner or position as to cause or be likely to cause danger to any person on a road. b. Television sets. (1) No person shall use or install for use in a motor vehicle a television receiving apparatus if the screen thereof is partly or wholly, and whether directly or in any reflection , visible to the driver whilst in driving seat or if the controles thereof, other than the sound volume control and the main switch, are with in reach of the driver whilst in the driving seat. (2) No person shall use a television receiving apparatus in a motor vehicle under such circumstances and in such a position that it might cause distraction to the driver of any other vehicle on the road.		

8. Interior impact protection

Economy: Chinese Taipei	Regulation no: Road Traffic Safety Standards, Article 39 Section 18	Categories: M1
ITEM	CONTENT	Illustration/supplement
A. General specification	No regulation ,regarding to the description of interior fittings according to the concept as to ECE regulation, exist.	
B. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.	N/A	
C. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points,excluding the side doors and pedals.	N/A	
D. Other interior fittings in the pass-enger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats.	N/A	
E. Roof	N/A	
F. Vehicle with an opening roof.	N/A	
G. Convertible vehicles	N/A	
H. Rear parts of seats anchored to the vehicle.	N/A	
I. Other not mentioned fittings.	N/A	

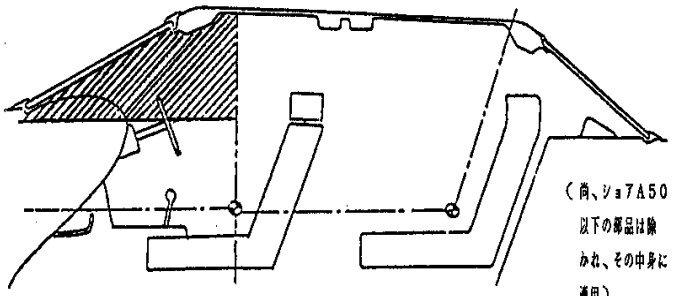
8. Interior impact protection

Economy: USA	Regulation no: FMVSS 201	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
A. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.	Instrument panels When that area of the instrument panel that is within the head impact area is impacted by a 15-pound, 6.5-inch diameter head form at a relative velocity of 15 mph (12 mph for vehicles that meet FMVSS 208), the deceleration of the head form shall not exceed 80g continuously for more than 3 milliseconds.	Test procedure: SAE RP J921, June 1965
B. Forward interior part of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points, excluding the side doors and pedals.	N/A	
C. Other interior fittings in the passenger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats.	Sun visors 1.A sun visor that is constructed of or covered with energy-absorbing material shall be provided for each front outboard designated seating position. 2.Each sun visor mounting shall present no rigid material edge radius of less than 0.125 inch that is statically contactable by a spherical 6.5-inch diameter head form. Interior compartment doors Each interior compartment door assembly located in an instrument panel, console assembly, seat back, or side panel adjacent to a designated seating position shall remain closed when tested in accordance with (a) and (b) or (a) and (c).	Test procedure (a)Subject the door latch system to an inertia load of 10g in a horizontal transverse direction and in a vertical direction in accordance with SAE RP J839b.

8. Interior impact protection		
Economy: USA	Regulation no: FMVSS 201	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
	Any interior compartment door located in an instrument panel or seat back shall remain closed when the instrument panel or seat back is tested Armrests Each installed armrest shall conform to at lest one of the following: (a)It shall be constructed with energy absorbing material and shall deflect or collapse laterally at least 2 inches without permitting contact with any underlying rigid material. (b)It shall be constructed with energy absorbing material that deflects or collapses to within 1.25 inches of a rigid test panel surface without permitting contact with any rigid material. any rigid material between 0.5 and 1.25 inches from the panel surface shall have a minimum vertical height of not less than 1 inch. (c)Along not less than 2 continuous inches of its length, the armrest shall, when measured vertically in side elevation, provide at least 2 inches of coverage within the pelvic impact area.	(b)Impact the vehicle perpendicularly into a fixed collision barrier at a forward longitudinal velocity of 30 mph. (c)Subject the door latch system to a horizontal inertia load of 30g in a longitudinal direction.

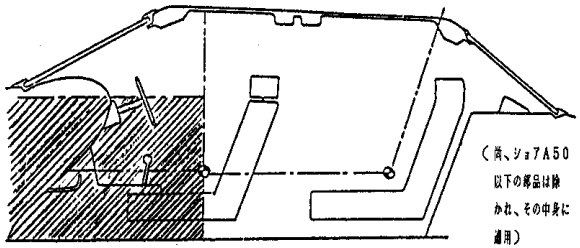
8. Interior impact protection		
Economy: USA	Regulation no: FMVSS 201	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
D. Roof	N/A	
E. Vehicle with an opening roof.	N/A	
F. Convertible vehicles	N/A	
G. Rear parts of seats anchored to the vehicle.	Seat backs When that area of the seat back that is within the head impact area is impacted by a 15-pound,6.5-inch diameter head form at a relative velocity of 15 mph, the deceleration of the head form shall not exceed 80g continuously for more than 3 milliseconds.	
H. Other not mentioned fittings.	N/A	

8. Interior impact protection

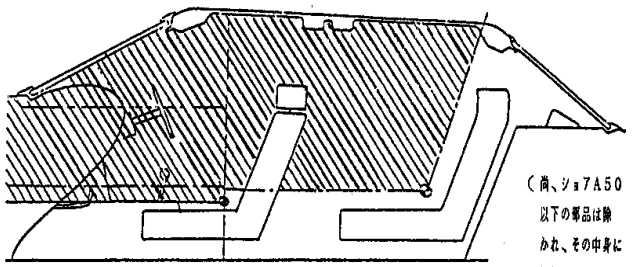
Economy: ECE	**Regulation no: ECE21-01**	**Categories: M1**
ITEM	**CONTENT**	**Illustration/supplement**
A. General specification		
B. Forwarding interior parts of the passenger compartment above the level of the instrument panel in front of the front seat "H" points excluding side doors.	1.Vehicle parts with in the reference zone with the exception of those which are not part of the istrument panel and which are placed at less than 10cm from glazed surface shall be energy-dissipating, as prescribed in Annex 4 of this regulation. Those parts within the reference zone which satisfy both of the following conditions shall also be excluded from consideration . 1-(1) During a test in accordance with the requirement of Annex 4 of this regulation, the pendulum makes contact with parts outside the reference zone; and 1-(2) Parts to be tested are placed less than 10cm away from the parts contacted outside the reference zone; any metal support fittings shall have no protruding edges. 2.The lower edge of the instrument panel shall, unless it meets the requirement of paragraph A-1 above, be rounded to a radius of curvature of not less than 19mm. 3.Switches, pull-knobs and the like, made of rigid material which, measured in accordance with the method prescribed in Annex 6 of this regulation, project from 3.2mm to 9.5mm from the panel shall have a cross sectional area of not less than 2cm^2, measured 2.5mm from the point projecting furthest and shall have rounded edge with a radius of curvature of not less than 2.5mm.	 * Reference zone means the head-impact zone as defined in annex 1 of this regulation. ↓ **DETERMINATION OF THE HEAD-IMPACT ZONE.** (1) The head impact zone comprises all the non-grazed surfaces of the interior of a vehicle which are capable of entering into static contact with a spherical head 165mm in diameter that is an integral part of a measuring apparatus whose dimension from the pivotal point of the hip to the top of the head is continuously adjustable between 736mm and 840mm.

8. Interior impact protection

Economy: ECE	Regulation no: ECE21-01	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
	4.If these component project more than 9.5mm from the surface of the instrument panel, they shall be so designed and constructed as to be able, under the effect of a longitudinal horizontal forces of 37.8daN delivered by a flat-ended ram of not more than 50mm diameter, either to retract into the surface of the panel until they do not project by more than 9.5mm or to become detached; in the latter case, no dangerous projections of more than 9.5mm shall remain; a cross-section of not more than 6.5mm from the point of maximum projections shall be not less than 6.5cm^2 in area. 5.In the case of a projecting a component made of non-rigid material of less than 50 shore A hardness mounted on a rigid support, the requirements of paragraph 3. and 4. of this column, shall apply only to the rigid support.	(2) The aforesaid zone shall be determined by the following procedure or its graphic equivalent: (2)-1 The pivotal point of the measuring apparatus shall be placed as follows for each seating position for which the manufacturer has made provision: (2)-1-1. In case of sliding seats: * At the "H" point.(see Annex 5 of this regulation) * At the point situated horizontally 127 mm forward of the "H" point and either at a height resulting from the variation in the height of the "H" point caused by a forward sift of 127mm or of 19mm. (2)-1-2. In case on non-sliding seats: * At the "H" point of the seat considered.

C. Forward interior parts of the passenger compartment below the level of the instrument panel and in front of the front seat "H" points, excluding the side doors and pedals.	1.Components covered by this paragraph, such as switches ,the ignition key, etc' shall comply with the require-ment of paragraph A-3 to A-4, except for the pedals and their fixture and those components that cannot be contacted by the device described in Annex 7 of this regulation. 2.The hand-brake control, if mounted on or under the instrument panel; shall be so placed that when it is in the position of rest there is no possibility of the occupants of the vehicle striking against it in the event of a frontal impact. If this condition is not met, the surface of the control shall satisfy the requirements of C-3-2-3 below.	

8. Interior impact protection

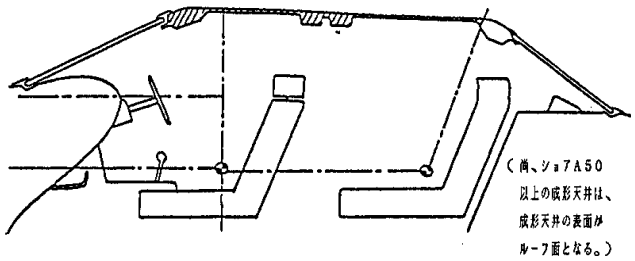
Economy: ECE	Regulation no: ECE21-01	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
	3.Shelves and other similar items shall be so designed and constructed that the support in no case have protruding edges, and they shall meet one or other of the following conditions;(right side column) 4.If the items in question contain a part made of material less than 50 shore A hardness when fitted to a rigid support, the above requirement, except for the requirement covered by Annex 4 relating to energy-absorption, shall apply only to the rigid support.	3-(1): The part facing into the vehicle shall present a surface not less than 25mm high with edges rounded to a radius of curvature of not less than 3.2mm. This surface shall consist of or be covered with an energy-dissipating materials defined in Annex 4 of this Regulation, and shall be tested in accordance therewith, the impact being applied in a horizontal longitudinal direction. 3-(2): Shelves and other similar items shall,under the effect of a forward-acting horizontal longitudinal force of 37.8 daN excerted by a cylinder of 110 mm diameter with its axis vertical, become detached, brake up, be substantially distorted or retract without producing dangerous features on the rim of the shelf. The force must be directed at the strongest part of the shelves or other similar items.
D. Other interior fittings in the passenger compartment in front of the transverse plane passing through the Torso Reference Line of the Mannequin placed on the rear most seats. * Requirements of this paragraph apply to control handles, levers and knobs and to any other protruding objects not referred to paragraph " A " and " B " above.	1.If the items referred in this paragraph are so placed that occupants of the vehicle can contact them, they shall meet the requirements of 1-(1),1-(2),1-(3) and 2.,3. If they can be contacted by a 165mm diameter sphere and are above the lowest "H" point (see Annex 5 of this regulation) of the front seats and forward of the transverse plane of the torso reference line of the mannequin on the rearmost seat, and out side the zones defined by the description in supplement column of this paragraph. these requirements shall be considered to have been fulfilled if:	

8. Interior impact protection		
Economy: ECE	**Regulation no: ECE21-01**	**Categories: M1**
ITEM	**CONTENT**	**Illustration/supplement**
	1-(1) Their surface terminates in rounded edges, the radii of curvature being not less than 3.2mm; 1-(2) control levers and knobs shall be so designed and constructed that, under the effect of a forward acting longitudinal horizontal force of 37.8daN either the projection in its most unfavourable position is reduced to not more than 25 mm from the surface of the panel or the said fittings become detached or bent; in the two at-Terri cases no dangerous projections shall remain. Window winders may, however, project 35mm from the surface of the panel; 1-(3) The handbrake control, when in the released position, and the gear lever, when in any forwarded gear position, have, except when placed in the zones defined in the description in the supplement column above. and in the zone below the horizontal plane passing through the "H" point of the front seats, a surface area of not less than 6.5cm^2 measured at a cross-section normal to the longitudinal horizontal direction up to a distance of 6.5mm from the part projecting furthest, the radius of curvature being not less than 3.2mm 2.The requirement in paragraph 1-(3) above shall not apply to a floor-mounted handbrake control; for such control, if the height of any part in the released position is above a horizontal plane passing through the lowest "H" point of the front seats(see Annex 5 of this regulation) the control shall have a cross sectional area of at least 6.5cm^2 measured in a horizontal plane not more than 6.5mm from the furthest projecting part(measured in the vertical direction). The radius of curvature shall not be less than 3.2mm.	* "Reference Zone" means the head-impact zone as defined in description where is supplement column of paragraph "A" except; - the area bounded by the forward horizontal projection of a circle circumscribing the outer limits of the steering control, increased by a peripheral band 127mm in width; this area is bounded below by the horizontal plane tangentail to the lower edge of the steering control when the latter is in the position for driving straight ahead; - the part of the surface of the instrument panel comprised between the edge of the area specified in above phrase and the nearest inner sidewall of the vehicle; this part of the surface is bounded below by the horizontal plane tangential to the lower edge of the steering control; and - the windscreen side pillars.

8. Interior impact protection		
Economy: ECE	**Regulation no: ECE21-01**	**Categories: M1**
ITEM	**CONTENT**	**Illustration/supplement**
	3.The other elements of the vehicle's equipment not covered by the above paragraph,(2.) such as seat slide rails, devices for rolling up safety belts,etc' are not subject to any regulation if they are situated below a horizontal line passing through the "H" point of each seat even through the occupant is likely to come into contact with such elements. 4.If the parts considered above complies a component made of material of less than 50 shore A hardness, mounted on a rigid support, the above requirements shall apply only to the rigid support.	3.-(1) components mounted on the roof but which are not part of the roof structure, such as grab handles, lights and sun visors, etc', shall have a radius of curvature not less than 3.2mm and, in addition, the width of the projecting parts shall not be less than the amount of their downward projection; alternatively, these components shall pass the energy-dissipating test in accordance with the requirement of Annex 4 (procedure for testing energy dissipating material)
E. Roof * The requirement of this paragraph apply to the inner face of the roof, however, they do not apply to such parts of the roof as cannot be touched by a sphere 165mm in diameter.	1.The part of the inner face of the roof which is situated above or forward of the occupants shall exhibit no dangerous roughness at sharp edges, directed rearwards or downwards. the width of the projecting parts shall not be less than the amount of their downward projection and the edges shall have a radius of curvature of not less than 5mm. In particular, the rigid roof sticks or ribs, with the exception of the header rail of the grazed surfaces and door frames, shall not project downwards more than 19mm. 2.If the roof sticks or ribs do not meet the requirement of paragraph 1. above. they shall pass the energy-dissipating test in accordance with the requirement of Annex 4 (Procedure for testing energy-dissipating materials) to this regulation.	

8. Interior impact protection		
Economy: ECE	**Regulation no: ECE21-01**	**Categories: M1**
ITEM	**CONTENT**	**Illustration/supplement**
	3.The material wires which stretch the lining of the roof and the frames of the sun visors shall have a maximum diameter of 5mm or be able to absorb the energy, as prescribed in Annex 4 to this regulation. Non-rigid attachment elements of the frames of the sun visors shall meet the requirements of paragraph 1 above.	
F. Vehicle with an opening roof. * This paragraph and paragraph F,above shall apply to vehicles with an opening roof is in the closed position.	1.The opening and operating devices shall be so designed and constructed as to exclude accidental or inopportune operation as far as possible; 2.Their surface shall terminate in rounded edges, the radii of curvature being not less than 5mm; 3.The opening and operating devices shall be accommodated, when in the position of rest, in areas which cannot be touched by a sphere 165mm in diameter. If this condition cannot be met, the opening and operating devices shall, in the position of rest, either remain retracted or be so designed and constructed, that, under the effect of a force of 37.8daN applied in the direction of impact defined in Annex4 to this regulation as the tangent to the trajectory of the headform, either the projection as described in Annex6(Method of measuring projections) to this regulation shall be reduced to not more than 25mm beyond the surface on which the devices are mounted or the devices shall become detached; in the latter case, no dangerous projections shall remain.	

8. Interior impact protection

Economy: ECE	Regulation no: ECE21-01	Categories: M1
ITEM	**CONTENT**	**Illustration/supplement**
G. Convertible vehicles	In the case of convertible vehicles, only the under-side of the top of the roll-bar and the top of the windscreen frame in all its normal utilization positions shall comply with the requirements of paragraph " D. Roof ". The system of folding rods or links used to support a non-rigid roof shall, where they are situated above and forward of the occupants, exhibit no dangerous roughness or sharp edges, directed rearwards or downwards.	
H. Rear parts of seats anchored to the vehicle.	1.The surface of rear parts of seats shall exhibit no dangerous roughness or sharp edges likely to increase the risk or severity of injury to the occupants, except as provided in paragraphs 1-(1),1-(2),1-(3) below. That part of the back of the front seat which is in the head-impact zone defined in Annex 1 of this regulation shall be energy-dissipating, as prescribed in Annex 4 to this regulation. For determining the head impact zone the front seats shall, if they are adjustable, be in the rearmost driving position with their backs inclined as near as possible to 25•K unless indicated otherwise by the manufacturer. 1-(1) In the case of separate front seats, the rear passengers head-impact zone shall extend for either side of the seat centerline, in the top part of the rear of the seat-back.	

8. Interior impact protection		
Economy: ECE	**Regulation no: ECE21-01**	**Categories: M1**
ITEM	**CONTENT**	**Illustration/supplement**
	1-(1)-1: In the case of seats fitted with head restraints,each test shall be carried out with the head-restraint in the lowest position and at a point situated on the vertical line passing through the center of the head restraint. 1-(1)-2: In the case of a seat which is designed to be fitted in several types of vehicle, the impact zone shall be determined by the vehicle whose rearmost driving seat position is, of each of the types considered, the least favorable; the resultant impact zone will be deemed adequate for the other types 1-(2) In the case of front bench seats, the impact zone shall extend between the longitudinal vertical planes 10cm outboard of the centerline of each designated outboard seating position. the centerline of each outboard seating position of a bench seat shall be specified by the manufacturer. 1-(3) In the head impact zone outside the limits prescribed in paragraph 1-(1),1-(2) inclusive, the seat frame structure shall be padded to avoid direct contact of the head with it; and, in these zone, shall have a radius of curvature of at least 5mm. These parts may alternatively satisfy the energy-dissipation requirement specified in Annex 4 to this regulation.	* These requirement shall not apply to the rearmost seat, to seats facing sideways, to back-to-back seats or to folding(tip-up) seats. If the impact zones of the seats, head restraints and their supports contain parts covered with material softer than 50 shore A hardness, the above requirements, with the exception of those relating to energy-dissipation described in Annex 4 to this regulation, shall apply only to the rigid parts. * These requirement of this paragraph shall be considerd to be satisfied in the case of head restraints that either are part of a vehicle type approved under Regulation no.17(03 series) or are approved under Regulation no.25(02 series). * Annex 1: Determination of the head-impact zone. * Annex 4: Procedure for testing energy-dissipating material.

8. Interior impact protection		
Economy: ECE	**Regulation no: ECE21-01**	**Categories: M1**
ITEM	**CONTENT**	**Illustration/supplement**
I. Other not mentioned fittings.	The requirement of paragraph G. " Rear parts of seats anchored to the vehicle" shall apply to such fittings not mentioned in previous paragraphs as, according to their location, are capable of being contacted by the occupants in accordance with the various procedures prescribed paragraph "A" to "G". If the contactable members of such fittings are made of material of less than 50 shore A hardness mounted on a rigid support, the requirements shall apply only to the rigid support.	

ITEM 96-9

Reversing Lamps

APEC Regulation Analysis Findings
Item No.96-9: Reversing Lamps

* The U.S., Canada and Korea have reversing lamp requirements that are equivalent to FMVSS 108.

* Australia's regulation is equivalent to those of ECE R.23 (00 Series) and ECE R.48.

* New Zealand requires ECE/ADR/Japanese/FMVSS as alternatives.

* Other member economies provide only a small number of requirements that are often unique.

* A comparison by each requirement item is made as follows:

(1) Light Distribution (c-a-1): Australia, Canada, Korea, U.S. and ECE regulation establish a specific limit value for light distribution.
These can be divided into the ECE light distribution type (Australia, ECE) and the FMVSS type (U.S., Canada, Korea). The two types provide nearly identical light intensity value (cd).

(2) Color (c-a-2): Member economies basically require a white color for the light of reversing lamps. But in addition to white, Indonesia, Korea, Papua New Guinea and Philippines permit a yellow or amber color. All member economies approve a white light for reversing lamps.

(3) Illuminating surface area (c-a-3): No member economies have requirements for the illuminating surface area of reversing lamps.

(4) Bulb power (c-a-4): Only Hong Kong and Singapore set forth a regulation, both not more than 24W.

(5) Mechanical performance (c-a-5): Only the U.S. and Canada provide requirements concerning resistance against vibration, humidity, dust and corrosion. These requirements of the two member economies are harmonized with FMVSS 108.

(6) Visibility (c-b-1): Requirements are provided by Australia, Canada, Korea, U.S. and ECE, and can be divided into the ECE type and FMVSS type. The two types are not harmonized with each other.

ECE type - Australia, ECE

FMVSS type - Canada, Korea, U.S.

(7) Wiring (c-b-2): Except Brunei and Malaysia, all member economies require the reversing lamps to turn on at the reverse gear position.

ITEM No.96-9　Reversing lamps

A : Application　Passenger car

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Australia	ADR 1 (80 cd MIN.)	Common (White)			ECE R23 (General)	ADR 13 (45°L to 45°R 15°U to 5°D)	Common (Reverse gear)
Brunei							
Canada	FMVSS 108 (80 cd MIN.)	Common (White)			FMVSS 108 (Vibration, Moisture, Dust and Corrosion)	FMVSS 108 (in the field at 0.9m to rear)	Common (Reverse gear)
China							
Hong Kong	Unique (deflected downward beam)			Unique (24W or less)			Common (Reverse gear)
Indonesia		Unique (White or light yellow)					Common (Reverse gear)
Japan	SRRV 40 (5000 cd MAX.)	Common (White)					Common (Reverse gear)
Korea	FMVSS 108 (80 cd MIN.)	Unique (White or Yellow)				FMVSS 108 (in the field at 0.9m to rear)	Common (Reverse gear)

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Malaysia							
New Zealand		Common (White)					Common (Reverse gear)
Papua New Guinea		Unique (White or amber)					Common (Reverse gear)
Philippine		Unique (White or light yellow)					Common (Reverse gear)
Singapore				Unique (24W or less)			Common (Reverse gear)
Chinese Taipei		Common (White)					Common (Reverse gear)
Thailand		Common (White)					Common (Reverse gear)
U.S.A.	FMVSS 108 (80 cd MIN.)	Common (White)			FMVSS 108 (Vibration, Moisture, Dust and Corrosion)	FMVSS 108 (in the field at 0.9m to rear)	Common (Reverse gear)
Common (White)					ECE R23 (General)	(45°L to 45°R 15°U to 5°D)	Common (Reverse gear)

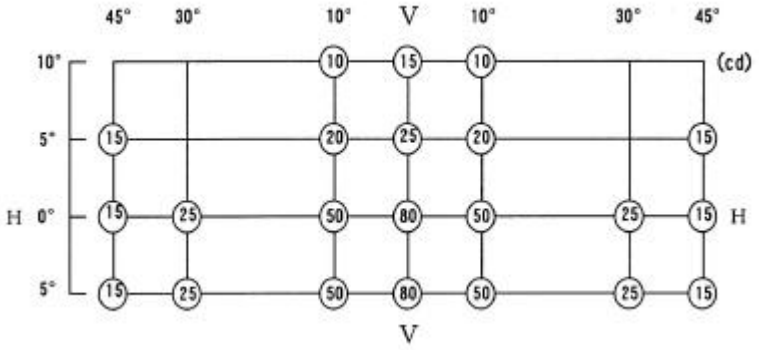
Economy : Australia

Title of Standard : ADR 1/00 and 13/00

A. Application : Moped, Motorcycle, Passenger vehicle, Goods vehicles and Trailers

C-a-1. Photometry :

< minimum intensity >



< Maximum intensity >

300 cd Max. in or above the horizontal plane, or

600 cd Max. below the horizontal plane.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angle : 45°to right and to left if there is only one light.

45°outwards and 30°inwards if there are two.

Vertical angle : 15°upwards and 5°downwards.

C-b-2. Electrical Connection :

They shall be such that the lamp can light up only if the reverse gear is engaged and if the device which controls the starting and stopping of the engine is in such a position that operation of the engine is possible. It shall not light up or remain lit if either of the above conditions is not satisfied.

Economy : Canada

Title of Standard : CMVSS No. 108
SAE J593c

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

Group	Test point, degrees	Total for group, candela (see Note)
1	45L-5U 45L-H 45L-5D	45
2	30L-H 30L-5D	50
3	10L-10U 10L-5U V-10U V-5U 10R-10U 10R-5U	100
4	10L-H 10L-5D V-H V-5D 10R-H 10R-5D	380
5	30R-H 30R-5D	50
6	45R-5U 45R-H 45R-5D	45

Note: When 2 lamps of the same or symmetrically opposite design are used, the reading along the vertical axis and the averages of the readings for the same angles left and right of vertical for 1 lamp shall be used to determine compliance with the requirements. If 2 lamps of differing designs are used, they shall be tested individually and the values added to determine that the combined units meet twice the candela requirements.

When only 1 reversing lamp is used on the vehicle, it shall be tested to twice the candela requirements.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility :

Reversing lamps shall be mounted on the rear so that the center of the lens of at least one lamp is visible from any eye point elevation from at least 6ft to 2ft above the horizontal plane on which the vehicle is standing; and from any position in the area, rearward of a vertical plane perpendicular to the longitudinal axis of the vehicle, 3ft to the rear of the vehicle and extending 3ft beyond each side of the vehicle.

C-b-2. Electrical Connection :

Reversing lamp shall be illuminated when the ignition switch is energized and reverse gear is engaged.

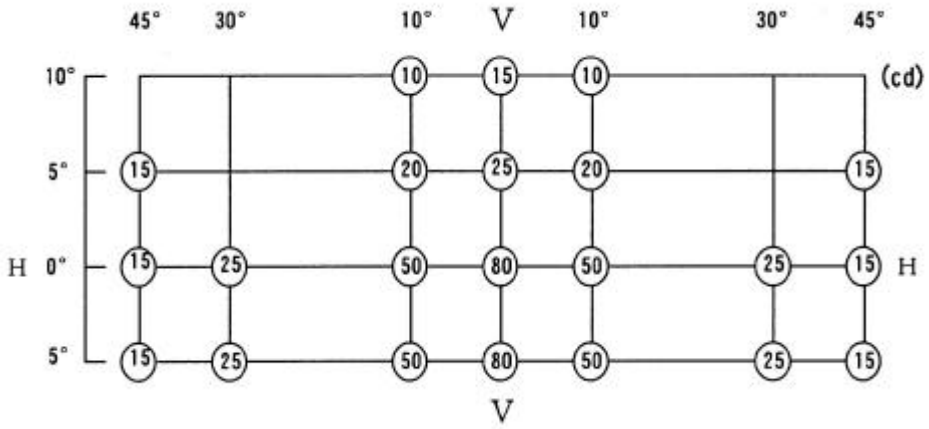
Economy : China

Title of Standard : GB 15235-94

A. Application : Vehicles and Trailers

C-a-1. Photometry :

< minimum intensity >



< Maximum intensity >

300 cd Max. in or above the horizontal plane, or

600 cd Max. below the horizontal plane.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : 21W (Category : P21W and C21W)

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Horizontal angle : 45°to right and to left if there is only one light.

45°outwards and 30°inwards if there are two.

Vertical angle : 15°upwards and 5°downwards.

C-b-2. Electrical Connection :

They shall be such that the lamp can light up only if the reverse gear is engaged and if the device which controls the starting and stopping of the engine is in such a position that operation of the engine is possible. It shall not light up or remain lit if either of the above conditions is not satisfied.

Economy : Hong Kong

Title of Standard : Road Traffic Regulation, No. 105

A. Application : N/A.

C-a-1. Photometry :

The light emitted thereby is at all times a beam which is deflected downwards to such an extent that it is incapable of dazzling any person who is on the same horizontal plane as the vehicle at a greater distance than 8 metres from the reversing lamp and whose eye-level is not less than one metre above that plane.

C-a-2. Color : N/A.

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : 24W or less in total of all bulbs

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamp shall be so constructed that it cannot be swiched on otherwise than

(1) automatically by the selection of the reverse gear of the vehicle, or

(2) by the operation of a switch by the driver of the vehicle, being a switch which serves no other purpose.

Economy : Indonesia

Title of Standard : Government Regulation No. 44/1993

A. Application : Motorcycle, passenger cars, buses, cargo vans and special vehicles

C-a-1. Photometry : N/A.

C-a-2. Color : White or light yellow

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversig lamps shall be on only if the force transmission device is used for reverse-moving position.

Economy : Japan

Title of Standard : Safety Regulation of Road Vehicles, Article 40
Motor Vehicle Inspection Procedures, 4-30

A. Application : Vehicles

C-a-1. Photometry : 5,000 cd or less

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-a-6. Others :

The main photometric axis shall be directed downwards and shall not strike the level of the road at a distance of 75 m or more to the rear.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamps shall be wired so that they may be turned on only when the transmission system is in reverse gear.

Economy : Korea

Title of Standard : The regulation of the motor vehicle safety standards (KMVSS), Article 39 and 106

A. Application : Motor vehicles

C-a-1. Photometry :

Not less than 80 cd and not more than 600 cd in or above the horizontal plane, or
Not less than 80 cd and not more than 5,000 cd below the horizontal plane.

* Type approval test standard for motor vehicles

(1) Maximum intensity

600 cd Max. (for one-lamp) and 300 cd Max. (for two-lamp) in or above the horizontal plane, and 5,000 cd Max. below the horizontal plane.

(2) Minimum intensity

Group	Test point, degrees	Total for group, candela (see Note)
1	45L-5U 45L-H 45L-5D	45
2	30L-H 30L-5D	50
3	10L-10U 10L-5U V-10U V-5U 10R-10U 10R-5U	100
4	10L-H 10L-5D V-H V-5D 10R-H 10R-5D	380
5	30R-H 30R-5D	50
6	45R-5U 45R-H 45R-5D	45

Note: When 2 lamps of the same or symmetrically opposite design are used, the reading along the vertical axis and the averages of the readings for the same angles left and right of vertical for 1 lamp shall be used to determine compliance with the requirements.
If 2 lamps of differing designs are used, they shall be tested individually and the values added to determine that the combined units meet twice the candela requirements.
When only 1 reversing lamp is used on the vehicle, it shall be tested to twice the candela requirements.

C-a-2. Color : White or yellow

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

The center of the lens surface shall be visible from any eye point elevation at least 60 centimeters to 180 centimeters above the horizontal plane on which the vehicle is standing; and from any position in the area, rearward of a vertical plane perpendicular to the center line of a vehicle, 90 centimeters to the rear of the vehicle and extending 90 centimeters beyond each side of the vehicle.

C-b-2. Electrical Connection :

Reversing lamp shall be activated when the transmission shift lever is in the reverse driving position.

Economy : New Zealand

Title of Standard : Transport Regulations 1990, No.21
Traffic Regulations 1976

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamps shall be so controlled that their light can be displayed only while reverse gear is engaged or white the beams of light from both headlamps are not displayed.

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulation, No. 106

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : White or amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamps shall be so connected that they operate only when the reverse gear is engaged.

Economy : Philippine

Title of Standard : Motor Vehicle Inspection System (A0-91-005), Section 8

A. Application : Motor vehicle except motor cycle

C-a-1. Photometry : N/A.

C-a-2. Color : White or light yellow

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamps shall be so wired that they may be turned on only when the transmission system is in reverse position.

Economy : Singapore

Title of Standard : Road Traffic (Motor Vehicles, Construction and Use) Rules, No. 32

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : N/A.

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage :

- Not less than 15W or not more than 24W for a public service vehicle and a goods vehicles
- 24W or less for other vehicles

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamp shall be operated

(1) automatically when the reverse gear of the vehicle is engaged, or

(2) by a switch which also operates simultaneously a warning readily visible or audible to the driver when in his seat, if and so long as the reversing light is in operation.

Economy : Chinese Taipei

Title of Standard : Road Traffic Safety Standard, Article 39 Section 12 Annex 7

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamp shall be on when the transmission system is in reverse position.

Economy : Thailand

Title of Standard : Ministerial Regulations No.22

A. Application : Motor vehicle and Trailer

C-a-1. Photometry : N/A

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Reversing lamps shall give out light only when the reverse gear is engaged.

Economy : U.S.A.

Title of Standard : FMVSS No. 108
SAE J593c

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

Group	Test point, degrees	Total for group, candela (see Note)
1	45L-5U 45L-H 45L-5D	45
2	30L-H 30L-5D	50
3	10L-10U 10L-5U V-10U V-5U 10R-10U 10R-5U	100
4	10L-H 10L-5D V-H V-5D 10R-H 10R-5D	380
5	30R-H 30R-5D	50
6	45R-5U 45R-H 45R-5D	45

Note: When 2 lamps of the same or symmetrically opposite design are used, the reading along the vertical axis and the averages of the readings for the same angles left and right of vertical for 1 lamp shall be used to determine compliance with the requirements. If 2 lamps of differing designs are used, they shall be tested individually and the values added to determine that the combined units meet twice the candela requirements.

When only 1 reversing lamp is used on the vehicle, it shall be tested to twice the candela requirements.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility :

Reversing lamps shall be mounted on the rear so that the center of the lens of at least one lamp is visible from any eye point elevation from at least 6ft to 2ft above the horizontal plane on which the vehicle is standing; and from any position in the area, rearward of a vertical plane perpendicular to the longitudinal axis of the vehicle, 3ft to the rear of the vehicle and extending 3ft beyond each side of the vehicle.

C-b-2. Electrical Connection :

Reversing lamp shall be illuminated when the ignition switch is energized and reverse gear is engaged.

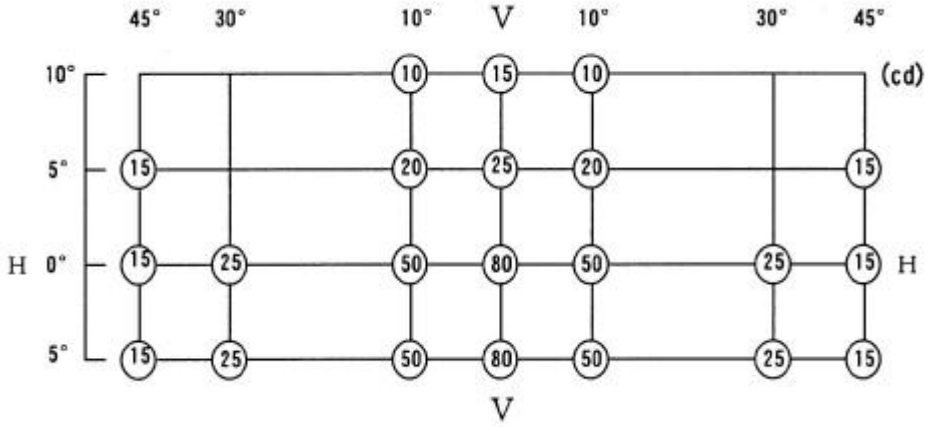
Economy : ECE

Title of Standard : ECE Regulation No.23, and No. 48, 01 series

A. Application : N/A.

C-a-1. Photometry :

< minimum intensity >



< Maximum intensity >

300 cd Max. in or above the horizontal plane, or

600 cd Max. below the horizontal plane.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angle : 45°to right and to left if there is only one light.

45°outwards and 30°inwards if there are two.

Vertical angle : 15°upwards and 5°downwards.

C-b-2. Electrical Connection :

They shall be such that the lamp can light up only if the reverse gear is engaged and if the device which controls the starting and stopping of the engine is in such a position that operation of the engine is possible. It shall not light up or remain lit if either of the above conditions is not satisfied.

ITEM 96-10

Vehicle and component marking (incl. VIN)

APEC Regulation Analysis Findings
Item No. 96-10: Vehicle and component marking (incl. vin)

1. Only Australia, New Zealand and the U.S. (FMVSS, 49CFR) have a regulation for identification marks.

2. EEC (not ECE) provides a VIN requirement, while Japan lacks such a requirement.

Item No. 96-10 Vehicle and Component Marking(Incl VIN)

A: Application: Passenger Vehicle

Member Economies	B-b-1		B-b-2	B-b-3	D	E
	VIN Contents & structure	Location	Component Marking	Certification Label	Marking	Reference Standard Alternative Regulation
Australia	ADR61/02	←	←	←		ISO3779,3780,4030.
Brunei	N/A	←	←	←		
Canada	FMVSS 115	←	N/A	←		FMVSS115
Chile	N/A	←	←	←		
China	N/A	←	←	←		
Hong Kong	N/A	←	←	←		
Indonesia	N/A	←	←	←		
Japan	N/A	←	←	←		
Korea	N/A	←	←	←		
Malaysia	N/A	←	←	←		
Mexico	N/A	←	←	←		
New Zealand	see column E	←	N/A	←		ISO3779,FMVSS115, ADR43/01
Papua New Guinea	N/A	←	←	←		
Philippines	N/A	←	←	←		
Singapore	N/A	←	←	←		
Chinese Taipei	N/A	←	←	←		
Thailand	N/A	←	←	←		
United States	FMVSS115	←	49CFR PART541	49CFR PART567		
ECE	N/A	←	←	←		

10. Vehicle and component marking(incl. VIN)

Economy: Australia	Regulation no: ADR 61/02	Categories:
ITEM	CONTENT	Illustration/supplement
A. General information	N/A	
B. Manufacturer's plate / Compliance plate	Every motor vehicle must bear an Approved Compliance Plate which must be placed in a conspicuous position on the vehicle.	
C. Registration Plates	All vehicle: (a) provision must be made for mounting a registration plate to be affixed to the rear of the vehicle so that no part of such plate is more than 1,300 mm from the ground. (b) provision must be made for mounting a registration plate to be affixed to the front of the vehicle forward of and parallel to the front Axle so that no part of such plate is more than 1,300 mm from the ground. (c) no part of a vehicle, including its standard equipment, regular production options or equipment must be so located as to obscure any part of the plate(s).	Registration Plate Size: 136 x 372 mm
D. Vehicle identification number.(VIN)	Every vehicle must have a unique VIN. The VIN must comply with the requirements of: (a) ISO 3779 "VIN-Content and structure"; (b) ISO 3780 "WMI code"; and (c) ISO 4030 "VIN-Location and attachment". except that: it is permissible to locate the VIN on the left-hand side of the vehicle; and Clause 4.2 of the ISO 4030 is not applicable.	
E. Engine number	An identification number must be legible and permanently stamped, cast laser engraved or a combination of these upon the main component of the engine and such number must be located where it can be readily seen when the engine is installed in the motor vehicle for which it was intended.	

10. Vehicle and component marking(incl. VIN)		
Economy: CANADA	Regulation no: MVSR 115	Categories:
ITEM	CONTENT	Illustration/supplement
A. General information	N/A	
B. Manufacturer's plate / Certification Label		
C. Vehicle identification number.(VIN)	1.Each vehicle shall have a VIN and the VIN of any two vehicles manufactured by manufacturer within a thirty year period shall not be identical. 2.The VIN of each vehicle shall (a) be composed of capital, sanserif characters; (b) be sunk into, embossed on or imprinted, clearly and indelibly, on (1)any part of the vehicle that is not designed to be removed except for repair, other than glazing, or (2)a separate plate or label that is permanently affixed to a part referred to in subpara. (1);and (c)(1)be composed of characters having a minimum height of 4 mm, (2)be located inside the passenger compartment, and (3)be without any part of such vehicle being removed, readable through the vehicle glazing under daylight conditions by an observer having 20/20 vision Snellen whose eyepoint is located outside the vehicle adjacent to the left windshield pillar. 3.The VIN of any vehicle shall be alphanumeric and shall contain seventeen characters.	
D. Components marking		

10. Vehicle and component marking(incl VIN)		
Economy: New Zealand	Regulation no: Traffic regulations Part VIIA	Categories: Passenger car
ITEM	CONTENT	Illustration/supplement
A. General information	N/A	
B. Manufacturer's plate a. Name of manufacturer.	N/A N/A	
b. EEC type approval number	N/A	
c. Maximum permitted laden mass of the vehicle.	N/A	
d. Maximum permitted laden mass for the combination, where the vehicle is used for towing.	N/A	
e. Maximum permitted road mass for each axle, listed in order from front to rear	N/A	
f. In case of a semi trailer, the maximum permitted mass on the fifth wheel king pin	N/A	
g. Vehicle identification number.(VIN)	Structure of vehicle identification numbers: (a) International standard ISO 3779, or (b) The Australian Design Rule 43/01,or (c) The Federal Motor Vehicle Safety Standard Number115, or (d) A Standard published in New Zealand by Standards New Zealand.	Vehicle Identification number means a group of letters and numbers consisting 17 characters that- (a) is affixed to a motor vehicle in accordance with the relevant standard prescribed under regulation 90v of these regulation ; and (b) is capable of being decoded to provide information about that vehicle.

10. Vehicle and component marking(incl VIN)

Economy: PNG Regulation no: Motor traffic regulation 89

ITEM	CONTENT	Illustration/supplement
A. General information	N/A	
B. Manufacturer's plate	A person shall not operate a motor vehicle on which there is a trader's plate unless; (a) the trader's plate is affixed to the vehi-cle in accordance with section 11-(1);and (b) the provisions of this regulation relating to trader's plates are complied with.	
a. Name of manufacturer.	N/A	
b. EEC type approval number	N/A	
c. Maximum permitted laden mass of the vehicle.	N/A	
d. Maximum permitted laden mass for the combination, where the vehicle is used for towing.	N/A	
e. Maximum permitted road mass for each axle, listed in order from front to rear	N/A	
f. In case of a semi trailer, the maximum permitted mass on the fifth wheel king pin	N/A	
g. Vehicle identification number.(VIN)	N/A	

10. Vehicle and component marking(incl VIN)

Country: Chinese Taipei | Regulation no: Article 39 | Categories: Passenger car

ITEM	CONTENT	Illustration/supplement
A. General information	Inspection of the vehicle shall be carried out by checking engine and chassis number referring to initial registration record.	
B. Manufacturer's plate	N/A	
a. Name of manufacturer.	N/A	
b. EEC type approval number	N/A	
c. Maximum permitted laden mass of the vehicle.	N/A	
d. Maximum permitted laden mass for the combination, where the vehicle is used for towing.	N/A	
e. Maximum permitted road mass for each axle, listed in order from front to rear	N/A	
f. In case of a semi trailer, the maximum permitted mass on the fifth wheel king pin	N/A	
g. Vehicle identification number.(VIN)	N/A	

10. Vehicle and component marking(incl. VIN)

Economy: USA	Regulation no: CFR Part 567, FMVSS115, 49CFR Part541	Categories:
ITEM	CONTENT	Illustration/supplement
A. General information	N/A	
B. Manufacturer's plate / Certification Label	49 CFR Part 567 Each manufacturer shall affix to each vehicle a label, of the type and in the manner described below. (a)The label shall, unless riveted, be permanently affixed in such a manner that it cannot be removed without destroying or defacing it. (b)The label shall be affixed to either the hinge pillar, door-latch post, or the door edge that meets the door-latch post, next to the driver's seating position. (c)The label shall contain the following statements: 1.Name of manufacturer. 2.Month and year of manufacture. 3.Gross vehicle weight rating. 4.Gross axle weight rating. 5.The statement: "This vehicle conforms to all applicable ------." 6.VIN. 7.The type classification of the vehicle (e.g., passenger car).	
C. Vehicle identification number.(VIN)	A. VIN - Basic Requirement (FMVSS 115) (a)Each vehicle shall have a VIN that is assigned by the manufacturer.(b)Each VIN shall consist of 17 characters.	

10. Vehicle and component marking(incl. VIN)

Economy: USA	Regulation no: CFR Part 567, FMVSS115, 49CFR Part541	Categories:
ITEM	CONTENT	Illustration/supplement
	(c)The VIN's of any two vehicles manufactured within a 30-year period shall not be identical. (d)The VIN shall be located inside the passenger compartment. It shall be readable, without moving any part of the vehicle, through the vehicle glazing under daylight lighting conditions by an observer having 20/20 vision (Snellen) whose eyepoint is located outside the vehicle the adjacent to the left windshield pillar. Each character in the VIN shall have a minimum height of 4 mm.	
D. Components marking	A.49 CFR Part 541 (a)Each passenger car having High Theft Rates must have an identifying number affixed or inscribed on each of the parts specified in para.(1)-(14). (1)Engine. (2)Transmission. (3)Right front fender. (4)Left front fender. (5)Hood. (6)Right front door. (7)Left front door. (8)Right rear door. (9)Left rear door. (10)Front bumper.	

10. Vehicle and component marking(incl. VIN)		
Economy: USA	Regulation no: CFR Part 567, FMVSS115, 49CFR Part541	Categories:
ITEM	CONTENT	Illustration/supplement
	(11)Rear bumper. (12)Right rear quarter panel. (13)Left rear quarter panel. (14)Decklid, tailgate, or hatchback. (b)The number required to be inscribed or affixed by para.(a) shall be the VIN of the passenger car.	

ITEM 96-11

Seat belt anchorages

APEC Regulation Analysis Findings
Item No. 96-11: Seat belt anchorages

1. Canada has a seat belt anchorage regulation that is similar to that of the U.S.

2. In addition to the seat belt anchorage regulation of its own, New Zealand accepts the related regulations of the U.S., Japan, Australia, ECE and EEC as alternatives.

3. A comparison of specific requirements for seat belt anchorages is as follows:

(1) Australia, Canada, Hong Kong, Japan, New Zealand, Chinese Taipei, U.S. and ECE require all seats to be equipped with seat belt anchorages (B-b-1). People's republic of China, Indonesia, Korea and Singapore require only the front seats (including the driver's seat) to be furnished with seat belt anchorages. Other member economies do not have any requirements for seat belt anchorages.

(2) With respect to seat belt types and the number of anchorages (B-b-2), Australia, Canada, Hong Kong, Japan, New Zealand, U.S. and ECE require 3-point seat belts for outer seats and 2-point or higher seat belts for other seats. Indonesia requires 2-point or higher seat belts for all seats. Korea and Singapore require 3-poimt seat belts for front seat including the driver's seat.

(3) As for seat belt anchorage positions (B-b-3), Australia, Canada, People's Republic of China, Japan, Korea, U.S. and ECE Specify positions of the upper anchorages. These positions vary considerable among these member economies except Canada and the U.S., which designate the same upper anchorage positions. (See figures 1-4)
Regarding the lower anchorages, the required lap belt angle is 20-75° for Canada, People's Republic of China, Japan and Korea; 20-80° for Australia 30-75° for the U.S.; and 30-80° for ECE. People's Republic of China and Japan have the same position requirements for the lower anchorages as well as the upper ones.

(4) Concerning the rigidity of anchorages as measured in terms of applied load an load holding time (C-b-1), Australia seats forth 22,000 N, and People's Republic of China, Japan and korea 22,300N for lap-only seat belt anchorages. Australia requires 13,300N and People's Republic of China, Japan and ECE 13,500N for lap-and-shoulder seat belt

anchorages.

The load holding time is also variant with People's Republic of China and Japan specifying 0.2 second or more, Australia 1 second or more, and the U.S., Korea and Canada 10 seconds or more. ECE does not stipulate a load holding time.

(5) As for the direction of load application (C-b-2), Canada, people's Republic of China, Japan, U.S. and ECE require 5-15° for lap belt anchorages and 0-20° for shoulder belt anchorages.

(6) With respect to labeling and marking (D), the U.S. and Canada demand the inclusion of explanations on anchorage safety in the driver's manual. ECE requires "E" marking.

ITEM No.96-11: Seat Belt Anchorages

A: Application: Passenger cars.

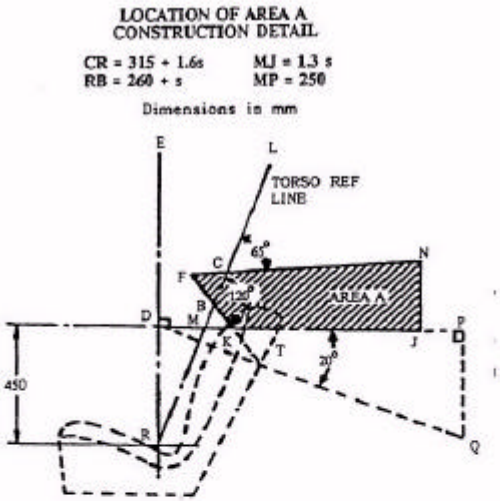
Member Economies	B-b-1) Seating Position required	B-b-2) Minimum Type & Number of Anchorages
Australia	Common (All seating positions)	Common (3-point for outboard, at least 2-point for others)
Brunei		
Canada	Common (All seating positions)	Common (3-point for outboard, at least 2-point for others)
Chile		
China	Unique (Driver and front passenger)	Unique (Unspecified anchors for all seat positions)
Hong Kong	Common (All seating positions)	Common (3-point for outboard, at least 2-point for others)
Indonesia	Unique (Driver and front passenger)	Unique (At least 2-point for all front positions)
Japan	Common (All seating positions)	Common (3-point for outboard, at least 2-point for others)
Korea	Unique (Driver and front passenger)	Unique (3-point for driver and front passenger)
Malaysia		
Mexico		
New Zealand	Common (All seating positions)	Common (3-point for outboard, at least 2-point for others)
Papua new guinea		
Philippines		
Singapore	Unique (Driver and front passenger)	Unique (3-point for driver and front passenger)
Chinese Taipei	Common (All seating positions)	Unique (Unspecified anchors for all seat positions)
Thailand		
United States	Common (All seating positions)	Common (3-point for outboard, at least 2-point for others)
ECE	Common (All seating positions)	Common (3-point for outboard, at least 2-point for others)

Member Economies	B-b-3) Location of Anchorage at seat position
Australia	ADR 5 (See fig.1 for upper anchorage location), Unique (Line from the points on the Pelvis Reference Locus to lap belt anchorage point : 25-80°)
Brunei	
Canada	FMVSS 210 (for upper anchorage location), Unique (Line from SgRP to lap belt anchorage point : 20-75°)
Chile	
China	SRRV22-3 (See Fig.2 for upper anchorage location, line from R to lap belt anchorage point : 20-75°)
Hong Kong	
Indonesia	
Japan	SRRV22-3 (See Fig.2 for upper anchorage location, line from R to lap belt anchorage point : 20-75°)
Korea	FMVSS 210 (for upper anchorage location), Unique (Line from SgRP to lap belt anchorage point : 20-75°)
Malaysia	
Mexico	
New Zealand	
Papua new guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	FMVSS 210 (for upper anchorage location), Unique (Line from SgRP to lap belt anchorage point : 30-75°)
ECE	ECE R14 (See fig.4 for upper anchorage location), Unique (Line from H to lap belt anchorage point : 30-80°)

Member Economies	C-b-1) Anchorage strength (Loading force & Sustained time)
Australia	ADR 5 (Lap-only : 22.0 kN, for ≥ 1 sec., lap / shoulder : 13.3 kN, for ≥ 1 sec.)
Brunei	
Canada	FMVSS 210
Chile	
China	SRRV 22-3 (Lap-only : 22,300 N, for ≥ 0.2 sec., Lap / shoulder : 13,500 N, for ≥ 0.2 sec.)
Hong Kong	
Indonesia	
Japan	SRRV 22-3 (Lap-only : 2,270 kgf (22,300 N), for ≥ 0.2 sec., Lap / shoulder : 1,380kgf (13,500 N), for ≥ 0.2 sec.)
Korea	Unique (Lap-only : 2,270 Kg, for 10 sec., lap / shoulder : 1,360 kg, for 10 sec.)
Malaysia	
Mexico	
New Zealand	
Papua new guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	FMVSS 210 (Lap-only : 5,000 lbs (22,240N), for ≥ 10 sec., Lap / shoulder : 3,000 lbs (13,344N), for ≥ 10 sec.)
ECE	ECE R14 (Lap-only : 2,225 ± 20 daN, Lap/shoulder : 1,350 ± 20 daN)

Member Economies	C-b-2) Angle of loading	D) Label & marking
Australia	ADR 5 (Lap : 5-50°, shoulder : 0-20°)	
Brunei		
Canada	Common (5 - 15°)	FMVSS 210 (Owner's manual statement and / or diagram for some seat belt configurations)
Chile		
China	Common (10° ± 5°)	
Hong Kong		
Indonesia		
Japan	Common (10° ± 5°)	
Korea		
Malaysia		
Mexico		
New Zealand		
Papua new guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States	Common (10° - 5°)	FMVSS 210 (Safety statement and / or diagram of anchorages in owner's manual, for some seat belt configurations)
ECE	Common (10° ± 5°)	ECE R14 (International approval mark)

Member Economies	E) Referenced standards
Australia	*ADR 4/00, 4/01, and 4/02 *AS 2597.10-1983 *Australian standards E35-1970 *ADR for Door Latches and Hinges
Brunei	
Canada	*CMVSS 208 *SAE Rec. Prac. J383 APR 86, Figure 5 *SAE J384 Apr 86, Figure 2
Chile	
China	*GB/T 11559, GB/T 11563
Hong Kong	
Indonesia	
Japan	*Tech. Std. for occupant protection in Frontal Collision, Jisha 899, 1983 *Tech. Std. for seats and seat anchorages (Jisha 92,1975)
Korea	
Malaysia	
Mexico	
New Zealand	*ECE 14 *ECE 70/387 *FMVSS 210 *Australian ADR 5/00, 5/01 *Japan Article 22-3, jisha 92
Papua new guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	*SAE Rec. Prac. J826 (May 1987) *SAE Rec. Prac. J1100 (June 1984)
ECE	



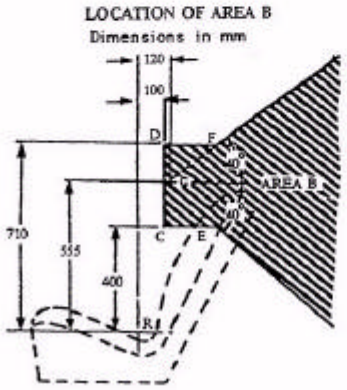


Fig.1

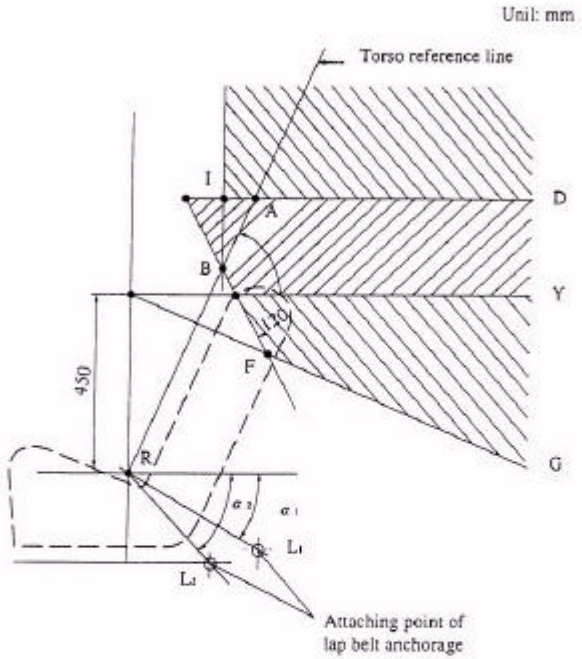
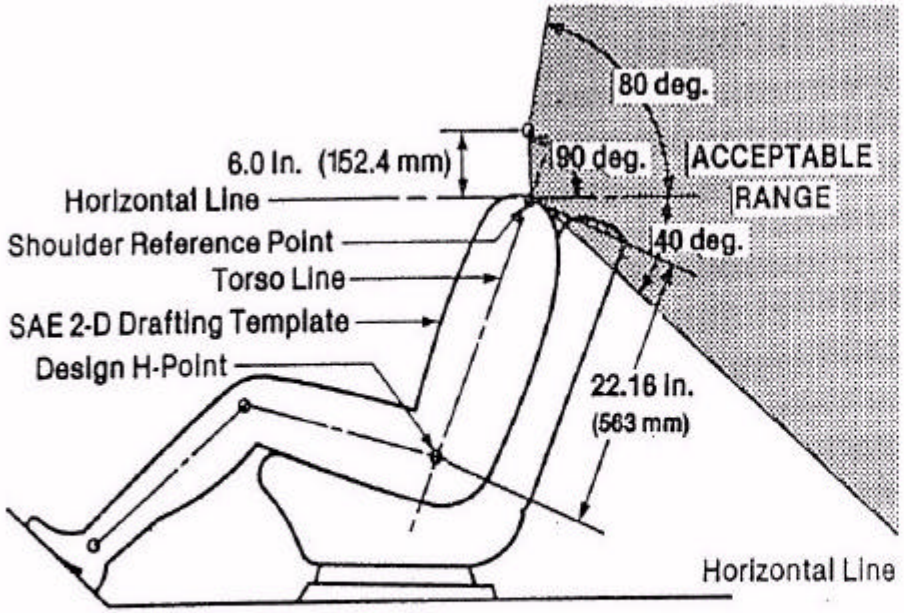


Fig.2

ITEM 96-11-2-6



LOCATION OF ANCHORAGE FOR UPPER TORSO RESTRAINT

Fig.3

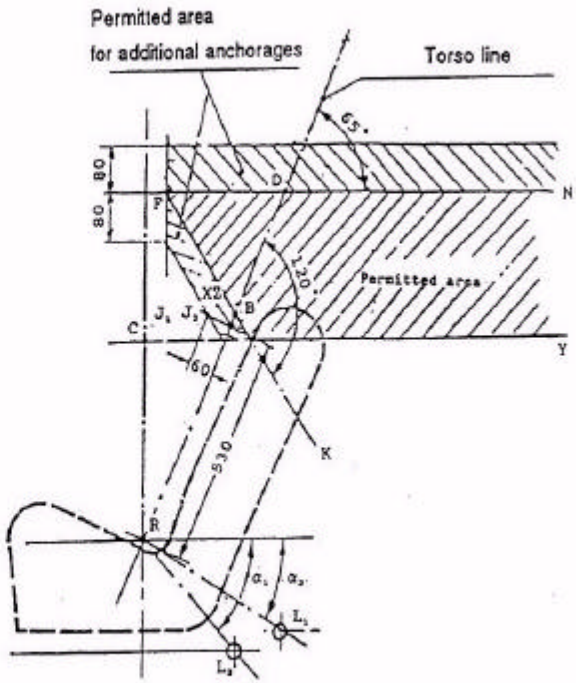


Fig.4

AUSTRALIA

Australian Design Rule 5/03 - Anchorages for Seatbelts

ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars (MA,MB)	
B:Structure requirements B-a:Structure of parts	It is recommended that each anchorage should accept a 7/16 inch - 20 UNF -2A threaded steel bolt.	
B-b:Structure of parts installed in vehicle	1.2 Requirements for Anchorages 1.2.1 Seatbelt anchorages must be provided for all seating positions (as established in accordance with clause 6 of C-b) The type of seat belt and anchorage erequired is as follows:	

Type of seatbelt and anchorages required (3)		
Vehicle category	MA	MB
Front Row seats : Driver	R	R
Outboard passenger	R	R
Center	L	L
2nd Row seats : Outboard (1)	R	R
Center	L	L
3rd Row seats : Outboard (2)	L/S	R
Center	L	L

Where:
L = At least Lap anchorage
L/S = Lap/Sash = Pelvic Restraint + Upper Torso Restraint
R = Lap/Sash with Retractor
NOTES:
(1) If no permanent structure then lap anchorages are acceptable.

(2) If Seat is adjustable for conversion of occupant space to luggage or goods space and is not an outboard seat in the front or second row of seats then lap anchorages are acceptable

(3) Upper torso restraint anchorages must not be provided for side-facing seats (See clause 1.5.5).

(B-b:Structure of parts installed in vehicle)	1.3 All anchorages must be designed so that seatbelt assemblies may be replaced readily. Any anchorage may be designed to receive more than one anchor fitting. 1.4 Pelvic Restraint For each seating position two lap anchorages must be available. 1.5 Upper Torso Restraint 1.5.1 For all front-facing front outboard seating positions, provision must be made for upper torso restraint. 1.5.2 For all front facing and rear facing outboard seating positions provision must be made for upper torso restraint provided that there is permanent structure other than the seat above a horizontal plane located 350 mm above the Seating Reference Point and rearward of a vertical transverse plane through the upper torso reference point. If the design provides for a harness belt, one or two harness torso anchorages must be provided. 1.5.4 Optional Anchorages 1.5.4.1 For MA vehicles, provision of upper torso restraint must be optional in the case of outboard seating positions where the seat is designed to provide adjustment for conversion of occupant space to luggage or goods space and such seating positions are not the driver's or front passenger seating positions or the seating positions immediately to the rear thereof. 1.5.5 Upper torso restraint must not be provided for side-facing seating positions.	
C :Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	None. 1.1 Strength of Anchorages 1.1.2 Each Anchorage must be capable of supporting, for not less than one second, the load imposed on it by a body block subjected to the appropriate load as specified in clause 1.1.4. 1.1.3 An anchorage may be tested in a test relevant to that single anchorage only or in combination with tests on other anchorages. 1.1.4 The loads to be applied to body blocks for testing of anchorages must be:	

(C-b:Performance of parts installed in vehicle)

Table 1

Anchorage under test	Minimum total load to be applied to body block or blocks
Lap anchorages provided for lap belt system only.	22.0 kN for front-and and side-facing, seating positions 9.0 kN for rear- facing seating positions.
Anchorage common to both pelvic and upper torso restraint in a lap-sash belt or harness belt system.	22.0 kN for side-facing seating positions 9.0 kN for rear- facing seating positions.
Lap anchorages provided for pelvic restraint only in a lap-sash belt system	13.3 kN for front-facing seating positions 5.3 kN for rear- facing seating positions.
Final Torso anchorages and harness torso anchorages.	17.7 kN for front-facing seating positions 7.0 kN for rear- facing seating positions.

(C-b:Performance of parts installed in vehicle)	1.2 Symmetrical Anchorages Except where the requirements of clause 1.3 apply, in cases where two anchorages are identical in design and symmetrically located relative to the vertical longitudinal plane through the geometric centre of the vehicle, a test on one anchorage must be considered also as a test on the other. 1.3 Adjacent and Multiple Anchorages 1.3.1 A single anchorage which provides for two seating positions must be regarded as 2 anchorages. 1.3.2 All anchorages which are provided for different seating positions and which are separated by not more than 200 mm must be tested simultaneously, except that: 1.3.2.1 if one seating position faces to the front and the other to the rear, the anchorages must be tested independently; and 1.3.2.2 notwithstanding the requirements of clause 1.1, the minimum total load to be applied to the body block or blocks for testing one anchorage common to both pelvic and upper torso restraint may be limited to 17.7kN. 1.4 Anchorages on Pillars 1.4.1 In cases where a lap anchorage and either a final torso anchorage or a sash guide which is a load bearing sash guide as described in clause 2.1.2, are both located on a pillar which is in the vicinity of the front seat back and which joins the roof to the under body structure, the pillar must be capable of supporting, for not less than one second, the loads imposed on it by body blocks subjected to loads totalling 26.6 kN such that: 1.4.1.1 not less than 13.3 kN is applied to the body block attached to the final torso anchorage or sash guide as appropriate and another anchorage as specified in clause 4.4.1, and 1.4.1.2 the balance of the load is applied to a body block attached to the lap anchorage and another anchorage as specified in clause 4.4.1. 1.4.1.3 Testing to the requirements of this clause may be incorporated in a test conducted in accordance with the provisions of clause 1.1. 1.5 Adjustable Upper Torso Anchorages In cases where one or more anchorages are adjustable, the anchorages must be capable of meeting the relevant strengh requirements of clauses 1.1.1.3 and 1.4 wih the anchorages in any position of adjustment.	

(C-b:Performance of parts installed in vehicle)	1.6 Adjustable Sash Location Points In cases where an anchorage is fitted with a sash guide system incorporating an adjustable sash location point, the anchorage must be capable of meeting the relevant strength requirements of clauses 1.1, 1.3 and 1.4 with the sash location point set in any position of adjustment. 2. SASH GUIDE REQUIREMENTS 2.1 General 2.1.1 The sash guide must be nominated by the vehicle manufacturer as being either: 2.1.1.1 a component of a seatbelt assembly; or 2.1.1.2 not a component of a seatbelt assembly. This latter category must include those sash guides which are not intended to be replaced when the seatbelt assembly is replaced. 2.1.2 For the purpose of this rule, a load bearing sash guide means a sash guide which remains integral with its supporting structure and retains strap under the following loading loading conditions: 2.1.2.1 the anchorage test loads specified in clause 1.1, or 2.1.2.2 in the case where the sash guide is a component of a seatbelt assembly, both the dynamic testing procedure of the Australian Design Rule 4/... "Seatbelts" and the static strength of assembly test of Australian Standard E35-1970, "Seat Belt Assemblies for Motor Vehicles" or Australian Standard AS 2597.10 - 1983, "Determination of Static Strength and Dummy Displacement" as specified in the Australian Design Rule 4/... "Seatbelts" . 2.1.3 In the case where thesash guide is not a component of a seatbelt assembly (as nominated in clause 2.1.1.2), then the sash guide must comply with clause 6.8 as well as clause 4.2.7 of Australian Design Rule 4/00 and 4/01 for "Seatbelts" or clause 5.8 of Australian Design Rule 4/02 for "Seatbelts" (where applicable) as if the Sash Guide were part of the Seatbelt Assembly: (but also excluding clauses 5,9 and 14 of Australian Standard 2596-1983, "Seat Belt Assemblies for Motor Vehicles" or clauses 3,7 and 11 of Australian Standard E35 Pt. 1-1970, "Seat Belt Assemblies for Motor Vehicles"), clause 4.3.3 and clause 4.5.1 of Australian Design Rule 4/00 and 4/01 for "Seatbelts" or clauses 6.3 and 8.1 of Australian Design Rule 4/02 for "Seatbelts".	

(C-b:Performance of parts installed in vehicle)	2.2 Provision A sash guide must be provided for each seating position to be fitted with a lap-sash belt. 2.3 Strength Except in cases where the anchor fitting at the final torso anchorage is the sash guide, the sash guide must, when tested in accordance with the requirements of clause 5.1, withstand the loads in such a way that after application and removal of the loads there is no substantial deformation and the sash guide remains integral with its supporting structure and continues to retain the strap. 2.4 Seat Backs In cases where the seat back is a sash guide device the design of the seat back must be such that it is not possible for the strap to fall below the lower boundary of area A at any point not greater than 300 mm from the Seating Reference Plane. If this requirement is met by the use of a positive restraining device incorporated with or attached to the seat back then the device must be designed to withstand a load of 50 N applied in a horizontal transverse direction away from the Seating Reference Plane. 2.5 Design of Sash Guide Devices 2.5.1 In cases where the sash guide which includes the sash location point is a load bearing sash guide, it must retain the strap so that either: 2.6 Sash Location Point The sash guide must be so designed that the sash location point meets the location requirements of clause 3.2. 2.7 Failure of Sash Guide devices 2.7.1 In cases where one or more sash guide in the sash guide system are not load bearing sash guides, the design of the system must be such that in the installed design position: 2.7.1.1 the point of the first load bearing sash guide where the centreline of the strap first changes direction after leaving the preceding sash guide must be in area A or area B; and	

(C-b:Performance of parts installed in vehicle)	2.7.1.2 the muximumm length of strap required to pass from that point to the Upper Torso Reference Point via the sash guide system must not exceed by more than 60 mm the true distance between those points. 2.8 Deflection of Sash Guides 2.8.1 In the case of a sash guide system where the sash guide which includes the sash location point is a load bearing sash guide, and is not a component of a seatbelt assembly (as nominated in clause 2.1) the design must be such that: 2.8.1.1 in the case of a sash guide system with a non-adjustable sash location point, the sash guide system must comply with clauses 2.8.2 and 2.8.3,and 2.8.1.2 in the case of a sash guide system with an adjustable sash location point, the sash guide system must comply with clauses 2.8.2 and 2.8.4 with the sash location point set in any position of adjustment. 2.8.2 When a load is applied as specified in clause 5.2, sash guide deflection must not reduce, by more than 60mm, the actual length of strap measured along the strap centreline between the Upper Torso Reference Point and the final anchor point. 2.8.3 When a load is applied as specified in clause 5.2, the displaced sash location point must lie in area A or area B. 2.8.4 When a load is applied as specified in clause 5.2, the displaced sash location point must not lie below horizontal transverse plane DJ of arear A or horizontal transverse plane CE of area B whichever is the lower. 2.9 Effect of Seat Back Adjustment In cases where the seat back is provided with at least one point of adjustment between the design seat back angle and 30° inclusive, the requirements of clauses 2.7.1.2 and 2.8.1 must be met when the Upper Torso Reference Point is determined with the seat back adjusted not to the design seat back angle but to the greatest available seat back angle up to and including 30°. 3. LOCATION OF ANCHOR POINTS 3.1 Lap Anchor Points 3.1.1 The two lap anchor points provided for a particular seating position must lie on opposite sides of the Seating Reference Plane in such a way that the sum of distances measured normal to the seating reference plane is not less than 165mm. 3.1.2 The lines joining the lap anchor point to the extreme points on the pelvis reference locus must be inclined to the horizontal at angles of not less than 25° nor more than 80°when viewed normal to the Seating Reference Plane.	

(C-b:Performance of parts installed in vehicle)	3.1.3 In cases where the line representing the centreline of the strap is not a straight line when viewed normal to the Seating Reference Plane then: 3.1.3.1 with the seat in its foremost driving or riding position the line passing through the foremost point on the Pelvis Reference Locus and extending rearward to the first point of contact with the seat or other device must be inclined to the horizontal at an angle of not less than 25° ; and 3.1.3.2 With the seat in the rearmost driving or riding position the distance from the pelvis reference point to the lap anchor point measured along the centreline of the strap must not exceed by more than 60mm the distance from the pelvis reference point to the lap anchor point, except in the cases where the system is so designed that when tested in accordance with the load requirements of clause 1.1 the components of the vehicle or seat which cause the centreline of the strap between the lap anchor point and the pelvis reference point to vary from a straight line, do not deflect or fail in such a manner that the effective length of the strap measured along the centreline between the lap anchor point and the pelvis reference point is reduced by more than 60mm. 3.2 Sash Location Point 3.2.1 For both conditions of load specified in clause 5.1 the following requirements must be met: 3.2.1.1 the sash location point must be at least 140mm from the Seating Reference Plane; and 3.2.1.2 the sash location point must lie in area A. 3.2.2 Notwithstanding the requirements of clause 3.2.1, the sash location point may be adjustable for comfort provided that. 3.2.2.1 at least one point in the range of adjustment must permit the sash location point to comply with the requirements of clause 3.2.1, 3.2.2.2 no point of adjustment must cause the sash location point to lie below horizontal transverse plane DJ of area A for both conditions of load specified in clause 5.1, and 3.2.2.3 the sash location point must be adjustable without the use of tools. 3.3 Harness Anchor Points 3.3.1 In cases where only one harness anchorage is provided for a particular seating position, the harness anchor point must be located:	

(C-b:Performance of parts installed in vehicle)	3.3.1.1 Rearward of transverse plane inclined at the same angle as the torso reference line and 500mm horizontally rearward from the Seating Reference point; 3.3.1.2 not more than 50mm from the Seating Reference Plane; and 3.3.1.3 within area B but without the transverse location requirements of clause 7.2.1. 3.3.2 In cases where two harness anchorages are provided for a particular seating position, the two anchor points must be located: 3.3.2.1 Rearward of a transverse plane inclined at the same angle as the torso reference line and 75mm horizontally rearward from the Seating Reference Point; 3.3.2.2 either side of the Seating Reference Plane in such a way that the distances from the Seating Reference Plane do not differ by more than 100 mm; 3.3.2.3 such that the transverse separation does not exceed 300mm, and is either greater than 250mm or is less than 250mm by not more than half the horizontal distance from either anchor point to the transverse plane through the torso reference line; and 3.3.2.4 within area B but without the transverse location requirements of clause 7.2.1. 4. TESTIGN OF ANCHORAGES 4.1 Installation of Doors Except in cases where the vehicle complies with the Australian Design Rule for "Door Latches and Hinges", testing must be carried out with the vehicle doors open or removed. 4.2 Installation of Seats The appropriate seats must be installed for the tests and located in their rearmost driving or riding position and with the seat back adjusted to the design seat back angle except that in cases where the line of pull could not contact a particular portion of the seat then that portion may be removed. 4.3 Body Blocks Loads must be transmitted by the use of body blocks. 4.4 Loading of Body Blocks 4.4.1 Each body block must be restrained by attachments which are representative of a passing around the body block and connected to the anchorage under test and another appropriate anchorage as described in the following Table 2, by fittings that are representative of the actual anchor fittings designed for each Anchorage.	

(C-b:Performance of parts installed in vehicle)

Table 2

Anchorage under test	Other appropriate anchorage
Lap anchorage provided for lap belt system.	The other lap anchorage for that seating position.
Anchorage common to both pelvic and upper torso restraint in a lap-sash belt system.	Final torso anchorage and /or the lap anchorage for that seating position.
Lap anchorage provided for pelvic restraint only in a lap-sash belt system.	Anchorage common to both pelvic and upper torso restraint in a lap-sash belt system
Final torso anchorage.	Anchorage common to both pelvic and upper torso restraint in a lap sash belt system
Anchorage common to both pelvic and upper torso restraint in a harness belt system	The other anchorage common to both pelvic and upper torso restraint and/or the harness torso anchorage
Harness torso anchorage	Open or both anchorages common to both pelvic and upper torso restraint in a harness belt system

4.4.2 In cases where one anchorage is a final torso anchorage, the attachment restraining the body block must pass through the sash guide system except that:

4.4.2.1 It may by-pass any sash guide which is not a load bearing sash guide; and

4.4.2.2 a load bearing sash guide which is a component of a seatbelt assembly (as nominated in clause 2.1) may be replaced by a representative component of sufficient strength to withstand the load requirements of clause 1.1.

(C-b:Performance of parts installed in vehicle)	4.5 Direction of Loading 4.5.1 In the case of front and rear facing seats, the direction of load to the body blocks must be: 4.5.1.1 Forward of the seating position; 4.5.1.2 parallel to the Seating Reference Plane; 4.5.1.3 in the case of pelvic restraint, at an angle above the horizontal of not less than 5° nor more than 50° ; and 4.5.1.4 in the case of upper torso restraint, at an angle above the horizontal of not less than 0° nor more than 20°. 4.5.2 In the case of side facing seats, the direction of load to the body block attached to the lap anchorages must be: 4.5.2.1 in a direction towards the front of the vehicle; 4.5.2.2 in a vertical plane inclined inboard to a vertical longitudinal plane relative to the vehicle by not more than 20°; and 4.5.2.3 at an angle to the horizontal of not less than 5°nor more than 50°. 5. TEST OF SASH GUIDE 5.1 With the upper torso strap installed in the vehicle, tensile loads of 5N and 900 N must be applied to it in a direction from the appropriate sash location point towards the Upper Torso Reference Point. 5.2 With the upper torso strap installed in the vehicle, a tensile load of not less than 8.5 kN must be applied to the strap in a direction from the appropriate sash location point towards the Upper Torso Reference Point. 7. AREA A AND AREA B 7.1 Area A 7.1.1 Area A is dependent on the seat back angle and on its transverse distance S from the Seating Reference Plane. The seat back angle must be taken as the design seat back angle. 7.1.2 For a particular value of S and subject to clause 7.1.3 area A is located as follows: (refer to Fig.1) 7.1.2.1 above a horizontal transverse plane DJ located 450mm above the Seating Reference Point R; 7.1.2.2 to the rear of a transverse plane FK inclined downward at the rear 120° to the torso reference line and passing through a point B on the torso reference line and located 260mm + S from the Seating Reference Point;	

(C-b:Performance of parts installed in vehicle)	7.1.2.3 below a transverse plane FN inclined upward at the rear 65° to the torso reference line and passing through a point C along the torso reference line located 315mm +1.6 S from the Seating Reference Point R; and 7.1.2.4 Forward of a vertical transverse plane NJ located 1.3 S rearward of point M on the torso reference line. 7.1.3 In cases where S is less than 200mm, area A as defined in clause 7.1.2 is extended by the addition of an area KPQT constructed as follows: 7.1.3.1 extend DJ to point P so that MP = 250 mm 7.1.3.2 draw line DQ so that angle PDQ is 20° and angle DPQ is 90° ; and 7.1.3.3 extend FK to intersect DQ at point T. 7.2 Area B 7.2.1 Transverse location - area B extends transversely from a plane 140mm from and parallel to the Seating Reference Plane and on the same side as the sash guide. 7.2.2 Longitudinal location - in side elevation relative to the Seating Reference Plane, area B is established as follows: 7.2.2.1 to the rear of a transverse vertical plane CD located 100 mm rearward of the Seating Reference Point R; 7.2.2.2 above a horizontal plane CE located 400 mm above the Seating Reference Point R; and 7.2.2.3 below a horizontal DF located 710 mm above the Seating Reference Point R. 7.2.3 Notwithstanding the requirements of clauses 7.2.2.1, 7.2.2.2 and 7.2.2.3 above the location in side elevation may be as follows: 7.2.3.1 to the rear of a point G located 555 mm above and 120mm rearward of the Seating Reference Point R; 7.2.3.2 below a transverse plane GF inclined 40° above the horizontal; and 7.2.3.3 above a transverse plane GE inclined 40° below the horizontal.	
D:Label marking requirements	None	
E:Referenced standards	•ADR 4/00, 4/01 and 4/02 “Seatbelts” •Australian Standard E35-1970,“Seat Belt Assemblies for Motor Vehicles” •Australian Standard AS 2597-10-1983,“Determination of Static Strength and Dummy Displacement” •Australian Design Rule for “Door Latches and Hinges”	

FIG 1
LOCATION OF AREA A
CONSTRUCTION DETAIL

CR = 315 + 1.6 s MJ = 1.3 s
RB = 260 + s MP = 250

Dimensions in mm

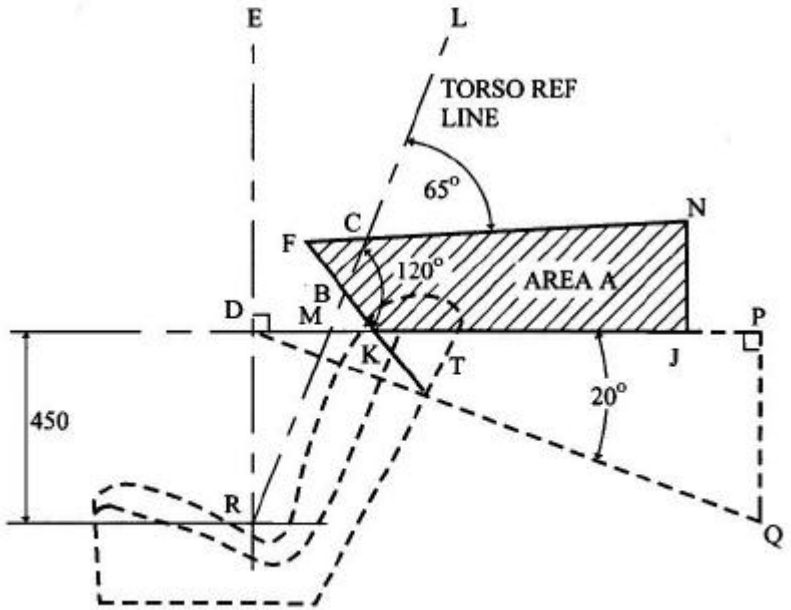
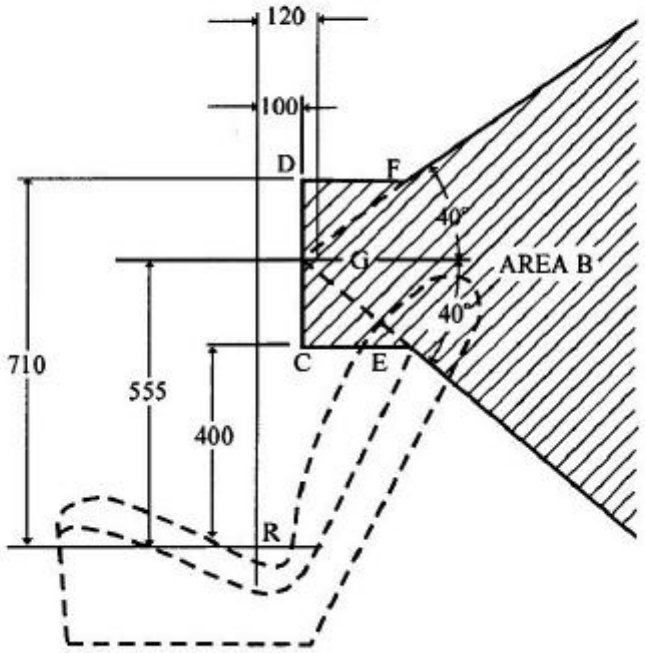


FIG 2
LOCATION OF AREA B

Dimensions in mm



CANADA

CMVSS 210 - Seat Belt Assembly Anchorages		
ITEM	**CONTENTS**	**Illustration/Supplement**
A:Application	Passenger Cars	
B:Structure requirements **B-a:Structure of parts**	None	
B-b:Structure of parts installed in vehicle	•Anchorages for a Type 2 manual seat belt assembly shall be installed for each designated seating position required by 208, and •In any other case, anchorages for a Type 1 or Type 2 manual seat belt assembly shall be installed. An anchorage for the pelvic portion of a belt assembly shall be located at least 165mm laterally from the other anchorage of the seat belt, as measured between the vertical centrelines of the bolt holes or, in designs using another means of attachment to the vehicle structure, the centroids of such means. For seat belt assemblies in which the belt passes outside the seat or between the seat cushions without bearing on the seat structure, as illustrated in Figure 1 of SAE Recommended Practice J383 (June 1995): •A line shall extend forward at 30° - 75 ° (from horizontal) to the nearest belt-anchorage contact point from either (a) the SgRP (non-adjusting seat), (b) the H-point with the seat in its rearmost position (adjustable seat with a travel of not more than 70mm) or (c) a point 63.5 mm forward & 9.5 mm above the SgRP (adjustable seat with a travel of more than 70mm)	Type 1 seat belt assembly: a lap belt for pelvic restraint. Type 2 seat belt assembly: a combination of pelvic and upper torso restraint.

(B-b:Structure of parts installed in vehicle)	For seat belt assemblies in which the belt bears on the seat structure, as illustrated in Figure 3 of SAE Recommended Practice J383 (June 1995): •The anchorage shall be aft of the rearmost contact point of the belt on the seat frame with the seat in its rearmost position, and •The line from the SgRP to the nearest contact point of the belt with seat frame shall extend forward from the contact point at 30°-75° from horizontal. For seat belt assemblies in which the anchorage is on the seat structure: •The line from the SgRP to the nearest belt - anchorage contact point shall extend forward from the contact point at 30° - 75° from horizontal. As for an non-adjustable anchorage for the upper end of an upper torso restraint, the intersection of the longitudinal centreline of the bolt hole and the surface of the mounting structure or, in designs using another means of attachment to the vehicle structure, the centroid of such means shall be located within the range indicated in section 6.1 of SAE Recommended Practice J383 (June 1995), with reference to an H-point template described in section 3 of SAE Standard J826 (June 1992), where (a) the H-point of the template is located at the unique Design H-point of the seat, as defined in section 2.2.11.1 of SAE Recommended Practice J1100 (June 1993), at the full rearward and full downward position of the seat; and (b) the torso line of the template is at the same angle to the vertical plane as the seat back with the seat adjusted to its full rearward and full downward position and the seat back in its most upright position. For an adjustable anchorage for the upper end of an upper torso restraint, the mid-point of the range of adjustment of the anchorage or the position that is suitable for a 50th percentile adult male, if that position is specified in the owner's manual, shall be located within the range referred to in the previous paragraph above.	
C:Performance requirements **C-a:Performance of parts**	None	

C-b:Performance of parts installed in vehicle	Except for side-facing seats, anchorages for a Type 1 manual belt assembly or the pelvic portion of a Type 2 manual belt assembly that is equipped with a detachable upper torso restraint shall withstand a force of 22,240 N: Test Method (210, December 1996): Setting: restrain a pelvic body block by either Type 1 assembly or Type 2 pelvic portion only Seat position: rearmost position (longitudinally) Force application: for 10 seconds in the direction that the seat faces (required force must be attained within 30 seconds). Initial force application angle: 5° - 15° above horizontal centerline. (Permanent deformation or rupture of an anchorage during the test shall not be considered a failure if the required force is maintained for 10 seconds.) Anchorages for a Type 2 manual belt assembly shall be subjected to a force of 13,344 N: Test Method (210, December 1996): Setting: restrain a pelvic body block and an upper torso body block by Type 2 belt assembly. Other conditions: the same as above. Anchorages for designated seating positions that face in the same direction shall be tested by simultaneously loading the assemblies attached to the anchorages, where the anchorages are: (a) common to the same seat; or (b) laterally adjacent but not common to the same seat and at least one of the anchorages is located within 304.8mm of the anchorage for the adjacent seating position, as measured between the vertical centrelines of the bolt holes or, in designs using another means of attachment to the vehicle structure, the centroids of such means.	

D:Label marking requirements	The owner's manuals for passenger cars, MPVs or trucks with GVWR ≤ 4,536 kg having rear designated seating positions shall contain a statement indicating that children and infants are safer when properly restrained in a child restraint system or infant restraint system secured in a rear seating position.	
E: Referenced standards	* CMVSS 208 (Re: Type 2 seat belt assembly location requirements.) * SAE Recommendation Practice J383 APR86, Figure 5, "Upper Torso Restraint," which also refers to a 2-dimensional mannequin described in SAE Standard J826 APR80. (Re: Location of seat belt anchorage of upper torso restraint.) * SAE Recommendation Practice J384 APR86, Figure 2, "Typical Body and Shoulder Blocks." (Re: Pelvic and upper torso body block dimensions.) *SAE Recommendation Practice J1100 (June 1993) (Re: Location of H-point) * Test Method 210 "Seat Belt Anchorages" (December 1996)	

CHINA

National Standard of the People's Republic of China GB 14167-93 Motor Vehicles - Safety Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	None 1. Attaching location of anchorage (Paragraph 4.1)(See Fig.1) 1) Lower anchorage location •Angle a1 and a2 shall be 20-75°in any seat position. •The distance between the two vertical planes parallel to the median longitudinal plane of the vehicle and each passing through a different one of points L1 and L2 shall be at least 350 mm. (May shorten to 300 mm, if justifiable reasons) The median longitudinal plane of the seat shall pass between points L1 and L2 and shall be at least 120 mm from these points. 2) Upper anchorage location •Upper anchorage shall lie within a range of D-E-F-G planes, which are perpendicular to the median longitudinal plane of the vehicle. Distance S shall not be less than 140 mm. •Upper anchorage may lie within the range of H-I-D planes, if there are justifiable reasons. •If upper anchorage is below the horizontal plane CY that includes Point C, the contact point of the belt with the upper part of the seat back shall be situated above plane CY. A guide shall be provided. 2. Threaded anchorage holes 1) Anchorage shall have a threaded hole of 7/16 inch-20UNF 2A or 2B.	
C:Performance requirements C-a:Performance of parts	None	

National Standard of the People's Republic of China GB 14167-93 Motor Vehicles - Safety Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
C-b:Performance of parts installed in vehicle	1. Strength of anchorages 1) When loaded safety belt shall not separate from its anchorages. Permanent deformation or rupture of anchorage or surrounding is not considered a failure. 2. Test procedures 1) Loading specifications (Paragraph 5.2) •Load applied in forward direction at 10±5°angle above horizontal in a plane parallel to the vehicle's longitudinal plane (see Fig.2 and Fig.3). The back and seat pan of a 3-DH machine are used as loading blocks. (see Fig.4 and Fig.5). •Full application of the load achieved within 60 s. Anchorages must withstand load for 0.2 s. 2) The Type I seat belt anchorage test (Paragraph 5.3) •A test load of 22300±220N shall be applied to the seat pad attached to safety belt fixed in a vehicle as specified in paragraph 5.2. •In the case of rear positions , the load shall be 2940±220N. 3) The Type II seat belt anchorage test (Paragraph 5.4) •A test load of 13500±200N shall be simultaneously applied to the seat pad and the back pan attached to safety belt. •In the case of rear positions, the load shall be 2940±220N. 4) Specifications of simultaneous tests •The test as set forth in Paragraph 5.3 or Paragraph 5.4 may be carried out for each individual safety belt. Anchorage to which plural safety belt assemblies are attached or are close to each other, the test for those anchorages shall be conducted simultaneously. 5) Test with anchorage attached on seat •In instances where the seat belt anchorages are directly attached to the seat structure or vehicle structure, it shall be necessary to simultaneously apply the load equal to 20 times the mass of the complete seat horizontally and longitudinally in a forward direction through the center of gravity of the seat. •In the case of rear positions, the load P shall be applied for a duration of 0.5 s, where the load P is: P = (735 + weight of seat for one person) X 4 where, Unit:N.	

National Standard of the People's Republic of China GB 14167-93 Motor Vehicles - Safety Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
D:Label marking requirements	None	
E:Referenced standards	None	

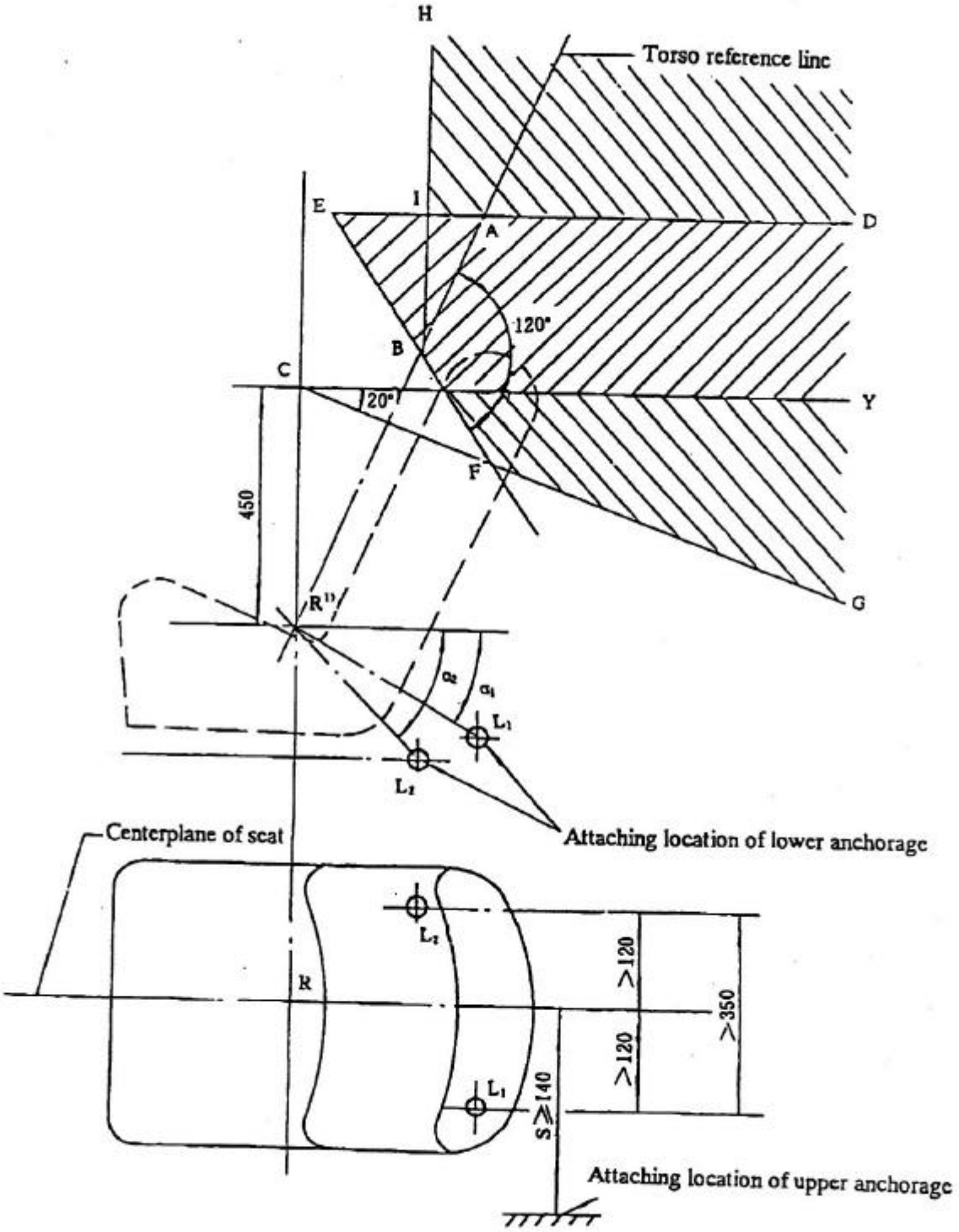

H
Torso reference line
E
I
D
A
120°
B
C
20°
Y
F
450
G
R11
α2
α1
L1
L2
Centerplane of seat
Attaching location of lower anchorage
L2
R
≥120
≥350
≥120
L1
S≥140
Attaching location of upper anchorage

Fig.1

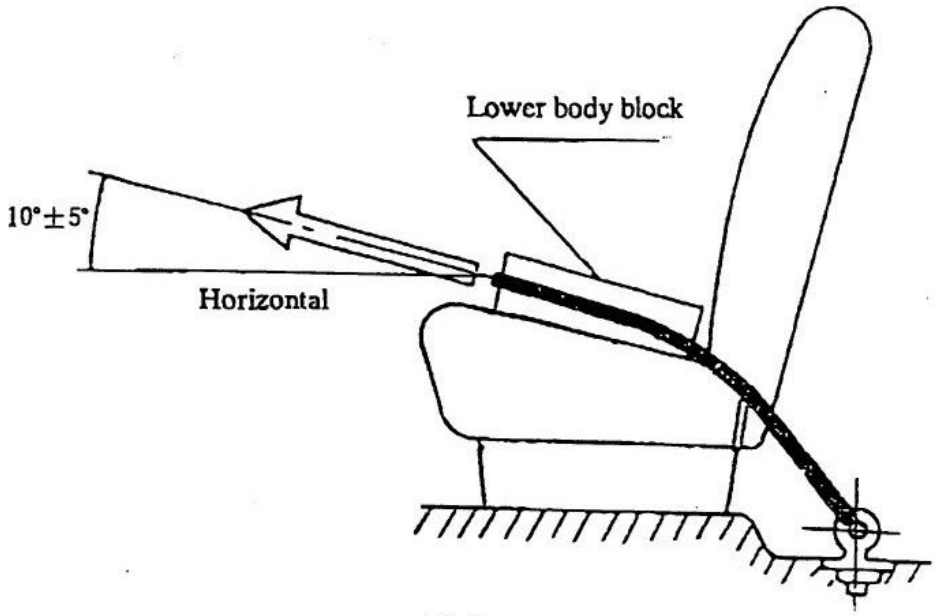

Lower body block
10°±5°
Horizontal

Fig.2

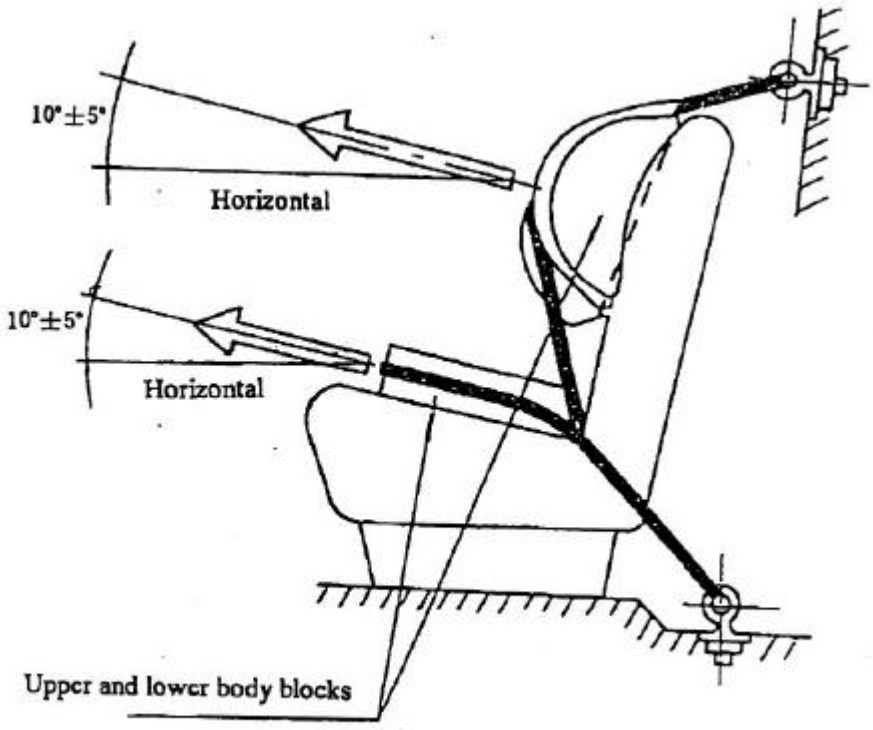

10°±5°
Horizontal
10°±5°
Horizontal
Upper and lower body blocks

Fig.3

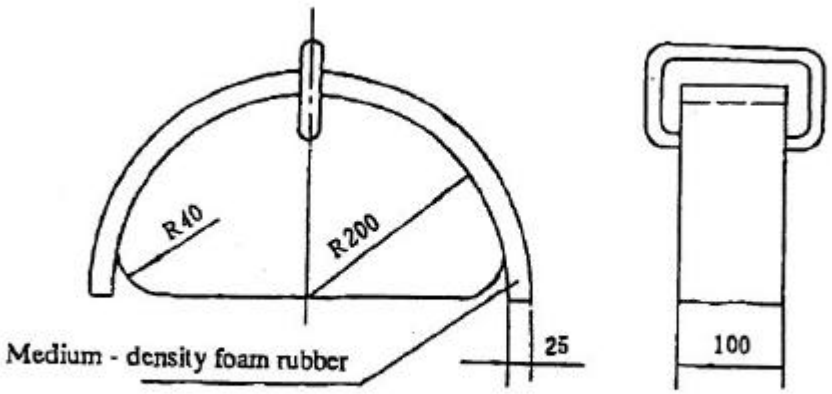


Fig.4 Upper body block

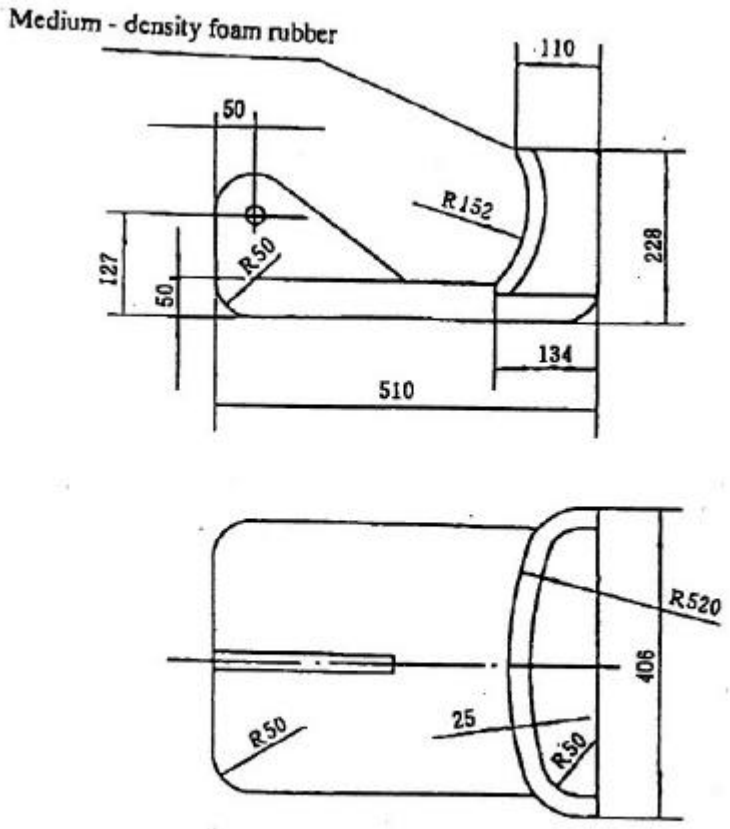


Fig.5 Lower body block

HONG KONG

Road Traffic (Safety Equipment) Regulations No.6B - Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None Front seat belt anchorages required for all passenger cars registered after 1 August 1976, except cars fitted with approved alternative passive restraints. Middle front seat belt anchorages required for passenger cars registered on or after 1 June 1996. Rear seat belt anchorages required for passenger cars registered on or after 1 June 1996. Every vehicle shall be provided with approved front seat belt anchorage points for upper torso belts for - 1)the driver’s seat 2)the specified passenger’s seat Every vehicle shall be provided with approved middle front seat belt anchorage points designed to hold either a body restraining seat belt or a lap belt. Every vehicle shall be provided with approved rear seat belt anchorage points designed to hold securely - 1)body restraining seat belts in the case of outboard rear seats 2)body restraining seat belts or lap belts in the case of middle rear seats.	

C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None None	
D:Label marking requirements	None	
E:Referenced standards	None	

INDONESIA

Government Regulation No.44/1993 Article 70, 76 - Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None The safety belt shall •have two or more anchors fitted to equip the driver's seat and the passenger's seat beside the driver's seat. •not have sharp edges which may hurt the users. •be fitted in such a way that there shall not be other objects or equipment hindering their function.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None None	
D:Label marking requirements	None	
E:Referenced standards	None	

JAPAN

Safety Regulations for Road Vehicles Article 22-3 Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	None Each motor vehicle shall be provided with seat belt anchorages in the following locations: 1) outboard, forward facing seats: Type 2 seat belts 2) all other seats: Type 1 seat belts or Type 2 seat belts The anchorage of a seat belt shall: 1) fully withstand the load applied by the seat belt in a collision. 2) be constructed so that it may not loosen or become deformed by vibration or shocks, etc. 3) be located so that it may allow an efficient function of the seat belt installed there. 4) be located so that it is neither damaged nor causes hindrance upon boarding and alighting. 5) allow easy installation of seat belt. The seat belt anchorage shall be located where the function of the seat belt may be retained when the occupant wears the seat belt. The seat belt anchorage shall be situated where the webbing of the seat belt may not come in contact with sharp edges of the motor vehicle or seat structures. Lap belt anchorages: When those angles between a horizontal plane and plans perpendicular to the median longitudinal plane of the test vehicle and passing through the “R” point and attaching locations L_1 or L_2 of the lap belt anchorage are designated respectively as α_1 and	

Safety Regulations for Road Vehicles Article 22-3 Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
	α_2, the angles equivalent to α_1 and α_2 shall be within the range of 20° to 75° in any position to which the seat can be adjusted. (see Fig. 1) The distance between the two vertical planes parallel to the median longitudinal plane of the test vehicle and each passing through each of the attaching locations of the lap belt anchorage shall be at least 350 mm. (See Fig. 1) It is permissible to shorten this distance to 300 mm, provided that there are justifiable reasons, such as the particular construction of the motor vehicle. The distance between the attaching location of the lap belt anchorage and the median seating plane shall be at least 120 mm. Shoulder belt anchorage: The attaching location of the shoulder belt anchorage that secures the upper part of the shoulder belt (hereinafter referred to as “the attaching location of the shoulder belt”) shall lie within a range of D-E-F-G enclosed by the following planes. (See Fig. 1) The distance between the attaching location of the shoulder belt and the median seating plane, S, shall be at least 140 mm. The attaching location of the shoulder belt may lie within the range of H-I-D that has been enclosed by the following planes, provided that there are justifiable reasons, such as particular construction of the motor vehicle. If the attaching location of the shoulder belt is located below the horizontal plane CY that includes Point C, the contact point of the shoulder belt with the upper part of the seat back shall be situated above the plane CY. A guide shall be provided so as to prevent the shoulder belt from being disengaged from the occupant’s shoulder.	

Safety Regulations for Road Vehicles Article 22-3 Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
C-a:Performance of parts	None	
C-b:Performance of parts installed in vehicle	When tested in accordance with the test procedure, the seat belt anchorage shall not exhibit any detachment, cracking or deformation, etc. which will cause the failure of the intended function. Type 1 seat belt anchorage test: Set the seat to the design reference position. Mount a body block as shown in Fig. 2 or Fig. 3. Pull each body block with a force of 2,270 kgf (22,300N)(910 kgf (8,900N) for seats facing backward) in a forward direction at an angle of 10°±5° above the horizontal in a plane parallel to the median longitudinal plane of the test vehicle, for a duration of at least 0.2 second. Full application of the load shall be achieved within 60 seconds. (See Fig. 4) Type 2 seat belt anchorage test: Set the seat to the design reference position. Mount body blocks as shown in Fig. 2 or Fig. 3. Pull each body block simultaneously with a force of 1,380 kgf (13,500N)(550 kgf (5,400N) for seats facing backward) in a forward direction at an angle of 10°±5° above the horizontal in a plane parallel to the median longitudinal plane of the test vehicle, for a duration of at least 0.2 second. Full application of each load shall be achieved within 60 seconds. (See Fig. 5) The tests may be carried out for each individual seat, but should be done simultaneously for: 1)Plural seat belt anchorages which are attached to the same seat. 2)Seat belt anchorage to which plural seat belt assemblies are attached. 3)Plural seat belt anchorages whose attached sections are close to each other. Where the seat belt anchorages are directly attached to the seat, simultaneously apply the load in a forward direction, as set force in Paragraph 3-2-1 of “Technical Standard for Seats and Seat Anchorages.”	

Safety Regulations for Road Vehicles Article 22-3 Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
D:Label marking requirements	None	
E:Referenced standards	•Technical Standard for Occupant Protection in Frontal Collision (Jisha 899, 1983) •Technical Standard for Seats and Seat Anchorages (Jisha 92, 1975)	

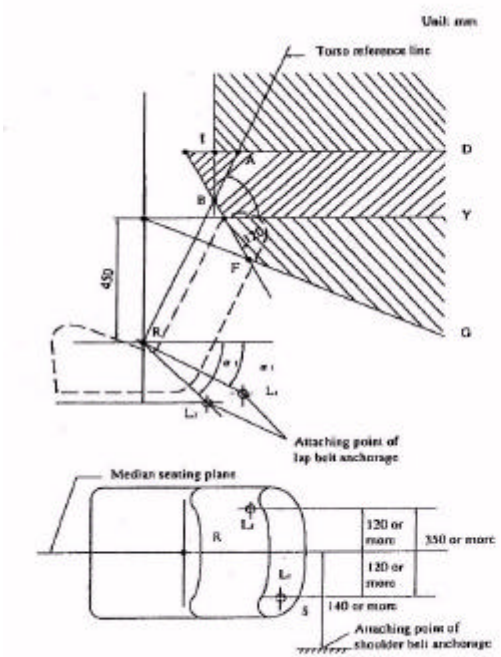


Fig. 1

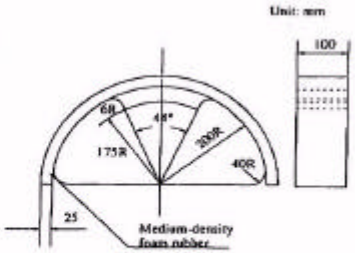


Fig. 2 Body Block I-shape

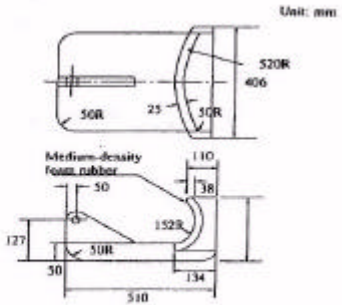


Fig. 3 Body Block II-shape

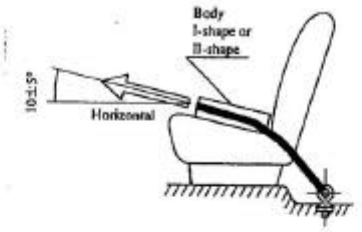


Fig. 4

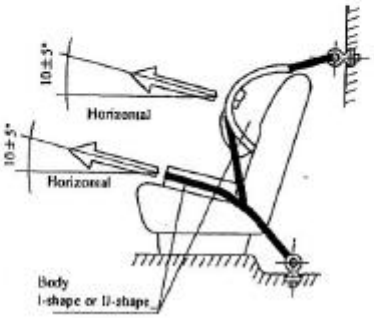


Fig. 5

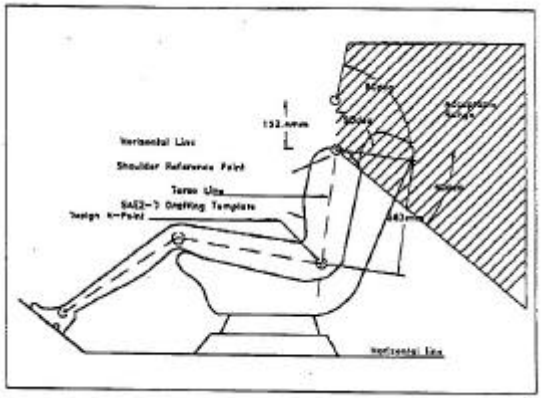
KOREA

The Regulations of The Motor Vehicle Safety Standards Article 103 - Seat Belt		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	None Driver & front passenger:3-point belt For anchorages for pelvic restraint of 2- or 3-point seat belt assembly, the angle between the plane having the seating reference point and the location of the anchorage perpendicular to the vertical center plane of the vehicle and the horizontal plane shall be between 20 and 75 degrees, and planes having the anchorages parallel to the vertical center plane shall be located at least 165 mm apart laterally. Anchorage for upper torso restraint of 3-point belt shall be installed within range specified in Appendix 17.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	None Seat belt assembly anchorage must meet each of the following: 1. Pelvic restraint of 2- or 3-point belts must withstand 2,270-kg force for 10 s. 2. The upper and pelvic portions of 3-point belt shall simultaneously withstand 1,360-kg force for 10 s. Strength requirements: Must meet Appendix 16 strength requirements and withstand 30 times the inertia load, and shall be certified as the Korean Standard in accordance with the Industrial Standardization Act or pass the quality inspection of the Industrial Product Quality Control Act.	
D:Label/marking requirements	None	
E:Referenced standards	•Industrial Standardization Act & Industrial Product Quality Control Act.	

Appendix 16: Static Strength Standard of Seat Belt

Category	2-point seat belt	3-point seat belt		
	Pelvic Restraint	Pelvic Restraint	Upper Torso Restraint	Attachment hardware to receive pelvic & upper torso restraint
Strength (kg)	2,270 or more	2,270 or more	1,360 or more	2,270 or more
Complete fracture of metal attachment hardware during test	None	None	None	-

Appendix 17 Location of anchorage for upper torso restraint of A 3-Point seat belt (Article 103 Paragraph 3 item 4)



New Zealand

Transport (Vehicle Standards) Regulations 1990 Regulation No. 30 - Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None Seat belt anchorages • Every motorcar required by these regulations to be fitted with seat belts shall be fitted with seat belt anchorages suitable for their attachment. • All outboard seating positions require 3-point seat belts, all other positions require 2-point seat belts. • Every seat belt anchorage required by this regulation shall comply with the appropriate vehicle standard.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None None	
D:Label marking requirements	None	
E:Referenced standards	• ECE R14 •76/115/EEC •FMVSS 210 (USA) • ADR 5/00, 5/01 (Australia) •SRRV Article 22-3, Jisha-92 (Japan)	

Singapore

Road Traffic (Motor Vehicles, Seat Belts) Rules S.4, S.6, S.7 - Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None Every motor vehicle shall be provided with anchorage points designed to hold body-restraining seat belts for 1) the driver's seat 2) the specified passenger's seat (if any) Every seat belt provided shall, if the seat is one with integral seat belt anchorages, be properly secured to the integral seat belt anchorage points forming part thereof, or, if the seat for which it is provided is not such a seat, be properly secured to the structure of the vehicle by the anchorage points.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in Vehicle	 None The anchorage points shall meet the British Standard Specification for seat belt anchorage points, namely either B.S. AU 48: 1965 or B.S. AU 48a or other specifications the Registrar may approve.	
D:Label marking requirements	Every vehicle registered on or after 1st January 1978 shall be legibly and permanently marked with the specification number of the British Standard for seat belt anchorage points, namely either B.S. AU48:1965 or B.S. AU 48a, or other specifications the Registrar may approve.	
E:Referenced standards	British Standard (B.S.) AU 48: 1965, B.S. AU 48a	

CHINESE TAIPEI

Road Traffic Safety Regulations No.39-18 Seat Belt Anchorages		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None All seats for new light passenger cars must have seat belts.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in Vehicle	 None None	
D:Label marking requirements	None	
E:Referenced standards	None	

THAILAND

The ministerial regulation No.22, The department of Land Transport's Notification Dated 9 September, BE2540		
ITEM	CONTENTS	Illustration/supplement
A:Application	Passenger Cars (not more than 7 passengers), registered from 1998/1/1 Passenger Cars (more than 7 passengers), registered from 1994/1/1 Private passenger car, registered from 1994/1/1 Small rural buses, registered from 1988/1/1 Taxi registered from 1998/1/1 Service car (green license plate), registered from 1988/1/1	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None (1)The combined lap and shoulder belt for driver and the person at the other side of front seat (2)The lap belt for the person in the middle seat between the driver and the person at the other side of front seat	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in Vehicle	 None None	
D:Label marking requirements	None	
E:Referenced standards	None	

UNITED STATES OF AMERICA

FMVSS 210 - Seat Belt Assembly Anchorages		
ITEM	**CONTENTS**	**Illustration/Supplement**
A:Application	Passenger Cars	
B:Structure requirement **B-a:Structure of parts** **B-b:Structure of parts installed in vehicle**	None Anchorages for Type 1 or 2 seat belt assembly shall be installed for each designated seating position as required by FMVSS 208.(4.1.1), except for those equipped with a seat belt assembly that meets the frontal crash protection requirements of FMVSS 208 (S5.1). All vehicles manufactured on and after September 1, 1987, with an automatic restraint system at front right outboard seating position which cannot be adjusted to secure a child restraint system with OEM attachment hardware, shall have either anchorages for a Type 1 seat belt assembly or a Type 2 seat belt assembly installed at that position (manufacturer's option). In th case of Type 1 seat belt assembly, it shall consist of at a minimum, holes threaded to accept bolts that comply with FMVSS 209 (S4.1(f)). Seat belt anchorages for Type 1 seat belt assemblies and the pelvic portion of Type 2 seat belt assemblies: -For installations in which seat belt does not bear upon seat frame: •Non-adjustable seat: A line from SgRP to the nearest belt - anchorage contact point shall extend forward from the anchorage at 30°- 75° angle (from horizontal). •Adjustable seat: A line from a point 2.50 inches (64 mm) forward and 0.375 inches (10mm) above the SgRP to the nearest belt - anchorage contact point shall extend forward from anchorage at 30°- 75° angle (from horizontal).	Type 1 seat belt assembly: a lap belt for pelvic restraint. Type 2 seat belt assembly: a combination of pelvic and upper torso restraint.

(B-b:Structure of parts installed in vehicle)	-For installations in which belt bears upon seat frame: •The seat belt anchorage, if not on the seat structure, shall be aft of the rearmost belt contact point on the seat frame. The line from the SgRP to the nearest belt contact point on the seat frame (seat at the SgRP), shall extend forward from the contact point at a 30°- 75° angle (from horizontal). -For installations in which the seat belt attaches to seat structure: •The line from the SgRP to the nearest contact point of the belt with the hardware attaching it to the seat structure, shall extend forward from the contact point at a 30°- 75° angle (from horizontal). -Anchorages for an individual belt assembly shall be located at least 6.50 inches (165 mm) apart laterally, measured between the vertical centerline of the bolt holes or, in designs using another means of attachment to the vehicle structure, the centroids of such means. Seat belt anchorages for the upper torso portion of Type 2 seat belt assemblies: Adjust the seat to its full rearward and downward position and adjust the seat back to its most upright position. With the seat and seat back so positioned, the seat belt anchorage for the upper end of the upper torso restraint shall be ocated within the range given in Figure 3 on the page ITEM11-2-7, with reference to: •two dimensional drafting template described in SAE Recommended Practice J826 (May 1987). •the H-point of the template shall be at the design H-point of the seat for its full rearward and full downward position, as defined in SAE Recommended Practice J1100 (June 1984), and the template's torso line shall be at the same angle from the vertical as the seat back.	

C:Performance Requirements **C-a:Performance of parts** **C-b:Performance of parts installed in vehicle**	None Except for side-facing seats and the attachment hardware of assembly which comply with FMVSS 208 (S5.1), anchorages for a Type 1 seat belt assembly and the lap belt portion of a Type 2 seat belt assembly or automatic seat belt assembly if equipped with a detachable upper torso belt shall withstand a force of 5,000 lbs (22,241 N): Test Method (FMVSS 210, S5.1): Setting: restrain a pelvic body block by either Type 1 assembly or Type 2 lap belt only (Optional body block is applicable for center sets of some anchorages.) Seat position: rearmost position (longitudinally) Force application: for 10 seconds in the direction that the seat faces (required force must be attained within 30 seconds). Initial force application angle: 5° - 15° above horizontal centerline. (Permanent deformation or rupture of an anchorage or its surrounding area during the test shall not be considered a failure, if the required force is sustained for 10 seconds.) Except for side-facing seats and the attachment hardware of assembly which comply with FMVSS 208 (S5.1), anchorages for a Type 2 and automatic seat belt assemblies which are installed according to FMVSS 208, shall withstand a force of 3,000 lbs (13,345 N):. Test Method (FMVSS 210, S5.2): Setting: restrain a pelvic body block and an upper torso body block by Type 2 or automatic seat belt assembly. Other conditions: the same as above.	

(C-a:Performance of parts)	Anchorages for designated seating positions that face in the same direction shall be tested by simultaneously loading the assemblies attached to the anchorages, where the anchorages are: (a) common to the same seat; or (b) laterally adjacent but not common to the same seat and at least one of the anchorage is located within 12 inches (305mm) of the anchorage for the adjacent seating position, as measured between the vertical centerlines of the bolt holes.	
D:Label/marking requirement	Owner's manuals of all vehicles of GVWR ≤ 10,000 lbs (4,536 kg) manufactured after September 1, 1987 shall include: •A section explaining that all child restraint systems are designed to be secured in vehicle seats by lap belts or the lap belt portion of a lap-shoulder belt, and that children could be endangered in a crash if restraints are not properly secured. •As for the vehicles with rear seating positions, a statement alerting vehicle owners that , according to accident statistics, children are safer when properly restrained in the rear seating positions than in the front seating positions.	
E:Referenced Standards	•SAE Recommended Practice J826 (May 1987): 2-D drafting template •SAE Recommended Practice J1100 (June 1984): Design H-point of seat	

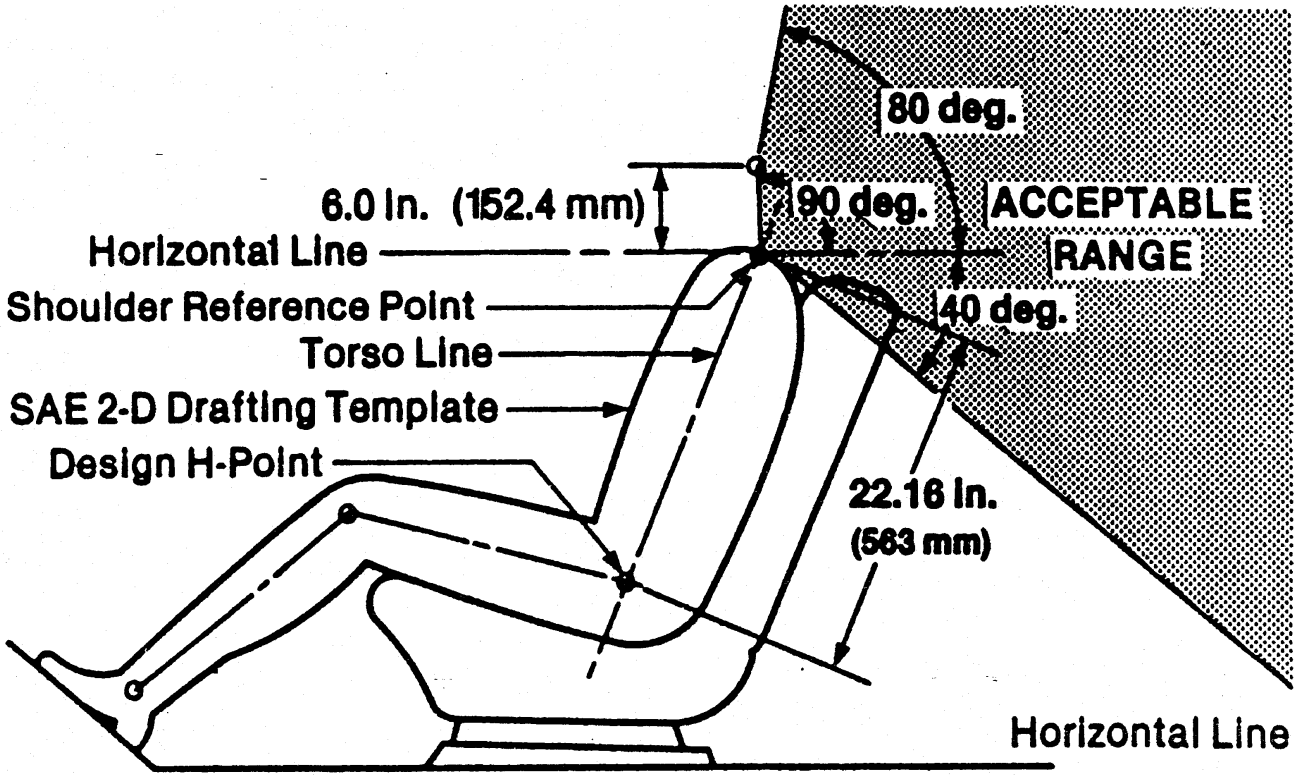
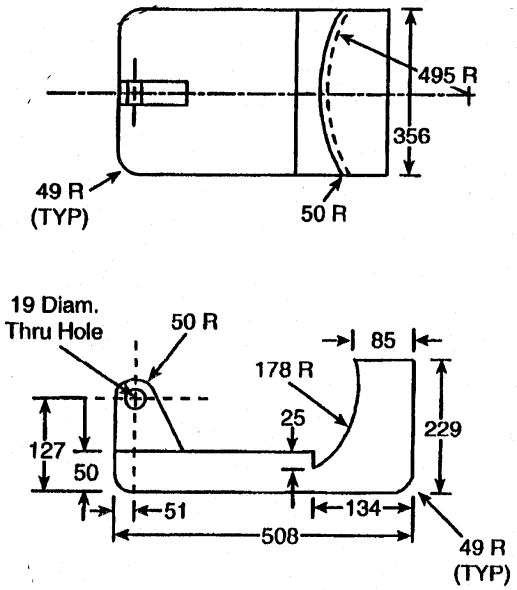
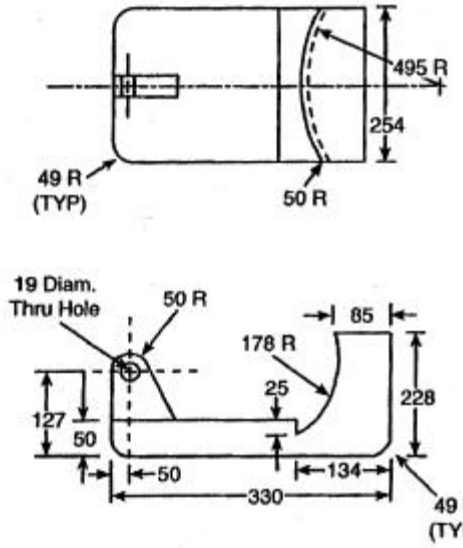


Figure 1 LOCATION OF ANCHORAGE FOR UPPER TORSO RESTRAINT



NOTES:
1. Block Covered by 25 Med. Density Canvas Covered Foam Rubber
2. All Dimensions in millimeters (mm)

Figure 2A.– BODY BLOCK FOR LAP BELT ANCHORAGE



NOTES:
1. Block Covered by 25 Med. Density Canvas Covered Foam Rubber
2. All Dimensions in millimeters (mm)

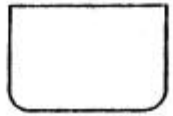


Figure 2B.– OPTIONAL BODY BLOCK FOR CENTER SEATING POSITIONS

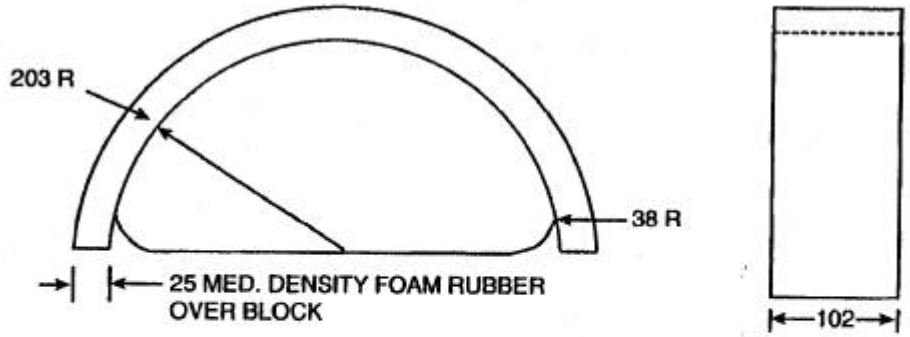


Figure 3.– BODY BLOCK FOR COMBINATION SHOULDER AND LAP BELT ACHORAGE
All dimensions in millimeters (mm)

ECE

ECE Regulation 14 - Seat Belt Anchorages

ITEM	CONTENTS	Illustration/supplement
A : Application	Passenger Cars (category “M1”)	
B : Structure requirements **B-a : Structure of parts** **B-b : Structure of parts Installed in vehicle**	None Anchorages for safety-belts shall: * Enable the installation of a suitable safety belt. The belt anchorages of the front out-board positions shall be suitable for safety belts incorporating upper torso anchorages. * Reduce to a minimum the risk of the belt’s slipping when worn correctly. * Reduce to a minimum the risk of strap damage due to contact with sharp rigid parts of the vehicle or seat structures. An anchorage shall have a threaded hole of 7/16-inch (20 UNF 2B). It shall be possible to remove the safety belt without damaging the anchorages. The minimum number of safety-belt anchorages for each seating position:	

Minimum Number of Anchorage Points						
	Forward-facing Seating Positions					Rear-facing Seating Positions
Vehicle categories	Outboard Seating Positions			Center Seating Positions		
	Front		Other	Front	Other	
	Driver	Passenger				
M1	3	3	3, or 2ϕ	3 or 2 *	2	2

Note) 2 = two lower anchorages for the installation of a lap belt
3 = two lower anchorages and one upper anchorage for the installation of a lap and shoulder (3 point) belt
ϕ= if there is passage >500 mm between seat and nearest side-wall of the vehicle
* = in case the windscreen is located outside the reference zone defined in annex 1 to Regulation No.21

(B-b:Structure of parts installed in vehicle)

For folding seats or seating intended sorely for use when the vehicle is stationary, as well as for all the seats of any vehicles which are not covered by the requirements given
here, no belt anchorages are required. However, they must comply with these requirements if fitted. (Two lower anchorages shall be sufficient.)

In the case of seats capable of being turned to or placed in other orientations, for use when the vehicle is stationary, these requirements shall apply only to those orientations
designated for normal use when the vehicle is traveling on the road.

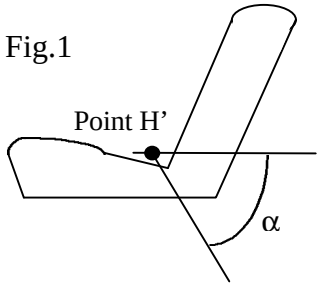
The belt anchorages for any one belt may be located either wholly on the vehicle structure or on the seat structure or any other part of vehicle or dispersed between these locations.

Any one-belt anchorage may be used for attaching the ends of two adjacent safety belts provided that the test requirements are met.
As for location of the lower belt anchorage, the angle (α: see Fig.1) shall be within the range shown below:

	M1 (°)
Front buckle side	45 - 80
other than buckle side	30 - 80
angle constant *	50 - 70
bench	buckle side: 45 - 80 other than buckle side: 30 - 80
adjustable seat with seat back angle < 20°	buckle side: 45 - 80 other than buckle side: 20 - 80
Rear	30 - 80
Front Center	see Front
Rear Center	see Rear
Folding Seat	No belt anchorages are required. If fitted, refer to the angle requirements for Front and Rear above.

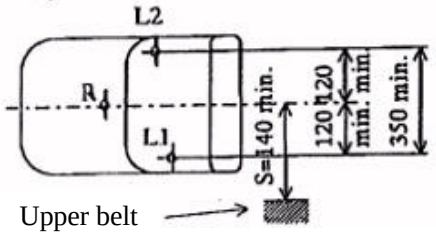
*: e.g. anchorage fixed at the seat.

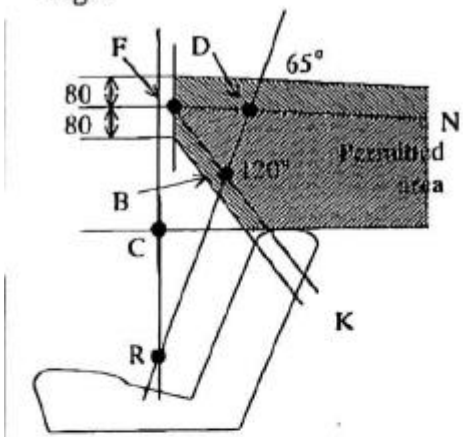
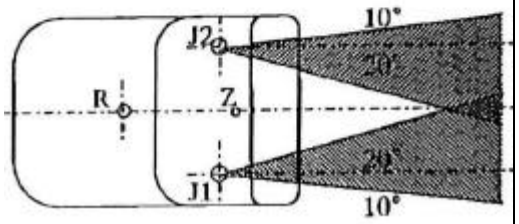
Fig.1



Note) Point H' is a reference point corresponding to H point which shall be determined for every normal position in which the seat is used.

Fig.2



(B-b : Structure of parts installed in vehicle)	The distance between the two lower belt anchorages of the same seat-belt shall not be less than 350 mm, and the median longitudinal plane of the seat shall be at least 120 mm from each anchorage (see Fig. 2). The upper anchorages shall be located (see Fig. 2 - 4): (1) below the plane FN, which runs perpendicular to the longitudinal median plane of the seat and makes an angle of 65° with the torso line at a point D such that DR= 315 mm + 1.8 S*. (however, when S ≤ 200 mm, then DR=675 mm.) This angle may be reduced to 60° in the case of rear seats. (2) behind the plane FK, which runs perpendicular to the longitudinal median plane of the seat and makes an angle of 120° with the torso line at a point B such that BR= 260 mm + S. Where S ≥ 280 mm, the manufacturer may opt to use BR=260 mm + 0.8S. (3) with S ≥ 140 mm (4) rear of R point (5) above a horizontal plane passing through point C, which is a point situated 450 mm vertically above the R point. (However, where S ≥ 280 mm and manufacturer chooses the formula "BR=260 mm + 0.8S", then CR=500 mm.) Additional upper anchorages may be provided if they: • comply with all requirements (1) to (5), as shown as ■ in Fig.3 or • can be used without the aid of tools, comply with requirements (4) and (5) and are located within 80 mm, vertically, of the area shown as ■ in Fig. 3. • as for the anchorages are for harness belt, comply with (5) if they lie behind the transverse plane passing through the reference line and are located within the area shown below: - single anchorage: two dihedrals given in Fig. 4. - two anchorages: within whichever of the above two areas is suitable, provided that each anchorage is not more than 50 mm distant from the other anchorage symmetrically located about the longitudinal median plane P of the seat.	Fig.3  * S is distance of the effective upper belt anchorages from the longitudinal median plane P of the seat. Fig.4 

C : Performance Requirements

C-a : Performance of parts

None.

C-b : Performance of parts installed in vehicle

When tested as below, the belt anchorages shall withstand the specified load for not less than 0.2 second. Permanent deformation, rupture or breakage, of any anchorage or surrounding area shall not constitute failure if the required force is sustained for the time given above.

Test condition

- The test may be carried out either on a vehicle structure or on a completely finished vehicle.
- Test may be restricted to only one seat or one group of the seats, if the anchorages concerned have the same structural characteristics as the others.
- All the belt anchorages of the same group of seats shall be tested simultaneously.
- Any fitting normally provided and likely to contribute to the rigidity of the vehicle structure may be fitted.
- The seats shall be placed in the position for driver or use to give the most adverse conditions with respect to the strength of the system.
- If the seat-back is adjustable, it shall be locked as specified by the manufacturer or, in a position corresponding to an effective seat-back angle as close as possible to 25°.

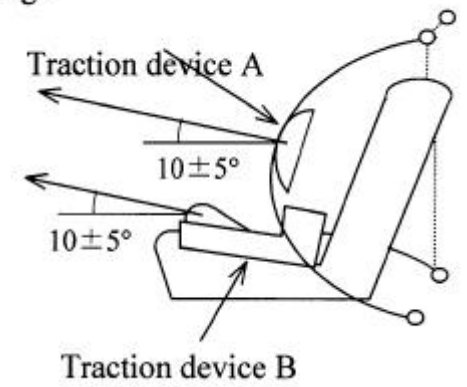
Belt anchorages for type A belt (shoulder and lap belt)

[TEST 1]

The following test load shall be applied to traction Devices A and B. (See Fig.5)

Vehicle Category	Upper belt anchorage	Lower belt anchorages
M1	135 ± 020 daN	135 ± 020 daN

Fig.5



(C-b :Performance of parts installed in vehicle)

• In case of the anchorage for a three point belt incorporating a retractor having a pulley or strap guide at the upper belt anchorage, a special pulley or guide for the wire or strap appropriate to transmit the load from the traction device A, or the pulley or strap guide supplied by the manufacturer, shall be fitted to the upper belt anchorage.

• For where the retractor is not attached to the required outboard lower belt anchorage or where the retractor is attached to the upper belt anchorage, the lower belt anchorage shall also be submitted to the following test.

[TEST 2]

The following test load shall also be submitted to the lower belt anchorages. (See Fig.6)

Vehicle Category	Lower belt anchorages
M1	2225 ± 20 daN

<u>The belt anchorages for type B belt (lap belt)</u>

The following test load shall be applied to a traction device B. (See Fig.6)

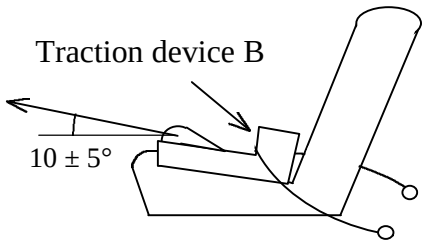
Vehicle Category	Lower belt anchorages
M1	2225 ± 20 daN

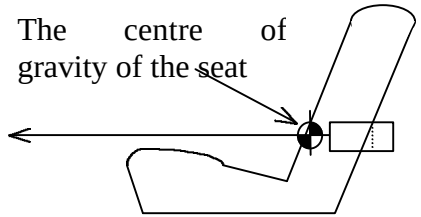
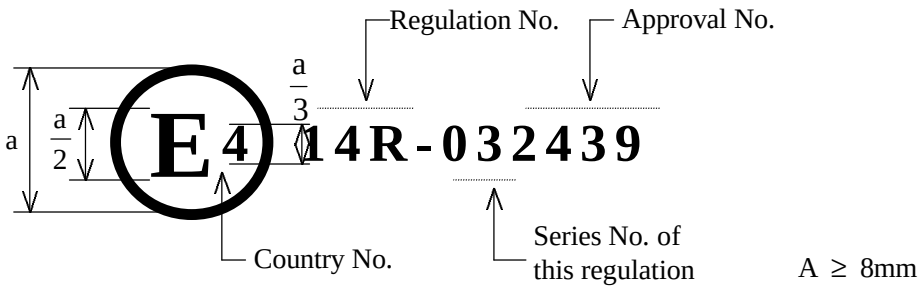
<u>The belt anchorages for special type belt</u>

If the number of anchorages is more than three, the following test load shall be applied
to a traction device attached to the belt anchorages of such a safety-belt.

Vehicle Category	Upper belt anchorage	Lower belt anchorages
M1	1350 ± 20 daN	1350 ± 20 daN

Fig.6



<table>
<tr>
<td>(C-b:Performance of parts installed in vehicle)</td>
<td>
<u>The belt anchorages located wholly within the seat structure or dispersed between the Structure and the seat structure</u>
The above tests shall be supplemented by the following force applied horizontally and longitudinally through the center of gravity of the seat: (See Fig.7)
<table>
<tr><th>Vehicle Category</th><th>Supplemental load</th></tr>
<tr><td>M1</td><td>the mass of the complete seat × 20</td></tr>
</table>
<u>Rearward-facing seats</u>
The following load shall be applied to the forward direction.
<table>
<tr><th>Vehicle Category</th><th>Three-pointed belt</th><th>Lap belt</th></tr>
<tr><td>M1</td><td>450 ± 20 daN</td><td>740 ± 20 daN</td></tr>
</table>
</td>
<td>Fig.7
 
</td>
</tr>
<tr>
<td>D:Label marking requirements</td>
<td>An international approved mark shall be affixed, conspicuously and in a readily Accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, placed close to or on the vehicle data plate affixed by the manufacturer.

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ITEM 96-12

Stop lamps

APEC Regulation Analysis Findings
Item No.96-12: Stop Lamps

* The U.S., Canada and Korea have regulation for stop lamps that are equivalent to FMVSS 108.

* Australia's regulation is equivalent to those of ECE R.7 (01 or 02 Series) and ECE R.48.

* New Zealand requires ECE/ADR/Japanese/FMVSS as alternatives.

* Other member economies provide only a small number of requirements that are often unique.

* A comparison by each requirement item is made as follows:

(1) Light Distribution (c-a-1): Australia, Canada, Indonesia, Japan, Korea, Chinese Taipei, Thailand, U.S. and ECE establish a specific limit value for light distribution, but these values are not harmonized among these member economies.

(2) Color (c-a-2): All member economies require a red color for the light of stop lamps.

(3) Illuminating surface area (c-a-3): Canada, Japan, Korea, Malaysia, Singapore and U.S. establish an area regulation, but these values required are not harmonized.

(4) Bulb power (c-a-4): Hong Kong, Japan, Malaysia and Singapore set forth a regulations, all ranging between 15W and 36W.

(5) Mechanical performance (c-a-5): Only the U.S. and Canada provide requirements concerning resistance against vibration, humidity, dust and corrosion. These requirements of the two member economies are harmonized with FMVSS 108.

(6) Visibility (c-b-1): Judgment criteria differ between the FMVSS type (specification of an illumination area value within a visible range), ECE type (specification of a light intensity value within a visible range), and Japan type (specification of simply a visible distance).

FMVSS type - Canada, Korea, U.S.
ECE type - Australia, Hong Kong, New Zealand, ECE
Japan type - Japan, Malaysia, New Zealand, Papua New Guinea

(7) Wiring (c-b-2): The U.S. and Canada provide a wiring requirement for the case where a direction indicator lamp and a stop lamp are combined. Australia, Japan, Korea, New Zealand, Philippines, Singapore, Chinese Taipei and ECE require the stop lamps to light up whenever the brakes are operated.

ITEM No. 96-12 Stop lamps

A: Application Passenger Car

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Australia	ADR 49 (40 to 100 cd)	Common (Red)			ECE R7 (General)	ADR 13 (45°L to 45°R 15°U to 15°D)	ADR 13
Brunei							
Canada	FMVSS 108 (80 to 300 cd)	Common (Red)	FMVSS 108 (50 cm² or more)		FMVSS 108 (Vibration, Moisture, Dust and Corrosion)	FMVSS 108 (12.5cm² at 45°)	FMVSS 108
China							
Hong Kong		Common (Red)		Unique (15W to 36W)		ECE R48 (45°L to 45°R 15°U to 15°D)	
Indonesia	Unique (Stronger than tail lamp)	Common (Red)					
Japan	SRRV 39 (5 times or more stronger than that of the tail lamp)	Common (Red)	SRRV 39 (20 cm² or more)	SRRV 39 (15W or more)		SRRV 39 (100m in day)	SRRV 39
Korea	FMVSS 108 (80 to 300 cd)	Common (Red)	Unique (22 cm² or more)			Unique (12.5cm² at 45° out ward)	Unique

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Malaysia		Common (Red)	Unique (30 cm² or more)	Unique (15W to 36W)		SRRV 39 (100m in day)	
New Zealand		Common (Red)				SRRV 39 & ECE R48 (100m in day 45°L to 45°R 15°U to 15°D)	
Papua New Guinea		Common (Red)				SRRV 39 (100m in day)	
Philippine		Common (Red)					Unique
Singapore		Common (Red)	Unique (60 cm² or more)	Unique (15W to 36W)			Unique
Chinese Taipei	Unique (Higher than tail lamp)	Common (Red)					Unique
Thailand	Unique (Brighter than tail lamp)						
U.S.A.	FMVSS 108 (80 to 300 cd)	Common (Red)	FMVSS 108 (50 cm² or more)		FMVSS 108 (Vibration, Moisture, Dust and Corrosion)	FMVSS 108 (12.5cm² at 45°)	FMVSS 108
ECE	ECE R7 (60 to 185 cd)	Common (Red)			ECE R7 (General)	ECE R48 (45°L to 45°R 15°U to 15°D)	ECE R48

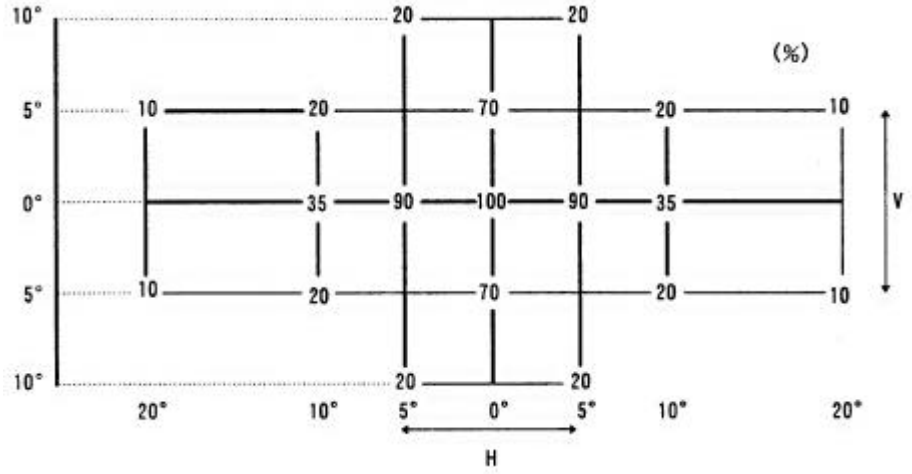
Economy : Australia

Title of Standard : ADR 49/00 and 13/00

A. Application :Moped, Motorcycle, Passenger vehicle, Goods vehicles and Trailers

C-a-1. Photometry :

	Minimum intensity (cd) (at H-V point)	Maximum intensity (cd)
Stop lamp	40	100



In detail, see ADR 49/00

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angles: 45°to the left and to the right

Vertical angles : 15° above and below

Throughout the field defined above, the intensity shall be not less than 0.3 cd.

C-b-2. Electrical Connection :

Must light up when the service brake is applied. The stop lamps need not function if the device which starts and/or stop the engine is in a position which makes it impossible for the engine to operate. The stop lamps may be activated by the application of a retarder or similar device.

Economy : Canada

Title of Standard : CMVSS No. 108
SAE J586 FEB84, SAE J1398 MAY85

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

TABLE1-PHOTOMETRIC REQUIREMENTS
(for motor vehicles less than 2032 mm in overall width)

Zone	Test Points (deg)	Minimum Luminous Intensity (cd) Lighted Sections		
		1	2	3
1	10U-5L 5U-20L 5D-20L 10D-20L	50	60	70
2	5U-10L H-10L 5D-10L	100	115	135
3	5U-V H-5L H-V H-5R 5D-V	380	445	520
4	5U-10R H-10R 5D-10R	100	115	135
5	10U-5R 5U-20R 5D-20R 10D-20R	50	60	70
Maximum Luminous Intensity (cd)		300	360	420

In detail, see SAE J586 FEB84

TABLE2-PHOTOMETRIC REQUIREMENTS

(for motor vehicles less than 2032 mm in overall width)

Zone	Test Results (deg)	Minimum Luminous Intensity Total for Zone (cd)
1	10U-5L 5U-20L 5D-20L 10D-20L	50
2	5U-10L H-10L 5D-10L	100
3	5U-V H-5L H-V H-5R 5D-V	380
4	5U-10R H-10R 5D-10R	100
5	10U-5R 5U-20R 5D-20R 10D-20R	50
Minimum Luminous Intensity (cd)		300

In detail, see SAE J1398 MAY85

C-a-2. Color : Red

C-a-3. Luminous Area :

Functional lighted lens area shall be at lest 50 cm^2 for motor vehicles less than 2032 mm in overall width, and at least 75 cm^2 for motor vehicles 2032 mm or more in overall width.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility :

Signals from lamps on both sides of the vehicles shall be visible through a horizontal angles of 45 deg to the left and to 45 deg to the right. To be considered visible, the lamp shall have the outer lens surface of at least 12.5cm².

C-b-2. Electrical Connection :

When a stop lamp is optically combined with a direction indicator lamp, the circuit shall be such that the stop lamp can not be turned on if the direction indicator lamp is flashing.

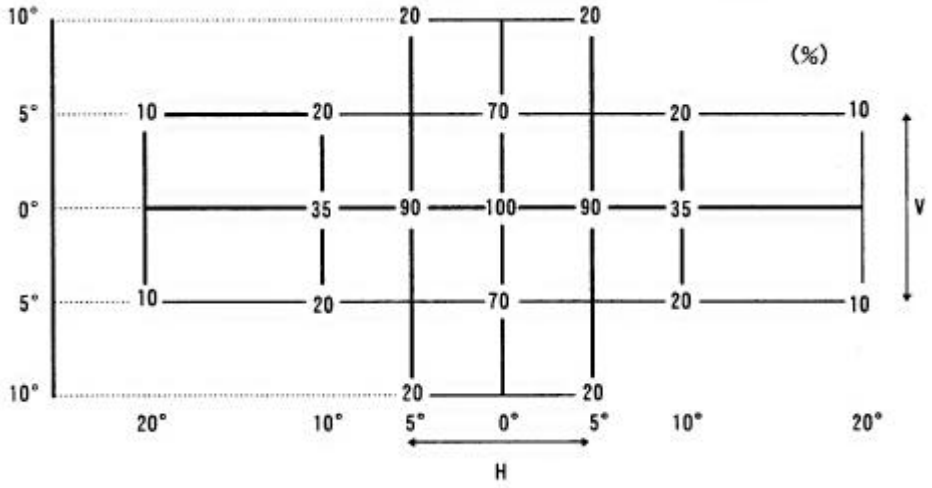
Economy : China

Title of Standard : GB 5920-94

A. Application : Vehicles and Trailers

C-a-1. Photometry :

	Minimum intensity (cd) (at H-V point)	Maximum intensity (cd)
Stop lamp	40	100



C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : 21W (Category : P21W for stop lamp, and
P21/5W and P21/4W for Tail & Stop lamp)

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Horizontal angles: 45° to the left and to the right

Vertical angles : 15° above and below

Throughout the field defined above, the intensity shall be not less than 0.3 cd.

C-b-2. Electrical Connection :

Must light up when the service brake is applied. The stop lamps need not function if the device which starts and/or stop the engine is in a position which makes it impossible for the engine to operate. The stop lamps may be activated by the application of a retarder or similar device.

Economy : Hong Kong

Title of Standard : Road Traffic Regulation No. 115

A. Application : N/A.

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : Not less than 15 W nor more than 36W in total of all bulbs

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Horizontal : 45° to the left and to the right

Vertical : 15° above and below

C-b-2. Electrical Connection : N/A.

Economy : Indonesia

Title of Standard : Government Regulation No. 44/1993-29,33

A. Application : Motorcycle, passenger cars, buses, cargo vans and special vehicles

C-a-1. Photometry : Stop light shall be stronger that rear position light.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : Japan

Title of Standard : Safety Regulation of Road Vehicles, Article 39
Motor Vehicle Inspection Procedures, 4-29

A. Application : Vehicles

C-a-1. Photometry :

As for a stop lamp in combination with a tail lamp, the luminous intensities of stop lamp shall be 5 times or more those of tail lamp.

C-a-2. Color : Red

C-a-3. Luminous Area : 20 cm^2 or more

C-a-4. Bulb Wattage : 15 W or more

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Visibility distance in day time shall be 100 m.

C-b-2. Electrical Connection :

Stop lamp shall be so wired that it may be turned on only when the service brake system or the auxiliary brake system is operated.

Economy : Korea

Title of Standard : The regulation of the motor vehicle safety standards (KMVSS),
Article 43, 78 and 106

A. Application : Motor vehicles and two-wheeled motorcycles

C-a-1. Photometry :

<motor vehicle>

Not less than 40cd but not more than 420cd

* Type approval test standards for motor vehicles

(1) Maximum intensity (cd)

One-lamp Type	Two-lamp Type	Three-lamp Type
300	360	420

(2) Minimum intensity (cd)

Test Point (deg)	One-lamp Type	Two-lamp Type	Three-lamp Type
20L-5U 5L-10U 5L-10D 20L-5D	52.0	61.6	71.4
10L-5U 10L-H 10L-5D	100.0	118.7	137.4
H-5L H-V H-5R V-5U V-5D	380.0	451.2	522.4
10R-5U 10R-H 10R-5D	100.0	118.7	137.4
20R-5U 5R-10U 5R-10D 20R-5D	52.0	61.6	71.4

(3)If the stop lamp is combined with other lamps, when activated, the luminous intensity at each test point on H-V, H-5L, H-5R, 5U-V as specified in Item 2 shall be not less than 5 times the minimum luminous intensity, the luminous intensity at other test points, 3 times the minimum luminous intensity.

<Two-wheeled motorcycle>
Not less than 10 cd but not more than 420 cd

C-a-2. Color : Red

C-a-3. Luminous Area : Effective projected luminous area shall not less than 22 cm^2.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :
The illumination area shall be not less than 12.5 cm^2 when measured at 45°outward on the horizontal.

C-b-2. Electrical Connection :
Stop lamp shall be activated upon application of the service brake and in the steady-burning state until removal of braking.

Economy : Malaysia

Motor Vehicles (Construction and Use) Rules, 1959-26

A. Application : Motor vehicle and trailer

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : 30 cm^2 Min.

C-a-4. Bulb Wattage : Not less than 15 watts and not more than 36 watts.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Stop lamp shall be clearly visible during day time in clear weather from a distance of at least 100 m.

C-b-2. Electrical Connection : N/A.

Economy : New Zealand

Title of Standard : Transport Regulations 1990, No. 18
Traffic Regulations 1976, No. 61

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :
Visibility distance in day time shall be 100 m through the following angles;
Horizontal : 45° to the left and to the right
Vertical : 15° above and below

C-b-2. Electrical Connection : N/A.

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulation, No. 99

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : Visibility distance in day time shall be 100 m.

C-b-2. Electrical Connection : N/A.

Economy : Philippines

Title of Standard : Motor Vehicle Inspection System (A0-91-005), Section 8

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Stop lamp shall be so wired that it may be turned on only when the service brake system of the vehicle is applied.

Economy : Singapore

Title of Standard :

Road Traffic (Motor Vehicles, Construction and Use) Rules, No. 30 and 31.

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : 60 cm^2 Min.

C-a-4. Bulb Wattage :

- Not less than 25W or not more than 50W for a public service vehicle and a goods vehicles
- Not less than 15W or not more than 36W for other vehicles

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Stop lamp shall be operated by the application of the brakes of a braking system of the motor vehicle.

Economy : Chinese Taipei

Title of Standard : Road Traffic Safety Standard, Article 39 Section 12 Annex 7

A. Application : Motor vehicle

C-a-1. Photometry : The intensity of stop lamp shall be higher than that of rear position lamp.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Stop lamp shall be activated in the steady-burning state upon application of the service brake, and shall not be flashed.

Economy : Thailand

Title of Standard : Ministerial Regulations No.22

A. Application : Motor vehicle and Trailer

C-a-1. Photometry :

If stop lamps are housed in the same unit as tail lamps, they shall be brighter than the tail lamps.

C-a-2. Color : N/A.

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : U.S.A.

Title of Standard : FMVSS No. 108
SAE J586 FEB84, SAE J1398 MAY85

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

TABLE1-PHOTOMETRIC REQUIREMENTS
(for motor vehicles less than 2032 mm in overall width)

Zone	Test Points (deg)	Minimum Luminous Intensity (cd) Lighted Sections 1	2	3
1	10U-5L 5U-20L 5D-20L 10D-20L	50	60	70
2	5U-10L H-10L 5D-10L	100	115	135
3	5U-V H-5L H-V H-5R 5D-V	380	445	520
4	5U-10R H-10R 5D-10R	100	115	135
5	10U-5R 5U-20R 5D-20R 10D-20R	50	60	70

Maximum Luminous Intensity (cd)	300	360	420

In detail, see SAE J586 FEB84

TABLE2-PHOTOMETRIC REQUIREMENTS

(for motor vehicles less than 2032 mm in overall width)

Zone	Test Results (deg)	Minimum Luminous Intensity Total for Zone (cd)
1	10U-5L 5U-20L 5D-20L 10D-20L	50
2	5U-10L H-10L 5D-10L	100
3	5U-V H-5L H-V H-5R 5D-V	380
4	5U-10R H-10R 5D-10R	100
5	10U-5R 5U-20R 5D-20R 10D-20R	50
Minimum Luminous Intensity (cd)		300

C-a-2. Color : Red

C-a-3. Luminous Area :

Functional lighted lens area shall be at lest 50 cm^2 for motor vehicles less than 2032 mm in overall width, and at least 75 cm^2 for motor vehicles 2032 mm or more in overall width.

C-a-4. Bulb Wattage : N/A

C-a-5. Mechanical :

Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility :

Signals from lamps on both sides of the vehicles shall be visible through a horizontal angles of 45 deg to the left and to 45 deg to the right. To be considered visible, the lamp shall have the outer lens surface of at least 12.5cm².

C-b-2. Electrical Connection :

When a stop lamp is optically combined with a direction indicator lamp, the circuit shall be such that the stop lamp can not be turned on if the direction indicator lamp is flashing.

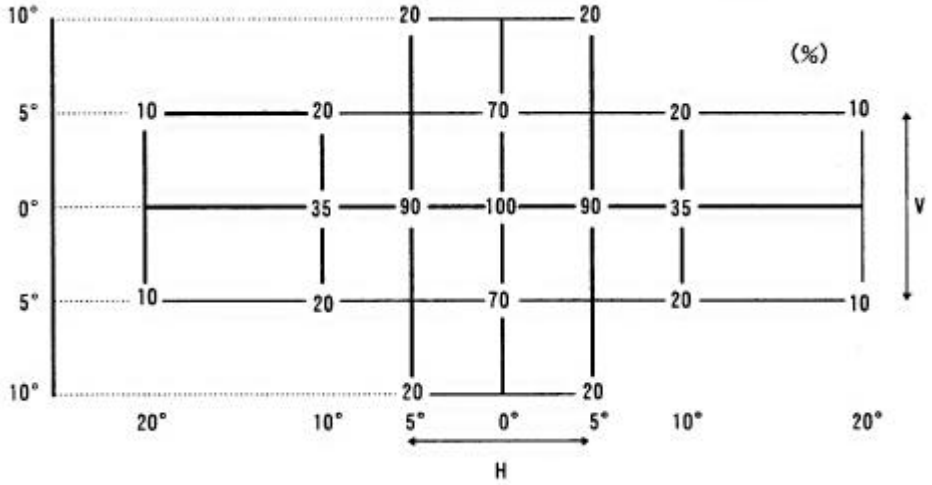
Economy : ECE

Title of Standard : ECE Regulation No. 7, 02 series, and No.48, 01 series

A. Application : N/A

C-a-1. Photometry :

	Minimum intensity (cd) (at H-V point)	Maximum intensity (cd)
Stop lamp	60	185



In detail, see ECE Reg. No.7

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angles: 45° to the left and to the right

Vertical angles : 15° above and below

Throughout the field defined above, the intensity shall be not less than 0.3 cd.

C-b-2. Electrical Connection :

Must light up when the service brake is applied. The stop lamps need not function if the device which starts and/or stop the engine is in a position which makes it impossible for the engine to operate. The stop lamps may be activated by the application of a retarder or similar device.

ITEM 96-13

Child restraint system

APEC Regulation Analysis Findings
Item No. 96-13: Child restraint system

1. Australia provides an anchor and anchor-fitting requirement.

2. Australia does not have compulsory specifications for the CRS.

3. Only Canada, Japan, U.S. and ECE apply requirements for the CRS itself.

4. As a whole, CRS regulations are widely varied in the APEC region, although there are similar specific requirements.

5. A comparison of specific requirements for CRSs is as follows:

(1) Mass group - Japan and ECE divide CRSs into 4 groups according to the weight of the applicable child, and the weight limits for these groups are identical. On the other hand, the U.S. and Canada does not apply such grouping. The U.S. sets the upper limits of child weight, but Canada does not do so.

(2) Seat back height - Japan and the U.S. specify nearly identical seat back heights of CRSs according to child weight. ECE specifies the lower limits of seat back height only for Groups I and II. Canada does not have any specifications for seat back height.

(3) Crotch strap - Japan, U.S., Canada and ECE all require a crotch strap for the CRS and this happens to be the only common requirement among the quartet.

(4) Tether strap - Only Canada requires tether straps.

(5) Buckle pushbutton area - Canada and Japan do not specify any buckle pushbutton area. The U.S. and ECE adopt distinct specifications for the area (ECE sets forth-different area specifications for different pushbutton types).

(6) Flame resistance - Japan, U.S. and Canada apply requirements for the CRS's flame resistance.

(7) Installations on the vehicle - Australia, Japan and the U.S. have some common requirements. But ECE specifies anchorage installation methods for different CRS categories. Canada provides an installation requirement for rearward-facing CRSs.

(8) Webbing strength - All member economies require webbing strength to remain 75% or more of the initial strength. But they cannot be considered as identical requirements because their pre-test conditioning requirements are different. Japan and the U.S. are identical in requiring only a wear resistance test using a hexagonal rod. But ECE requires light, heat, water and low-temperature resistance tests as well.

(9) Adjustment hardware - The U.S. and Canada have requirements for heat and corrosion resistance. ECE applies a unique microslip and adjustment hardware requirement, but does not have resistance requirements. Japan provides no specifications for adjustment hardware.

(10) Dynamic test / buckle release force - The U.S. and Canada specify 70N, ECE adopts unique 60N, but Japan does not have any specification for buckle release force.

(11) Dynamic test / injury criteria - Injury evaluation items differ among member economies. Canada and ECE apply only chest acceleration, but their chest acceleration limit values are different. Although Canada, U.S. and Japan require the chest acceleration to be less than 60G, Japan evaluates head safety in terms of acceleration while the U.S. in terms of HIC. Overall, the regulations of member economies are varied with regard to dynamic tests and injury criteria.

(12) Dynamic test / displacement - Member economies have their own requirements. For example, although both Japan and the U.S. restrict the displacement of the head and knees, their displacement limit values are different. Canada restricts only head displacement. ECE is unique in that it restricts head displacement in terms of area (i.e., horizontal and vertical displacement).

(13) Labeling - Member economies have their unique labeling requirements (Japan does not have one). Canada requires the use of both English and French in the label. The U.S. and ECE both demand the labeling of a warning as to a danger to rearward-facing CRSs in the event of air bag inflation. Further, the U.S. requires that the maximum permissible weight and height of a child be indicated for each CRS model. ECE requires the maximum limit weight to be indicated for forward/rearward-facing dual type CRSs.

Item No. 96-13 Child Restraint Systems

A: Application Passenger

Member Economies	b-a-1; Mass Group	b-a-2; Height of seatback	b-a-3; Crotch strap	b-a-4; Tether strap	b-a-5; Buckle push button	b-a-6; Flammability
Australia	ADR 34 provides the requirements for anchor and anchor fitting, not for child restraint systems. AS 1754 is requirement for restraints					
Brunei						
Canada			Common (required)	Unique (CMVSS 213) (required)		FMVSS 302 *3
Chile						
China						
Hong Kong						
Indonesia						
Japan	SRRV22-5 (4 groups)	SRRV22-5(similar MVSS 213) (by mass group) *1	Common (required)		SRRV22-5 (Area; not required)	SRRV22-5 *4 (similar MVSS 213)
Korea						
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
United States	FMVSS 213(No group) (for not more than 22.7kg)	FMVSS 213(similar SRRV) (by mass group) *2	Common (required)		FMVSS 213 (Area; 3.9cm²≤)	FMVSS 302 *3 (similar SRRV)
ECE	ECE 44 / SRRV22-5 (4 groups)	ECE 44 (not less than 500mm only for Group I, II)	Common (required)		ECE 44 (Area; enclosed type :4.5cm²≤ not-enclosed:2.5cm²≤)	

Member Economies	b-b-1; Installation in vehicle	c-a-1; Strength of webbing	c-a-2; Adjustment hardware	c-a-3; After dynamic test Buckle release force	c-a-3; After dynamic test Injury criteria	c-a-3; After dynamic test Displacement
Australia	ADR 34 provides the requirements for anchor and anchor fitting, not for child restraint systems.					
Brunei						
Canada	Unique(CMVSS 213) (Rear-facing;using byType 1 S/B)	Unique (similar FMVSS 209) (Common - 75%<)	FMVSS 209	FMVSS 213 (not more than 70N)	Unique (CMVSS 213) (Chest G < 60G)	Unique (CMVSS 213) (Head: <720mm)
Chile						
China						
Hong Kong						
Indonesia						
Japan	SRRV22-5 *5 (similar MVSS213)	SRRV22-5 (similar FMVSS 209) (Common - 75%<)			SRRV22-5 (Head<80G, Chest<60G)	SRRV22-5 (Head<600mm, Knee<700mm)
Korea						
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
United States	FMVSS 213 *6 (similar SRRV)	FMVSS 209(similar SRRV) (Common - 75%<)	FMVS 209 (Corrosion and temperature resistance)	FMVSS 213 (not more than 70N)	FMVSS 213 (HIC<1000, Chest <60G)	FMVSS 213 (Head<813, Knee pivot<914mm)
ECE	ECE 44 *7 (different by categories)	ECE 44 (Common - 75%<)	ECE 44*8 (Adjustment force, microsplip only)	ECE 44 (not more than 60N)	ECE 44 (Chest only) Chest G < 55G	ECE 44 (Head: Limited by area)

Member Economies	d; Label	e; Equivalent standard
Australia	ADR 34 provides the requirements for anchor and anchor fitting, not for child restraint systems.	
Brunei		
Canada	Unique(CMVSS 213) Letters in English & French	
Chile		
China		
Hong Kong		
Indonesia		
Japan		
Korea		
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States	FMVSS 213 *9	
ECE	ECE 44 *10	

Details of requirements marked *

*1: SRRV 22-5 (Height of seat back)	Weight {kg}	Height {mm}
	W1; Less than 10kg	'--- 450
	W2 ; 9--18kg &W3; 15--25kg	'--- 500
	W4; 22 -- 36kg	'--- 550
*2: FMVSS 213 (Height of seat back)	Weight (lbs){kg}	Height (inch){mm}
	Less than 20{9.1}	'--- 18 {457}
	20 or more, but more than 40{9.1•`18.1}	'--- 20 {508}
	More than 40{18.1}	'--- 22 {559}

*3: FMVSS 302 (Flammability)
*Applied area: Any portion of a single or composite material which is within 1/2 inch(1.3cm) of the occupant compartment air space.
*The subject material shall not burn, nor transmit a flame front across its surface, at a rate of more than 4 inches(10cm) per minute.

*4: SRRV 22-5 (Flammability)
*Shall meet the requirements of "Technical standard for Flame-resistant Interior materials for Motor vehicle".
-- Applied area of 'Interior materials of driver's compartment' is not specially defined by dimension, however except for those materials less than 293mm in length or less than 25mm in width.
-- Shall comply with one od the following requirements given below.
(1) Shall not burn
(2) The maximum rate (60¥distance / Time(sec.)) shall not exceed 100mm/min.
(3) The burning of the test specimen stops before a duration of 60 seconds has elapsed after the flame reached the index line A and the the length of portion of the test specimen that has burnt after the flame reached the index line A is less than 50mm.

*5: SRRV 22-5 (Installation in vehicle)
*Not be hung on the seatback of the vehicle. Nor shall or part of the leg of the CR be inserted into the gap between the seat cushion and the seatback of the vehicle.
*For the bed for babies, restraining or retaining a baby in a direction perpendicular to the forward movement of the vehicle.
*A protector or a third party to rescue the child readily in the event of emergency.

Details of requirements marked *

*6: FMVSS 213 (Installation in vehicle)	*Add-on CRS shall have no means designed for attaching the system to a vehicle seat cushion or vehicle seat back and no component (except belts) that is designated to be inserted between the vehicle seat cushion and vehicle seat back.
*7: ECE44 (Installation in vehicle)	*For the "Universal" and Restricted" categories, only by means of an adult safety-belt meeting the requirements of Reg.No.16 (or equivalent) fitted to anchorages meeting the requirements of Reg.No.14 (or equivalent) *For the "Semi-universal" category: by means of the lower anchorages prescribed in Reg.No.14 and additional anchorages meeting the recommendation. *For the "Specific vehicle" category: by means of the anchorages designed by manufacturer of the vehicle or the manufacturer of the vehicle or the manufacturer of the child restraint. *Booster cushion must be restrained by either an adult or by separate means.
*8: ECE 44 (Adjustment hardware)	*The force required to operate a manual adjusting device shall be exceed 50N. *In a micro slip test, the amount of strap slip shall not exceed 25mm for one adjusting device or 40mm for all adjusting devices.
*9: FMVSS 213 (Label)	*The statement: "This CRS conforms to all applicable FMVSS." *Manufacturer's recommendation for the maximum mass and height of children who can safely occupy the system. *Various attentions to be paid by types of CRS. (Means of installation, a warning for rear-facing CRS against passenger airbag, etc.) *The statement : Must register the restraint and a purchaser's name / address so as to be contacted when recalled.
*10: ECE 44 (Label)	*One of the parts made of plastics of the child restraint device shall be marked clearly (and indelibly) with the year of production. *Warning for rear-facing seat against a passenger airbag should be included in a manner the t it is visible in installed position. *For CRS designed for installing forward -facing and rear-facing, the weight of child occupied in it to be restricted should be described.

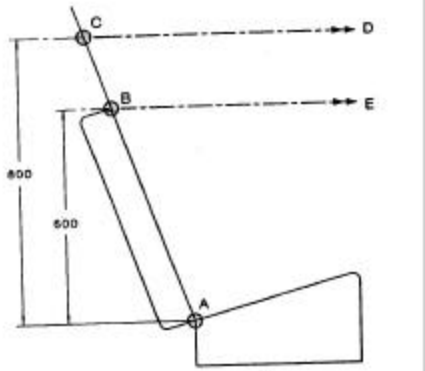
ITEM 96-13 Child restraint system

AS / NZ 1754-1995		
Item	Abstract	Figures & Supplementary explanation
A; Scope	This standard specifies requirements for restraining devices for child occupants of passenger car and their derivatives (This does not cover child restraints which are an integrated feature of motor vehicles.) <Type designation> Type A1 - rearward-facing restraint with a harness or other means of retaining the occupants, suitable for infants whose mass is up to 9Kg, and spine length is up to 700mm. Type A2 - transversely installed type of the same restraint system as above. Type B - forward-facing chair with harness, suitable for children whose mass is within the range 8kg to 18kg. Type C – forward-facing harness without chair, suitable for children whose mass is within the range 14kg to 32kg. Type D – rearward-facing harness without chair, suitable for children whose mass is within the range 8kg to 18kg. Type E – a restraint consisting of either. (i) a booster seat or a cushion used in conjunction with a Type C child restraint or an adult lap-sash belt, suitable for children whose mass is in the range 14kg to 26kg or (ii) a booster seat used in conjunction with a Type C child restraint or an adult lap-sash seat belt suitable for children in the range 14 to 21kg; or (iii) a converter suitable for children in the mass range 18 to 32kg.	
B-a-1; Webbing	*As indicated in AS 1753/NZ 5432, shall meet the requirements of Class B, Class C, or Class D. *The end of any webbing shall be treated to prevent unraveling .	Class B – 23mm – 34mm Class C – 34mm – 46mm Class D – 46mm – 76mm
-2: Metal parts or coated metal parts.	*When exposed for not less than 50h to salt spray, shall show no significant evidence of base metal corrosion, or of blistering of the coating, and shall be operational.	
-3: Flammability	*All fabrics, including coated fabrics, padded composite materials, trimmings and attachment, but excluding webbing, shall comply with the requirements of flammability.	

ITEM 96-13 Child restraint system

AS / NZ 1754-1995		
Item	Abstract	Figures & Supplementary explanation
-4: Toxicity	*Any part of material which can be reasonably expected to be mouthed or sucked by a child in the restraint, shall comply with the requirements of AS 1647.3 (General, coating materials, plastics materials, graphic materials)	
-5: Plastics stabilization	*Plastics used in main load- bearing moldings shall be stabilized against UV and thermal degradation. *The child restraint should weigh not more than 9kg.	
-6: System	*Any child restraint recline mechanism shall incorporate a self-locking device.	
-7: Crotch strap	*Any crotch strap shall be designed and located so that it does not load the genital region of the child in a frontal impact.	
-8: Quick-release device (Buckle)	*with the exception of Type E, the CR shall include a quick-release device. *when a buckle is use as the quick-release device, Actuation surface---Not less than 350mm2, Every width---Not less than 15mm Single pressing operation shall permit the components of the device to disengage. The colour of the actuation surface shall be red or orange. The colour of the external surfaces of the device, other than the actuation surface, shall not be red and orange. The buckles shall not have a potential for inadvertent release by the vehicle occupants.	
-9: Finish	*Any accessible sharp edge or sharp point shall not be a hazardous sharp edge or a hazardous sharp point *Any component of the child restraint which is designed to be removed from the child restraint shall not present an ingestion or inhalation hazard. *Any projection which is able to be grasped with the thumb and forefinger or the teeth of a child shall be attached to the CR in a manner that prevents the components being removed or broken in the torsion and tension test.	
-10: Others	*Any restraining harness shall have not less than three point of attachment. *The length of the upper anchorage strap shall be adjustable. *Parts normally in contact with the wearer or other occupants shall not cause staining or discoloration of clothing.	

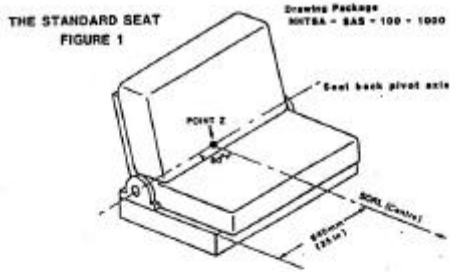
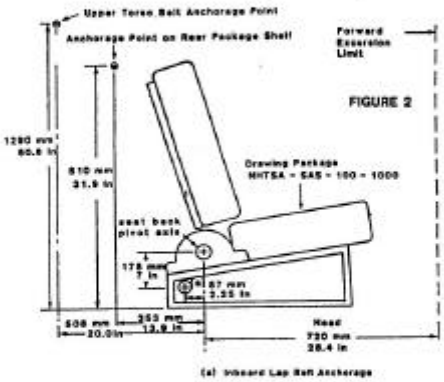
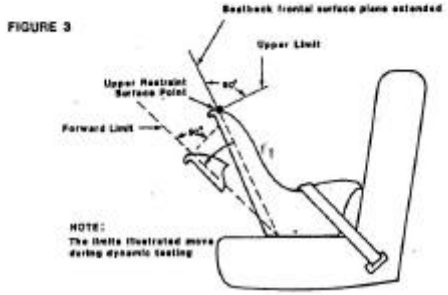
ITEM 96-13 Child restraint system

AS / NZ 1754-1995		
Item	Abstract	Figures & Supplementary explanation
B-b-1: Adjustment for installation	*The restraint system shall have adequate adjustments for fitment to every vehicle model and seating position for which it purports to be suitable. Adjustment shall be accomplished without the use of tools.	
-2: Anchorage system	*Except for Type E, the upper portion of the CR shall be designed to be attached to be the vehicle through an upper anchorage strap and fitting which shall be provided with the CR. *The lower portion of the CR shall be designed to be attached to the vehicle through an adult seat belt.	
C-a-1: Durability of components	*Parts which side, roll over, or engage in each other should have sufficient resistance to wear to remain effective after 5000 operations.	
-2: Adjusters	*Tilt-lock adjustment device shall lock at an angle of not less than 25 degrees when tested in accordance with AS 2597.7. *Slip adjusters, excluding energy absorbing devices, shall restrict slip at any load-carrying part to 25mm and the total slip at all parts to 50mm.	
-3: Quick-release device	*The average initial force required to operate the release actuator and that after 5000 operations shall be not less than 40N and not more than 80N.	
-4: Dynamic performance	*The CRS shall retain the dummy in the CR and shall retain the CR, including any additional parts, in the testrig. *There shall be no evidence of complete separation of any load-carrying part or parts and no fragmentation of any rigid components. *The test dummy shall be able to be released by the operation of the quick-release device with a force of less than 10N. *The resultant head deceleration for Type A1, A2 and D shall not exceed 150g. *The dummy's head shall remain within the area bounded shown in the figure 4.1. Type A1: AC, CD Type A2: AB, BE Type D : AC, CD *Booster cushions or booster seats of Type E shall not become dislodged sufficiently to compromise the restraint seating position of the test dummy.	 FIGURE 4.1 EXCURSION LIMITS

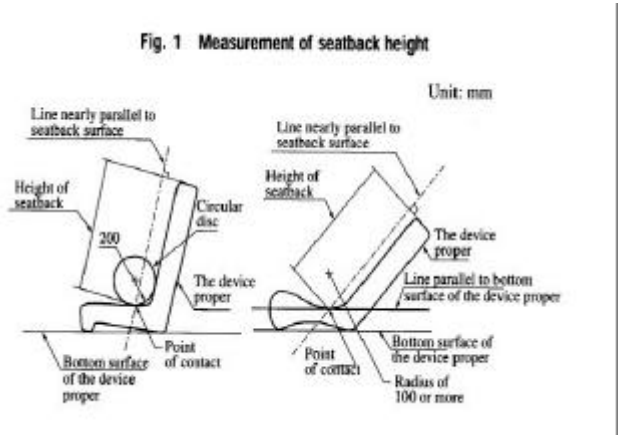
ITEM 96-13 Child restraint system

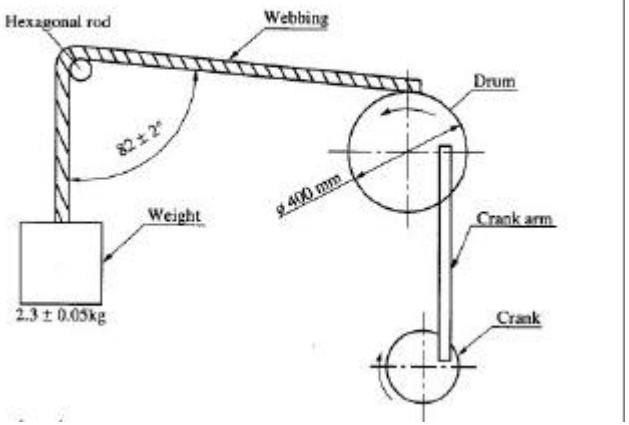
AS / NZ 1754-1995		
Item	Abstract	Figures & Supplementary explanation
	*Self-locking device shall not release from any position in the dynamic test. *When tested in accordance with AS/NZS 3629.2, Type B and D child restraint which do not have a crotch strap or leg straps shall no evidence of hazardous throat contact having occurred. *When tested in accordance with AS 3629.4/NZS5466.3, there shall be no evidence of complete separation of any load-carrying part or parts and no fragmentation of any rigid components. *The force exerted on the top anchorage strap during dynamic testing should be not more than 7kN.	

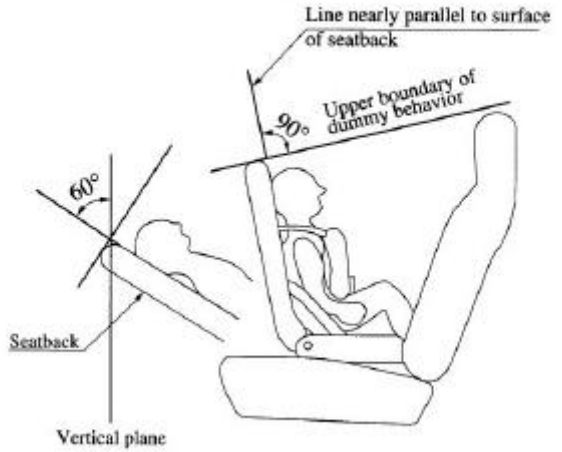
CMVSS 213		
Item	Abstract	Figures & Supplementary explanation
B-a-1; Mass group	No group	
B-a-2; Height of seatback -3 ; Crotch strap -4; Tether strap -5; Buckle push button -6; Flammability	*If the target point of the head of dummy is not below a horizontal plane tangent to the top of the seat, shall provide restraint against rearward movement of the head the child by means of a continuous seat back that satisfies the following requirements. has a height of at least 500 mm {20 in} from the lowest point on the seating surface has a width of at least 150mm {5.9in} in the horizontal plane at the height specified *Front-facing CRS shall have a crotch restraint. *Tether strap shall be fitted with any tether hook whose anchorage hardware attachment dimensions conform to those illustrated in Figure 4. *The area is not specified. *Each material used in a CRS shall conform to the requirements of section 302.	
B-b-1; Installation in vehicle	*Rear-facing CRS shall be installed by means of Type 1 seat belt only.	
C-a-1; Strength of webbing -2; Buckles, adjustment hardware	*(Resistance to abrasion*) [Test] CMVSS 209 [Requirement] Shall have a breaking strength of not less than 75% of the strength of the unbraided webbing. *Shall meet the requirements of CMVSS 209(7)(h)~ (k). [Resistance to light, micro-organisms, crock and stains] (*Width*) *Shall have a width of not less than 38 mm {1.5 in } when a force of 22 kN for Type 1 or 9.8 kN for Type 2 is applied. *Meet the requirements of FMVSS 209 (Corrosion , Temperature resistance).	

-3; Dynamic requirements	[Test] Speed : 48 km/h { 30 mph } [Requirement] *Shall release when a force of not more than 71N is applied after test. <*Forward-facing seat*> *Not allow the angle between the system's back and the seating surface to be less than 45°. <*Injury Criteria*> *Resultant acceleration of upper thorax shall not more than 60G (cumulative duration is not more than 3ms)	
	<*Occupant excursion*> *CRS other than rear-facing ones and car beds shall not allow any portion of the dummy's head to pass through the vertical transverse plane that is 720mm{28.4 in} forward of point Z on the seat (Fig.1, 2) *Rear-facing CRS shall not allow all portions of the test dummy's and torso shall be retained within the confines of the system and the either side of head to pass through the transverse orthogonal planes whose intersection contains the forward-most and top-most points. (Fig.3) <*Back support angle*> *For a rear-facing CRS, the angle between the system's back and the vertical on the plane, measured 240mm above the seat surface shall not 70°. <*Head impact protection*> *Except for protrusions that comply with the specified limit, the surface which is contactable by the dummy head shall be covered with slow recovery, energy absorbing material with the following characteristics: 1)In the 25% compression -deflection test, shall have a resistance of not less than 0.5 lbs/in^2 and not more than 10 lbs/in^2 2)A thickness of not less 1/2 in for materials having the 25 % resistance of not less than 1.8 lbs/in^2 and not more than 10 lbs/ in^2 *Materials having the 25% resistance of less than 1.8 lbs/in shall have a thickness not less than 3/4 in	 
D; Label	*Letter: English and French *Model name or number of the system *Manufacturer (or Distributor) *Month and year of manufacture *Place of manufacture (or Distributor) *The statement: "This CRS conforms to all applicable CMVSS."	

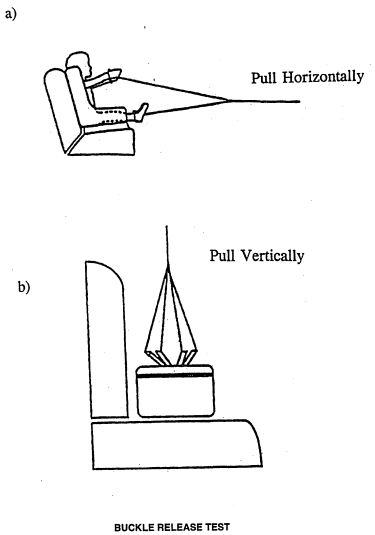
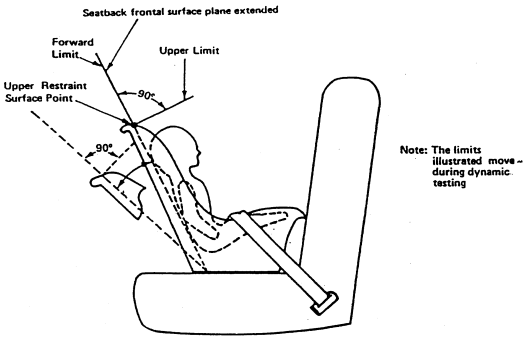
	*Manufacturer's recommendations for the maximum mass and height of children who can safely occupy the system. *Various attentions to be paid by types of CRS. (Mean of installation etc., but not including a warning for rear-facing CRS against passenger airbag etc.)	
E; Equivalent standard	Not applicable	

TYPE APPROVAL STANDARD FOR CHILD RESTRAINTS (JAPAN); Chigi Circular No.287 of December 28, 1995		
Item	Abstract	Figures & Supplementary explanation
B-a-1; Mass group	According with the range of body weights of applicable children W1; Less than 10 kg ---- capable to restrain or retain an infant in the rearward direction W2; 9 and 18 kg W3; 15 and 25 kg W4; 22 and 36 kg	
B-a-2; Height of seatback -3; Crotch strap -4; Tether strap -5; Buckle push button -6; Flammability	W1 450 mm W2 and W3 500 mm W4 550 mm Not required. Its push-button section shape and dimension enables a protector or a third party to push it readily. The surface of the push-button shall be colored red or the operating method shall be indicated by letters on the push-button. Shall meet the requirements of “Technical standard for Flame-resistant Interior materials for Motor vehicle”.	
B-b-1; Installation in vehicle	Shall be constracted so that it can satisfy the followings. *Secured installed or removed readily from the seat of the motor vehicle by means of the vehicle seat belt.	

	* Not be hung on the seatback of the vehicle. Nor shall or part of the leg of the CR be inserted into the gap between the seat cushion and the seatback of the vehicle. *For the bed for babies, restraining or retaining a baby in a direction perpendicular to the forward movement of the vehicle. *Restraining or retaining a child in place in the device. A protector or a third party to rescue the child readily in the event of emergency. *Not as to damage the seat or the seat belt of the vehicle concerned.	
C-a-1; Webbing of child belt	<*Width*> [Test] When subjected to 20N{2 kgf} of tensile strength longitudinally, measure it. [Criteria] W1 and W2 ; not less than 25 mm W3 and W4 ; not less than 38 mm <*Tensile strengh*> [Test] Distance between clamps; 200+/-20 mm, Speed; 100 mm/min. [Criteria] W1 and W2 ; not less than 3.6 kN{370 kgf} W3 ; not less than 5.0 kN{510 kgf} W4 ; not less than 7.3 kN{740 kgf} <*Wear-resistance*> [Test] Repeat speed; 30+/-1 cycles /min., Stroke; 330+/-30 mm, Cycles; 2,500 [Criteria] not less than 75% of the value prior to the test.	Fig. 2 Wear-resistant testing apparatus using a hexagonal rod 
-2; Adjustment attachments	Not required.	
-3; Dynamic requirement	[Test] Test speed ; 50+0/-2 km/h [Criteria] No bearing part shall be broken. There shall be no such harmful cracks, deformation and so forth which might injure a child. The buckle shall remain engaged. The device proper shall not be ejected from the seat belt. For bed for babies, every part of the head and torso sections of the dummy shall be	

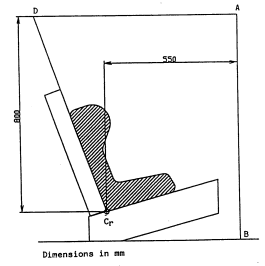
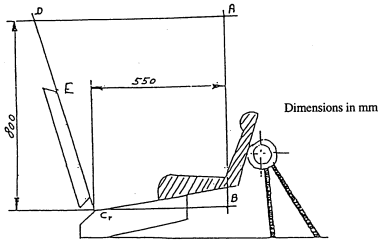
	retained in the bed for babies, however during rebound period it is permissible. <*Rearward-facing seat*> *The position of center of gravity of the dummy's head section shall not exceed a plane which is perpendicular to the surface of the seatback . *The angle of the surface of the seatback to the vertical plane shall not exceed 60°. <*Forward-facing seat*> *The composite acceleration of the head and chest sections of the dummy with a nominal mass of 15 kg shall be as follows: For more than 3ms, Head: 785 m/s^2{80G} Chest: 588 m/s^2{60G} Forward displacement of the position of center of gravity of the dummy's head section shall not exceed 600 mm.	Fig. 5 Conditions of Rearward-facing seat for infants during dynamic test 
D; Label	Not required.	
E; Equivalent standard	Not applicable.	

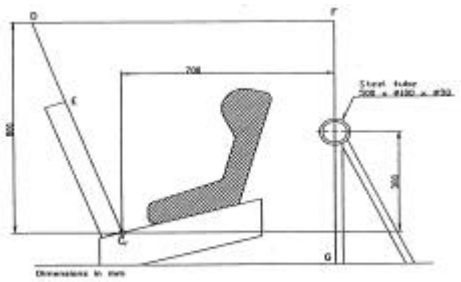
FMVSS 213		
Item	Abstract	Figures & Supplementary explanation
B-a-1; Mass group	No group. Applied to CRS for children having a mass of not more than 22.7 kg.	
B-a-2;Height of seat back	Weight (lbs){kg} — Height (in) {mm} Less than 20{9.1} ---- 18 {457} 20 or more, but not more than 40{9.1~18.1} ---- 20{508} More than 40{18.1} ---- 22{559 }	
-3; Crotch strap		
-4; Tether strap	Not required.	
-5; Buckle push-button	The minimum surface area for child restraint buckles designed for push button application shall be 0.6 in{3.9•}.	
-6; Flammability	Each material used in a CRS shall conform to the requirements of S4 of FMVSS 302. (In case of built-in CRS, in both " in-use" and "stowed" positions.)	--- Material shall not burn, nor transmit a flame front across its surface, at a rate of more than 4 in/min.
B-b-1; Installation in vehicle	Add-on CRS shall have no means designed for attaching the system to a vehicle seat cushion or vehicle seat back and no component (except belts) that is designated to be inserted between the vehicle seat cushion and vehicle seat back.	
C-a-1; Webbing of belt	*(Resistance to abrasion)* [Test] Using two hex bars or adjustment hardware, Cycles: 2,500 [Requirement] Shall have a breaking strength of not less than 75% of the strength of the unabraded webbing. (*Resistance to light and micro-organisms*) Meet the requirements of FMVSS 209.	
-2; Buckles, adjustment hardware	(*Width*) *Shall have a width of not less than1.5 in {38.1 mm} when a force of 5 lbs{2.3 kgf} is applied.	

	*Meet the requirements of FMVSS 209 (Corrosion and Temperature resistance).	
-3; Dynamic requirements	[Test] Speed : 30 mph{ 48 km/h} [Requirement] *No complete separation of any load bearing structural element. *No partial separation exposing either surfaces with a radius of less than 1/4 in{6.4 mm} , or protrusions greater than 3/8 in {9.5 mm}. *Shall release when a force of not more than 71N is applied. <*Forward-facing seat*> *Not allow the angle between the system's back and the seating surface to be less than 45°. <*Injury Criteria*> *CRS for children whose masses are more than 20lbs{10kg} shall satisfy the followings. HEAD: HIC<1000, CHEST < 60G (cumulative duration is not more than 3ms)	 BUCKLE RELEASE TEST
	<*Occupant excursion*> *CRS other than rear-facing ones and car beds shall retain the test dummy's torso within the system and satisfy the requirements follow-mentioned. Head--- Not more than 813 mm forward of point Z on the seat. Knee pivot --- Not more than 914 mm forward of point Z on the seat. *In the case of rear-facing CRS, all portion of the test dummy's torso shall be retained within the system and neither of the target points on either side of head shall pass through the transverse orthogonal planes indicated in figure 1C. <*Car beds*> *All portions of the test dummy's head and torso shall be retained within the confines of the car bed. <*Back support angle*> *For a rear-facing CRS, the angle between the system's back and the vertical shall not 70°. <*Head impact protection*> *Except for protrusions that comply with the specified limit, the surface which is contactable by the dummy head shall be covered with slow recovery, energy absorbing material with the following characteristics:	 Note : The limits illustrated move during dynamic testing

	1)In the 25% compression -deflection test, shall have a resistance of not less than 0.5 lbs/in^2 and not more than 10 lbs/in^2 2)A thickness of not less 1/2 in for materials having the 25 % resistance of not less than 1.8 lbs/in^2 and not more than 10 lbs/ in^2 *Materials having the 25% resistance of less than 1.8 lbs/in shall have a thickness of not less than 3/4 in.	
D; Label	*Letter : English *Model name or number of the system *Manufacturers (or Distributors) *Month and year of manufacture *Place of manufacture (or Distributor) *The statement: “This CRS conforms to all applicable FMVSS.” *Manufacturer’s recommendations for the maximum mass and height of children who can safely occupy the system. *Various attentions to be paid by types of CRS. (Means of installation, a warning for rear-facing CRS against passenger airbag, etc.) *The statement: Must register the restraint and a purchaser’s name /address so as to be contacted when recalled.	
E; Equivalent standard	Not applicable.	

ECE 44-03 (EC) of May 23, 1995)		
Item	Abstract	Figures & Supplementary explanation
B-a-1; Mass group	According with the mass range of applicable children Group 0; Less than 10 kg ---- capable to restrain or retain an infant in the rearward direction I; 9 ~18 kg II; 15 ~25 kg III; 22 ~36 kg	
B-a-2; Height of seatback -3; Crotch strap -4; Tether strap -5; Buckle push button -6; Flammability	Group I, II and I & II : Not less than 500mm A crotch strap shall be required on all forward -facing group I restraints incorporating an integral harness belt system. Not required. Enclosed device--------- Area: Not less than 4.5cm² Width: 15mm Non-enclosed device--- Area: Not less than 2.5 cm² Width: 10mm Shall declare in writing that this restraint conforms to ECE R.E.3.	
B-b-1; Installation in vehicle	By categories for CRS, the requirement for anchorage are provided.	
C-a-1; Webbing of child belt	<*Width*> [Test] When subjected to 20N{2 kgf} of tensile strength longitudinally, measure it. [Criteria] Group 0 and I ; not less than 25 mm Group II and III ; not less than 38 mm <*Tensile strengh*> [Test] Distance between clamps; 200+/-20 mm, Speed; 100 mm/min. [Criteria] Group 0 and I ; not less than 3.6 kN{370 kgf} Group II ; not less than 5.0 kN{510 kgf} Group III ; not less than 7.2 kN{730 kgf}	

	<*Wear-resistance*> [Test] Repeat speed; 30+/-1 cycles /min., Stroke; 330+/-30 mm, Cycles; 2,500 [Criteria] not less than 75% of the value prior to the test.	
-2; Adjustment attachments	*The force required to operate a manual adjusting device shall be exceed 50N. *The amount of strap slip shall not exceed 25mm for one adjusting device or 40mm for all adjusting devices. *An adjuster mounted directly on the child restraint shall be capable of withstanding repeated operation of 5000 cycles.	
-3; Dynamic requirement	[Test] Test speed ; 50+0/-2 km/h for frontal impact 30+0/-2 km/h for rear impact [Criteria] *The resultant hest acceleration shall not exceed 55G. *The vertical component of the acceleration from the abdomen towards the head shall not 30G. *Abdoment penetration --- There shall be no visible signs of penetration of the modeling clay of the abdomen caused by any part of the restraining device. <Forward-facing seat, Group I , II, & III> *The head shall not pass beyond the planes BA and DA as defined in the Fig.1 right-shown. *The composite acceleration of the head and chest sections of the dummy with a nominal mass of 15 kg shall be as follows: For more than 3ms, Head: 785 m/s^2{80G} Chest: 588 m/s^2{60G} <Rearward-facing sea, Group 0, 0+ & I> **CRS supported by dashboard*: The head shall not pass beyond the planes AD and DCr as defined Fig.2	 **Figure 1: Arrangement for testing a forward-facing device** 7.1.4.4.1.1.2. Rearward-facing devices: the head of the manikin shall not pass beyond the planes AD and DC$_r$, as defined in the figure below: 

	*<u>*CRS in Group 0 not-supported by the dashboard and carrycots*</u>: The head shall not pass beyond the planes AB, AD and DE as defined in Fig.3. *The angle of the surface of the seatback to the vertical plane shall not exceed 60°.	 Figure 4: Arrangement for testing rearward-facing devices, except group 0, not supported by the dashboard.
D; Label	*One of the parts made of plastics of the child restraint device shall be marked clearly (and indelibly) with the year of production. *Warning for rear-facing seat against a passenger airbag should be included in a manner that it is visible in installed position. *For a CRS designed for installing forward-facing and rear-facing, the weight of child occupied in it to be restricted should be described.	
E; Equivalent standard	Not applicable.	

ITEM 96-14

Front position lamps

APEC Regulation Analysis Findings
Item No.96-14: Front Position Lamps

* The U.S., Canada and Korea have position lamp requirements that are equivalent to FMVSS 108.

* Australia's regulation is equivalent to ECE R.7 (01 or 02 Series) and ECE R.48.

* New Zealand requires ECE/ADR/Japanese/FMVSS as alternatives.

* Other member economies provide only a small number of requirements that are often unique.

* A comparison by each requirement item is made as follows:

(1) Light Distribution (c-a-1): Australia, Canada, Korea, U.S. and ECE establish a specific limit value for light distribution. These can be divided into the ECE light distribution type (Australia, ECE) and the FMVSS type (U.S., Canada, Korea). The two types provide nearly identical light intensity value (cd).

(2) Color (c-a-2): Member economies basically require a white color for the light of position lamps. But in addition to white, Canada, Indonesia, Japan, Korea, New Zealand, Papua New Guinea, Philippines, Chinese Taipei, Thailand and U.S. approve a yellow or amber color as all.
All member economies approve a white light for position lamps.

(3) Illuminating surface area (c-a-3): Japan requires an illumination area of at least 15 cm^2, and Singapore of at least 50 mm in diameter.

(4) Bulb power (c-a-4): Japan, Malaysia, Papua New Guinea and Singapore set forth a regulation, all within the 5-7W range.

(5) Mechanical performance (c-a-5): Only the U.S. and Canada provide requirements concerning resistance against vibration, humidity, dust and corrosion. These requirements of the two member economies are harmonized with FMVSS 108.

(6) Visibility (c-b-1): Judgment criteria differ between the ECE type (which specifies an illuminating surface area) and the Japan type (which specify a visible distance).

ECE type - Australia, ECE
Japan type - Indonesia, Japan, New Zealand, Papua New Guinea

(7) Wiring (c-b-2): Australia and ECE require the front and rear position lamps and license plate lamps to turn on simultaneously. Japan provides wiring requirements for cases where the direction indicator lamps and front position lamps are combined.

ITEM No. 16-14 Front Position lamps

A: Application Passenger Car

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Australia	ADR 49 (4 to 60 cd)	ADR 13 (White)			ECE R7 (General)	ADR 13 (45°in to 80° out 15°U to 15°D)	ADR 13
Brunei							
Canada	FMVSS 108 (4 to 125 cd)	FMVSS 108 (White or amber)			FMVSS 108 (Vibration, Moisture, Dust and Corrosion)		
China							
Hong Kong		ECE R48 (White)				Unique (Reasonable distance)	
Indonesia		Unique (White or light yellow)				Unique (100 in evening)	
Japan		SRRV 34 (White, light-yellow or amber)	SRRV 34 (15cm² or more)	SRRV 34 (5W or more)		SRRV 34 (300m in night)	SRRV 34

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Korea	Unique (4 to 125cd)	Unique (White, yellow or amber)					
Malaysia		ECE R48 (White)		Unique (7W or less)			
New Zealand		Unique (White or amber)				Unique (200m in night 45° in to 80° out 15°U to 15°D)	
Papua New Guinea		FMVSS 108 (White or amber)		Unique (7W or less)		Unique (200m in night)	
Philippine		SRRV 34 (White, light yellow or amber)					
Singapore		ECE R48 (White)	Unique	Unique (5W to 7W)			
Chinese Taipei		Unique (White, light yellow, amber or red)					

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Thailand		FMVSS 108 (White or amber)					
U.S.A.	FMVSS 108 (4 to 125 cd)	FMVSS 108 (White or amber)			FMVSS 108 (Vibration, Moisture, Dust and Corrosion)		
ECE	ECE R7 (4 to 60 cd)	ECE R48 (White)			ECE R7 (General)	ECE R48 (45° in to 80° out 15°U to 15°D)	ECE R48

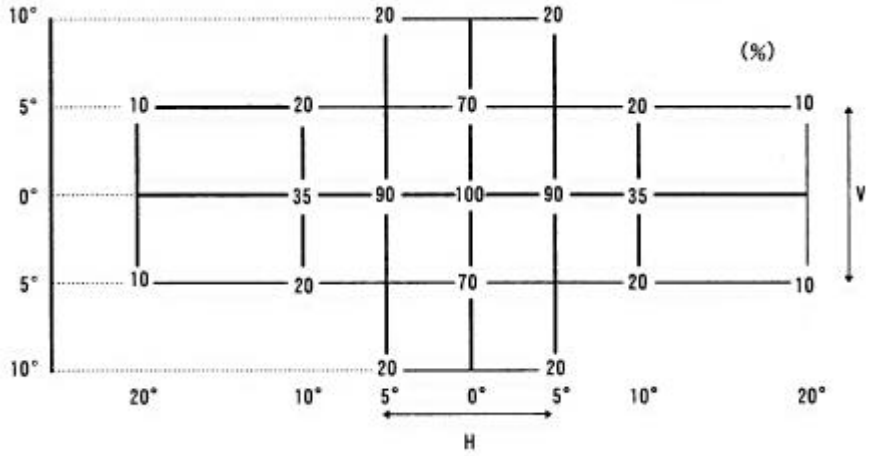
Economy : Australia

Title of Standard : ADR 49/00 and 13/00

A. Application : Moped, Motorcycle, Passenger vehicle, Goods vehicles and Trailers

C-a-1. Photometry :

	Minimum intensity (cd) (at H-V point)	Maximum intensity (cd)
Front position lamp	4	60
Front position lamp (incorporated in headlamp)	4	100



In detail, see ADR 49/00

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angles: 45° inwards and 80° outwards

Vertical angles : 15° above and below the horizontal

Throughout the field defined above, the intensity shall be not less than 0.05 cd.

C-b-2. Electrical Connection :

The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps.

Economy : Canada

Title of Standard : CMVSS No. 108
SAE J222 MAR86

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

Group	Test point, degrees	Total for group, candela
1	10U-5L 5U-20L 5D-20L 10D-5L	60
2	5U-10L H-10L 5D-10L	75
3	H-5L 5U-V H-V 5D-V H-5R	420
4	5U-10R H-10R 5D-10R	75
5	10U-5R 5U-20R 5D-20R 10D-5R	60

C-a-2. Color : White or amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

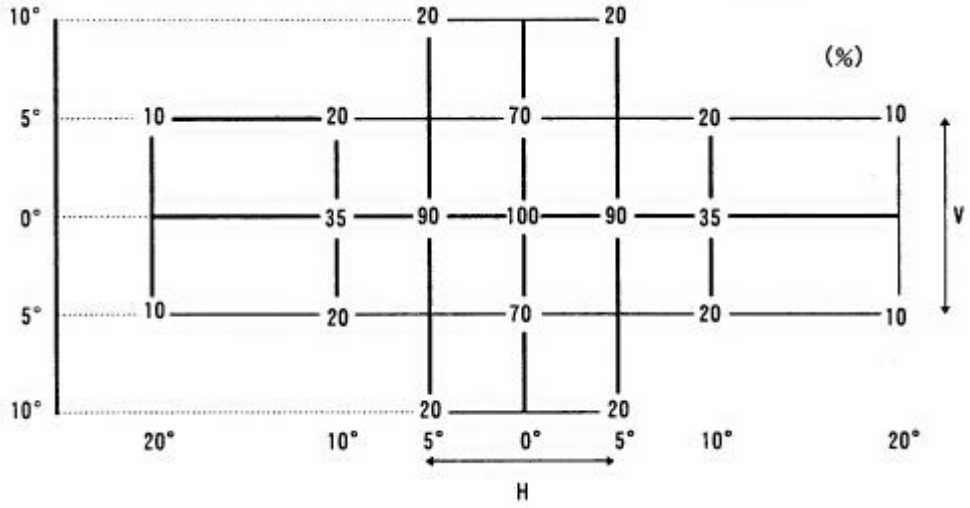
Economy : China

Title of Standard : GB 5920-94

A. Application : Vehicles and Trailers

C-a-1. Photometry :

	Minimum intensity (cd) (at H-V point)	Maximum intensity (cd)
Front position lamp	4	60
Front position lamp (incorporated in headlamp)	4	100



C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage :

Bulb Wattage	Bulb Categories
3 W	W3W
4 W	T4W
5 W	R5W, C5W and W5W
10 W	R10W

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Horizontal angles: 45° inwards and 80° outwards
Vertical angles : 15° above and below the horizontal

Throughout the field defined above, the intensity shall be not less than 0.05 cd.

C-b-2. Electrical Connection :

The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps.

Economy : Hong Kong

Title of Standard : Road Traffic Regulation, No. 89, 90 and 91

A. Application : N/A.

C-a-1. Photometry : N/A.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : The light shall be visible from a reasonable distance.

C-b-2. Electrical Connection : N/A.

Economy : Indonesia

Title of Standard : Government Regulation No. 44/1993

A. Application : Motorcycle, passenger cars, buses, cargo vans and special vehicles

C-a-1. Photometry : N/A.

C-a-2. Color : White or light yellow

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

The lamp shall be visible in the evening in bright weather from a distance of at least 100m.

C-b-2. Electrical Connection : N/A.

Economy : Japan

Title of Standard : Safety Regulation of Road Vehicles, Article 34
Motor Vehicle Inspection Procedures, 4-24

A. Application : Vehicles

C-a-1. Photometry : N/A.

C-a-2. Color : White, light-yellow or amber

C-a-3. Luminous Area : 15 cm^2 or more

C-a-4. Bulb Wattage : 5 W or more

C-a-5. Mechanical : N/A.

C-b-1. Visibility : Visibility distance in night time shall be 300 m.

C-b-2. Electrical Connection :
When a direction indicator or a hazard warning lamp is in operation, a front position lamp in combination with the direction indicator or hazard warning lamp shall be wired so that both or the side, where the direction indicator or hazard warning lamp is operating, of the front position lamp shall be put off.

Economy : Korea

Title of Standard : The regulation of the motor vehicle safety standards (KMVSS), Article 40 and 106

A. Application : Motor vehicles

C-a-1. Photometry :

Not less than 4 cd and not more than 125 cd when measured from the center of the lamp
Not less than 4 cd and not more than 250 cd when measured from the below the center of the lamp

* Type approval test standards for motor vehicle

1. Maximum intensity
125 cd Max. on and above the H line
250 cd Max. below the H line

2. Minimum intensity (cd)
(1) In the case of a motor vehicle with a width of more than 200 cm.

Test Point (deg)	Sum of Minimum Intensity
45L-10U 45L-H 45L-10D	1.86
V-10U V-H V-10D	1.86
45R-10U 45R-H 45R-10D	1.86

(2) In the case of a motor vehicle with a width of 200 cm or less.

Test Point (deg)	Luminous Intensity (cd)
20L-5U 5L-10U 5L-10D 20L-5D	2.4
10L-5U 10L-H 10L-5D	3.0
H-5L H-V H-5R V-5U V-5D	16.8
10R-5U 10R-H 10R-5D	3.0
20R-5U 5R-10U 5R-10D 20R-5D	2.4

C-a-2. Color : White , yellow or amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : Malaysia

Title of Standard : Motor Vehicles (Construction and Use) Rules, 1959

A. Application : Motor vehicle and trailer

C-a-1. Photometry : N/A.

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : Not exceeding 7 watts.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : New Zealand

Title of Standard : Transport Regulations 1990, No. 16
Traffic Regulations 1976, No. 59

A. Application : Motor vehicle that exceeds 1.5m in width

C-a-1. Photometry : N/A.

C-a-2. Color : White or amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :
Visibility distance in night time shall be 200m through the following angles;
Horizontal : 45° inboard and 80° outboard
Vertical : 15° above and below

C-b-2. Electrical Connection : N/A.

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulation

A. Application :

Motor vehicle other than

(a) a Motorcycle, or

(b) a trailer the width of which does not exceed 1.5 m

C-a-1. Photometry : N/A.

C-a-2. Color : White or amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : 7W or less

C-a-5. Mechanical : N/A.

C-b-1. Visibility : Visibility distance in night time shall be 200m.

C-b-2. Electrical Connection : N/A.

Economy : Philippine

Title of Standard : Motor Vehicle Inspection System (A0-91-005), Section 8

A. Application : Motor vehicle except motorcycle

C-a-1. Photometry : N/A.

C-a-2. Color : White , light yellow or amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : Singapore

Title of Standard : Road Traffic (Motor Vehicles, Lighting) Rules, No. 18 and 20.

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : White

C-a-3. Luminous Area :

The lamp shall have an illuminated area not less than the area of a circle of 50 mm in diameter and of such a shape that a circle of 20 mm in diameter may inscribed therein.

C-a-4. Bulb Wattage : Not less than 5W or not more than 7W

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : Chinese Taipei

Title of Standard : Road Traffic Safety Standard, Article 39 Section 12 Annex 7

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : White, light yellow, amber or red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : Thailand

Title of Standard : Ministerial Regulations No.22

A. Application : Motor vehicle and Trailer

C-a-1. Photometry : N/A.

C-a-2. Color : White or Amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Economy : U.S.A.

Title of Standard : FMVSS No. 108
SAE J222

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

Group	Test point, degrees	Total for group, candela
1	10U-5L 5U-20L 5D-20L 10D-5L	60
2	5U-10L H-10L 5D-10L	75
3	H-5L 5U-V H-V 5D-V H-5R	420
4	5U-10R H-10R 5D-10R	75
5	10U-5R 5U-20R 5D-20R 10D-5R	60

C-a-2. Color : White or amber

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :
Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

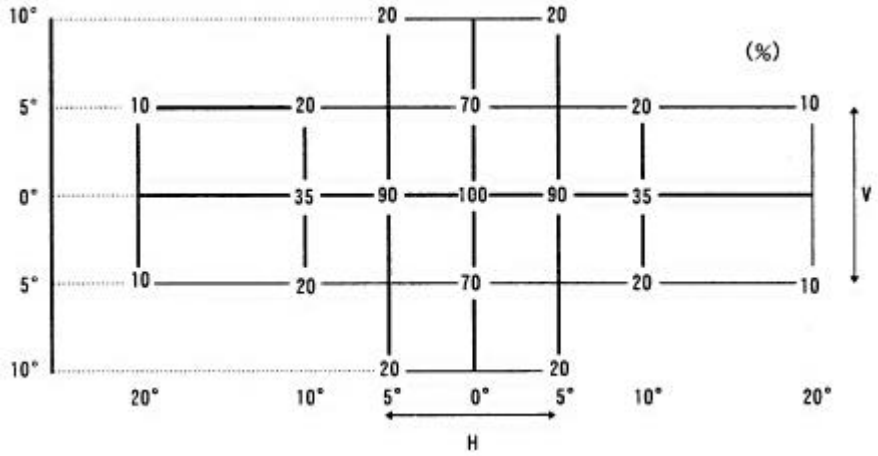
Economy : ECE

Title of Standard : ECE Regulation No. 7, 02 series, and No. 48, 01 series.

A. Application : N/A

C-a-1. Photometry :

	Minimum intensity (cd) (at H-V point)	Maximum intensity (cd)
Front position lamp	4	60
Front position lamp (incorporated in headlamp)	4	100



In detail, see ECE Reg. No.7

C-a-2. Color : White

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

The device must be so designed and constructed that under normal conditions of use, and notwithstanding the vibrations the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angles: 45° inwards and 80° outwards

Vertical angles : 15° above and below the horizontal

Throughout the field defined above, the intensity shall be not less than 0.05 cd.

C-b-2. Electrical Connection :

The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps, if they exist, the side-marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously. This condition does not apply when using front and rear position lamps, as well as side-marker lamps when combined or reciprocally incorporated with said lamps, as parking lamps.

ITEM 96-15

Tyres and wheels (motorcycles)

APEC Regulation Analysis Findings
Item No. 96-15: Tyres and wheels (motorcycles)

The regulations of member economies for motorcycle tires and wheels can be divided into the following three groups:

1) Those providing requirements to be observed by motorcycle users.
2) Those providing tire and rim selection to be observed by motorcycle manufactures.
3) Those providing tire safety standards to be observed by tire producers.

1. Regulations Applied to Motorcycle Users (e.g., road traffic laws)

These regulations are in force in Brunei Darussalam, Hong Kong, Japan, Korea, Malaysia, New Zealand, Singapore and Chinese Taipei. The principal requirements of the regulations are:

1) Prevention of damage to road surfaces 4 economies
2) Damage to tires 5 economies
3) TWI 4 economies
4) Tire and rim matching 3 economies

2. Tire and Rim Selection to Be Observed by Motorcycle Manufacturers

The FMVSS 120, CMVSS 120 and ADR 24 regulations of the U.S., Canada and Australia, respectively, pertain to tire and rim selection. The U.S. and Canadian regulations are nearly identical, requiring the tire-rim combination, axle load rating, etc. which are prescribed in the world's seven major regulations. The U.S. and Canada define the tire load rating and gross axle weight in terms of gross axle weight rating, while Australia in terms of gross vehicle mass.

As for tire performance requirements, the U.S. and Canada subscribe to FMVSS 119, and Australia quotes national industrial standards, ie. ETRTO, JATMA, TRA (Aust), TRA Inc(U.S). The U.S. and Canada require motorcycle makers to indicate on rims what tires are suitable. Australia requires that conforming tires, rims, air pressure, load capacity, etc. be indicated in placards and affixed in an easily noticeable place.

3. Tire Safety Regulations to Be Observed by Tire Producers

The FMVSS 119, CMVSS 119, and ECE 75 regulations of the U.S., Canada, and Europe, respectively, pertain to safety regulations applied to tire producers. The performance requirements of the U.S. and Canada contain similar test items and conditions.

High-speed tests, however, can be divided into the FMVSS and ECE types. The FMVSS type requires a high-speed durability test, while the ECE a maximum speed inspection test.

Overall, the U.S., and Canada adopt similar FMVSS-type tire safety regulations which are focused on the assurance of tire quality. On the other hand, the emphasis of the ECE-type tire safety regulations is laid on dimensional specification and maximum-speed tire condition.

ITEM No. 96-15 Tyres and wheels

«A: application»→ Motorcycle

ECONOMY	Prevention of Road Surface	Damage of Tyre	Tread Wear Indicator	Tyre & Rim
Australia	Tyres must not be fitted with cleats or any other gripping devices of a type which would cause damage to roads, bridge and culverts			
Brunei	No damage to the surface of a road	Any parts of the cord, carcass fabric is not exposed		
Canada				
Chile				
China				
Hong Kong	No damage to the surface of a road	No brake in its fabric, no cut (excess 25mm, 10% of the width), no separation, partial failure of the structure	At least 1mm depth	
Indonesia				
Japan	No damage road surface	Free from any notable damage (cracks, bare cords etc.)	1.6mm or more	
Korea	No damage road surface		1.6mm or more	
Malaysia	No damage to the surface of a road			Be fitted with suitable size and design
Mexico				
New Zealand		Not wear damaged cords	Not less than 1.5mm	Muched tyres and rims of sufficient load capacity
Papua New Guinea				
Philippines				
Singapore				Pneumatic tyre of a suitable size and design
Chinese Taipei		Free from defect		
Thailand				
United States				
ECE				

ECONOMY	Load	Different Type Tyre	Wheel
Australia	Sum of load carrying capacity not less than GVM		
Brunei			
Canada			
Chile			
China			
Hong Kong		Different types of structure shall not be fitted to the same axle or front and rear axle ensure safety	
Indonesia			Ensure safety
Japan			
Korea	Within maximum permissible load as specified in the industrial standards		Securely fitted
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
United States			
ECE			

Tyres and Rim Selection

	U.S.A FMVSS 120	CANADA CMVSS 120	AUSTRALIA ADR 24
Scope	Tyre and rim selection, Rim marking requirement		Tyre and rim appropriate to vehicle load capacity. Rim size and speed characteristics.
Tyre Performance Requirement	FMVSS 119	FMVSS 119 CMVSS 119	None
Retread Tyre	FMVSS 119 (DOT mark) for a new tyre	FMVSS 119 for a new tyre CMVSS 119 JIS D 4230	None
Tyre Load Rating and Gross Axle Weight	Not less than GAWR		Not less than GVM (Gross Vehicle Mass)
Rim Marking	T = TRA E = ETRTO J = JATMA D = DIN B = BSI S = STRO A = ATRA N = Independent list		None
Labeling	Label information written in block-type characters each of whose size is not less than 2.4 mm; (1) Tyre: Load capacity and air pressure are not less than GAWR (2) Rim: Rim type shall comply with the applicable tyre.		(a) Placards; Tyres, rims, air pressure, load capacity, and so on shall be indicated in solid placards and affixed in an easily noticeable place. (b) Specified in Nominated standards
Motorcycle (L-Group)	(Requirements are included in applicable regulations.)		(a) Same axle, same type of carcass and ply (b) Load capacity are not less than GVM (c) Type load is specified in nominated standards.
Non-Pneumatic Tyre	Specified	None	None

MOTOR VEHICLE STANDARDS ACT
A national standard determined under section 7 of the Act

AUSTRALIAN DESIGN RULE 24/02

TYRE AND RIM SELECTION

The function of this Australian Design Rule is to specify requirements for tyres and '*Rims'* appropriate to vehicle load capacity, *'Rim'* size and speed characteristics.

24.0.1 Not used.

24.0.2 *'Normal Loaded Vehicle Mass of a Passenger Vehicle'* — the sum of:

24.0.2.1 the '*Unladen Mass'* together with:

24.0.2.2 the heaviest regular production options, if such individual options have a mass of 2.3 kg or more; plus

24.0.2.3 68 kg for each of 2 front *'Seat'* occupants; plus

24.0.2.4 if the designated '*Seating Capacity*' is 5 or more, 68 kg for a rear '*Seat'* passenger.

24.0.3 *'Normal Loaded Vehicle Mass of a Vehicle other than a Passenger Vehicle*' — the sum of:

24.0.3.1 the '*Unladen Mass*' together with:

24.0.3.2 the heaviest regular production options, if such individual options have a mass of 2.3 kg or more; plus:

24.0.3.3.1 68 kg for the front '*Seat'* occupant if only one front seating position is

provided; or

24.0.3.3.2 68 kg for each of 2 front *'Seat'* occupants if more than one front seating position is provided; plus:

24.0.3.4 one third of the difference between this mass and the *'Maximum Loaded Vehicle Mass of a Vehicle other than a Passenger Vehicle'* distributed evenly over the loading space area or in the case of *'Partially Completed Vehicles'* over the rear *'Axle' or 'Axle Group'*.

24.0.4 *'Maximum Loaded Vehicle Mass of a Passenger Vehicle'* — the sum of:

24.0.4.1 the *'Unladen Mass'* together with:

24.0.4.2 the heaviest regular production options, if such individual options have a mass of 2.3 kg or more, with a full capacity of lubricating oil, coolant and fuel; plus

24.0.4.3 additional loading equivalent to 68 kg at each seating position; plus

24.0.4.4 the number of seating positions times 13.6 kg for luggage in the appropriate luggage space, with the centre of gravity of the luggage load at the centre of the luggage space.

24.0.5 *'Maximum Loaded Vehicle Mass of a Vehicle other than a Passenger Vehicle'* — the *'Gross Vehicle Mass'* or *'Gross Trailer Mass'*.

24.0.6 *'Vhicle Normal Load on the Tyre'* — that load on an individual tyre that is determined by distributing to each *'Axle'* or *'Axle Group'* its share of the weight arising from the relevant *'Normal Loaded Vehicle Mass'* and dividing by the number of tyres on the *'Axle'* or *'Axle Group'*.

24.0.6.1 For a passenger vehicle the load attributable to the occupants may be distributed as in Table 1.

24.0.7 *'Winter Tread'* (includes tyres known as "Mud and Snow", "M&S" or "Snow") — a tyre whose *'Tread'* pattern and whose structure are primarily designed to ensure in mud and fresh or melting snow a performance better than that of an ordinary (road-type) tyre. The *'Tread'* pattern of a *'Winter Tread'* generally consists of *'Groove'* (rib) and/or solid block elements more widely spaced than on an ordinary (road-type) tyre.

TABLE 1

Designated *'Seating Capacity'*	Occupant Distribution	Occupant Mass to be Added to Mass on *'Axle'*	
		Front *'Axle'*	Rear *'Axle'*
4 or less	2 in Front *'Seat'*	73 kg	63 kg
5 or more	2 in Front *'Seat'* 1 in Second *'Seat'*	87 kg	117 kg

24.1.1 The tyres shall not be fitted with cleats or any other gripping devices of a type which would cause damage to roads, bridges or culverts.

24.1.2 Provision of *'Pneumatic Tyres'* and Maximum Cold Inflation Pressure

24.1.2.1 All vehicles shall be equipped with *'Pneumatic Tyres'*.

24.1.2.2 The *'Manufacturer'* shall not specify a cold inflation pressure greater than 825 kPa.

24.3.1 Placard

24.3.1.1 A placard of durable material shall be permanently affixed to the vehicle in a

prominent position and shall display:

24.3.1.1.1 For each *'Axle'* or *'Axle Group'* the tyre size designation(s) and the size and profile of the *'Rims'* to which they are fitted.

24.3.1.1.2 The recommended cold inflation pressure(s) (expressed in kPa**) for each *'Axle'* or *'Axle Group'* at maximum load as determined by Clause 24.3.2.1. Recommended pressures for other conditions may be included.

24.3.1.1.3 The load carrying capacities of each *'Axle'* or *'Axle Group'* as determined by Clause 24.3.4.4.

24.3.1.1.4 The statement:

"The sum of the load carrying capacities of the tyres fitted to any axle or axle group of this vehicle shall not be less than the relevant load shown above."

24.3.1.1.5 A statement concerning tyre *'Speed Category'*, as specified in Clause 24.3.3.

24.3.1.2 The tyre shall not be referred to by name of manufacturer or brand name on the placard.

24.3.2 Tyre Pressures

24.3.2.1 The recommended cold inflation pressure for the tyres of an *'Axle'* or *'Axle Group'* at maximum load shall not be less than the pressure specified in the *'Nominated Standard'* for the tyre size designation at the tyre load determined from the load carrying capacity of that *'Axle'* or *'Axle Group'* as shown on the tyre placard.

24.3.2.2 This recommended cold inflation pressure shall not exceed the maximum pressure specified in the *'Nominated Standard'*.

24.3.3 *'Speed Category'* Statement

24.3.3.1 For forward-control passenger vehicles (MB) or off-road passenger vehicles (MC) fitted with light truck tyres:

Either the statement:

24.3.3.1.1 : "The tyres fitted to this vehicle shall have a speed category not less than "N" (140 km/h).",

if the *'Maximum Vehicle Speed 24/00'* is ≥ 140 km/h; or

24.3.3.1.2 : "The tyres fitted to this vehicles shall have a speed category not less than "*" ("¯" km/h).",

if the *'Maximum Vehicle Speed 24/00'* is < 140 km/h.

where: "*" is the *'Speed Category'* symbol (Table 4 of ADR 23/... "Passenger Car Tyres" refers) appropriate to the *'Maximum Vehicle Speed 24/00'* of the vehicle; and
"¯" is the equivalent speed in km/h.

24.3.3.2 For light omnibuses (MD), heavy omnibuses (ME), N-Group and T-Group vehicles fitted with light truck or truck tyres; and T-Group vehicles fitted with passenger car tyres:

Either the statement

24.3.3.2.1 "The tyres fitted to this vehicle shall have a speed category not less than "L" (120 km/h)."; or

24.3.3.2.2 "The tyres fitted to this vehicle shall have a speed category at least equal to the recommended maximum vehicle operating speed, "..." km/h).",

if the recommended maximum vehicle operating speed is less than 120 km/h.

where "..." is the vehicle *'Manufacture's'* recommended maximum vehicle operating speed.

24.3.4 Selection of Tyres and *'Rims'*

24.3.4.1 All tyres fitted to an *'Axle'* shall be of the same type of *'Carcass'* construction, but may vary in respect of *'Cord'* materials and number of *'Plies'*.

24.3.4.2 The *'Rims'* shall be constructed to the dimensions of a *'Rim'* specified for the tyre size designation as an approved fitment in the *'Nominated Standard'*.

24.3.4.3 The tyre and *'Rim'* combinations on the vehicle shall be included in the recommended combinations displayed on the placard.

24.3.4.4 The sum of the load carrying capacities of the tyres fitted on each *'Axle'* or *'Axle Group'* shall not be less than the minimum specified on the vehicle's tyre placard. This minimum shall be not less than the lowest of:

24.3.4.4.1 the manufacturer's *'Gross Axle Load Rating'* for *'Axle'* or *'Axle Group'*;

24.3.4.4.2 the *'Vehicle Maximum Load on the Tyre'* multiplied by the number of tyres on the *'Axle'* or *'Axle Group'*;

24.3.4.4.3 the maximum load carrying capacity as listed in the appropriate *'Nominated Standard'* for the tyres fitted on that *'Axle'* or *'Axle Group'*; or

24.3.4.4.4 the maximum statutory permissible load for that *'Axle'* or *'Axle Group'*.

24.3.4.5 Speed Rating

24.3.4.5.1 Requirements for forward-control passenger vehicles [MB] and off-road passenger vehicles [MC] fitted with light truck tyres:

The *'Speed Category'* of the tyres fitted shall not be less than either 140 km/h or the *'Maximum Vehicle Speed 24/00'*, if this is less than 140 km/h.

24.3.4.5.2 Requirements for all other vehicles:

The *'Speed Category'* of the tyres fitted, when loaded to the *'Axle'* capacity specified on the tyre placard, shall not be less than either 120 km/h or the recommended maximum operating speed specified on the placard, if this is less than 120 km/h.

24.3.4.6 Performance Requirements

24.3.4.6.1 All Vehicles Fitted with New Light Truck or Truck Tyres

The tyres fitted shall comply with the technical requirements of at least one of the following:

24.3.4.6.1.1 Australian Standard 2230–1979: "New Pneumatic Highway Tyres other than Passenger Car Tyres" or 2230–1990 "Pneumatic Tyres Light Truck and Truck/Bus-New".

24.3.4.6.1.2 (US) Federal Motor Vehicle Safety Standard 119–1973; FR38–218: "New Pneumatic Tyres for Vehicles other than Passenger Cars".

24.3.4.6.1.3 ECE Regulation 54/00 – "Tyres for Commercial Vehicles"; or

24.3.4.6.1.4 Japanese Industrial Standard JIS D4230–1986 – "Tyres for Automobiles".

24.3.4.6.2 T-Group Vehicles Fitted with Retreaded Tyres

Retreaded tyres may be fitted to T-Group vehicles.

24.3.4.6.2.1 Retreaded passenger car and light truck tyres shall comply with the technical requirements of AS 1973–1993 "Retreaded Pneumatic Passenger Car and Light Truck Tyres".

24.3.5 If passenger car tyres are also recommended as suitable by the vehicle *'Manufacturer'* for fitment to a motor vehicle, the requirements of Section 24.2 shall be met for such tyres.

24.4.1 Carcass construction

All tyres fitted to an *'Axle'* shall be of the same type of *'Carcass'* construction, but may vary in respect of *'Cord'* materials and number of *'Plies'*.

24.4.2 Load capacity

The sum of the load carrying capacities recommended for all the tyres and *'Rims'* with which the vehicle is equipped shall be not less than the *'GVM'*.

24.4.3 *'Maximum Load Ratings'* of tyres shall comply with those listed for the tyre size designation in one of the *'Nominated Standards'*, or the tyre manufacturer's warranted maximum tyre load.

THE ROAD TRAFFIC ENACTMENT 1954

SECTION 2 — USE OF VEHICLES

31. (l) All the tyres or tracks of a vehicle shall at all times while the vehicle is being used be of such a design and maintained in such condition as will not in any way cause damage to the surface of the road or danger to persons on or in the vehicle or other persons using the road.

(2) In addition to the requirements of paragraph (1), no pneumatic tyres shall be used on a road in such a condition that any part of the cord carcass fabric thereof is exposed.

MVSR 120

Tire Selection and Rims for Vehicles
Other Than Passenger Cars

120. (1) Subject to subsection (5), the tires of every bus, chassis-cab, motorcycle, motor driven cycle, moped, multipurpose passenger vehicle, trailer, trailer converter dolly and truck shall meet the requirements of the Motor Vehicle Tire Safety Regulations.

(2) Every motor vehicle described in subsection (1) shall be equipped with rims that are listed by the manufacturer of the tires as being suitable for use with the tires of the motor vehicle in accordance with subsection 1(1) or 2(1) of Schedule V to the Motor Vehicle Tire Safety Regulations.

(3) The sum of the maximum load ratings of the tires fitted to an axle shall

(a) be not less than the gross axle weight rating (GAWR) of the axle system as specified in the vehicle's statement of compliance label as required by section 6 of the Regulations;

(b) where the statement of compliance label shows more than one GAWR for the axle system, be not less than the GAWR corresponding to the size designation of the tires fitted to the axle; and

(c) where the size designation of the tires fitted to the axle does not appear on the statement of compliance label, be not less than the lowest GAWR appearing on the label.

(4) For the purpose of determining the sum referred to in subsection (3), where a bus, chassis-cab, multipurpose passenger vehicle, trailer, trailer converter dolly or truck is equipped with a passenger car tire, the maximum load rating of that tire shall be divided by a factor of 1.10.

(5) A bus, chassis-cab, trailer, trailer converter dolly or truck may, at the request of the purchaser, be equipped at the place of manufacture of the vehicle with retreaded or used tires if those tires

(a) are owned or leased by the purchaser;

(b) have a total maximum load rating that meets the requirements of subsection (3);

(c) have not been the subject of a notice of defect;

(d) have a tread depth greater than 1.5 mm (1/16 inch); and

(e) were originally manufactured to comply with

(i) in the case of used tires, the requirements of the Motor Vehicle Tire Safety Regulations, and

(ii) in the case of retreaded tires, Canada Motor Vehicle Tire Safety Standard 119, United States Federal Motor Vehicle Safety Standard 119 or Japanese Industrial Standard JIS D4230.

(6) Each rim fitted to a vehicle described in subsection (1) shall be marked with

(a) a letter indicating the source of the rim's published nominal dimensions, which letter shall be

(i) "T" if the nominal dimensions are published by the Tire and Rim Association, Inc.,

(ii) "E" if the nominal dimensions are published by the European Tire and Rim Technical Organization,

(iii) "J" if the nominal dimensions are published by the Japan Automobile Tire Manufacturers' Association, Inc.,

(iv) "D" if the nominal dimensions are published by the Deutsches Institut f¸r Normung,

(v) "M" if the nominal dimensions are published by the Society of Motor Manufacturers and Traders Limited,

(vi) "B" if the nominal dimensions are published by the British Standards Institution,

(vii) "S" if the nominal dimensions are published by the Scandinavian Tire and Rim Organization, or

(viii) "N" if the nominal dimensions are contained in a list that is required to be furnished pursuant to paragraph 1(1)(a) or 2(1)(a) of Schedule V to the Motor Vehicle Tire Safety Regulations;

(b) the rim size designation;

(c) in the case of a multipiece rim, the rim type designation;

(d) a designation that identifies the manufacturer of the rim by

(i) name,

(ii) trademark, or

(iii) symbol; and

(e) the date of manufacture of the rim, expressed in numerals showing

(i) the month, day and year, or

(ii) the month and year.

(7) The markings referred to in subsection (6) shall

(a) be in lettering not less than 3 mm (1/8 inch) high; and

(b) be impressed to a depth or embossed to a height of not less than 0.13 mm (.005 inch) as measured from the surrounding surface.

(8) The markings referred to in paragraphs (6)(a) to (c) shall appear on the weather side of the rim.

(9) The markings referred to in paragraphs (6)(d) and (e) may appear on any part of the rim.

(10) In the case of wheels of single piece construction, the markings referred to in subsection (6) may appear on the wheel disc.

(11) In the case of rims of multipiece construction,

(a) the markings referred to in subsection (6) shall appear on the rim base; and

(b) the markings referred to in paragraphs (6)(b) to (d) shall appear on each other part of the rim in addition to the rim base.

(12) Subject to subsection (14), the compliance label required by subsection 6(1) of these Regulations shall display, after each GAWR,

(a) the size designation of tires appropriate for that GAWR;
(b) the size designation and, if applicable, the type designation of rims appropriate for the tires specified pursuant to paragraph (a); and

(c) the cold inflation pressure, in kilopascals or pounds per square inch, for the

tires specified pursuant to paragraph (a).

(13) The tires specified pursuant to paragraph (12)(a) and the rims specified pursuant to paragraph (12)(b) need not be the tires and rims with which the vehicle is equipped.

(14) At the option of the manufacturer, the information required by subsection (12) may be listed on a separate tire information label affixed to the vehicle in the manner, location and form described in section 6 of the Regulations.

CHINA

ITEM | CONTENT | ILLUSTRATION / SUPPLEMENT

National Standard
of
the People's Republic of China

Tyres

GB/T	6326–94	Tyres terms
GB	2978–89	Series of passenger car tyres
GB	1191–89	Passenger car diagonal tyres
GB	9743–88	Radial tyres of passenger car
GB	2977–89	Series of truck tyres
GB	516–89	Truck diagonal tyres
GB	9744–88	Radial tyres of truck
GB	2983–91	Series of motorcycle tyres
GB	518–91	Motorcycle tyres

Test method of tyres

GB	4502–84	Endurance test for passenger car tyres (drum method)
GB	4503–84	Strength test for passenger car tyres
GB	4504–84	Bead unseating resistance test for tubeless passenger car tyres
GB	7034–86	High speed test for passenger car tyres (drum method)
GB	4501–84	Endurance test for truck and bus tyres (drum method)
GB	6327–86	Strength test for truck and bus tyres
GB/T	13203–91	Strength test for motorcycle tyres
GB/T	13204–91	High speed performance test for motorcycle tyres (drum method)
GB/T	13205–91	Endurance test for motorcycle tyres (drum method)
GB/T	521–93	Method of measuring tyre peripheral dimensions
GB/T	7035–93	High speed performance test for light truck tyres (drum method)

GB 518 Motorcycle tyres
GB 521 Method of measuring tyre peripheral dimension
GB 2983 Series of motorcycle tyres
GB 13202 Series of motorcycle rims

GB 518–91

4.1.1. Strength
Tyre strength performance shall conform to the specifications of table 3.

Table 3–Minimum static breaking energy J

nominal section width mm	ply rating		
	2	4	6
>66	17	34	45
≤66	–	30	40

NOTE: For cotton or rayon framework materials, allow to reach 60% of the value in table.

4.2.7. Compute the breaking energy for each point by means of the following formula:

$$\frac{F \cdot P}{2000}$$

where:
W—— breaking energy, J;
F—— breaking force, N;
P—— penetration depth, mm.

GB/T13205–91

4.2. Test procedures

4.2.1. Check and adjust the tyre pressure before test, make it to reach the pressure corresponding to maximum load specified in GB 2983, then measure the tyre peripheral dimensions in accordance with the requirements of GB 521 after 15 min.

4.2.2. Mount the tyre and rim assembly on the fixture of tester, press the tyre against the outer face of the test drum by using maximum load specified in GB 2983, start the drum and reach the speed of 80 km/h within 15 min.

4.2.3. Conduct the test, without interruption in accordance with the specifications of table 1.

Table 1

test stage	test requirements	
	load rate, %	test time, h
1	100	4
2	110	6
3	115	24

4.2.4. Stop the machine immediately after the completion of test specified in table 1, and measure the tread and carcass temperature, inflation pressure and tyre peripheral dimensions. Then remove the tyre from the test rim in accordance with the specifications of item 5.2 and check the appearance.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
5.	Quality evaluation	
5.1.	The pressure of tyre at the end of testing shall not be less than the initial pressure specified, otherwise select another sample ant re-test shall be done.	
5.2.	After completion of the test, there shall be no visual evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, open splices, cracking or broken cords.	
GB/T 13204–91		
4.	Test methods	
4.1.	Test conditions	
4.1.1.	Appearance and peripheral dimensions of test tyres shall conform to the specifications of GB 518.	
4.1.2.	Ambient temperature shall maintain at 38 ± 3°C in a distance within 1 m from test tyre during the whole testing.	
4.1.3.	Test rim dimensions and contour curve shall conform to standard rim specified in GB 518 and GB 13202.	
4.1.4.	Mount the tyre on the standard rim and inflate it to the pressure corresponding to maximum load, and maintain it at ambient temperature of 38 ± 3°C for over 3 h.	
4.1.5.	Conduct the tests in accordance with the requirements of table 1, and ensure the test speed and test time during every test stage correctly.	
4.2.	Test procedures	

4.2.1. Check and adjust the tyre pressure to reach the pressure corresponding to maximum load specified in GB 2983 and measure the tyre peripheral dimensions in accordance with the requirements of GB 521 after 15 min. The interval time between pressure adjusting and test starting shall be less than 30 min.

4.2.2. Mount the tyre and rim assembly on the fixture of tester, press the tyre against the outer face of the test drum by using the test load specified in table 1. Start the drum and reach the speed of pre-testing stage specified within 5 min.

Table 1–Test condition of high speed test for motorcycle tyres

overall section width of new tyre, mm	≤66	>66
test load, kg	maximum load × 0.88	
pressure, kPa	pressure corresponding to maximum load	
test stage	test requirements	
	speed × time (km/h × min)	speed × time (km/h × min)
pre–testing	80 × 120	80 × 120
1	90 × 30	120 × 30
2	100 × 30	130 × 30
3	110 × *30	140 × 30

4.2.3. Remove the tyre from the drum immediately after completing the pre–testing, and readjust the tyre pressure to the specifications of table 1 after tyre cooling to the ambient temperature specified in 4.1.4. Conduct other test stage and increase speed one stage by one stage. The pressure shall be not adjusted during this testing.

4.2.4. The test stage specified in table 2 shall be used if the tyre is required to verify

the higher speed rating. Increase the speed to the speed specified in №1 stage within 10 min. from tyre start-up. Then increase the speed by stages without stopping. The pressure shall not be adjused during this time.

Table 2 – Test condition of high speed test for motorcycle tyres

speed rating	S	H
pressure, kPa	250	280
test load, kg	maximum load × 0.88	
test stage and speed	km/h × min	
1	140 × 10	170 × 10
2	150 × 10	180 × 10
3	160 × 10	190 × 10
4	170 × 20	200 × 20

4. 2. 5. The time required between speed changing and speed stabilizing during every test stage (excluding pre-testing) shall be less than 1 min.

4. 2. 6. Stop the machine immediately after the test completed specified in tables 1 and 2, and measure the pressure. Allow the tyre to cool for 1 h. Then deflate the tyre, remove it from the drum and inspect the appearance.

5. Quality evaluation

5.1. The pressure of tyre at the end of testing shall not be less than the value specified in tables 1 and 2.

5.2. After completion of the test, there shall be no visual evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking, open splices, cracking or broken cords.

GB 518–91

CHINA

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT

7.1. Marks

The following marks must be on both sides of each tyre; and marks specified in items a, b and i must be on the flap;

a. Size;
b. Trade mark and manufacturer (or place name);
c. Ply rating;
t. Framework material;
c. Maximum load and corresponding inflation pressure;
f. Standard rim;
g. Running direction code (the tyre with directional tread pattern);
h. Production number (or production date);
i. Qualified stamp.

7.2. Mark requirements

7.2.1. The mark of items a–h on tyre must be moulded; and the marks on item i and flap shall nor be washed away by water.

7.2.2 On both side of shoulders, corresponding to wearing indicators shall have at least 4Δ types codes on each side to indicate the position of wearing indicator.

Every motor vehicle

21. Tyre of soft or elastic material

A tyre shall not be deemed to be soft or elastic material unless the said material is either—

(a) continuous round the circumference of the wheel; or

(b) fitted in sections so that so far as reasonably practicable no space is left between the ends thereof,

and is of such thickness and design as to minimize, so far as reasonably possible, vibration when the vehicle is in motion, and so constructed as to be free from any defect which might in any way cause damage to the surface of a road.

22. Tyres

(1) Subject to paragraphs (2) and (7), no wheel of a motor vehicle or trailer shall be fitted with a pneumatic tyre that—

(a) is unsuitable having regard to the use to which the motor vehicle or trailer is being put or to the types of tyres fitted to its other wheels;

(b) is not so inflated as to make it fit for the use to which the motor vehicle or trailer is being put;

(c) has a break in its fabric, or has a cut in excess of 25 mm in length or 10% of the section width of the tyre, whichever is the greater, measured in any direction on the outside of the tyre and deep enough to reach the body cords;

(d) has any lump or bulge caused by separation or partial failure of its structure;

(e) has any portion of the ply or cord structure exposed: or

(f) does not—

(i) in the case of a motor cycle the cylinder capacity of the engine of which does not exceed 50 cm^3, show throughout at least 3/4 of the breadth of the tread and round the entire outer circumference of the tyre a pattern the relief of which is clearly visible; and

(ii) in the case of any other motor vehicle or any trailer, have a tread pattern (excluding any tie-bar) with a depth of at least 1 mm throughout at least 3/4 of the breadth of the tread and round the entire outer circumference of the tyre:

(2) Paragraph (1) shall not prohibit the use on a road of a motor vehicle or trailer by reason only of the fact that a wheel of the vehicle or trailer is fitted with a tyre which is not fully inflated if the tyre and the wheel to which it is fitted are so constructed as to make the tyre in that condition fit for the use to which the motor vehicle or trailer is being put and the outer sides of the wall of the tyre are so marked as to enable the tyre to be identified as having been so constructed.

(3) No motor vehicle or trailer shall be fitted with a recut pneumatic tyre the fabric of which has been cut or exposed by the recutting process.

(4) Without prejudice to paragraphs (1) and (3), all the tyres of a motor vehicle or trailer shall cat all times while the vehicle or trailer is used on a road be maintained in such condition as to be fit for the use to which the vehicle or trailer is being put and as to be free from any defect which might in any way cause damage to the surface of the road or danger to persons on or in the vehicle or to other persons using the road.

(5) Pneumatic tyres of different types of structures shall not be fitted to the same axle of a vehicle.

(6) A motor vehicle or trailer shall not be fitted with—

(a) a diagonal-ply tyre or a bias-belted tyre on the rear axle and a radial-ply tyre on the front axle; or

(b) a diagonal-ply tyre on the rear axle and a bias-belted tyre on the front axle.

(7) Paragraph (1) shall not apply to a land tractor, or land implement, or to an agricultural trailer when the trailer is being towed by a land tractor and nothing in paragraph (1) or (3) shall apply to a broken down vehicle or to a vehicle proceeding to a place where it is to be broken up, in either case being towed by a motor vehicle at a speed not exceeding 20 km/h.

(8) For the purposes of this regulation—

"bias-belt tyre" means a pneumatic tyre, the structure of which is such that the ply cords extend to the bead so as to be laid at alternate angles of substantially less than 90 degrees to the peripheral line of the tread, and are constrained by a circumferential belt comprising two or more layers of substantially inextensible cord material laid at alternate angles smaller than those of the ply cord structure;

"diagonal-ply tyre" means a pneumatic tyre, other than a bias-belted tyre, the structure of which is such that the ply cords extend to the bead so as to be laid at alternate angles of substantially less than 90 degrees to the peripheral line of the tread;

"radial-ply tyre" means a pneumatic tyre, the structure of which is such that the ply cords extend to the bead so as to be laid at an angle of substantially 90 degrees to the peripheral line of the tread, the ply cord structure being stabilized by a substantially inextensible circumferential belt.
"type of structure," in relation to a tyre, means a type of structure of a tyre of a kind as defines in this paragraph.

ITEM	CONTENT	**ILLUSTRATION / SUPPLEMENT**

Every motor vehicle

(1) Every motorized vehicle, trailer car and linked car must possess a wheel system encompassing wheels and wheel axles.

(2) The wheels as referred to in sub-article (1) are in the form of wheel rims and tyres with inflatable inner tubes as well as wheel axles and combined wheel axles, which can all ensure safety.

(3) The tyres with inflatable inner tubes as referred to in sub-article (2) must possess sufficient adhesion, both on dry roads and on wet roads.

(4) The design of wheel axles and/or combined wheel axles as referred to in sub-article (2) must take into account the class of the road to be passed.

(5) Further stipulation on the wheel system and wheel axles and/or combined wheel axles as referred to in sub-article (1) and sub-article (4) shall be laid down in a Ministerial Decree.

Motor Vehicle shall comply with the following requirements for ground-contact section and contact pressure.

(1) No ground-contact section shall be constructed in such a way that it damages road surfaces;

(2) For pneumatic tires or a solid tires whose ground-contact section is 25 mm or thicker, the pressure of the ground-contact section shall not be more than 150 kg/cm of the width of the ground-contact section;

(3) For caterpillar tracks, the pressure of the ground-contact area shall not be more than 3 kg/cm^2 of the ground-contact area;

(4) Ground-contact sections other than those in Items (2) and (3) as well as those of sledges, the pressure of the ground-contact section shall not exceed 100 kg/cm of the width of the ground-contact section;

(5) For tractors, the requirements of Items (2), (3) and (4) shall be met even when coupled to a trailer.

1. The running system of a motor vehicle shall be secure to ensure safe operation.

2. Pneumatic tire shall comply with the following requirements. However, the requirement of Item (2) shall not apply to a motor vehicle with a maximum speed of less than 40 km/h or a trailer drawn thereby:

(1) The tires shall be free from any notable damage such as cracks, bare cords, etc;

(2) The ground-contact section of a tire shall have a tread to reduce the likelihood of slipping. In this case, the tread depth (except for tires mounted on large-sized special motor vehicles and trailers drawn by the aforesaid motor vehicles) shall be 1.6 mm or more (0.8 mm, in the case of tires mounted on two-wheeled motor vehicles with or without sidecars) at any part of the said treads.

3. Tire chains shall be able to be attached firmly to the running system to ensure safe operation.

Section 2 SAFETY STANDARDS FOR TWO–WHEELED MOTORCYCLES

Article 64 Running Gear

(1) The load of the pneumatic tire of a two-wheeled motorcycle in the loaded state shall be within the maximum permissible load as specified in the Industrial Standards of the country of that tire manufacturer (in case where the pneumatic tires are not specified in the Industrial Standards, the maximum permissible load specified by that tire manufacturer).

(2) Each tire and other parts of the running gear of a two–wheeled motorcycle shall be securely fitted.

Vehicles

Except where otherwise provided in these rules, a tyre shall not be deemed to be of soft or elastic material unless the said material is either—

(i) continuous round the circumference of the wheel, or

(ii) fitted in sections so that so far as reasonably practicable no space is left between the ends thereof.

and is of such thickness and design as to minimize, so far as reasonably possible, vibration when the vehicle is in motion, and so constructed as to be free from any defect which might in any way cause damage to the surface of a road.

(1) Every motor vehicle shall be so constructed that the entire weight of the vehicle is transmitted to the road surface by circular wheels or by tracks:

Provided that—

(i) no part of a wheel or its fittings may project more than $3^{1}/_{2}$ inches beyond the extreme outer lateral face of any tyre when fully inflated;

(ii) in the case of a tracked vehicle the parts of the track which come into contact with the road surface shall be flat and have a minimum width of $^{1}/_{2}$ inch. The total area of each track actually in contact with the road surface at any one time shall not be less than 36 square inches in respect of each ton of the unladen weight.

(2) All wheels of a motor vehicle which are equipped with tyres other than pneumatic tyres shall have a rim diameter of not less than 27 inches:

Provided that this rule shall not apply—

(i) to any motor vehicle or trailer not exceeding 30 cwts. in weight

unladen designed for use in works or on private premises and used on a road only in passing from one part of the works or premises to another or to works or premises in the immediate neighbourhood;

(ii) to a land-tractor or any motor vehicle designed for use and used by or on behalf of Government or a local authority solely in connection with street cleaning or road construction or repairs, the collection or disposal of the contents of gullies, latrines or cesspools;

(iii) to any mobile crane.

Every wheel of a motor vehicle other than a road roller shall be equipped with pneumatic tyres:

Provided that this rule shall not apply to the following motor vehicles if they are equipped with tyres of soft or elastic material on every wheel—

(i) land tractors;

(ii) motor vehicles designed for use and used by or on behalf of Government or a local authority solely in connection with street cleansing, the collection or disposal of refuse, or collection or disposal of the contents of gullies latrines or cesspools or to a turn-table fire escape, or to a tower waggon;

(iii) motor vehicles designed for use in works or on private premises and used on a road only in passing from one part of the works or premises to another or to works or premises in the immediate neighbourhood; and

(iv) trailers or semi-trailers being plant owned by Government or a local authority, used on a road construction of repairs even if such plant is not equipped with tyres of soft or elastic material.

All the wheels of a vehicle shall be fitted with pneumatic tyres of suitable size and design.

TRAFFIC REGULATIONS 1976

71. Tyres

(1) No person shall on any road use on any motor vehicle a pneumatic tyre that has worn or damaged cords apparent by external examination.

[(2) No person shall on any road use on any motor vehicle a pneumatic tyre having a tread pattern (excluding any tie-bar or tread-depth indicator strip) of less than 1.5 mm in depth across at least three quarters of the breadth of the tread and around the entire circumference of the tyre. Nothing in this subclause shall apply with respect to any motor vehicle that is not capable of a speed in excess of 30 km/h, nor to any trailer drawn by such a vehicle, nor to any trailer that has a gross weight of less than 1,000 kg, nor to any [moped], nor to any tyre on a twin wheel fitted to a vehicle that is not principally designed for the carriage of passengers unless both the tyres fitted to that twin wheel have a tread pattern less than that specified as aforesaid.]

(3) No person shall on any motor cycle fitted with a motor the total piston displacement of which does not exceed 60 cm^3 or on any [moped] a pneumatic tyre the tread pattern of which is not clearly visible across at least three-quarters of the breadth of the tread and around the entire circumference of the tyre.

(4) Notwithstanding anything in [subclauses (2) and (3)] of this regulation, the use of a tyre in breach of those provisions shall not be an offence if, before the occasion on which the tyre was so used,—

(a) The owner of the motor vehicle had taken all reasonable steps to obtain a new or retreaded or recapped tyre to replace the tyre that did not comply with the requirements of the relevant subclause but such a tyre was not obtainable; and

(b) The owner had placed with a supplier an order for such a tyre, which order was still in force.

(5) No person shall on any road use on any motor vehicle, or sell for such use, a pneumatic tyre which has had its designed tread-depth increased by the process of regrooving subsequent to manufacture.

(6) Subclause (5) of this regulation shall not apply to tyres used by heavy motor vehicles at speeds below 50 km/h and specially designed and constructed for the process of regrooving subsequent to manufacture.

Subcl (2) substituted by reg 8, SR 1978/72, and as amended by reg 2(3), DSR 1984/31.
Subcl (3) amended by reg 2(3), SR 1984/31.
Subcl (4) amended by reg 16, SR 1980/31.

71.1 Exemptions: For exemptions from this regulation, see reg 89 of these regulations.

71.2 Road work vehicles: By notice in the 1969 *Gazette*, p 863, vehicles designed and used exclusively or principally for road construction or earth-moving purposes are exempted from subcl (2) of this regulation.

71.3 Vehicles registered etc after 1 November 1990: As to vehicles first registered after, or which undergo modifications or repairs after, 1 November 1990 see also reg 14 of the Transport (Vehicle Standards) Regulations 1990, and the Second Schedule to those regulations.

71.4 Owner liability: In terms of s 41A of the Transport Act 1962 (as amended by 1992/108) regs 71(1) and 71(2) are "stationary vehicle offence" and proceedings under either may be taken against the person who allegedly committed the offence, against a registered owner of the vehicle and/or against any person who at the time of the offence was lawfully entitled to possession of the vehicle. See the statutory presumptions, and the limited range of statutory defences, set out in that section.

The Passenger Service Vehicle Construction Regulations 1978

SR 1978/15

13. Tyres and rims

(1) Each tyre of a passenger-service vehicle shall be pneumatic and of good quality and construction throughout, and shall be maintained in a safe and satisfactory condition.

(2) Every passenger-service vehicle shall be equipped with matched tyres and rims of sufficient load capacity to meet reasonable requirements of service. In determining the types and sizes of the tyres required, the load tables and data as published from time to time by the tyre manufacturer, and any tables and data provided by the British Standards Institute, the European Tyre and Rim Technical Organisation, the Tyre and Rim Association of the United States of America, or the Tyre and Rim Association of Australia may be utilised by the Secretary with any variation thereof that he considers reasonable. The appropriate inflation pressure shall be that recommended for the tyre and the service, and, so far as practicable and subject to any inflation pressure limits imposed by the Heavy Motor Vehicle Regulations 1974.

13.1 Cross-reference: See reg 8 of the Heavy Motor Vehicle Regulations 1974, and reg 14 of the Transport (Vehicle Standards) Regulations 1990.

The Goods Service Vehicle (Constructional) Regulations 1936

SR 1936/80
(Reprinted, SR 1961/94)

3. Tyres

(1) Every tyre on a road wheel of a vehicle shall be made of rubber or other elastic material.

(2) Every such tyre shall at all times be in a safe condition.

3.1 Tyres: See reg 8 of the Heavy Motor Vehicle Regulations 1974 as to maximum inflation of tyres; and also see reg 14 of the Transport (Vehicle Standards) Regulations 1990.

The Transport (Vehicle Standards) Regulations 1990

SR 1990/247

Tyres and Rims

14. Tyres and rims

(1) Tyres on the same axle shall be of the same nominal size and be of similar construction.

(2) Each tyre shall be pneumatic and of good quality and construction throughout, and shall comply with the appropriate vehicle standard.

(3) Tyres and rims shall be matched and be of sufficient load capacity to meet reasonable requirements of service, and the sum of the load capacity of all the tyres and rims shall be not less than the gross vehicle mass.

(4) Pneumatic tyres shall have a tread pattern (excluding any tie-bar or tread-depth indicator strip) of not less than 1.5 mm in depth across at least three-quarters of the breadth of the tread and around the entire circumference of the tyre.

(5) The appropriate inflation pressure shall be that recommended by the vehicle manufacturer for the tyre, having regard to the loading and the service and, so far as is practicable, the tyre shall be kept inflated at that pressure.

(6) This regulation shall not apply to any space saving spare wheel supplied by the vehicle manufacturer for temporary use only and used in the event of a road wheel being disabled.

14.1 Cross-reference: See reg 71 of the Traffic Regulations 1976 for further tyre requirements.

Every motor vehicles

(1) Subject to paragraph (2), every wheel of a motor vehicle or a trailer when the trailer is being drawn on a road shall be equipped with a pneumatic tyre of a suitable size or design.

(2) Subject to rule 66 in the case of any of the following vehicles every wheel thereof shall be fitted with a pneumatic tyre, or a tyre of soft or elastic material of a suitable size and design:

(a) motor tractors, light locomotives and heavy locomotives;

(b) motor vehicles trailers designed for use and used by or on behalf of the Government solely in connection with street cleansing, the collection or disposal of refuse or of the contents of drains, gullies, latrines or cess-pools;

(c) turntable fire-escapes;

(d) tower wagons; and

(e) motor-cars each not exceeding 1.5 metric tons in weight unladen.

Every wheel of a vehicle shall be fitted with a pneumatic tyre of a suitable size and design.

(1) The wheels of every vehicle which is a taxi shall be fitted with pneumatic tyres which shall be—

(a) of such dimension as may be approved by the Registrar; and

(b) inflated to such pressure as the Registrar may specify.

(2) The size and pressure of the tyres for any taxi shall be displayed on the dashboard of the taxi.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	Every motor vehicles It shall be free from any defect of Tires, Wheels, Screws and Nuts.	

This Standard applies to new pneumatic tires designed for highway use on multipurpose passenger vehicles, trucks, buses, trailers, and motocycles.

Each manufacturer of tires shall ensure that a listing of the rims that may be used with each tire that he produces is provided to the public. Each rim listing shall include dimensional specifications and a diagram of the rim. However a listing complied in accordance with paragraph (a) need not include dimensional specifications or a diagram of a rim if the rim's dimensional specifications and diagram are contained in each listing published in accordance with paragraph (b).

(a) Listed by manufacturer name or brand name in a document furnished to dealers of the manufacturer's tires to any person upon request and in duplicate: Tire Division National Highway Safety Administration.

(b) Contained in publications, current at the date of manufacture of the tire or any later date, of at least one of the following organizations:
- The Tire and Rim Association
- The European Tyre and Rim Technical Organization
- Japan Automobile Tire Manufacturers' Association
- Deutsche Industrie Nom
- British Standards Institution
- Scandinavian Tire and Rim Organization
- The Tyre and Rim Association of Australia

Mount the tire on a model rim assembly and inflate to the pressure corresponding to the maximum load, or maximum dual load where there is both a single and dual load marked on the tire.

Force a cylindrical steel plunger with a hemispherical end and of the diameter specified for the tire size, perpendicularly into tread as near to the centerline as possible, at a rate of 2 inches per minute, until the tire breaks or the plunger is stopped by the rim, and record the force and distance of penetration just before the plunger is stopped by the rim at five test points equally

spaced around the circumference of the tire.

And compute the breaking energy for each test point by means of the following formula:
w = [(F × P) / 2] where W = Energy, F = Force and P = Penetration

Determine the breaking energy value for the tire by computing the average of the five values.

A tire's average breaking energy shall be not less than the specified value for that tire's size and load range.

Mount the tire and a model rim assembly and inflate it to the inflation pressure corresponding to the maximum load rating marked on the tire. Use single maximum load value when the tire is marked with both single and dual maximum load.

Mount the tire and wheel assembly on a test axle and press it again a flat-faced steel test wheel 67.23 inches in diameter and at least as wide as the tread of the tire.

Apply the test load and rotate the test wheel as specified for the type of tire tested conducting each successive phase of the test without interruption.

During the test, an ambient temperature shall be maintained at 95 ± 5 deg. F.

After completion of the test, there shall be no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chucking, broken cords, cracking, or open splices. And the tire pressure at the end of the test shall be not less than the initial pressure.

This requirement is applied only to motorcycle tires and to non-speed-restricted tires of 14.5 inch nominal rim diameter or less marked load range A, B, C, or D.

Mount the tire and a model rim assembly and inflate it to the inflation pressure corresponding to the maximum load rating marked on the tire. Use single maximum load value when the tire is marked with both single and dual maximum load.
Mount the tire and wheel assembly on a test axle and press it again a flat-faced steel test wheel 67.23 inches in diameter and at least as wide as the tread of the tire.

Apply a force of 88% of the maximum load rating marked on the tire (use single maximum load value when the tire is marked with both single and dual maximum loads) and rotate the test wheel at 250 rpm for 2 hours and then without interruption or readjustment of inflation pressure, rotate the test wheel at 375 rpm for 30 minutes, then at 400 rpm for 30 minutes, and then at 425 rpm for 30 minutes,

After completion of the test, there shall be no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chucking, broken cords, cracking, or open splices. And the tire pressure at the end of the test shall be not less than the initial pressure.

Each tire shall be marked on each sidewall with the following informations (a) through (j). The markings shall be in letters and numerals not less than 0.078 inch high and raised above or sunk below the tire surface not less than 0.015 inch, except that the marking depth shall be not less than 0.010 inch in the case of motocycle tires.

Markings may appear on only one sidewall in the case of motocycle tires and recreational boat, baggage, and special trailer tires.

(a) The symbol DOT which shall constitute a certification that the tire conforms to applicable Federal Motor Vehicle Safety Standards. This number may be marked on only one sidewall.

(b) The tire identification number. This number may be marked on only one sidewall.

(c) The tire size designation

(d) The maximum load rating and corresponding inflation pressure of the tire, shown as follows :

(Mark on tires rated for single and dual load)
Max load single – lbs at – psi cold.
Max load dual – lbs at – psi cold.
(Mark on tires rated for single load)
Max load – lbs at – psi cold.

(e) The speed restriction of the tire, if 55 miles/hour or less, shown as follows: Max speed – mph

(f) The actual number of plies and the composition of the ply cord material in the sidewall, and if different, in the tread area.

(g) The words “tubeless” or “tube type” as applicable.

(h) The words “regroovable” if the tire is designed for regrooving.

(i) The words “radial” if the tire is a radial ply tire.

(j) The letter designating the tire load range.

Each tire of that size designation shall have a maximum load rating that is not less than the published maximum load rating, or if there are differing published ratings for the same tire size designation, not less than the lowest published maximum load rating.

Each tire shall be labeled with the symbol DOT which shall constitute a certification by a tire manufacturer himself that the tire conforms to applicable Federal Motor Vehicle Safety Standards.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
§571.120	Standard No. 120; Tire selection and rims for motor vehicles other than passenger cars.	
S1.	*Scope.* This standard specifies tire and rim selection requirements and rim marking requirements.	
S2.	*Purpose.* The purpose of this standard is to provide safe operational performance by ensuring that vehicles to which it applies are equipped with tires of adequate size and load rating and with rims of appropriate size and type designation.	
S3.	*Application.* This standard applies to multipurpose passenger vehicles, trucks, buses, trailers, and motor-cycles, to rims for use on those vehicles, and to non-pneumatic spare tire assemblies for use on those vehicles.	
S4.	*Definitions.* All terms defined in the Act and the rules and standards issued under its authority are used as defined therein. *Rim base* means the portion of a rim remaining after removal of all split or continuous rim flanges, side rings, and locking rings that can be detached from the rim. *Rim size designation* means rim diameter and width. *Rim diameter* means nominal diameter of the bead seat. *Rim width* means nominal distance between rim flanges. *Rim type designation* means the industry or manufacturer’s designation for a rim by style or code. *Weather side* means the surface area of the rim not covered by the inflated tire.	
S5.	*Requirements.*	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
S5.1	*Tire and rim selection.*	
S5.1.1	Except as specified in S5.1.3, each vehicle equipped with pneumatic tires for highway service shall be equipped with tires that meet the requirements of §571.109, New pneumatic tires, or §571.119, New pneumatic tires for vehicles other than passenger cars, and rims that are listed by the manufacturer of the tires as suitable for use with those tires, in accordance with S4.4 of §571.109 or S5.1 of §571.119, as applicable, except that vehicles may be equipped with a non-pneumatic spare tire assembly that meets the requirements of §571.129, New non-pneumatic tires for passenger cars, and S8 of this standard. Vehicles equipped with such an assembly shall meet the requirements of S5.3.3, S7, and S9 of this standard.	
S5.1.2	Except in the case of a vehicle which has a speed attainable in 3.2 kilometers of 80 kilometers per hour or less, the sum of the maximum load ratings of the tires fitted to an axle shall be not less than the gross axle weight rating (GAWR) of the axle system as specified on the vehicle's certification label required by 49 CFR part 567. If the certification label shows more than one GAWR for the axle system, the sum shall be not less than the GAWR corresponding to the size designation of the tires fitted to the axle. If the size designation of the tires fitted to the axle does not appear on the certification label, the sum shall be not less than the lowest GAWR appearing on the label. When a tire subject to FMVSS No. 109 is installed on a multipurpose passenger vehicle, truck, bus, or trailer, the tire's load rating shall be reduced by dividing by 1.10 before calculating the sum (i.e., the sum of the load ratings of the tires on each axle, when the tires' load carrying capacity at the recommended tire cold inflation pressure is reduced by dividing by 1.10, must be appropriate for the GAWR).	
S5.1.3	In place of tires that meet the requirements of Standard No. 119, a truck, bus, or trailer may at the request of a purchaser be equipped at the place of manufacturer of the vehicle with retreated or used tires owned or leased by the	

purchaser, if the sum of the maximum load ratings meets the requirements of S5.1.2. Used tires employed under this provision must have been originally manufactured to comply with Standard No. 119, as evidenced by the DOT symbol.

S5.2 *Rim marking.* Each rim or, at the option of the manufacturer in the case of a single-piece wheel, wheel disc shall be marked with the information listed in paragraphs (a) through (e) of this paragraph, in lettering not less than 3 millimeters high, impressed to a depth or, at the option of the manufacturer, embossed to a height of not less than 0.125 millimeters. The information listed in paragraphs (a) through (c) of this paragraph shall appear on the weather side. In the case of rims of multi piece construction, the information listed in paragraphs (a) through (e) of this paragraph shall appear on the rim base and the information listed in paragraphs (b) and (d) of this paragraph shall also appear on each other part of the rim.

(a) A designation which indicates the source of the rim's published nominal dimensions, as follows:

(1) "T" indicates The Tire and Rim Association.
(2) "E" indicates The European Tyre and Rim Technical Organization.
(3) "J" indicates Japan Automobile Tire Manufacturers' Association, Inc.
(4) "D" indicates Deutsche Industrie Norm.
(5) "B" indicates British Standards Institution.
(6) "S" indicates Scandinavian Tire and Rim Organization.
(7) "A" indicates The Tyre and Rim Association of Australia.
(8) "N" indicates an independent listing pursuant to S4.4.1(a) of Standard No. 109 or S5.1(a) of Standard No. 119.

(b) The rim size designation, and in case of multipiece rims, the rim type designation. For example: 20×5.50, or 20×5.5.

(c) The symbol DOT, constituting a certification by the manufacturer of the

rim that the rim complies with all applicable motor vehicle safety standards.

(d) A designation that identifies the manufacturer of the rim by name, trademark, or symbol.

(e) (l) Any manufacturer that elects to express the date of manufacture by means of a symbol shall notify NHTSA in writing of the full names and addresses of all manufacturers and brand name owners utilizing that symbol and the name and address of the trademark owner of that symbol, if any. The notification shall describe in narrative form and in detail how the month, day, and year or the month and year are depicted by the symbol. Such description shall include an actual size graphic depiction of the symbol, showing and/or explaining the interrelationship of the component parts of the symbol as they will appear on the rim or single piece wheel disc, including dimensional specifications, and where the symbol will be located on the rim or single piece wheel disc. The notification shall be received by NHTSA at least 60 calendar days prior to first use of the symbol. The notification shall be mailed to the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration, 400 Seventh Street SW., Washington, DC 20590. All information provided to NHTSA under this paragraph will be placed in the public docket.

(2) Each manufacturer of wheels shall provide an explanation of its date of manufacturer symbol to any person upon request.

S5.3 *Label information*. Each vehicle shall show the information specified in S5.3.1 and S5.3.2 and, in the case of a vehicle equipped with a non-pneumatic spare tire, the information specified in S5.3.3, in the English language, lettered in block capitals and numerals not less than 2.4 millimeters high and in the format set forth following this section. This information shall appear either—

(a) After each GAWR listed on the certification label required by §567.4 or §567.5 of this chapter; or, at the option of the manufacturer,

(b) On the tire information level affixed to the vehicle in the manner, location and form described in §567.4 (b) through (f) of this chapter, as appropriated for each GVWR–GAWR combination listed on the certification label.

S5.3.1 *Tires.* The size designation (not necessarily for the tires on the vehicle) and the recommended cold inflation pressure for those tires such that the sum of the load ratings of the tires on each axle (when the tires' load carrying capacity at the specified pressure is reduced by dividing by 1.10, in the case of a tire subject to FMVSS No.109) is appropriate for the GAWR as calculated in accordance with S5.1.2.

S5.3.2 *Rims.* The size designation and, if applicable, the type designation of Rims (not necessarily those on the vehicle) appropriate for those tires.

Truck Example

Suitable Tire—Rim Choice

GVWR: 7,840 kilograms (17,280 pounds)

GAWR: Front—2,850 kilograms (6,280 pounds) with 7.50-20 (D) tires, 20 × 6.00 rims at 520 kPa (75 psi) cold single

GAWR: Rear—4,990 kilograms (11,000 pounds) with 7.50-20 (D) tires, 20 × 6.00 rims, at 450 kPa (65 psi) cold dual

GAWR: 13,280 kilograms (29,279 pounds)

GAWR: Front—4,826 kilograms (10,640 pounds) with 10.00-20 (F) tires,

20 × 7.50 rims, at 620 kPa (90 psi) cold single

GAWR: Rear—8,454 kilograms (18,639 pounds) with 10.00-20 (F) tires, 20 × 7.50 rims, at 550 kPa (80 psi) cold dual

S5.3.3 The non-pneumatic tire identification code, with which that assembly is labeled pursuant to S4.3(a) of §571.129.

S6 *Load Limits for Non-Pneumatic Spare Tires.* The highest vehicle maximum load on the tire for the vehicle shall not be greater than the load rating for the non-pneumatic spare tire.

S7 *Labeling Requirements for Non-Pneumatic Spare Tires or Tire Assemblies.* Each non-pneumatic tire or, in the case of a non-pneumatic tire assembly in which the non-pneumatic tire is an integral part of the assembly, each non-pneumatic tire assembly shall include, in letters or numerals not less than 4 millimeters high, the information specified in paragraphs S7 (a) and (b). The information shall be permanently molded, stamped, or otherwise permanently marked into or onto the non-pneumatic tire or non-pneumatic tire assembly, or shall appear on a label that is permanently attached to the tire or tire assembly. If a label is used, it shall be subsurface printed, made of material that is resistant to fade, heat, moisture and abrasion, and attached in such a manner that it cannot be removed without destroying or defacing the label on the non-pneumatic tire or tire assembly. The information specified in paragraphs S7 (a) and (b) shall appear on both sides of the non-pneumatic tire or tire assembly, except, in the case of a non-pneumatic tire assembly which has a particular side that must always face outward when mounted on a vehicle, in which case the information specified in paragraphs S7 (a) and (b) shall only be required on the outward facing side. The information shall be positioned on the tire or tire assembly such that it is not placed on the tread or the outermost edge of the tire and is not obstructed by any portion of any non-pneumatic rim or wheel center member designated for use with that tire in this standard or in Standard No. 129.

(a) FOR TEMPORARY USE ONLY; and

(b) MAXIMUM 80 KM/H (50 M.P.H.).

S8 *Requirements for Vehicles Equipped with Non-Pneumatic Spare Tire Assemblies*

S8.1 *Vehicle Placarding Requirements.* A placard, permanently affixed to the inside of the spare tire stowage area or equally accessible location adjacent to the non-pneumatic spare tire assembly, shall display the information set forth in S7 in block capitals and numerals not less than 6 millimeters high preceded by the words "IMPORTANT–USE OF SPARE TIRE" in letters not less than 9 millimeters high.

S8.2 *Supplementary Information.* The owner's manual of the vehicle shall contain, in writing in the English language and in not less than 10 point type, the following information under the heading "IMPORTANT–USE OF SPARE TIRE":

(a) A statement indicating the information related to appropriate use for the non-pneumatic spare tire including at a minimum the information set forth in S8 (a) and (b) and either the information set forth in S5.3.6 or a statement that the information set forth in S5.3.6 is located on the vehicle placard and on the non-pneumatic tire;

(b) An instruction to drive carefully when the non-pneumatic spare tire is in use, and to install the proper pneumatic tire and rim at the first reasonable opportunity; and

(c) A statement that operation of the vehicle is not recommended with more than one non-pneumatic spare tire in use at the same time.

S9 *Non-Pneumatic Rims and Wheel Center Members*

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
S9.1	*Non-Pneumatic Rim Requirements.* Each non-pneumatic rim that is part of a separable non-pneumatic spare tire assembly shall be constructed to the dimensions of a non-pneumatic rim that is listed pursuant to S4.4 of §571.129 for use with the non-pneumatic tire, designated by its non-pneumatic tire identification code, with which the vehicle is equipped.	
S9.2	*Wheel Center Member Requirements.* Each wheel center member that is part of a separable non-pneumatic spare tire assembly shall be constructed to the dimensions of a wheel center member that is listed pursuant to S4.4 of §571.129 for use with the non-pneumatic tire, designated by its non-pneumatic tire identification code, with which the vehicle is equipped.	

* This regulation covers new pneumatic tyres designed for road use by mopeds and motor cycles;
* Application for approval of a type of pneumatic tyre shall be submitted by the holder of the trade name or mark or by his duly accredited representative.
  It shall specify:
- The tyre size designation;
- The trade name or mark;
- The category of use (normal, special or snow);
- The structure;
- The speed category;
- The load-capacity index of the tyres;
- Whether the tyre is to be used with or without an inner tube;
- Whether the tyre is “normal” or “reinforced”;
- The ply-rating number of tyres for motor cycle derivatives;
- The overall dimensions: overall section width and overall diameter;
- The factor x
- The rim on which the tyre can be mounted;
- The measuring rim and test rim;
- The test and measurement pressures;
- For tyres identified by means of letter code “V” within the size designation and suitable for speeds over 240 km/h or for tyres identified by means of letter code “Z” within the size designation and suitable for speeds over 270 km/h, the maximum speed permitted by the tyre manufacturer and the load carrying capacity for the maximum speed.
- Drawings or photographs in triplicate of the side walls and tread of the tyres and by a dimensioned drawing of the cross-section of the tyre submitted for approval;

* l. Section width of a tyre

* The section width is obtained by means of the following formula:

$S = S1 + K (A – A1)$

Where: S is the "section width" expressed in mm and measured on the measuring rim;
S1 is the "nominal section width" (in mm) as shown on the side wall;
A is the width (expressed in mm) of the measuring rim;
A1 is the width (expressed in mm) of the theoretical rim.
K shall be taken to equal 0.4.

*2. Outer diameter of a tyre :

* The outer diameter of a tyre is obtained by means of the following formula:

$D = d + 2H$

Where: D is the outer diameter expressed in mm.
d is the conventional number expressed in mm.
H is the nominal section height in mm, equal to: $H=0.01 \cdot S1 \cdot Ra$,
S1 is the nominal section width in mm, and Ra is the nominal aspect ratio.

*3. Methods of measuring pneumatic tyres

The dimensions of pneumatic tyres shall be measured by the procedure described in annex 6 attached herewith.

*4. Tyre section-width specifications

The overall width of a tyre may be less than the section width or widths determined pursuantant to paragraph 2.(1)*1. above.

It may exceed that value up to the value shown in the annex 5 or for sizes not included in annex 5 by the following percentages:

For normal and snow service : rim diameter code 13 and above: +10%
rim diameter code up to 12 inclusive: +8%

For special service tyres which are suitable for limited road use and are marked MST: 25%.

*5. Tyre outer-diameter specifications

The outer-diameter of a tyre must not be outside the values Dmin and Dmax specified in annex 5.
For sizes not listed in annex 5 the outer diameter of a tyre must not be outside of the values Dmin and Dmax obtained from the following formula:
Dmin = d + (2H•a), Dmax = d + (2H•b)
where: “H” and “d” are as defined as in paragraph 2.(1)*2. above.
“a” and b are specified in the followings, respectively.
where: “H” and “d” are as defined as in paragraph 2.(1)*2. above.
“a” and b are specified in the followings, respectively.

For normal highway service tyres and snow tyres	a
rim diameter code 13 and above	0.97
rim diameter codes up to 12 inclusive	0.93
for special service tyres	1.00
For normal highway service tyres	b
rim diameter code 13 and above	1.07
rim diameter codes up to 12 inclusive	1.10
for snow tyres and special service tyres	1.12

*1. The pneumatic tyre shall undergo high speed performance test carried out by the procedure described in annex 7 (attached herewith) to this Regulation.

*2. Where application is made for tyres identified by means of letter code “V” within the size designation and suitable for speeds over 240 km/h or for tyres identified by means of letter code “Z” within the size designation and suitable for speeds over 270 km/h, the above test is carried out on one tyre at the test conditions marked within parenthesis on the tyre.

Another test must be carried out on a second tyre of the same type at the test conditions if any specified as maximum by the tyre manufacturer.

*3. A tyre which, after undergoing the high performance test, does not exhibit any tread separation, ply separation, cord separation, chunking or broken cords shall be deemed to have passed the test.

*4. The outer diameter of the tyre, measured at least six hours after the test, must not differ by more than ± 3.5% from the outer diameter as measured before the test.

*5. The overall width of the tyre measured at the end of the test must not exceed the value determined in paragraph 2(1)*4 above.

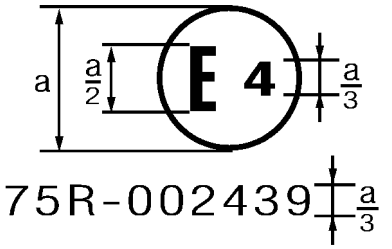
*1. The tyres indicated in paragraph 1.1 of annex 9 (attached herewith) to this Regulation, which have passed the test for the performance requirements in accordance with paragraph *1~5 above, shall be submitted to a dynamic growth test to be carried out in accordance with the procedure described in the said annex.

* Pneumatic tyres submitted for approval shall bear on at least one side wall the following markings:

- The trade name or mark;
- The tyre-size designation;
- An indication of the structure as follows:
  On diagonal tyres, no metking, or the letter “D”,
  On bias-belted tyres: the letter “B” placed in front of the rim diameter marking and, in addition the words “BIAS-BELTED” can be added,
  On radial-ply tyres: the letter “R” placed in front of the rim diameter marking and, the words “RADIAL” can be added.
- An indication of the tyre's speed category by means of the symbol;
- The inscription “M+S” or “M•S” or “M&S” in the case of a snow tyre;
- The inscription “MST” in the case of multiservice tyres;
- The inscription “MOPED” (or alternatively “CYCLOMOTEUR” or “CICLOMOTORE” in the case of moped tyres;
- The load-capacity indices;
- The words “TUBELESS” if the tyre is designated for use without an inner tube;
- The word “REINFORCED” or “REIN” if the tyre is a reinforced tyre;
- The data of manufacture in the form of a group of three digits that may be placed on one sidewall only;
- Tyre suitable for speeds above 240 km/h must be marked with the appropriate letter code “V” or “Z”, as applicable in front of the indication of the structure.
- Tyre suitable for speeds above 240 km/h or (270 km/h respectively) must bear ,within parenthesis, the marking of the load capacity index applicable at a speed of 210 km/h (or 240 km/h respectively) and a reference speed category symbol as follows:
  “V” in case of tyres identified with the letter code “V” within the size designation.
  “W” in case of tyres identified with the letter code “Z” within the size designation.
- Tyres shall provide adequate space for the approval markings.
- The approval mark that is given as an example of the arrangement.
- The markings and the approval mark referred to above paragraphs shall be moulded on to or into the tyres. They shall be clearly legible.

ECE Regulation (ECE 75)

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT



a = 9 mm (min)

Annex 7
PROCEDURE FOR LOAD/SPEED PERFORMANCE TESTS

1. Preparation of tyre

1.1. Mount a new tyre on the test rim specified by the manufacturer pursuant to paragraph 4.1.12. of this Regulation.

1.2. Inflate the tyre to the appropriate pressure given in the following table:

TESTING INFLATION PRESSURE (bars)

Tyre Size		Speed Category	Inflation pressure	
			bar	kPa
Moped	Standard	B	2.50	250
	Reinforced		3.00	300
Standard		F, G, J, K	2.50	250
		L, M, N, P	2.50	250
		Q, R, S	3.00	300
		T, U, H, V	3.50	350
Reinforced		F, G, J, K, L, M, N, P	3.30	330
		Q, R, S, T, U, H	3.90	390
Motor cycle Derivatives	4 PR	F, G, J, K, L, M	3.70	370
	6 PR		4.50	450
	8 PR		5.20	520

For speed above 240 km/h the test pressure is 3.20 bar (320 kPa).

For other types of tyre inflate to the pressure specified by the manufacturer in accordance with annex 1, item 14.2. of this regulation.

1.3. The manufacturer may request, giving reasons, the use of test-inflation pressures differing from those given under paragraph 1.2. above. In such a case the tyre shall be inflated to that pressure.

1.4. Condition the tyre-and-wheel assembly at test room temperature for not less than three hours.

1.5. Readjust the tyre pressure to that specified in paragraphs 1.2. or 1.3. above.

2. Test procedure

2.1. Mount the tyre-and wheel assembly on the test axle and press it against the outer face of a smooth test drum of 1.70 m ± 1% or 2.0 m ± 1% in diameter.

2.2. Apply to the test axle a load equal to 65% of

2.2.1. The maximum load rating equated to the Load Capacity Index for tyres with Speed Symbols up to H inclusive,

2.2.2. The maximum load rating associated with a maximum speed of 240 km/h for tyres Speed Symbol "V" (see paragraph 2.33.2. of this Regulation).

2.2.3. The maximum load rating associated with a maximum speed of 270 km/h for tyres with speed symbol "W" (see paragraph 2.33.3.).

2.2.4. The maximum load rating associated with the maximum speed specified by the tyre manufacturer for tyres suitable for speeds above 240 km/h (or 270 km/h as applicable) (see paragraph 6.2.1.1.).

2.3. The tyre pressure must not be corrected throughout the test and the test load must be kept constant.

2.4. During the test the temperature in the test room must be maintained between 20°C and 30°C or at a higher temperature if the manufacturer so agrees.

2.5. The test shall be run without interruption, in accordance with the following:

2.5.1. Twenty minutes is allowed to build up from zero to the initial test speed;

2.5.2. Initial test speed: 30 km/h less than the maximum rated speed of the tyre, if a 2.0 m diameter test drum is used, or 40 km/h less if a 1.7 m diameter test drum is used;

2.5.2.1. The maximum speed to be considered for the second test in case of tyres suitable for speeds above 240 km/h for tyres identified by means of letter code "V" within the size designation (or 270 km/h for tyres identified by means of letter code "Z" within the size designation) is the maximum speed specified by the tyre manufacturer (see paragraph 4.1.15.).

2.5.3. Speed steps of 10 km/h;

2.5.4. Test duration at each speed step: 10 minutes;

2.5.5. Total duration of the test: 1 hour;

2.5.6. Maximum test speed: the maximum rated speed of the type of tyre if the test is performed with a 2.0 m diameter test drum; maximum rated speed for the type of tyre less 10 km/h if the test is performed with a 1.7 m diameter test drum.

2.5.7. In case of moped tyres (speed category symbol B) the test speed is 50 km/h. The build-up from 0 to 50 km/h is 10 minutes, the duration at the speed step is 30 minutes with a total duration of the test of 40 minutes.

2.6. However in case a second test is performed to assess the top performances of tyres suitable for speeds above 240 km/h the procedure shall be the following:

2.6.1. Twenty minutes to build up from zero to the initial test speed;

2.6.2. Twenty minutes at the initial test speed;

2.6.3. Ten minutes to build up to the maximum test speed;

2.6.4. Five minutes at the maximum test speed;

3. Equivalent tests

If a test other than that described above is used, its equivalence must be proved.

Annex 9
TEST PROCEDURE FOR THE DYNAMIC GROWTH OF TYRES

1. Scope and range of application

1.1. This testing procedure is applicable for normal highway service tyres mentioned in paragraph 3.4.1. below.

1.2. It serves to determine the maximum tyre growth under the influence of centrifugal forces at the admissible maximum speed.

2. Description of test procedure

2.1. The test axle and the rim must be controlled in order to assure a radial run-out less than +0.5 mm and a lateral run-out less than ± 0.5 mm, when measured at the bead seat of the wheel.

2.2. Contour Outline Device

Any device (projecting grid, camera, spot lights and others) which permits the external contour of the tyre cross section to be outlined distinctly, or to establish an enveloping curve, normal to the tyre equator, at the point of the maximum deformation of the tread.

The device should reduce to a minimum any distortion and assure a constant (known) ratio (K) between the plotted contour and the actual tyre dimensions.

The device shall permit reference of the tyre contour to the wheel axis.

2.3. The deviation of the tyre tread peripheral speed, measured with a stroboscope, from the corresponding maximum speed of the tyre may not exceed ± 2%.

2.4. If another test procedure is applied, it must be proved to be equivalent to the present procedure.

3. Execution of test

3.1. During the test the temperature in the test room must be maintained at between 20°C and 30°C or at a higher temperature if the tyre manufacturer agrees.

3.2. The tyres to be tested shall have passed the load speed performance test according to annex 7 of the Regulation, without showing any defect.

3.3. The tyre to be tested shall be fitted to a wheel having a rim conforming to the applicable standard.

3.4. The tyre inflation pressure (testing pressure) shall be adjusted to the values indicated in paragraph 3.4.1.

3.4.1. Road tyres in bias and bias/belted construction.

Speed category	Tyre construction	Testing pressure	
		bar	kPa
P/Q/R/S	standard	2.5	250
T and above	standard	2.9	290

3.5. The tyre/wheel assembly shall be stored at the temperature of the testing room for a period of at least three hours.

3.6. After this conditioning storage period the inflation pressure shall be readjusted to the value indicated in paragraph 3.4.

3.7. Mount the tyre and rim assembly on the test axle and ensure the assembly is freely rotating. The tyre can be rotated either by means of a drive motor acting on the tyre axis or by pressing it against a test drum.

3.8. Accelerate the assembly without interruption to reach within five minutes the maximum speed capability of the tyre.

3.9. Position the contour outline device and ascertain that it is perpendicular to the rotation of the test tyre tread.

3.10 Check that the peripheral speed of the tread surface is within ± 2% of the maximum speed capability for the tyre.

Maintain the equipment at constant speed for at least five minutes and then portray the tyre cross-section in the area of maximum deformation, or check that the tyre does not exceed enveloping curve.

4. Evaluation

4.1. The limiting curve (enveloping curve) specified for the mounted tyre/wheel assembly shall be as in the example below;

In accordance with paragraphs 6.1.4. and 6.1.5. of the Regulation, the following limit values have been established for the enveloping curve:

Tyre speed category	Maximum Overall Width in Service (Smax) (1)	H dyn. (mm)	
		Category of Use: Normal	Category of Use: Snow and special
P/Q/R/S	S × 1.15	H × 1.10	H × 1.15
T/U/H	S × 1.15	H × 1.13	H × 1.18
Over 210 km/h	S × 1.15	H × 1.16	

(1) In case of tyres marked “MST” the coefficient for the calculation of the maximum overall width in service (Smax) is 1.25 instead of 1.15.

4.1.1. The main dimensions of the enveloping curve must be adjusted, if applicable, taking into account the constant ratio K (see paragraph 2.2. above).

4.2. The contour of the tyre portrayed at the maximum speed shall not exceed the enveloping curve, with reference to the tyre axes.

4.3. The tyre is not subjected to a further test.

ITEM 96-16

Head restraints

APEC Regulation Analysis Findings
Item No. 16: Head Restraints

1. Australia, Canada, People's Republic of China, Japan, Korea and U.S. adopt head restraint requirements, which are similar to each other.

2. A comparison of specific requirements for head restraint is as follows.

(1) Dimensions (B-a): The height (upper edge) and width of the head restraint are specified by Australia, Canada, People's Republic of China, Japan, Korea and U.S.
In addition, the width of the head restraint mounted on a bench-type seat is set forth by Australia, Canada, Korea and U.S.
Europe has changed the upper-edge height of the head restraint from 700mm to 750mm in its ECE R25, but no APEC member economy has adopted the new height as yet.

(2) Dynamic or static load test (C-a): Australia, Canada, Japan, Korea and U.S. provide a choice between a static and a dynamic load test.
There is no dynamic load test requirement in People's Republic of China's GB and Europe's ECE R25.

Item Number and Title : 16 Head Restraints

A : Application : Passenger Vehicles

Name of Economy	B-a: Structure of Parts (1)Requirement of Measure	C-a: Performance of Parts (1)Head Restrains..8G Load (Dynamic Strength Test)	C-a: Performance of Parts (2)Seat back.Moment (Static Strength Test)	Alternative Standards
Australia	ADR 22 (700 mm or higher of height)	ADR 22 (45 degree or less at 8G load)	ADR 22 (102 mm or less with 370 Nm) (up to 890 N load)	ECE 25 & FMVSS 202 (for items provided in ADR 22.2, 22.3 & 22.4)
Brunei				
Canada	Common(MVSR 202) (700 mm or higher of height)	Common(MVSR 202) (45 degree or less at 8G load)	Common(MVSR 202) (102 mm or less with 373 Nm) (up to 890 N load)	
Chile				
China	Common(GB 11550-95) (700 mm or higher of height)		Common(GB 11550-95) (102 mm or less with 373 Nm) (up to 890 N load)	
Hong Kong				
Indonesia				
Japan	SRRV 22 (700 mm or higher of height)	SRRV 22 (45 degree or less at 8G load)	SRRV 22 (102 mm or less with 38 kgm = 373 Nm) (up to 90 kgf = 890 N load)	ECE 25
Korea	Common(MVSS 99) (700 mm or higher of height)	Common(MVSS 99) (45 degree or less at 8G load)	Common(MVSS 99) (102 mm or less with 38 kgm = 373 Nm) (up to 90 kg = 890 N load)	
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei				
Thailand				
U.S.A	FMVSS 202 (27.5 in. = 700 mm or higher of height)	FMVSS 202 (45 degree or less at 8G load)	FMVSS 202 (4 in. = 101.4 mm or less with 3300 lb-in. = 373 Nm) (up to 200 lb = 890 N load)	

Item Number and Title : 16 Head Restraints

A : Application : Passenger Vehicles

Name of Economy	B-a:Structure of Parts (1)Requirement of Measure	C-a:Performance of Parts (1)Head Restrains..8G Load (Dynamic Strength Test)	C-a:Performance of Parts (2)Seat back..Moment (Static Strength Test)	Alternative Standards
ECE	ECE 25 (750 mm or higher of height)		ECE 25 (102 mm or less with 373 Nm) (up to 890 N load)	

ITEM 96-16 Head Restraints

Australia (Regulation Name :ADR22/00)		
Items	Summary	Figure and additional explanations
A: Application	* Passenger Car(MA) * Forward control Passenger cars(MB) * Off-road Passenger cars(MC)	
B-a:Structure of Parts 1)Requirement of measure	"A Head Restraint" shall be provided for each front outboard seating position. "A Head Restraint" shall be so designed that : * it present an impact surface which extends between 2 planes not less than 115 mm apart and normal to the trso line. * the upper boundary of the impact surface is not less than 700 mm above the seating reference point measured along the trso line , for any position of adjustment which may be provided. The head restraint shall be so designed that: The with of the head restraint shall be not less than 250 mm for use with bench seats and not less than 170 mm for use with individual seats when measured between heights of 585 mm and 635 mm above the seating reference point and along the trso line.	
B-b: Structure of Parts Installed in body	N/R	
C-a: Performance of Parts 1)head rest…8G load (dynamic strength test) C-a: Performance of Parts 2)head rest…moment (static strength test)	The head restraints shall meet the conditions of either a dynamic or static. Dynamic test; (requirement) Acceleration of the seat supporting structure of up to 8 times the acceleration due to gravity shall not produce an angular displacement of the head reference line of more than 45 degree. (Test method) A dummy meeting the requirements shall be placed in the seating position under test and restraint by a seat belt providing upper trso restraint. A Forward acceleration shall be applied to the seat supporting structure, When graphically depicted, the magnitude of acceleration curve shall not be less than that of a half-sine wave having the amplitude of 8 times the acceleration due to gravity and a duration of 80 milliseconds and not more than that a half-sine wave having an amplitude of 9.6 times the acceleration due to gravity and a during of 96 milliseconds. Static test; (requirement) The rearmost point of the head form shall not be displaced to more than 102 mm perpendicularly earward of displaced extended trso line during the application of load specified. (Test method)A test device shall be placed in the seating position under test and a rearward moment of 370 Nm about the seating reference point shall be applied through the back pan. After removing the back pan , using a 165 mm diameter in plan view and a 150 mm height in profile view , apply perpendicular to the displaced extended trso line a rearward load , at a point 635 mm along the trso line from the seating reference point that will produce a 370 Nm moment about the seating reference point. The load shall be gradually increased to 890 Nm or until the seat back fails, whichever occurs first.	

ITEM 96-16 Head Restraints

Australia (Regulation Name :ADR22/00)		
Items	Summary	Figure and additional explanations
C-a: Performance of Parts 3)Front side…headform impact (energy absorption test)	N/R	
C-a: Performance of Parts 4)Back side… headform impact (energy absorption test)	N/R	
C-b: Performance of Parts Installed in body	N/R	
D-a : Label Marking Requirement Its Own Requirement	N/R	
D-b : Label Marking Requirement Its Installed in Body	N/R	
E: Reference Standards	ECE 25/01 or 25/01 ”Head Restraints (headrests)” and FMVSS 202-33F.R.15065, October 9, 1968 “Head Restraints - Passenger Cars” shall be deemed to be equivalent to the technical requirements of this rule. ECE R17/03 ”Strength of Seats and their Anchorages and the Characteristics of any Head Restraints provided for the Seats” shall deemed to be equivalent to the technical requirements of this rule. For vehicles which have an ECE approved to R17 the approval must be of the form 17RA03XXX including that the “Seat” was approved to ECE 17/03 and that at least one “Seat” was fitted or was capable of being fitted with a “Head Restraint”.	

ITEM 96-16 Head Restraints

CANADA (Regulation Name:MVSR 202)		
Items	Summary	Figure and additional explanations
A: Application	A head restraint shall be provided at each front outboard designated seating position in a passenger car, multipurpose passenger vehicle with a GVWR of 4536 kg or less , bus with a GVWR of 4536 kg or less and truck with a GVWR of 4536 kg or less	
B-a: Structure of Parts 1)Requirement of measure C-a: Performance of Parts 1)head rest…8G load (dynamic strength test) C-a: Performance of Parts 2)head rest…moment (static strength test)	(Requirement)When tested during a forward acceleration of not less than 8 g on the seat supporting structure , limits rearward angular displacement of the head reference line to 45 degree from the torso reference line ; or displacement of the head reference line to 45 degree from the torso reference line ; or (Test method)The test referred to in paragraph (a) shall carried out as follows. the head restraint shall be in its fully extended design position; A forward acceleration shall be applied to the structure supporting the seat in such a manner that , when graphically Depicted , the magnitude of the acceleration curve shall not be less than that of a half-sine wave having an amplitude of 8g and a duration of 80 milliseconds and not more than that of a half-sine wave having an amplitude of 9.6 g and a duration of 96 milliseconds ; and The maximum rearward angular displacement of the head reference line shall be measured. (Requirement) when adjusted to its fully extended design position, (i) has an overall height of not less than 700 mm when measured perpendicularly to a line that passes through the seating reference point and is perpendicular to the torso line, (ii) has a lateral width of not less than 250 mm in the case of a bench-type seat or 170 mm in the case of an individual seat , when measured either 63 mm below of the head restraint or 635 mm above seating reference point, (Requirement) (iii) does not allow the rearmost portion of the head form to be displaced more than 102 mm perpendicularly rearward of the extended displaced torso reference line during the application the test load , and (iv) withstands an increasing load until either failure of the seat or seat back occurs or the load so increased is equal to 890 N (Test method) An H-point machine with the centreline of the head-room probe in the full back position shall be placed at the manufacture's The displaced torso reference line shall be established by applying a rearward moment of 373 Nm about the seating reference point to the seat back through the back pan of the test device so placed; The back pan shall be removed and , using a 165 mm diameter spherical head form or a cylindrical head form having a 165 mm diameter plan view and a 153 mm height in profile view , a rearwards initial load shall be applied perpendicular to the displaced torso reference line and 65 mm below the top of the head restraint sufficient to produce a 373 Nm moment about the seating reference point; and The initial load shall be gradually increased 890 n or until the seat the seat back fails , whichever occurs first.	

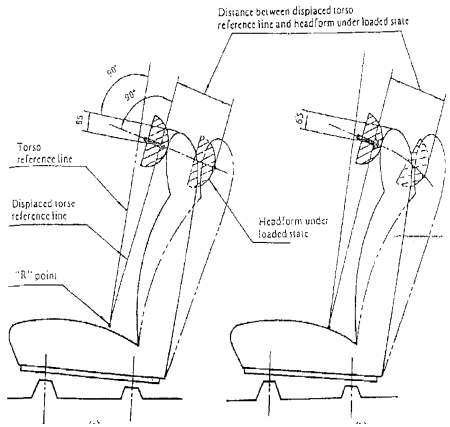
ITEM 96-16 Head Restraints

CANADA (Regulation Name:MVSR 202)		
Items	Summary	Figures and additional explanations
B-b: Structure of Parts	N/R	
C-a: Performance of Parts 3)Front side of seat back…headform impact (energy absorption dynamic test)	N/R	
C-a:Performance of Parts 4)Back side of seat back… headform impact (energy absorption dynamic test)	N/R	
:Performance of Parts Installed in body	N/R	
D-a:Label Marking Requirement Its Own Requirement	N/R	
D-b:Label Marking Requirement Its Installed in Body	N/R	
E: Reference Standards	N/R	

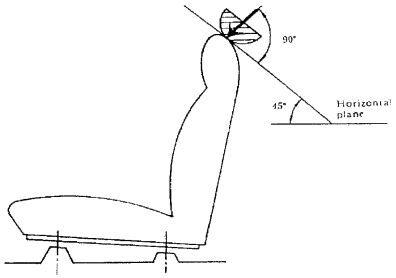
ITEM 96-16 Head Restraints

China(Regulation name : GB 11550-95)		
Items	Summary	Figures and additional explanations
A: Application B-a: Structure of Parts 1)Requirement of Measure	Position and dimension The position and dimension of the head restraint shall conform to the following. In case of the head restraint is adjustable, the fixed position of the head restraint shall conform to both (1) and (2). (1) The distance from the top of head restraint to "R" point shall be more than 700 mm for driver seat and 650 mm for other seats measured along the direction parallel with the torso reference line. (2) The external profile width of the head restraint shall be more than 85 mm to each side of the symmetry plane of the seat measured along the direction parallel with torso reference line, and either 65 mm below the top of head restraint or 635 mm above R point. If the head restraint is adjustable, the external profile height of the head restraint shall be more than 100 mm measured along the direction parallel with the torso reference line.	
China(Regulation name : GB 11550-95)		

ITEM 96-16 Head Restraints

Items	Summary	Figures and additional explanations
B-b: Structure of Parts Installed in Body	N/R	
C-a: Performance of Parts 1)Head Restraints…8G Load	N/R	
C-a: Performance of Parts 2)Head Restraints… Moment Load (Static Strength Test)	(requirements) Position and dimension The position and dimension of the head restraint shall conform to the following. In case of the head restraint is adjustable, the fixed position of the head restraint shall conform to both (1) and (2) (1) The distance from the top of head restraint to "R" point shall be more than 700 mm for driver seat and 650 mm for other seats measured along the direction parallel with the torso reference line. (2)The external profile width of the head restraint shall be more than 85 mm to each side of the symmetry plane of the seat measured along the direction parallel with torso reference line, and either 65 mm below the top of head restraint or 635 mm above R point. If the head restraint is adjustable, the external profile height of the head restraint shall be more than 100 mm measured along the direction parallel with the torso reference line. When testing , the maximum displacement of the headform permitted by the head restraint shall be less than 102 mm , and no drop and breakage of head restraint occur earlier than failure of the seat or seat back when load is increased to 890 N. (test method) After aligning the "H" point of the back pan with the "R" point of the seat, a force producing a moment of 373 Nm about the "R" point shall be applied through the back pan to the seat back. Then determine the position of the displaced torso line of the back pan. (under this loading state.) A force producing a moment of 373 Nm about the "R" point shall be applied through the headform to the head restraint on the seating center plane. The force applying point shall be positioned at a distance of 65 mm below the top of the head restraint measured alone the direction parallel with the torso reference line on the seating center plane as indicated in Fig.1. The force applying direction shall be vertical to the displaced torso reference line as indicated in Fig.1(a), or at the periphery with the "R" point as its rotational center as indicated in Fig.1(b).	Fig. 1 Force Applying Point, Force Applying Direction an Direction and Displacement of Headformd 

ITEM 96-16 Head Restraints

China(Regulation name : GB 11550-95)		
Items	Summary	Figures and additional explanations
	The distance between the forward edge of the headform and the displaced torso reference line (referred to headform displacement) shall be measured, and check the head restraint for damaged at the same time. After the test prescribed above has been conducted, the applying force shall be increased up to 890 N, and check the head restraint, seat and seat frame for damage at the same time.	
C-a:Performance of Parts 3)Frontward of Seat Back… Headform Impact (Energy Absorption Dynamic Test)	(Requirement) When testing , deceleration of the headform shall not exceed 80 g continuously for more than 3 millisecond. (Test method) Dynamic test shall be carried out by using testing machine of pendulum type, ejection type, drop type, etc. Impact test from front The impact point shall be positioned at a distance of 65 mm below the top of the head restraint, measured along the direction parallel with the torso reference line on the seating center plane.Impact shall be given to the front side of the head restraint by the headform at a speed of 25 ± 1 km/h in horizontal direction. The curve of the acceleration and its continuous time of impact headform shall be recorded during impact action.	
C-a: Performance of Parts 4)Backward of Head Restraints… Headform Impact (Energy Absorption Dynamic Test)	(Requirement) When testing , deceleration of the headform shall not exceed 80 g continuously for more than 3 millisecond. (Test method) Dynamic test shall be carried out by using testing machine of pendulum type, ejection type, drop type, etc. The impact point shall be positioned on the point where a line drawn at 45° to horizontal plane contacts the back side of the head restraint on the seating center plane. Impact shall be given to the back side of the head restraint by the headform at a speed of 25 ± 1 km/h in direction of 45° to horizontal plane. (See Fig. 2)	Fig.2 Impact Point and Impact Direction
C-b: Performance of Parts Installed in body	N/R	
D-a: Label Marking Requirement Its Own Requirement	N/R	

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D-b: Label Marking Requirement of Its Installed in Body	N/R	
E:Reference Standards	N/R	

ITEM 96-16 Head Restraints

Japan(Regulation name:SRRV 22-4)(effective date:1974.11)		
Items	Summary	Figures and additional explanations
A:Application	Passenger car(including taxi, excluding motor vehicle which has more than 11seating positions, whose maximum speed is not more than20 km/h and motor cycle)	
B-a: Design Req. as part 1)Dimension	• The upper edge of the head restraint shall be at least 700 mm from a plane which passes through the "R" point and is perpendicular to the torso reference line, or shall be adjustable more than 700 mm. • The width of the head restraint in a direction perpendicular to the seating center shall be at least 85 mm in respect to both right and left sides at a position at a distant of 65 mm below the top of the head restraint or at a distant of 635 mm above the "R" point, when measured in parallel with the torso reference line • The height of the head restraint, when measured in parallel with the torso reference line on the seating center plane, shall be at least 100 mm. However in case the gap between the head restraint and the seatback is not more than 50 mm, the aforesaid requirement shall not be applied.	
B-b: Design Requirement as installed	None	
C-a: Performance Req. as part 1)Headrest • •8G force	None	

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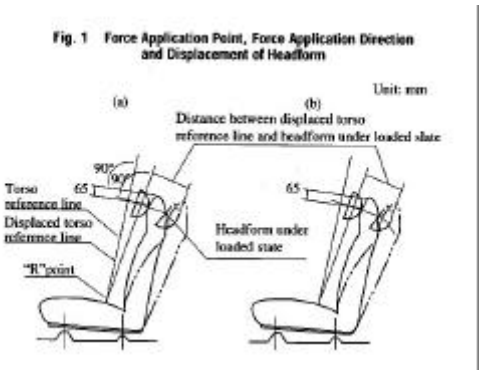
C-a:Headrest Moment 2)Headrest Moment (Static Test)	<Standard> The distance between the displaced torso reference line and the forward edge of the headform under the loaded state shall not exceed 102 mm.The head restraint and its attachment section shall not drop or break before the seat has broken. <Test Method> (test method) • After aligning the "H" point of the back pan with the "R" point, a force producing a moment of 38 kgfm(373Nm) about the "R" point shall be applied through the back pan to the seatback on the seating center plane. Determine the position of torso line. • A force producing a moment of 38 kgfm (373 Nm) about the "R" point shall be applied through the headform to the head restraint on the seating center plane. • The force application direction shall be a position at a distance of 65 mm below the top of the head restraint, when measured in parallel with the torso reference line on the seating center plane. • The force application direction shall be at right angles to the displaced torso reference line. However, after the force has started to be applied, the applying direction shall be at right angles to the displaced torso reference line, as indicated in Fig. 1(a), or at the peripheral direction with the "R" point as its rotational center as indicated in Fig. 1(b). • After the test prescribed in Paragraph 3-2-2 has been conducted, the applying force shall be increased up to 90 kgf (890 N).	

ITEM 96-16 Head Restraints

Japan(Regulation name:SRRV 22-4)(effective date:1974.11)		
Items	Summary	Figures and additional explanations
C-a: 3)Headrest Moment (Dynamic Test)	<Standard> Parts of the front and rear faces of the head restraint shall be padded to prevent any direct contact of the head of an occupant with the components of the structure. The components of the structure of the head restraint with a Shore hardness of not less than 50 A shall not contact with headform directly. <Test Method> (1) Test from Front An impact shall be given to the head restraint by letting the headform (its effective mass shall be 6.8kg, hereinafter as the same as in 3-3) strike at a speed of 24.1 km/h or more, using a pendulum type, ejection type, drop type or other type of testing machine. In this impact test, the impact point and impact direction shall be as follows ; The impact point shall be a position, at a distance of 65 mm below the top of the head restraint when measured in parallel with the torso reference line on the seating center plane. The impact direction shall be horizontal on the seating center plane. (2)Test from Rear An impact shall be given to the back side of the head restraint by letting the headform strike at a speed of 24.1 km/h or more, using a testing machine of a pendulum type, ejection type or drop type etc. In this case, the impact point and impact direction shall be as follows ; This test may be omitted for ahead restraint where this no possibility of it being collided directly by an occupant seating behind, e.g. a head restraint mounted on the most backward seat and a head restraint conducted by the test stipulated in technical standard for seatback impact absorption (Jisha Circular No.92 of March 7, 1975) The impact point shall be a position where a line drawn at 45 degrees to the horizontal plane contacts the back side of the head restraint on the seating center plane, as indicated in Fig.2. The impact direction shall be at 45degrees to the horizontal plane on the seating center plane.	
C-a: Performance of Parts 4)Back side of head restraint • • Headform Impact(Energy Absorption Dynamic Test)	17 Strength of seats	
C-b: Performance Req. as installed	None	
D-a: Marking/Label itself	None	
D-b: Marking as attached	None	
E :Reference Standard	ECE25, JIS D4606, JIS D4607-1970	

ITEM 96-16 Head Restraints

Korea (Regulation Name: THE REGULATIONS OF THE MOTOR VEHICLES SAFETY STANDARDS Article 99)		
Item	Summary	Figures and additional explanation
A: Application B-a: Structure of Parts 1)Requirement of measure C-a: Performance of Parts 1)head rest 8G load (dynamic strength test) C-a: Performance of Parts 2)head rest moment (static strength test)	Head Restraint(Article 26) The front seat (except the seat in the middle) of each passenger vehicle and mini and small bus shall be equipped with a head restraint to reduce head injuries in rear-end collisions. Head Restraint(Article 99) The head restraint of a front seat installed in each passenger vehicle and mini and small bus (except the seat in the middle) shall meet at least one of the following items. 1. (Requirement) the angular displacement of the head reference line(the line connecting between the center of the head and the pivot point of torso and neck of the 3-d manikin) from the torso reference line (the line connecting between the center of the head and the pivot point of thorax and pelvis oft 3-d manikin) shall be not more than 45 degrees. (Test method) a forward acceleration of 8 times the gravitational acceleration is being applied on the seat supporting structure 2. (Requirement) The head restraints , when adjusted to its highest design position , shall meet each of the following sub items. a) The top of the head restraint shall be at least 700 mm millimeters higher than the seating reference point. b) The lateral width of the head restraint shall be not less than 170 millimeters (254 millimeters , in the case of a bench-type seat) when measure either 65 millimeters below the top of the head restraint or 635 millimeters above the seating reference point. c) (Requirement) the rearmost portion the head restraint shall not be displaced more than 102 millimeters perpendicularly rearward of the displaced torso reference line. (Test method) Determine the displaced torso reference line by applying a rearward moment of 38 kilogram - meter about the seating reference point to the seat back through the test device back pan. After removing the back pan , using a 165 millimeter diameter spherical head form , a rearward moment of 38 kilogram-meter about the seating reference point is applied 65 millimeter below the top of the head restraints. d) (Requirement) After completion of the test specified in Sub item c , gradually increase the load to 90 kilograms or until the seat or seat back fails or the locking mechanism fails, the head restraint shall not fail or disengage	
B-b: Structure of Parts	N/R	

ITEM 96-16 Head Restraints

Korea (Regulation Name: THE REGULATIONS OF THE MOTOR VEHICLES SAFETY STANDARDS Article 99)		
Item	Summary	Figures and additional explanation
C-a: Performance of Parts 3)Front side of seat back headform impact (energy absorption test)	N/R	
C-a: Performance of Parts 4)Back side of seat back headform impact (energy absorption test)	N/R	
C-b: Performance of Parts Installed in body	N/R	
D-a: Label Marking Requirement Its Own Requirement	N/R	
D-b: Label Marking Requirement Its Installed in Body	N/R	
E: Reference Standards	N/R	

ITEM 96-16 Head Restraints

U.S.A FMVSS 202		
Item	Summary	Figures and additional explanation
A: Application	passenger cars , and to multipurpose passenger cars	
B-a: Structure of Parts 1)Requirement of Measure	Except for school buses , a head restraint that conforms to either (1) or (1) shall be provided at each outboard front designated seating position .It shall , when tested , during a forward acceleration of at least 8g on the seat supporting structure , limit limit rearward angular displacement of the head reference line to 45 degrees from the torso reference line. (test method):During a forward acceleration applied to the structure supporting the seat. the magnitude of the acceleration shall 8g (2)It shall , when adjusted to its fully extended design position , conform to (A) ,(B),(C),(D).	
C-a:Performance of Parts 1)Head Restraints…8G Load (Dynamic Strength Test)	(A) height of head restraint … When measured parallel to torso line , the top of the head restraint shall not be less than 27.5 inches above the seating reference point. (B)width of head restraint …When measured either 2.5 inches below the top of the head restraint or 25 inches above the seating reference point , the lateral width of the head restraint shall not be less than- (i) 10 inches for use with bench-type seat ; and (ii) 6.75 inches for use with individual seats. (C)moment(373Nm); (requirements):When tested , the rearmost portion of the head form shall not be displaced to more than 4 inches perpendicularly rearward of the displaced extended torso reference line during the application of the load .	
C-a: Performance of Parts 2)Head Restraints …Moment Load (Static Strength Test)	(test method):Establish the displaced torso reference line by applying a rearward moment of 3300 in.lb about the seating reference point to the seat back through the test device back pan located. After removing the back pan , using a 6.5 inch diameter spherical head form or a cylindrical head form having a 6.5 inch diameter in plain view and a 6-inch height in profile view, apply , perpendicular to the displaced torso reference line , a rearward initial load 2.5 inches below the top of the head restraint that will produce a 3300 in.ib moment about the seating reference point. (D) moment(increase until 90kg) (requirements):the head restraint shall withstand an increase • g load until one of the following occurs (i) failure of the seat or seat back : or (ii) application of a load of 200 pounds. (test method)Gradually increase this initial load to 200 lbs or until the seat or seat back fails, whichever occurs first.	
B-b: Structure of Parts	N/R	

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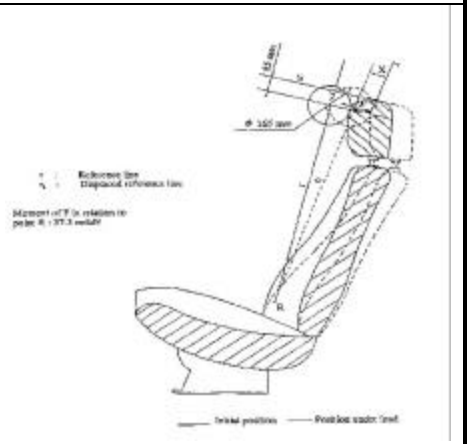
U.S.A FMVSS 202		
Item	Summary	Figures and additional explanation
C-a:Performance of Parts 3) Frontward of Seat Back • • Headform Impact	N/R	
C-a:Performance of Parts 4)Backward of Head Restraints • • Headform Impact	17 Strength of seats	
C-b: Performance of Parts Its Own Requirement	N/R	
D-a: Label Requirement	N/R	
E: Reference Standards	N/R	

ITEM 96-16 Head Restraints

ECE 25		
Item	Summary	Figures and additional explanations
A:Application B-a:Structure of Parts 1)Requirement of Measure	It does not apply to head-restraint devices which may be fitted to folding seats or seats facing towards the side or towards the rear. The height of the head restraint , measured in accordance with requirements shall conform to the following specifications. (1)For head restraints not adjustable for height , the height shall be not less than 750mm. (2)For head restraints adjustable for height. • The height shall not less than 750 mm values shall be obtained in a position between the highest and lowest positions to which adjustment is possible. • There shall be no "use position" resulting in a height of less than 700 mm. • In the case of seats other than the front seats the head restraints may be such that they can be be displaced to a position resulting in a height of less than 700 mm , provided that such position is clearly recognizable to the occupant as not being included for the use of the head restraint. • In the case of front seats head restraints may be such that they can be automatically displaced when the seat is not occupied , to a position resulting in a height of less than 700 mm , provided that they automatically return to the position of use when the seat is occupied. • Clearance between to head restraint and the interior surface of the roof , the windows or any part of the vehicle structure ; however , the clearance shall not exceed 25 mm. In the case of seats fitted with displacement and / or adjustment systems, this shall apply to all seat positions. Furthermore , there shall not be any "use position" resulting in a height lower than 700 mm. • Rear center seats or seating position shall not less than 700 mm. • The height of the device on which the head rests shall in the case of a head restraint adjustable for height be not less than 100 mm. • There shall be no gap of more than 60 mm between the seat back and the head restraint in the case of a device not adjustable for height. • If the head restraint is adjustable for height it shall , in its lowest position , be not more than 25 mm from the top of the seat back. • In the case of a head restraint not adjustable for height , the area to be considered is: above a plane perpendicular to the reference lone at 540 mm from the R point and between two vertical longitudinal planes passing at 85 mm on either side of the reference line. • In this case , one or more gaps , which regardless of its shape can show a distance "a" measured more than 60 mm , are permitted on the part of the device serving as the head restraint.	

ITEM 96-16 Head Restraints

ECE 25		
Item	Summary	Figures and additional explanations
	• The width of the head restraint shall be such as to provide suitable support for the head of a person normally seated. Head restraint shall cover an area extending not less than 85 mm to each side of the plane of symmetry of the seat for which the head restraint is intended. (There is a report on 108/WP29 Geneva , 12-14 March 1996) The height of head restraint : he words "less than 750 mm" to read " less than 800 mm" in the case of front seats and 750 mm in the case of other seat. For head restraints adjustable for height : amend the value of 700 mm to read 750 mm there shall not be any "use position" resulting in a height lower than 700 mm"	
B-b:Structure of Parts Installed in Body	N/R	
C-a:Performance of Parts 1)Head Restraints…8G Load	N/R	
C-a:Performance of Parts 2)Head Restraints … Moment Load (Static Strength Test)	(requirements) •The requirements shall be considered to be met if the distance is less than 102mm. •In the cases where the force is applied at a distance of 65 mm or less below the top of the head restraint , and only in such cases , it shall be increased to 89 daNm unless breakage of the seat or its back occur earlier. •If the head restraint is adjustable, it must not be possible to exceed the maximum prescribed height for use without voluntary action by the user in addition to adjusting operation. (Head restraint performance test method) •If the seat to the seat-back is adjustable relative to a head restraint anchorage to the vehicle structure , it shall be placed in the most unfavorable position. •By means of a spherical head 165 mm in diameter an initial force producing a moment of37.3 daNm about the "H" point shall be applied at right angles to the distanced reference line R at 65 mm below the top of the head restraint. •It shall be increased to 89 daNm unless brake of the seat or its back occurs earlier.	
C-a:Performance of Parts 3)Frontward of Seat Back … Headform Impact (Energy Absorption Dynamic Test)	Same as "17 HEADREST"	

ITEM 96-16 Head Restraints

ECE 25		
Item	Summary	Figures and additional explanations
C-a:Performance of Parts 4)Backward of Head Restraints • • Headform Impact (Energy Absorption Dynamic Test)	Same as "17 HEADREST"	
C-b: Performance of Parts Installed in body	N/R	
D-a: Label Marking Its Own Requirement	The devices submitted for approval shall be clearly and indelibly marked with the trade name or mark of applicant for approval.	
D-b Label Marking Requirement of Its Installed in Body	The devices provide adequate space for the approval mark. The head restraint is of the "integral" or "removable" type the markings may be reproduce on labels situated at a site.	
E: Reference Standards	N/R	

ITEM 96-17

Strength of seats

APEC Regulation Analysis Findings
Item No. 96-17: Strength of Seats

1. Australia, Canada, People's Republic of China, Japan, Korea and U.S. adopt regulations for the strength of seats, and their requirement items are varied.

2. A comparison of specific requirements for head restraint is as follows.

(1) Seat as a separate unit (B-a): Requirements for the seat locking system are adopted by Australia, Canada, People's Republic of China and U.S., and can be considered to be of the Australian, U.S. or ECE type.
Only Japan and Korea provide a requirement for seat size.

(2) Impact test on the seat as a separate unit (C-a-1, C-a-2): Those member economies which adopt an impact test on the seat have similar requirements for the testing equipment (headform) and test conditions.
Korea and Japan require the application of an impact test to both the front and back sides of the seat. On the other hand, Australia and the U.S. require that an impact test be applied to the back side of the seat.

(3) Static moment test on the seat as a separate unit (C-a-3): Australia, Canada, People's Republic of China, Japan, Korea and U.S. require that the seat remain unbroken under a moment load applied to the seating reference position.
Canada, People's Republic of China, Japan, Korea and U.S. prescribe a moment load value of 373Nm, compared with Australia's 530Nm.

(4) Seat anchorage test (C-b-1): Australia, Canada, Japan and Korea provide a choice between a static and a dynamic load test.
People's Republic of China and the U.S. specify only a static load test.

Item No.96-17 Strength of Seats

A : Application : Passenger Vehicles

Name of Economy	B-a: Structure of Parts (2) System of Seat Locks	B-a: Structure of Parts (3)Requirement of Measure	C-a: Performance of Parts (Energy Absorption Dynamic Test) (1)Front Side of Seat Back	C-a: Performance of Parts (Energy Absorption Dynamic Test) (2)Back Side of Seat Back	C-a: Performance of Parts (Static Strength Test) (3)Seat Back	C-b: Performance of Parts Installed in body (20G Load Test)
Australia	ADR 3 (self locking device & release control installation)			ADR 3 (80G or less for 3 milli. sec.)	ADR 3 (= ECE 17) (530Nm)	ADR 3 (20G load) (static or dynamic)
Brunei						
Canada	Common(MVSR 207) (self locking device & release control installation)				Common(MVSR 207) (3300 lb-in. =373 Nm)	Common(MVSR 207) (20G load) (static or dynamic)
Chile						
China	Common(GB 15083-94) (self locking device installation)				Common(GB 15083-94) (373 Nm)	FMVSS 207 (20G load) (static test only)
Hong Kong						
Indonesia						
Japan		SRRV 22 (40 cm or more of long & width)	SRRV 22 (80G or less for 3 milli. sec.)	SRRV 22 (80G or less for 3 milli. sec.)	SRRV 22 (38 kgm = 373 Nm)	SRRV 22 (20G load) (static or dynamic)
Korea		MVSS 24 & 25 (40 cm or more of long & width)	Common(MVSS 98) (80G or less for 3 milli. sec.)	Common(MVSS 98) (80G or less for 3 milli. sec.)	Common(MVSS 97) (38 kgm = 373 Nm)	Common(MVSS 97) (20G load) (static or dynamic)
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						

A: Application : Passenger vehicles						
Name of Economy	B-a: Structure of Parts (2) System of Seat Locks	B-a: Structure of Parts (3)Requirement of Measure	C-a: Performance of Parts (Energy Absorption Dynamic Test) (1)Front Side of Seat Back	C-a: Performance of Parts (Energy Absorption Dynamic Test) (2)Back Side of Seat Back	C-a: Performance of Parts (Static Strength Test) (3)Seat Back	C-b: Performance of Parts Installed in body (20G Load Test)
U.S.A	FMVSS 207 (self locking device & release control installation)				FMVSS 207 (3300 lb-in. = 373 Nm)	FMVSS 207 (20G load) (static test only)
ECE	ECE 17 (self locking device & release control installation)		ECE 17 (80G or less for 3 milli. sec.)	ECE 17 (80G or less for 3 milli. sec.)	ECE 17 (530 Nm)	ECE 17 (20G for 3 milli. sec. for static test) (48.3~53.1 km/h for dynamic test)

ITEM No. 96-17:Strength of seat

Australia ADR 3/03		
Items	Summary	Figure and additional explanations
A Application	*Passenger Car (MA) *Forward control Passenger cars (MB) *Off-road Passenger cars (MC)	
B-a: Structure of Parts 1) Exhibit Radii of Curvature in the Surface of the Seats	N/R	
B-a: Structure of Parts 2) Shift lock systems	* Except for a "Seats" having a back that is adjustable only for the comfort of its occupant hinged "Seats" or seat-backs shall be equipped with a self-locking device for restraining the hinged "Seats" or seat-back and a release control for releasing that restraining device to preclude the possible of impact forces acting on unrestrained hinged "Seats" or seat-backs. * Where the "Seat" must hinge to permit access to or egress from another seating position, the release control shall be readily accessible to the occupant of that "Seat" and to the occupant of any "Seat" immediately behind that "Seat".	
B-a: Structure of Parts 3) Requirement of measure	N/R	
B-b: Structure of Parts Installed in body	N/R	
C-a : Performance of Parts 1) Front side of head rest; headform impact (energy absorption test)	N/R	

ITEM No. 96-17:Strength of seat

Australia ADR 3/03		
Items	Summary	Figure and additional explanations
C-a: Performance of Parts 2)Back side of head rest… headform impact (energy absorption test)	(requirements)The rear parts of the "Seat" and "Head Restraint" when tested must not produce a deceleration a deceleration of the moving head greater than 80 times the acceleration due to gravity continuously for more than 3 ms. The requirements do not apply to rearmost "Seats" or back-to back "Seats" or vehicles with only a single row of "Seats". (test method)The dynamic testing equipment must consist of a rigid moving head having an effective mass of 6.8 ± 0.1kg. The portion of the moving head which contacts the "Seat" back must be of spherical shape with a diameter of 165 mm. impact point; surfaces of "Seats", including bench "Seats", are defined as those circumscribed by the full width of the "Seats", a transverse plane normal to the "Trso Reference Line" located 440 mm above the "Seating Reference Point" and a horizontal plane tangential to the top of the "Seat" back (including "Seats" with integral "Head Restraints") or tangential to the top of the "Head Restraint" where fitted either as a detachable or separate "Head Restraint". Impact direction; The direction of impact from the rear towards the front must be situated in a vertical longitudinal plane and lie along a line at The moving head must impact the "Seat" back at a velocity of not less than 6.69m/s.	
C-a: Performance of Parts 3)seat back…moment (static strength test)	(requirements)The "Seat Adjusters" need not be operable after the application of the loads. No release of the "Seat Adjuster" must occur during the application of the loads. (test method)A load producing a moment of 530 Nm about the "Seating Reference Point" for each occupant position for which the "Seat" is designed must be applied to the upper cross member in a "Rear ward" longitudinal direction , unless it is demonstrated that "Seat" assemblies such as rear "Seat" backs are supported by a vehicle body member capable of withstanding the nominated load. Testing which meets the 530 Nm requirement by any one of the following 3 methods is acceptable *force applied horizontally *force applied normal "Seat Back" *force applied longitudinally and "Rearward" to upper part of the "Seat Back" frame through a component simulating the back of a 3-D manikin.	

ITEM No. 96-17:Strength of seat

Australia ADR 3/03		
Items	Summary	Figure and additional explanations
C-b: Performance of Parts Installed in body 1)seat anchorage/seat back/ seat;in the body shell 20G load (static strength test) C-b: Performance of Parts Installed in body 2)seat anchorage/seat back/ seat…in the body shell 20G load (dynamic strength test)	(requirements) The "Seat Adjusters" need not be operable after the application of the loads. No release of the "Seat Adjuster" must occur during the application of the loads. Restraints Device for Hinged "Seat" or "Seat Back" must not release or fail. If non-self-locking auxiliary latches are provided they must unlatched during testing so that only the restraining device and hinges are taking the test loads. Where "Seats" are mounted on hinged covers, e.g. engine covers, and the "Seat" assembly can withstand the test loads without titling of the hinged cover and without any latches being latched, then the latches need not be self-locking. (test method) The following loads must be applied separately. Twenty times the weight of the entire "Seat" in a "Forward" longitudinal direction. The "Seat" must be located in the full "Forward" and upward design position. A load equal to 20 times the weight of the entire "Seat" must be applied in a "Rearward" longitudinal direction. A load equal to 20 times the weight of the entire "Seat" must be applied in a "Rearward" longitudinal direction. (Static test);It must be conducted in accordance with SAE document J879b "Motor Vehicle Seating Systems" , July 1968 using the values specified in and the procedures applicable to this rule. (Dynamic test);It must be conducted at the vehicle "Manufacture's" choice either to below two test. (1) It may be carried out in accordance with the dynamic test procedure of EEC Directive 74/408/EEC "Strength of Seats and their Anchorage" for front-facing "Seats" which are not "Folding Seats" and which do not incorporate any built-in seatbelt "Anchorage" (2) Alternatively , the following criteria must be met: The acceleration pulse applied must be such that all the parts of the "Seat" and supporting structure which anchors it to the vehicle have at least an acceleration of 20 times the acceleration due to gravity simultaneously in the same direction. any additional forces due to loading of seatbelt "Anchorage" or "Child Restraint Anchorage" must be achieved simultaneously with the acceleration required.	
D: Label Marking Requirement	N/R	
E: Reference Standards	The technical requirements of ECE R 17/03 or ECE R 17/04 "Seat and their Anchorages" together with , where applicable , the technical requirements "Safety Belt Anchorages" and these are deemed to be equivalent to thetechnical requirements of this rule for front-facing "Seats" which are not "Folding Seats".	

ITEM No. 96-17:Strength of seat

CANADA MVSR 207		
Items	Summary	Figure and additional explanations
A: Application	N/R	
B-a:Structure of Parts 1)Exhibit Radii of Curvature in the Surface of the Seats	N/R	
B-a;Structure of Parts 2)shift lock system	Except in the case of a passenger seat in a bus and a seat having a back that is only adjustable for the comfort of the occupant , a hinged or folding occupant seat or occupant seat back shall be equipped wit (a) a self - locking device for restraining the hinged or folding seat or seat back , and (b) a control for releasing the self - locking device. Where a designated seating position is immediately behind a seat equipped with the self - locking device , the control for releasing the device shall be readily accessible to (a) the occupant of the seat equipped with the device ; and (b) the occupant of the designated seating position immediately behind such seat if access to the control is required in order to allow him to exit from the vehicle.	
B-a;Structure of Parts 3)Requirement od measure	N/R	
B-b;Structure of Parts Installed in Body	N/R	
C-a: Performance of Parts 1)Front side of seat back; headform impact (energy absorption dynamic test)	N/R	
C-a:Performance of Parts 2)Front side of seat back; headform impact (energy absorption dynamic test)	N/R	

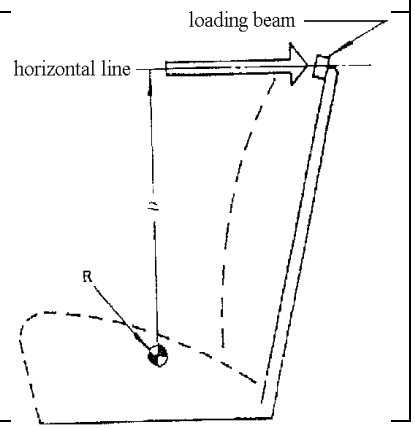
ITEM No. 96-17:Strength of seat

CANADA MVSR 207		
Items	Summary	Figure and additional explanations
C-a: Performance of Parts 3)seat back;moment (static strength test)	(Requirement) Each vehicle shall have an occupant seat for the driver and such occupant seat and all other occupant seats except a side-facing seat or a bus passenger seat shall , when subjected to Motor Vehicle Safety Test Methods , Section 207 , Anchorage of Seats , approved December 7 , 1973 , withstand , when installed in the vehicle (Test method) (b) in its rearmost position , application of a force that (i) produces a moment of 3300 pound-inches about the seating reference point for each designated seating position for which the occupant seat is designed , and (ii) is applied to the upper seat back or the upper cross-member of the seat back (A) in a rearward longitudinal direction for forward - facing seats , and (B) in a rearward longitudinal direction for rearward - facing seats. Except for vertical movement of non - locking suspension type occupant seats in trucks or buses , no occupant seat shall change its position adjustment during any application of force .	
C-b:Performance of Parts Installed in body 1)seat anchorage/seat back/ seat locking device; installed in body shell, 20G load (static strength test)	Anchorage of Seats; (Requirement) Each vehicle shall have an occupant seat for the driver and such occupant seat and all other occupant seats except a side-facing seat or a bus passenger seat shall , when subjected to Motor Vehicle Safety Test Methods, Section 207 , Anchorage of Seats , approved December 7 , 1973 , withstand , when installed in the vehicle (a) in any position to which it can be adjusted , (Test method) (i) the application of a force equal to 20 times the weight of the seat applied separately in (A) a Forward , and (B) a rearward longitudinal direction through the centre of gravity of the seat , and simultaneously , in the case of a seat having one or more seat belt assemblies attached direct to it , (ii) the application of a force equal to the total load imposed on the seat by simultaneously application in directions referred to in clauses (i)(A) and (B) of the respective loads required by section 210 of this Schedule for the seat belt so attached; and Except for vertical movement of non - locking suspension type occupant seats in trucks or buses , no occupant seat shall change its position adjustment during anyapplication of force .	

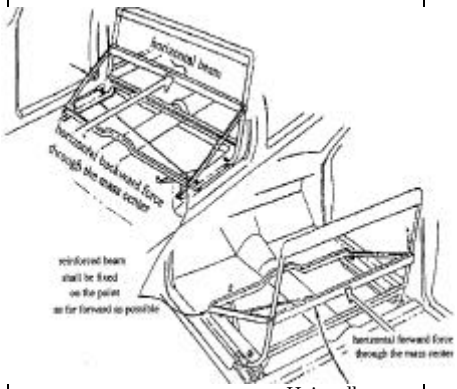
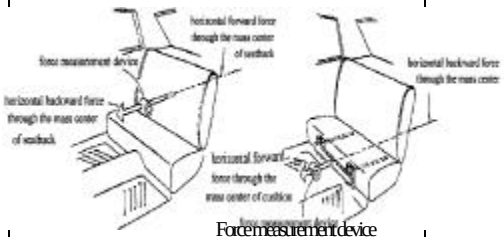
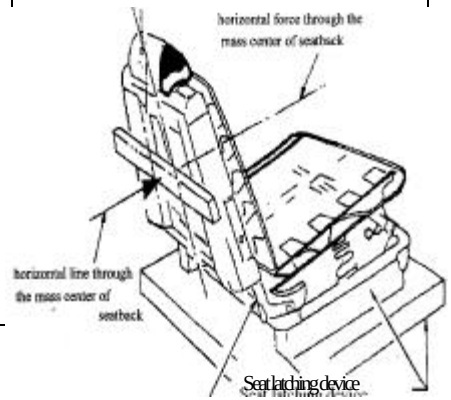
ITEM No. 96-17:Strength of seat

CANADA MVSR 207		
Items	Summary	Figure and additional explanations
	(Requirement) The self - locking device shall not release or fail when (Test method) (a) in the case of a forward - facing seat , a forward longitudinal force equal to 20 times the weight of the hinged or folding portion of the seat is applied through the centre of gravity of that portion of the seat; (b) in the case of a rearward - facing seat , a rearward longitudinal force equal to eight times the weight of the hinged or folding portion of the seat is applied through the centre of gravity of that portion of the seat; and	
C-b:Performance of Parts Installed in body 2)seat anchorage/seat back/ seat locking device; installed in body shell, 20G load (dynamic strength test)	(Requirement) The self - locking device shall not release or fail when (Test method) subjected to an acceleration of 20g in the longitudinal direction opposite to that in which the seat folds	
D-a;Label Marking Requirement Its Own Requirement	Seats not intended for occupancy whole the vehicle is in motion shall bear a conspicuous label that so states in English and in French.	
D-b;Label Marking Requirement Its Installed in Body	N/R	
E: Reference Standards	N/R	

ITEM No. 96-17:Strength of seat

China(Regulation name : GB 15083-94)		
Items	Summary	Figure and additional explanations
A: Application	Category M and N This standard does not applies to attached folding seats and longitudinal seats.	
B-a:Structure of Parts 1)Exhibit Radii of Curvature in the Surface of the Sea	N/R	
B-a :Structure of Parts 2)System of Seat Locks	Pivoted (tip-up) seat and folding seat (including back adjustable seat) shall incorporate a locking system. The adjustable device and latching of which shall be operated easily.	
B-a: Structure of Parts 3)Requirement of Measure	N/R	
B-b: Structure of Parts Installed in Body	N/R	
C-a:Performance of Parts 1)Front side of Seat Back; Headform Impact (Energy Absorption Dynamic Test)	N/R	
C-a:Performance of Parts 2)Back side of Seat Back; Headform Impact (Energy Absorption Dynamic Test)	N/R	
C-a:Performance of Parts 3)Seat Back;Moment (static strength test)	(Requirements) *When the seat assembly sustains a force of a moment equivalent to 373 N.m about the seat "R" point , for the forward facing seats , this force shall be applied horizontally backward , for the backward facing seats , this force shall be applied horizontally forward and the seat frame shall not be damaged and the seat assembly shall not be separated form the body for the adjustable seats the adjustable device shall be able to remain the seat in the originally adjusted After the test , it shall be permitted that adjusting function disappears. (Test method) *For the adjustable seats , adjust the seat to the fully rearward position , and lock the seat back at the designed position or the equivalent position. *Respectively and gradually apply the load to the value specified and keep this value for at least 0.2S. The speed of applying the load shall not be more than 5 mm/min.	

ITEM No. 96-17:Strength of seat

China(Regulation name : GB 15083-94)		
Items	Summary	Figure and additional explanations
C-b:Performance of Parts Installed in body 1) Seat Anchorage/Seat Back/ Seat;20G Load (Static Strength Test)	(Requirements) Pivoted (tip-up) seat and folding seat (including back adjustable seat) *Passing through the center of seat mass apply a horizontal force forward and rearward equal to 20 times the weight of the seat assembly the seat.The seat assembly shall not separate from the body. *For adjustable seats , the adjustment device shall be able to keep the seat in the originally adjusted position during the test , after the test , it is permitted that the adjusting functions. If there is a device in the seat back which prevents the seat backward , the force can only be applied forward ; and for forward facing seats. *For the pivoted (tip - up) seat , passing through the center of seat mass , apply a horizontal forward force equal to 20 times the weight of seat assembly of the seat ; for holding seat (including the seat the back of which can be adjusted) , passing through the center of back mass , apply a horizontal forward force equal to 20 times the weight of the back , the latching device can not be disengaged and damaged. When the folding seats (including the seat the back of which can be adjusted) and the povited tip - up seats sustain the force given below,their latching device shall not be disengaged and damaged. *For the forward facing seats , passing through the center of mass of the pivoted or folding part of the seat , apply a horizontally forward force equal to 20 times the weight of the povited or folding part of the sat to the seat. *For the backward facing seats , passing the center of mass of the pivoted or folding part of the seat , apply a horizontally backward force equal to 8 times the weight of the pivoted or folding part of the seat. (Test method) *Install the seat on the body or the test bench which imitates the body according to the requirement of design. Local strengthening is permitted if there is no proper force point applied on the seat. The upper end of the reinforced beam is fixed on the same horizontal beam , while the other end on a point as forward as possible of the seat adjuster attachments. The horizontal beam shall be in the same horizontal plane as the center of mass of seat (see Fig 1). *If the cushion and the back of the seat are separately fixed on the body , apply a horizontally	 Horizontal beam  Force measurement device 

ITEM 96-17-3-8

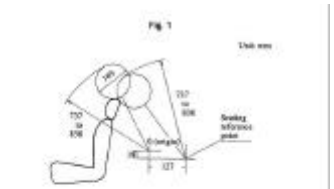
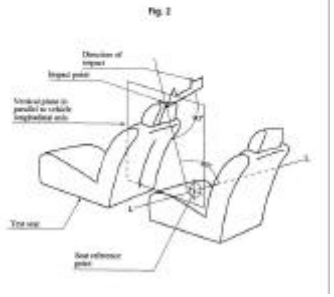
ITEM No. 96-17:Strength of seat

China(Regulation name : GB 15083-94)		
Items	Summary	Figure and additional explanations
C-b: Performance of Parts Installed in body 2) Seat Anchorage/Seat Back/ Seat;20G Load (Dynamic Strength Test)	N/R	
D-a: Label Marking Its Own Requirement	N/R	
D-b: Label Marking Requirement of Its Installed in Body	N/R	
E: Reference Standards	N/R	

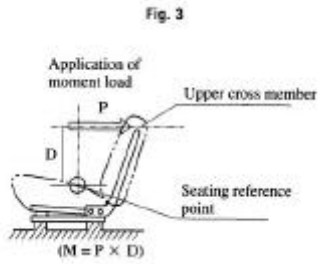
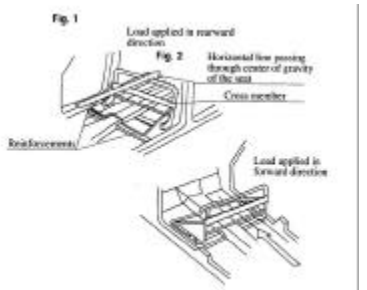
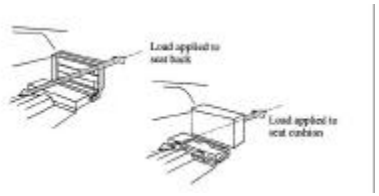
ITEM No. 96-17:Strength of seat

Japan(Regulation name: SRRV 22)(effective date:1974.11)		
Items	Summary	Figure and additional explanations
A: Application	Passenger car (including taxi, excluding motor vehicle which has more than11 seating positions , whose maximum speed is not more than 20 km/h and motor cycle)	
B-a: Design Req. as part 1)Exhibit Radii of Curvature in the Surface of the Seat	None	
B-a: Design Req. as part 2)System of Seat Locks	None	
B-a:Design Req. as part 3)Dimension	The width of the seat(not include driver and straddle seat (width/depth/note); General seats : Equal and more than 400mm/equal and more than 400mm seat of emergency exit neighborhood equal and more than 400mm/equal and more than 250mm assistant seats :Equal and more than 300mm(space at equal and more than 400mm)/only one seat childhood seat :Equal and more than 270mm/230~270mm/height equal and less than 250mm, frontward	
B-b :Design Requirement as installed	None	

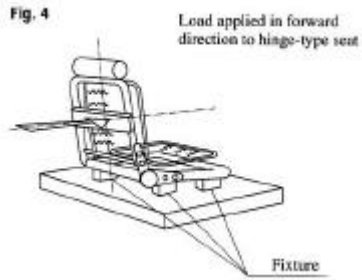
ITEM No. 96-17:Strength of seat

Japan(Regulation name:SRRV 22)(effective date:1974.11)		
Items	Summary	Figure and additional explanations
C-a :Performance of Parts 1)Front side Seat Back • • Headform Impact (Energy Absorption Dynamic Test) C-a: Performance of Parts 2)Back side of Seat Back • • Headform Impact (Energy Absorption Dynamic Test)	SRRV 22:Reference Standard ECE25(E/ECE/TRANS/505Rev.1/ Add.24/Amend.1-1981.7.30)) (Standard) The headform does not exceed 80g continuously for more than 3ms. (test method) (1)For the front face: The headform (6.8kg) shall strike the test item at a 24.1 km/h. •Impact point • •65 mm below top of the head restraint •Impact direction • •from the front toward , horizontal in a longitudinal plane (2)For the rear face: The headform (6.8kg) shall strike the test item at a 24.1 km/h. •Impact point • •a point contact with head restraint and tangent line at an angle of 45°from horizontal plane •Impact direction • •from the rear towards , at an angle of 45°from the horizontal plane	
C-a: Performance of Parts 2)Back side of Seat Back • • Headform Impact (Energy Absorption Dynamic Test)	SRRV 22 (Standard)(TRIAS-36) The headform does not exceed 80g continuously for more than 3ms. (Test Method) The headform (6.8kg,a diameter165 mm) shall strike the test item at25±1km/h. Impact point • •a point of maximum impact within impact area according to provisions. Impact direction • • (1) or (2) (1)include impact position, perpendicular to tangential line at the longitudinal median plane of body (2)perpendicular to tangential line at impact position	 

ITEM No. 96-17:Strength of seat

Japan(Regulation name:SRRV 22)(effective date:1974.11)		
Items	Summary	Figure and additional explanations
C-a: Performance of Parts 3)Seat Back • •Moment (Static strength test)	SRRV 22 (Requirements)(TRIAS-35) •Each seat shall withstand following forces. •No release of locking systems shall occur during the tests. •Each seat shall remain in its adjusted position when tested. After tests , these are not required to be in working order. (Test Method) Moment; 38kgm(373Nm) moment about the seating reference point for each designated seating position that the seat provides , applied to the upper cross-member of the seat back or the upper seat back	
C-b: Performance of Parts Installed in body 1) Seat Anchorage/Seat Back/ Seat • •20 G (Static Strength Test) C-b: Performance of Parts Installed in body 1) Seat Anchorage/Seat Back/ Seat • •20 G (Dynamic Strength Test)	SRRV 22 (A) (TRIAS-35) •Each seat shall withstand following forces. •No release of locking systems shall occur during the tests. •Each seat shall remain in its adjusted position when tested. After tests , these are not required to be in working order. (Test method) 20 times the weight of the seat applied in a forward / rearward longitudinal direction through the center of gravity of seats. •For a seat whose seat back and bench are attached to the vehicle by the same attachments , a center of gravity of seat , •For seat back and the seat bench are attached to the vehicle by different attachments , a center of gravity of each components ,20 times the weight of the seats or components applied in a forward / rearward longitudinal direction.	 

ITEM No. 96-17:Strength of seat

Japan(Regulation name:SRRV 22)(effective date:1974.11)		
Items	Summary	Figure and additional explanations
	(B)Restraint device for hinged of holding seats or seat back (Requirement/Test method)(TRIAS-35) Horizontal forward force for hinged seats, (1)20 times the weight of the seat applied in a forward longitudinal direction , by static or dynamic force. (2)The restraining device shall not release or fail when a longitudinal force equal to 20 times the weight or corresponds dynamics analysis.	
D-a: Marking/Label itself	None	
D-b: Marking as attached	None	
E: Reference Standard	JIS D4606 JIS D4607-1970 TRIAS 35,36	

ITEM No. 96-17:Strength of seat

Korea (Regulation Name:THE REGULATIONS OF THE MOTOR VEHICLES SAFETY STANDARDS Article 24,25,97,98)		
Items	Summary	Figure and additional explanations
A: Application		
B-a: Structure of Parts 1)Exhibit Radii of Curvature in the Surface of the Seats	N/R	
B-a: Structure of Parts 2)System of Seat Locks	N/R	
B-a:Structure of Parts 3)Requirement of Measure	Driver's Seat (Article 24) (Requirement) The driver's seat of each motor vehicle shall be constructed to that the driver may have a full view necessary for driving and so that the driver can control the motor vehicle without being obstructed by passengers or cargos Passenger Seat(Article 25) (1)The longitudinal and transverse dimensions of each passenger seat shall be not less than 40 centimeters respectively and the distance between the rear side of seat back of a front seat and the front side of seat back of a rear seat shall be not less 65 centimeters. However , this requirement does not apply to ambulances , fire fighting vehicles and special purpose vehicles approved by the Minister of Construction and Transportation because the installation of passenger seats may be difficult for the purpose of manufacturing that vehicle. (2) The longitudinal and transverse dimensions of each child passenger seat shall be not less than 27 centimeters respectively and the distance between the rear side of seat back of a front seat and the front side of seat back of a rear seat shall be not less 46 centimeters. (3) The height of each passenger seat in each bus except each designated seating capacity of 15 or less and buses designated primarily to transport children) shall be tes but not more than 45 centimeters. However, this requirement dose not apply to the seat near the engine and wheels because of he structural difficulty in installing the seat between 40 and 45 centimeters. (4) Folding seats in an aisle may be installed in buses with a designated seating capacity 30 or less , except buses designated seating capacity of 31 or more.	

ITEM No. 96-17:Strength of seat

Korea (Regulation Name: THE REGULATIONS OF THE MOTOR VEHICLES SAFETY STANDARDS Article 24,25,97,98)		
Items	Summary	Figure and additional explanations
C-a: Performance of Parts 1) Front side of head restraints • •headform impact (Enegy Absorption dynamic test) 2) Back side of head restraints • •headform impact (Energy Absorption dynamic test)	Seat Back(Article 98) (Requirement) the deceleration of the head form shall not exceed 80 times the gravitational acceleration continuously for more than 3 milliseconds , and if a vehicle equipped with inter compartment doors , those doors shall not openif those doors are impacted in the above procedures. (Test method) For passenger vehicles and each bus • truck • special-purpose truck with a gross vehicle weight of 4.5 tons or less , when the seat back within the head impact area (a head restraints , in the case of the seat with a head restraint) is impacted by a 165 millimeter diameter , 6.8k/g head form at a relative speed of 24.2km / h. However , this requirement does not apply to seat back as specified in the following 1. Seat backs in the rearmost row 2. Seat backs of side – facing seats 3. Seat backs of back - to back seats 4. Seat backs of auxiliary folding seats 5. Seat backs approved by the Minister of Construction and Transportation due to the structure of a vehicle	
C-a Performance of Parts 3) Seat back : moment (static strength test)	Driver's Seat and Passenger Seat (Article 97) (Requirement) Driver's Seat and Passenger Seat The occupant seat of a motor vehicle (except side-facing seats , auxiliary folding seats and passenger seats of buses)in its rearmost position shall withstand the forces as prescribed in Test method and shall not be detached from the position where it is adjusted previously. (Test method) For the forward facing seat , the force that produces a 38 kilogram-meter rearward moment about the seating reference , for the rearward facing seat , the force that procedures a 38 kilogram-meter rearward facing about the seating reference point.	

ITEM No. 96-17:Strength of seat

Korea (Regulation Name:THE REGULATIONS OF THE MOTOR VEHICLES SAFETY STANDARDS Article 24,25,97,98)		
Items	Summary	Figure and additional explanations
C-b: Performance of Parts Installed in body 1)seat anchorage/seat back/ seat locking syatem • •in the body shell 20G load (static strength test)	Driver's Seat and Passenger Seat(Article 97) (Requirement) The occupant seat of a motor vehicle (except side-facing seats , auxiliary folding seats and passenger seats of buses) in any adjustable position shall withstand the forces as prescribed in Item 1 or Item 2 . (Test method) 1. For the seat which a seat belt is not attached to , the force of 20 times the weight of the seat applied in a forward and rearward longitudinal directions of the vehicle. 2. For the seat which a seat belt is attached to , the force as specified in Item 1 and the force imposed on the seat belt assembly as specified in Article 103 Paragraph 3 applied simultaneously. (Requirement) •Each hinged seat and each folding seat (except for seats in trucks and special purpose vehicles and for passenger seats in buses) shall be equipped with the locking device for restraining the seat cushion and back and with the control device for reeking the locking device. •The locking device as specified in Paragraph 2 shall , once engaged , not be release when the forces as specified in the following items are applied to the locking device. (Test method) 1. For the seats which are facing each other , the force of 20 items the weight of hinged or folding portion of the seat applied in a forward longitudinal direction of the vehicle. 2. For the seat which is facing rearward , the force of 8 times the weight of hinged or folding portion of the seat applied in a rearward longitudinal direction of the vehicle	
C-b:Performance of Parts Installed in body 2)seat anchorage/seat back/seat locking system • •in the body shell 20G load (dynamic strength test)	(Requirement) The locking device as specified in Paragraph 2 shall , once engaged , not be release when the forces as specified in the following items are applied to the locking device. (Test method) The force equivalent to an acceleration of 20 times the gravitational acceleration applied in a longitudinal direction in which the seat folds	
D-a:Label Marking Requirement Its Own Requirement	N/R	
D-b:Label Marking Requirement Its Installed in Body	N/R	
E:Reference Standards	N/R	

ITEM No. 96-17:Strength of seat

New Zealand (Regulation Name:VSR31)		
Items	Summary	Figure and additional explanations
A :Application	N/R	
B-a: Structure of Parts 1)Exhibit Radii of Curvature in the Surface of the Seats	N/R	
B-a:Structure of Parts 2)System of Seat Locks	N/R	
B-b:Structure of Parts Installed in Body	N/R	
C-a: Performance of Parts	N/R	
C-b: Performance of Parts Installed in body	31. Seat anchorage's (1)Every motor vehicle shall have all of its seats attached to its structure in a secure manner. (2)Seats shall be attached in a manner that complies with the appropriate vehicle standard.	
D: Label Marking Requirement	N/R	
E: Reference Standards	N/R	

ITEM No. 96-17:Strength of seat

Chinese Taipei(Regulation name:ROAD SAFETY STANDARDS NO. 39)		
Items	Summary	Figure and additional explanations
A: Application	N/R	
B-a: Structure of Parts	N/R	
B-b: Structure of Parts Installed in Body	Seats shall be strongly holed on body.	
C-a: Performance of Parts	N/R	
C-b: Performance of Parts Installed in body	N/R	
D: Label Marking Requirement	N/R	
E: Reference Standards	N/R	

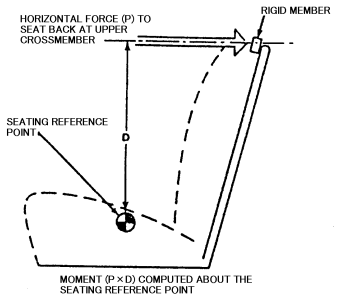
ITEM No. 96-17:Strength of seat

Thailand The ministerial regulation No.3 (B.E.2524)		
Items	Summary	Figure and additional explanations
A: Application	Passenger car	
B-a: Structure of Parts	N/R	
B-b: Structure of Parts Installed in Body	1. The maximum number of passengers for passenger cars (not more than 7 passenger) and passenger pick up can be calculated by suppose that the length of seat for one passenger is 40 cms. One more passenger can sit, if the rest of seat is more than 30cm. And 2 more passengers can sit in each row, if the length of seat is more than 4 meters : 2 children (not more than 10years) equals 1adult. 2. The maximum number of passenger for taxi can be calculated by suppose that the length of seat for the driver is 50 cm. And for one passenger is 40 cm. If the rest of seat is more than 30cm., one more passenger can sit. : 2 children (not more than 10 years) equals 1 adult.	
C-a: Performance of Parts	N/R	
C-b: Performance of Parts Installed in body	N/R	
D: Label Marking Requirement	N/R	
E: Reference Standards	N/R	

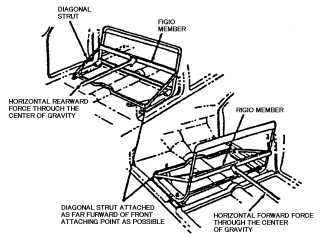
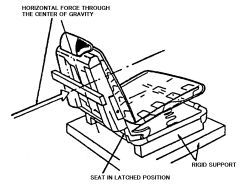
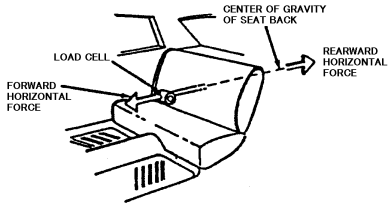
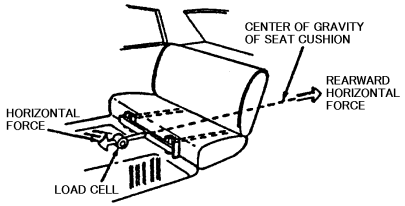
ITEM No. 96-17:Strength of seat

U.S.A (Regulation Name FMVSS 207, Effective Date:1995.3.14(60 FR 13639))		
Items	Summary	Figure and additional explanations
A Application	passenger cars , multipurpose passenger cars	
B-a: Structure of Parts 1)Exhibit Radii of Curvature in the Surface of the Sea	N/R	
B-a: Structure of Parts 2)System of Seat Locks	Except for a passenger seat in a bus or a seat having a back that is adjustable only for the comfort of its occupants , a hinged of folding occupant seat or occupant seat back shall-- (a) Be equipped with a self-locking device for restraining the hinged or folding seat or seat back , and (b) If there are any designated seating positions or auxiliary seating accommodations behind the seat , either immediately to the rear or to the sides , be equipped with a control for releasing that restraining device. If there is a designated seating position immediately behind a seat equipped with a restraining device, the control for releasing the device shall be readily accessible to the occupant of the seat equippedwith the device and , if access to the control is required in order to exit from the vehicle, to the occupant of the designated seating immediately behind the seat.	
B-a: Structure of Parts 3)Requirement of Measure	N/R	
B-b: Structure of Parts Installed in Body	N/R	

ITEM No. 96-17:Strength of seat

U.S.A (Regulation Name FMVSS 207, Effective Date:1995.3.14(60 FR 13639))		
Items	Summary	Figure and additional explanations
C-a: Performance of Parts 1)Front side of Seat Back • • Headform Impact (Energy Absorption Dynamic Test)	N/R	
C-a: Performance of Parts 2)Back side of Seat Back • • Headform Impact (Energy Absorption Dynamic Test)	N/R	
C-a: Performance of Parts 3)Seat Back • •Moment (static strength test)	(Requirements) •When tested , each occupant seat, other than a side-facing seat or a passenger seat on a bus , shall withstand the following forces. •Except for vertical movement of non locking suspension type occupant seats in trucks or buses , each seat shall remain in its adjusted position when tested in accordance with the test procedures. (Test method) In its rearmost position-a force that procedures a 3300 inch-pound moment about the seating reference point for each designated seating position that the seat provides, applied to the upper cross-member of the seat back or the upper seat back. •In a rearward longitudinal direction for forward-facing seats •In a forward longitudinal direction for rearward-facing seats	

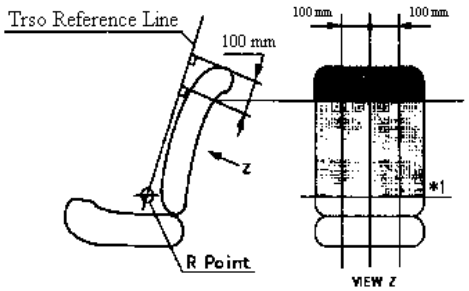
ITEM No. 96-17:Strength of seat

U.S.A (Regulation Name FMVSS 207, Effective Date:1995.3.14(60 FR 13639))		
Items	Summary	Figure and additional explanations
C-b:Performance of Parts Installed in body 1) Seat Anchorage/Seat Back/ Seat • •20G Load (Static Strength Test)	(A)Seat Anchorage and Seat Back; (Requirements) •When tested , each occupant seat, other than a side-facing seat or a passenger seat on a bus , shall withstand the following forces. •Except for vertical movement of nonlocking suspension type occupant seats in trucks or buses , each seat shall remain in its adjusted position when tested in accordance with the test procedures. (Test method) In any position to which it can be adjusted -20 times the weight of the seat applied in a forward longitudinal direction / a rearward longitudinal direction. If the seat back and the seat bench are attached to the vehicle by different attachments , attach to each component a fixture capable (B)Restraining device for hinged or folding seats or seat back (Requirements, Test method) (a) Once engaged , the restraining device for forward-facing seat shall not release or fail when a forward longitudinal force equal to 20 times the weight of the hinged or holding portion of the seat is applied through the center of gravity of that portion of the seat. (b) Once engaged , the restraining device for forward-facing seat shall not release or fail when a rearward longitudinal force equal to 8 times the weight of the hinged or holding portion of the seat is applied through the center of gravity of that portion of the seat. (test method : Figure 1,2,3,5)	 Figure 1  Figure 5 FIGURE 1: Load for hinged of holding portion of seat FIGURE 2 : Load for hinged of holding portion of seat back of transmitting a force to that component.  Figure 2  Figure 3 Load of seat bench

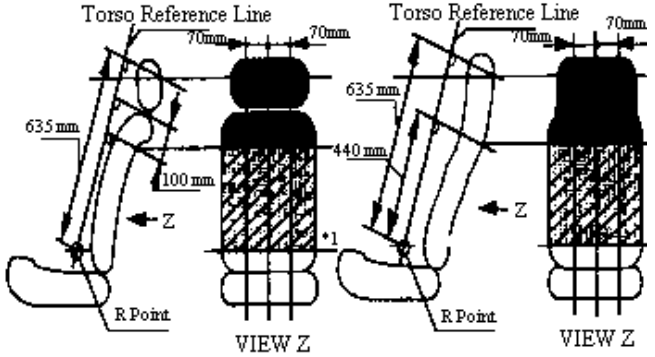
ITEM No. 96-17:Strength of seat

U.S.A (Regulation Name FMVSS 207,Effective Date:1995.3.14(60 FR 13639))		
Items	Summary	Figure and additional explanations
C-b:Performance of Parts Installed in body 2) Seat Anchorage/Seat Back/ Seat • •20G Load (Dynamic Strength Test)	(A)seat anchorage/seat back • •N/R (B)Restraint device for hinged or folding seats or seat back Once engaged , the restraining device for forward-facing seat shall not release or fail when the device is subjected to an acceleration 20 g., in the longitudinal direction opposite to that in which the seat folds.	
D-a:Label Marking Its Own Requirement	Seats not designated for occupancy while the vehicle is in motion shall be conspicuously labeled to that effect.	
D-b:Label Marking Requirement of Its Installed in Body	N/R	
E: Reference Standards	N/R	

ITEM No. 96-17:Strength of seat

<table>
<tr><td colspan="3">ECE(Regulation name: ECE 17)　(effective date:1994.1.26,Revision 3 - Amendment1)</td></tr>
<tr><td>Items</td><td>Summary</td><td>Figure and additional explanations</td></tr>
<tr><td>A: Application</td><td>Category M1
It does not apply to folding , side - facing or rearward - facing seats, or to any head restraint fitted to these seats.</td><td rowspan="3">Exhibit Radii of Curvature in the Surface of the Seats with no head rest
 

*1 : a horizontal plane passing through the lowest R point in each row of seats
Exhibit Radii of Curvature in the Surface of the Seats with head rest

Exhibit Radii of Curvature in the Surface of the Seats with head rest
 
</td></tr>
<tr><td>B-a:Structure of Parts
1) Exhibit Radii of Curvature
in the Surface of the Seats
Exhibit Radii of Curvature in the Surface of the Seats with no head rest</td><td>(requirements)
The surface of the rear parts of seats shall exhibit no dangerous roughness or sharp edges likely to increase
the risk of severity of injury to the occupants.
This requirement is considered as satisfied if the surface of the rear parts of seats tested in the conditions
specified radii of curvature not less than ;
(area1):energy absorption(80G,3ms)+ R≥2.5mm(R:radii)
(area 2):R≥5.0mm or energy absorption(80G,3ms)+R≥2.5mm + pad
(area 3):R≥3.2mm
This requirement does not apply to ;
•projection of less than 3.2 mm from the surrounding surface
(height of the projection is not more than half its with)
•rearmost seats and back-to-back seats
•parts such as flexible wire mesh
•material softer than 50 Shore A hardness</td></tr>
<tr><td>B-a: Structure of parts
2)System of Seat LocksParts</td><td>•Every adjustment and displacement system provided shall incorporate a locking system.
•The unlocking control for a device shall be placed on the outside of the seat close to door.
Its shall be easily accessible, even to the occupant of the seat immediately behind the seat concerned.</td></tr>
</table>

ITEM No. 96-17:Strength of seat

ECE(Regulation name: ECE 17) (effective date:1994.1.26,Revision 3 - Amendment1)		
Items	Summary	Figure and additional explanations
B-a:Structure of Parts 3)Requirement of measure	N/R	
B-b:Structure of Parts Installed in Body	N/R	
C-a:Performance of Parts Front side of Seat Back • • Headform Impact (Energy Absorption Dynamic Test) C-a:Performance of Parts 2)Back side of head restraint • •Headform Impact (Energy Absorption Dynamic Test)	(requirements) 1)This requirements is deemed to be met if in the tests carried out by the procedure specified the deceleration of the headform does not exceed 80g continuously for more than 3ms. 2)no dangerous edge shall occur during or remain after the test. 3)a)Parts of the front and rear faces of the head restraint situated in area 1 , shall pass the energy absorption test. b)Parts of the front and rear faces of the head restraint situated in area 2 , shall be so padded as to prevent any direct contact of the head with the components of the structure. The requirements shall not apply to parts of rear faces of head restraints designed to be fitted to seats behind which no seat is prevented .no rigid and dangerous parts project from the padding of the head rearrange or from its attachment of the seat-back as a result of the pressure extended by the headform during the test. (seat back and head restraints , energy absorption test) The headform shall strike the test items ,checking energy dissipation. If head restraint is adjustable , it shall be placed in the most unfavorable position allowed by its adjusting systems. impact point • •in area 1 , or if necessary in area 2 , on surfaces exhibiting radii of curvature less than 5 mm. direction of impact • •for rear face , from the rear towards the front shall be in a longitudinal plane at an angle of 45 degrees from the vertical. for the front face , the direction of Impact from the front towards the rear shall be horizontal in a longitudinal plane. Speed • •24.1km/h Headform • •165mm in diameter sphere, mass is 6.8kg.	*In the case of seats with adjustable head restraints , the tests shall be conducted with the head restraints placed in the most unfavorable position (generally , the highest position) allowed by its adjusting system.

ITEM No. 96-17:Strength of seat

ECE(Regulation name: ECE 17) (effective date:1994.1.26,Revision 3 - Amendment1)		
Items	Summary	Figure and additional explanations
C-a :Performance of Parts 3)seat back • •moment (static strength test)	(requirements) 1)No failure shall be shown in the seat frame or in the seat anchorage , the adjustment and displacement systems or their locking devices during or after the tests. Permanent deformations , including raptures , may be accepted , provided that these do not increase the risk of injury in the event of a collision and the prescribed loads were sustained. 2)After the tests , the displacements systems intended for permitting or facilitating the access of occupants must be in working order they must be capable , at least once , of being unlocked and must permit the displacement of the seat or the part of the seat for which they are intended. 3)the initial load is increased to 89 daN unless the breakage of the seat or seat - back occur earlier. (Test of strength of the seat-back and adjustment systems) A force producing a moment of 53 daNm in relation to the R point shall be applied longitudinally and rearwards to the upper part of the back frame through a component simulating the back of the manikin. In the case of a bench seat , where part or all of the supporting frame (including that of the head restraints) is common to more than one seating position , the test shall be conducted simultaneously for all those seating position.	

ITEM No. 96-17:Strength of seat

ECE(Regulation name: ECE 17) (effective date:1994.1.26,Revision 3 - Amendment1)		
Items	Summary	Figure and additional explanations
C-b:Performance of Parts Installed in body 1)seat anchorage/seat back/ seat locking device • • in the body shell, 20G load (static strength load)	(Requirement) 1)No failure shall be shown in the seat frame or in the seat anchorage , the adjustment and displacement systems or their locking devices during or after the tests. Permanent deformations , including raptures , may be accepted , provided that these do not increase the risk of injury in the event of a collision and the prescribed loads were sustained. 2)No release of the locking systems shall occur during the tests 3)After the tests , the displacements systems intended for permitting or facilitating the access of occupants must be in working order they must be capable , at least once , of being unlocked and must permit the displacement of the seat or the part of the seat for which they are intended. (Test of strength of the seat anchorage and the adjustment , locking and displacement systems) •A longitudinal horizontal deceleration of not less than 20 g shall be applied for 30 milliseconds in the direction to the whole shell of the vehicle. •At a request of manufacturer , they are replaced by a collision test of complete vehicle in running order against a rigid barrier. barrier shall consist of a block of reinforced concrete of not less than 3 m with , not less than 1.5 m height and not less than 0.6 m thickness. The speed on impact shall be between 48.3 and 53.1km/h.	(test method) *the distribution of the forces on the locking devices and seat anchorages would be less favorable than with either configuration , the tests shall be conducted that less favorable seating position.
D-a:Label Marking Its Own Requirement	The approval mark shall be clearly legible and indelible. The approval mark shall be placed close to or on the vehicle date plate affixed by the manufacturer.	
D-b:Label Marking Requirement of Its Installed in Body	N/R	
E: Reference Standards	3 DH machine elements designation (refer to SAE 400 , ISO 6549-1980)	

ITEM 96-18

Rear vision mirrors

APEC Regulation Analysis Findings
Item No. 96-18: Rear Vision Mirrors

1. Regulations for rear vision mirrors may be divided into the ECE type (People's Repubic of China), U.S. type (Canada, Australia), and Japan type.
   New Zealand requires ECE/ADR/Japan/FMVSS as alternatives

2. A comparison of specific requirements for head restraint is as follows.

(1) Curvature radius: Member economies have their unique specifications.

(2) Reflectance: The U.S. group requires a reflectance of 35% or more, and the ECE group 40% or more. Japan does not have any reflectance requirement.

(3) Visual field: Japan provides a visual field requirement only for outer mirrors, while the U.S. and ECE groups set forth requirements for both outer and inner mirrors. These three groups provide different requirements.

(4) Number of mirrors:

Inner mirrors - The U.S. group requires one inner mirror. The ECE group does not require any inner mirror unless it satisfies the visual field requirement. Japan allows an inner mirror to be or not to be furnished.

Outer mirrors - All member economies except New Zealand does not require outer mirrors unless windows behind the driver have less than 70% light transmission. The U.S. and ECE groups require an outer rear vision mirror on the front passenger side unless the visual field requirement for the inner mirror is satisfied. Japan requires an outer mirror on the front passenger side for all vehicles.

(5) Adjustment: All member economies require that rear view mirrors be easily adjustable as to their visual direction. The U.S. and ECE groups demand that the outer mirror on the driver's side be adjustable from the driver's seat.

(6) Impact test: Requirements differ between the U.S. and ECE groups. The requirement of People's Republic of China is similar to ECE. Japan's requirement is similar to ECE regarding both outer and inner mirrors, and similar to FMVSS with respect to inner mirrors.

Item No. 96-18 :Rear Vision Mirrors

A: Application: Passenger Car

Member Economies	B Structure Performance	B-a Structure of Parts	B-a-1) Dimension	B-a-2) Refelective Surface Area	B-a-3) Coefficient of Reflection	B-a-4) Structure
Australia				ADR14≥1200mm	FMVSS 111	
Brunei						
Canada			≥125cm^2 applied to outside mirrors for vehicles other than PC only.	890mm(35inches)≤ r≤1800mm (71.5inches) applied to outside convex mirrors for passenger 's side only.	FMVSS 111	
Chile						
China			ECE 46	ECE 46	ECE 46	
Hong Kong						
Indonesia						
Japan				SRRV 44		
Korea			≥126cm2	890mm≤ r ≤1650mm		
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
U.S.A.				FMVSS 111 35"≤ r ≤ 65"	FMVSS 111 ≥35%, ≥4% (D/N)	
ECE			ECE 46	ECE 46 Inside ≥1200mm Outside ≥1800mm	ECE 46 ≥40%, ≥4% (D/N)	

Member Economies	B-b Structure of Parts Installed to Vehicle	B-b-1) No. of Mirrors	B-b-2) Field of Vision	B-b-3) Position	B-b-4) Adjustment	C Performance
Australia		FMVSS 111	FMVSS 111	FMVSS 111	FMVSS 111	
Brunei				Unique		
Canada		PC : FMVSS 111 Others: Inside 1, D side 1, P side 1, or, D side 1, P side 1	FMVSS 111	FMVSS 111	FMVSS 111	
Chile						
China		ECE 46	ECE 46	ECE 46	ECE 46	
Hong Kong		ECE 46		Unique		
Indonesia		Two or more				
Japan		SRRV 44 Inside : 1 Outside:1	SRRV 44 See DGW	$\alpha \leq 55°$, 75° (P side)		
Korea		FMVSS 111	FMVSS 111			
Malaysia						
Mexico						
New Zealand		at least one				
Papua New Guinea			Unique			
Philippines			Unique			
Singapore		at least one				
Chinese Taipei						
Thailand						
U.S.A.		FMVSS 111 PC : Inside 1, D side 1, P side 1 only if the inside mirror can not meet the field of view requirements. Others : same as PC, or, D side 1, P side 1	FMVSS 111 See DWG	FMVSS 111	FMVSS 111 must be adjustable	
ECE		ECE 46 Inside : 1 D side :1	ECE 46 See DWG	$\alpha \leq 55°$	ECE 46 D side must be adjustable	

Member Economies	C-a Performance of Parts	C-a-1) Impact Reduction	C-a-2) Bending Test	C-b Performance of Perts Installed to Vehicle	D Label Marking	E Reference Standard
Australia		FMVSS 111				
Brunei						
Canada		400N(90 pounds) applied to inside mirrors only.				
Chile						
China		ECE 46	ECE 46		ECE 46	
Hong Kong						
Indonesia						
Japan		ECE 46				
Korea		FMVSS 111				
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
U.S.A.		FMVSS 111 90 pounds applied to inside mirrors only.			FMVSS 111 "Objects in Mirror are closer than they appear" applied to outside convex mirrors for passenger 's side only	
ECE		ECE 46 200,Pendulum	ECE 46 26Kg , 1min		Approval Mark	

Australia ADR No.14

<table>
<tr><th>TEM</th><th>CONTENTS</th><th>LLUSTRATION / SUPPLEMENT</th></tr>
<tr><td>A:Application</td><td>Passenger vehicle and Light omnibus</td><td></td></tr>
<tr><td>B:Structure Performances</td><td></td><td></td></tr>
<tr><td>B-a:Structure of Parts</td><td></td><td></td></tr>
<tr><td>1.Dimension</td><td>For convex mirrors, the reflective surface area is to be equal to or greater than that of a flat mirror required to meet the field of view requirements.</td><td></td></tr>
<tr><td>2. Reflective Surface Area</td><td><table><tr><td rowspan="2">Inside</td><td colspan="2">Outside</td></tr><tr><td>Driver’s side</td><td>Passenger’s side</td></tr><tr><td colspan="2">Mirror of unit magnification</td><td>Mirror of unit magnification or Convex mirror (r ≥ 1200mm)</td></tr></table>
*The radii of curvature shall not deviate by more than ± 15% from the average radius of curvature.</td><td></td></tr>
<tr><td>3.Coefficient of Reflection</td><td>The reflectance value of the reflective film ≥ 35%
Night driving position(prismatic type) ≥ 4%</td><td></td></tr>
<tr><td>4.Structure</td><td>1)The mirror mounting shall provide a stable support for the mirror, and shall provide for adjustment by tilting in both horizontal and vertical directions.
2)The outside mirror and mounting shall be free of sharp points or edges that could contribute to pedestrian injury.</td><td></td></tr>
<tr><td>B-b : Structure of Parts Installed to Vehicle</td><td></td><td></td></tr>
</table>

Item 96-18. REAR VISION MIRRORS

Australia ADR No.14

1. No. of Mirrors

No.	Inside	Outside	
		Driver's side	Passenger's side
	1	1	1*

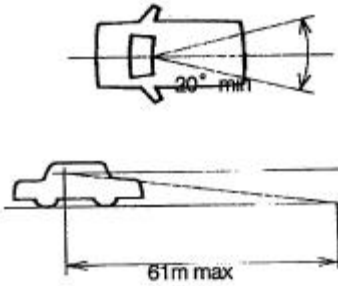
*When an inside rearview mirror does not provide the view to the rear required, the mirror shall be equipped.

2.Field of Vision

<Inside mirror>
The mirror shall provide a view with an included horizontal angle of at least 20° and sufficient vertical angle to provide a view of a level road surface extending to the horizon beginning at a point not greater than 61m.

<Outside mirror>
The mirror shall provide a view with a level road surface extending to the horizon from a line perpendicular to a plane tangential to the driver's side of the vehicle at the widest point and parallel to the longitudinal axis of the vehicle, extending 2.4m out from the tangential plane 11m behind the driver's eyes.

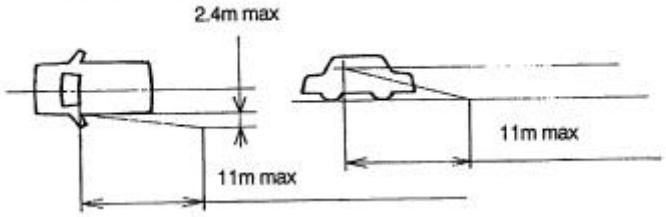
<Inside mirror>



3. Position

1) The outside mirror shall not be obscured by the unwiped portion of the windscreen.
2)Neither the mirror nor the mounting shall protrude further than the widest part of the vehicle body, except to the extent necessary to produce a field of view meeting the requirements.

<Outside mirror>



4.Adjustment

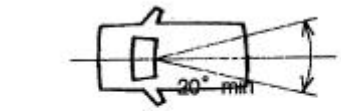
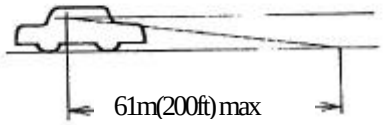
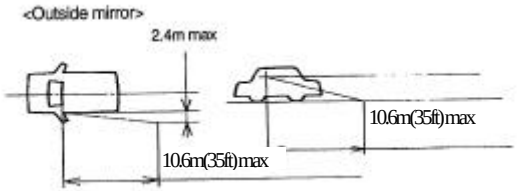
The outside mirror on driver's side shall be adjustable from the driver's seating position.

Australia ADR No.14		
TEM	CONTENTS	LLUSTRATION / SUPPLEMENT
C: Performance Requirement		
C-a: Performance of Parts		
1.Impact Reduction	If the inside mirror is in the “Head Impact Area”, the mounting shall deflect, collapse or break away without leaving sharp edges, when the reflective surface of the mirror is subjected to a force of not more than 400N in any direction that is not more than 45 degrees from the forward longitudinal direction.	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

Brunei Article 17.		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application		
B: Structure Performance		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	Every motor vehicle shall be equipped with a reflecting mirror.	
2.Field of Vision	Reflecting mirror shall be constructed and fitted to the motor vehicle as to enable the driver of such vehicle to be or become aware of the presence in the rear thereof of any other vehicle.	
C: Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to None Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

CANADA MVSR No. 111

TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger car, Multipurpose passenger vehicle, Truck and bus	
B: Structure Performance		
B-a: Structure of Parts		
1. Dimension	(Mirror of unit magnification (MPV, Truck or Bus)) GVWR ≤ 4536 Kg (Except school bus): ≥ 125cm^2 (19.5 sq. in) GVWR > 4536 Kg (Including school bus): ≥ 325 cm^2 (50 sq. in)	
2.Reflective Surface Area	An outside rearview mirror installed on the side of a vehicle opposite the driver's side may be convex if the reflective surface area is equal to or greater than that of a mirror of unit magnification that would meet the requirements. (Radius of curvature of convex mirror) 890mm (35 in.) ≤ r ≤ 1800mm(71.5 in.) *The radius of curvature at any point does not deviate by more than 12.5%from the average of any five radius of curvature measurements made on the reflective surface at least 6mm (0.25 in.) from the edge of the image display.	
3. Coefficient of Reflection	Average value : Single reflectance ≥ 35%, Multiple reflectance, daytime ≥ 35%, nighttime ≥ 4%, electrical failure ≥ 35% (Test Method) SAE Recommended Practice J964~~a~~, "Test Procedure for Determining Reflectivity of Rearview Mirrors" (June 1992)	
4. Structure	1) A rearview mirror shall be capable of adjustment from within the passenger compartment of the passenger car. 2) A rearview mirror shall have a stable support.	

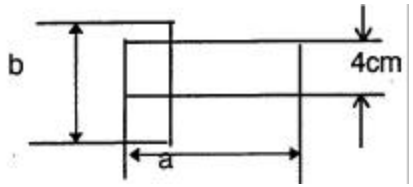
CANADA MVSR No. 111		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
4.Structure	3)A rearview mirror shall be adjustable in the horizontal and vertical directions. 4)A rearview mirror shall be free of sharp points or edges that could contribute to the injury of any occupant of the vehicle or of any pedestrian.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	PC : Inside 1, D side 1, P side 1 only if the inside mirror can not meet the field of view requirements. Others : Inside 1, D side 1, P side 1, or, D side 1, P side 1. *For passenger vehicle, when an inside rearview mirror does not provide the view to the rear red, the mirror shall be installed. *For MPV, Truck, or Bus with a GVWR of 4536Kg or less, except school bus, the mirror shall be installed.	
2.Field of Vision	<Inside mirror> The mirror shall provide a view that shall be not less than 20° horizontally rearward from the projected eyepoint, and extend to the horizon and include a point on the road surface not more than 60m(200ft). A field of view described above may be partially obscured by seated occupants or head restraints. <Outside mirror> The mirror shall provide a view that extends to the horizon and includes a line measuring 2.5m(8ft) perpendicular to and outboard from the vertical longitudinal plane tangent to the driver's side of the passenger car at the widest part thereof at a point 10.6m(35ft) behind the eyes of the driver. A field of view described above may be partially obscured by the rear body and fender contours.	<Inside mirror>   <Outside mirror> 

China GB15084-94		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Position	Mirror shall not have its view obscured by the portion of the windshield that is not wiped nor by any opaque portion of the vehicle structure, and in the case of outside rearview mirrors, have no greater protrusion beyond the perimeter of the vehicle than is necessary to meet or exceed the field of	
4.Adjustment	None	
C-a: Performance of Parts		
1.Impact Reduction	An inside rearview mirror shall collapse or break away without leaving sharp edges, when the reflective surface of the mirror is subjected to a force of 400N (90 lb.) in any direction that is not more than 45	
C-b:Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

China GB15084-94		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application	Motor vehicles of categories M and N	
B: Structure Performance		
B-a: Structure of Parts		

China GB15084-94

TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
1.Dimension	The dimensions of the reflecting surface shall be such that it is possible to inscribe a rectangle of a height of 4cm and of base length “a”, and a segment parallel to the height of the rectangle and of length “b”, as shown below.	

Type of mirror	Interior rearview mirrors	Exterior rearview mirrors	
Class or rearview mirrors	I	II	III
Vehicle categories	M1, M2, M3	M2, M3	M1, N1,N2, N3
A(min. values)	$\frac{15cm}{1+\frac{1000}{r}}$	$\frac{17cm}{1+\frac{1000}{r}}$	$\frac{13cm}{1+\frac{1000}{r}}$
B(min. values)		20	7
			

r : average radius of curvature(mm)

2.Reflective Surface Area	The reflecting surface shall be either flat or spherically convex. <The lower limit of curvatures>	

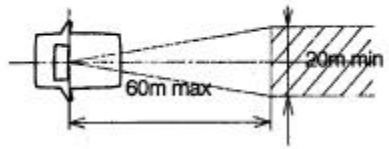
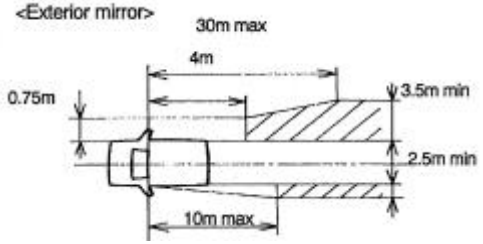
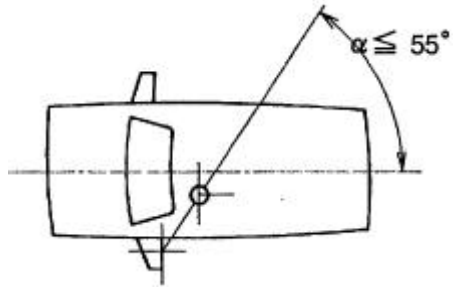
	Interior	Exterior	
Class	I	II	III
R	R≥ 1200mm	R≥ 1800mm	R≥ 1200mm

*The difference between ri or r’i and rp at each reference point shall not exceed 0.15r.
The difference between any of the radii of curvature(rp1, rp2 and rp3) and r shall not exceed 0.15r.
When “r” is not less than 3,000mm, the value of 0.15r quoted in paragraphs 7.2.2.1 and 7.2.2.2 is replaced by 0.25r.
The value of “r” shall not be less than:
1,200mm for interior rearview mirrors(ClassI) and “main” exterior rearview mirrors of ClassIII.
1,800mm for “main” exterior rearview mirrors of ClassII.

Item 96-18. REAR VISION MIRRORS

China GB15084-94

<table>
<tr><th>TEM</th><th>CONTENTS</th><th>ILLUSTRATION / SUPPLEMENT</th></tr>
<tr><td>3.Coefficient of Reflection</td><td>Normal coefficient of reflection ≥ 40%
Night position(for two position) ≥ 4%
*The “day” position shall allow the colors of the traffic signals to be recognized.</td><td></td></tr>
<tr><td>4.Structure</td><td>1)All rearview mirrors shall be adjustable.
2)All parts, which are in potential static contact with a sphere, either 165mm in dia., in the case of rearview mirrors, or 100mm in dia., in the case of exterior rearview mirrors, shall have a radius of curvature of not less than 2.5mm.
3)The edge of the reflecting surface shall be enclosed in a protective housing which shall have a radius of curvature of not less than 2.5mm at all points and in all directions.
If the reflecting surface projects beyond the housing, the radius of curvature of the edge of the ·cting
part shall be not less than 2.5mm and shall return into the housing under a force of 50N applied e
point of greatest projection relative to the housing in a horizontal direction.</td><td></td></tr>
<tr><td>B-b: Structure of Parts Installed to Vehicle</td><td></td><td></td></tr>
<tr><td>1.No. of Mirrors</td><td>
<table>
<tr><th rowspan="2">Vehicle category</th><th rowspan="2">Interior</th><th colspan="2">Exterior</th></tr>
<tr><th>Driver’s side</th><th>Passenger’s side</th></tr>
<tr><td>M1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>M2, M3</td><td>1</td><td>2</td><td>1</td></tr>
</table>
</td><td></td></tr>
</table>

China GB15084-94		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
2.Field of Vision	For vehicles driven on the right-hand side of the road. <Interior mirror> The field of vision shall be such that the driver can see at least a 20m-wide flat horizontal portion of the road, centred on the vertical longitudinal median plane of the vehicle, from 60m behind the driver's ocular points to the horizon. <Exterior mirror> 1)Left-hand mirror The field of vision shall be such that the driver can see at least a 2.5m-wide flat, horizontal portion road, which is bounded on the right by the plane which is parallel to the median longitudinal plane passing through the outermost point of the vehicle on the left and extend from 10m behind the driver's ocular points to the horizon. 2)Right-hand mirror The field of vision shall be such that the driver can see at least a 3.5m-wide, flat, horizontal portion of the road, bounded on the left by a plane parallel to the median longitudinal vertical plane of the vehicle and passing through the outermost point of the vehicle on the right which extends from 30m behind the driver's ocular points to the horizon. In addition, the road must be visible to the driver over a width of 0.75m from a point 4m behind the vertical plane passing through the driver's ocular points.	<Interior mirror>  <Exterior mirror> 
3.Position	Rearview mirrors shall be so placed that the driver has a clear view of the road to the rear and side vehicle. <Exterior rearview mirrors> 1)The exterior rearview mirror on the driver side shall be located so as to from an angle of not more than 55° between the vertical longitudinal median plane of the vehicle and the vertical plane which passes through the center of the rearview mirror and through the center of the straight 65mm line which joins the driver's two ocular points.	

China GB15084-94		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Position	2) Shall be visible through the side windows or through the portion of the windscreen that is swept by the windscreen wiper. (This provision shall not apply to exterior rearview mirrors fitted on the right side of vehicles of categories M2 and M3) 3)Where the bottom edge of an exterior rearview mirror is less than 2m above the ground, this rearview mirror shall not project more than 0.2m beyond the overall width of the vehicle when not fitted with the rearview mirror.	
4.Adjustment	The interior and the driver's side exterior rearview mirror shall be such that the driver can adjust in his driving position.	
C: Performance Requirement		
C-a: Performance of Parts		
1.Impact Reduction	<Interior rearview mirror> 1) The pendulum shall return in such a way that the projection on the release plane of the position taken by the arm makes an angle of at least 20° with the vertical. 2)Should there be a breakage of the mounting of the rearview mirror during the tests, the part remaining shall not project from the base by more than 1cm, and the configuration remaining after the test shall comply with the conditions prescribed in paragraph 6.3 of this regulation. 3)The mirror shall not break during the tests. 4)The fragments of glass still adhere to the back of the protective housing or to a surface firmly attached to the protective housing, except that partial separation of the glass from its backing is permitted, provided this does not exceed 2.5mm either side of the crack. <Exterior rearview mirror> Above mentioned requirement also applies to the exterior rearview mirror.	
2.Bending Test	The test load shall be 25kg applied for one minit. 1)The mirror shall not break. 2)The same as above mentioned " 7.Impact test (4)"	

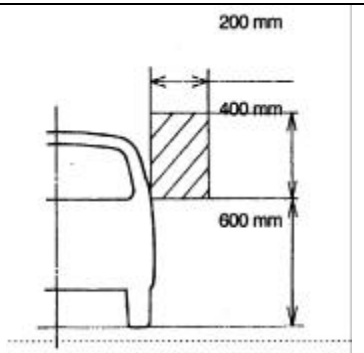
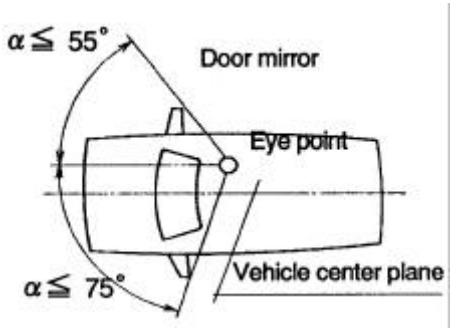
China GB15084-94		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
1.Marking	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E :Reference Standards	None	

Hong Kong Road Traffic Regulations No. 39		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application		
B: Structure Performance		
B-a: Structure of Parts		
1.Structure	<Inside mirror> The edges shall be surrounded by some material such as will make it unlikely that severe cuts will be inflicted in the event of the mirror or that material being struck by any occupant of the vehicle. <Outside mirror> It shall be fitted to the vehicle to remain steady under normal driving conditions.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	1)A mirror on the driver's side externally 2)A mirror internally or on the passenger's side externally	
2.Field of Vision	The mirrors shall be so constructed and fitted to the vehicle as to assist the driver to become aware of traffic to the rear and on both sides rearwards.	
3.Position	1)Every mirror fitted externally on a vehicle, when the bottom of the mirror is less than 2m above the road surface when the vehicle is laden, it shall not project more than 10cm beyond the overall width of the vehicle, or in the case where the vehicle is towing a trailer with an overall width greater than that of the towing vehicle, not more than 20cm beyond the overall width of the trailer, unless the mirror is designed so as not to cause injury to any person in the event of a collision. 2)Every mirror fitted externally on a vehicle, in the case of a vehicle fitted with windows and a windscreen, it shall be fitted in such a way as to be visible to the driver, when in his driving position, through a side window or through the portion of the windscreen which is swept by the windscreen wipers	

Hong Kong Road Traffic Regulations No. 39		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
C: Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle .	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

Indonesia Government Regulation No. 44/1993-70		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application	Motorised vehicles, Trailer cars and Linked cars	
B: Structure Performance		
B-a: Structure of Parts		
1.Reflective Surface Area	The view mirrors shall be made of glass or glass-like material which shall not change the distance and shape of persons and/or objects seen.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	The view mirrors of a motor vehicle shall be two or more in number	
C: Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking equipment of Its Installed to Vehicle	None	
E: Reference Standards	None	

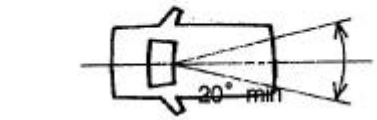
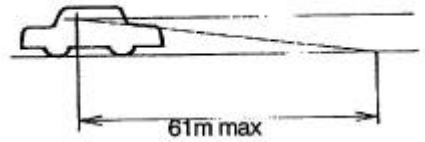
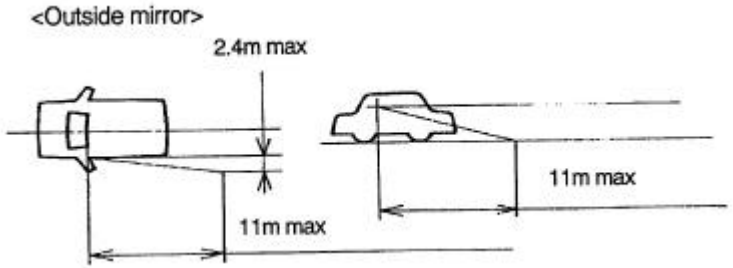
<table>
<tr><th colspan="3">Japan STANDARDS FOR CONSTRUCTION AND DEVICES OF MOTOR VEHICLES No. 44</th></tr>
<tr><th>TEM</th><th>CONTENTS</th><th>ILLUSTRATION / SUPPLEMENT</th></tr>
<tr><td>A: Application</td><td>Motor vehicle</td><td></td></tr>
<tr><td>B: Structure Performance</td><td></td><td></td></tr>
<tr><td>B-a: Structure of Parts</td><td></td><td></td></tr>
<tr><td>1.Reflective Surface Area</td><td><table><tr><th>Inside</th><th>Outside</th></tr><tr><td>Mirror of unit magnification</td><td>Convex mirror</td></tr></table></td><td></td></tr>
<tr><td>2.Coefficient of Reflection</td><td></td><td></td></tr>
<tr><td>3.Structure</td><td>1)The mounting of a rearview mirror shall be easily adjustable and shall be a stable support for the mirror.
2)Outside mirror shall not have any edge or rotating protrusions which are likely to endanger other traffic.
3)The mirror provided inside the compartment shall be constructed passengers are unlikely to hit their heads in it during collisions.</td><td></td></tr>
<tr><td>B-b: Structure of Parts Installed to Vehicle</td><td></td><td></td></tr>
<tr><td>1.No. of Mirrors</td><td><table><tr><th rowspan="2">No.</th><th rowspan="2">Inside</th><th colspan="2">outside</th></tr><tr><th>Driver’s side</th><th>Passenger’s side</th></tr><tr><td>1</td><td>1</td><td>1</td></tr></table></td><td></td></tr>
</table>

Japan STANDARDS FOR CONSTRUCTION AND DEVICES OF MOTOR VEHICLES No. 44		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
2.Field of Vision	Each side of the right and left of the vehicle, straight backwards up to 50m, and near the left side of the vehicle.	
3.Position	1)For outside rearview mirrors, refer to the illustration. 2)For fender mirrors, at least 80% of the effective reflecting section of the reaview mirror shall be visible from either of the two eye points through the area of the windshield that can be wiped by the wiper.For door mirrors, such rearview mirrors shall be visible from either of the two points through the area of the side window where mist of water droplets, etc. can be removed by defroster. 3)Rearview mirrors shall not protrude 250mm or more outwards from the outermost part of the motor vehicle, and 300mm or more upwards from the highest part of the motor vehicle.	
C: Performance Requirement		

Japan STANDARDS FOR CONSTRUCTION AND DEVICES OF MOTOR VEHICLES No. 44		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
C-a:Performance of Parts		
1.Impact Reduction	<Inside rearview mirror(if the mirror is in the head impact area)> 1)The rearview mirror shall be displaced to the outside of the head impact area or shall break or collapse without leaving sharp edges at an applying force 45kg or less. 2)During the test, the pendulum shall continue its movement after it hits the rearview mirror and shall reach a point sufficiently high to assume an angle of 20 degrees or more to the perpendicular line, in a vertical plane in parallel to the vehicle longitudinal center line. If the rearview mirror mount should fail, the fractured area shall have no sharp edge. <Outside rearview mirror> 1)The rearview mirror shall be displaced or shall break or collapse without leaving projection of 10mm or higher at an applying force 45kg or less. 2)During the test, the pendulum shall continue its movement after it hits the rearview mirror and shall reach a point sufficiently high to assume an angle of 20 degrees or more to the perpendicular line, in a vertical plane in parallel to the vehicle longitudinal center line. In instance where the mirror bracket should fail, there shall not be any projection of 10mm or higher at the attached portion. 3)The rearview mirror, whose height of the lowest part of the mirror or mounting that protrudes beyond the outermost part of the vehicle body in the vicinity of the mounting is 1.8m or less above the ground, shall be constructed so that the chances of it hitting pedestrians, etc. is reduced. 4)When a force is applied continuously to the mirror in accordance with the test procedures, the mirror shall swivel into a place inside the outermost part of the vehicle, in the vicinity of the mirror mounting, or the rearview mirror shall occupy a height of 1.8m or more above the ground, with the max. value of the applying force not exceeding 25kg.	

Japan STANDARDS FOR CONSTRUCTION AND DEVICES OF MOTOR VEHICLES No. 44		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
C-b:Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

<table>
<tr><td colspan="3">Korea The Regulations of The Motor Vehicle Safety Standards, Article 50, 108</td></tr>
<tr><td>TEM</td><td>CONTENTS</td><td>ILLUSTRATION / SUPPLEMENT</td></tr>
<tr><td>A: Application</td><td>Motor vehicles and Two-wheeled motorcycles</td><td></td></tr>
<tr><td>B-a: Structure of Parts</td><td></td><td></td></tr>
<tr><td>1.Dimension</td><td><Outside rearview mirror of unit magnification>
<table><tr><td>Bus, truck and special purpose vehicle with a gross vehicle weight of not more than 4.5t</td><td>Bus, truck and special purpose vehicle with a gross vehicle weight of ore than 4.5t</td></tr><tr><td>≥ 126 cm^2</td><td>≥ 323 cm^2</td></tr></table></td><td></td></tr>
<tr><td>2.Reflective Surface Area</td><td><table><tr><td>Passenger vehicle and bus with seating capacity if not more than 10 passengers</td><td>Bus, truck and special purpose vehicle with a gross vehicle weight of not more than 4.5t</td></tr><tr><td>Exterior (Passenger’s side) = mirror of unit magnification or convex mirror</td><td>Exterior (Passenger’s side) = mirror of unit magnification or convex mirror</td></tr><tr><td>Interior = mirror of unit magnification</td><td>———————</td></tr></table>
<Radii of curvature of convex mirror>
<table><tr><td>Passenger vehicle & bus with seating capacity of not more than 10</td><td>Bus, truck and special purpose vehicle</td></tr><tr><td>89cm ≤ r ≤ 165cm*</td><td>R ≥ 89cm</td></tr></table>
*The radii of curvature readings shall deviate from the average radius of curvature by not more than 12.5%.</td><td></td></tr>
</table>

Korea The Regulations of The Motor Vehicle Safety Standards, Article 50, 108		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Structure	1)The mounting shall provide a stable support for the mirror. 2)The mounting of outside rearview mirror shall be free of sharp protrusions or edges. 3)The mounting shall provide for mirror adjustment by tilting in both the horizontal and vertical directions.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	1)An inside rearview mirror 2)An outside rearview mirror on the driver's side	
2.Field of Vision	Passenger vehicle and bus with seating capacity of not more than 10 passengers. <Inside mirror> The mirror shall provide a view with a horizontal angle not less than 20° and the vertical angle of a field of vision which shall include at least a view of the level road extending 61m. <Outside mirror> The mirror shall provide a view to recognize a level road surface extending 2.4m out from the tangent plane 10.5m behind the driver.	<Inside mirror>   <Outside mirror> 

Korea The Regulations of The Motor Vehicle Safety Standards, Article 50, 108		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Position	The mirror shall not be obscured by the unwiped portion of windshield.	
C: Performance Requirement		
C-a: Performance of Parts		
1.Impact Reduction	An inside rearview mirror shall collapse or break away without leaving sharp edges, when the reflective surface of the mirror is subjected to a force of 400N (90lb.) in any direction that is not more than 45 degrees from the forward longitudinal direction.	
C-b :Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement		
1.Marking	If the convex mirror is installed, the convex mirror shall have, at the lower edge of the mirror's reflective surface, the mark in letters not less than 4.5mm but not more than 6.5mm hight says that objects in mirror are closer than they appear.	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

New Zealand VSR No.28, TR No.74 & PSV No.49/59		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A :Application		
B: Structure Performance		
B-a Structure of Parts 1.Dimension	<Passenger service vehicle(omnibuses, service coaches and school buses) > Interior mirror < 200mm x 100mm Convex mirror over the step of the second doorway ≥ 200mm(min.dia.)	
B-b:Structure of Parts Installed to Vehicle		
1.No. of Mirrors	<Motor vehicle(other than a trailer)> Shall be fitted with at least one mirror so as to provide effective rear vision. If any treatment to glazing behind the driver reduces light transmission below 70%, external rear view mirrors are required <Heavy motor vehicle(being a goods service or passenger service vehicle)> Shall be fitted on the left side (or , in the case of a vehicle with its steering column to the left side of the longitudinal centre-line of the body of the vehicle, on the right side) with an external mirror.	
2.Field of Vision	1)A mirror shall reflect of the driver a view of the roadway to the rear sufficient for driving requirements. 2)For passenger service vehicle(omnibuses, service coaches and school buses), mirrors shall be fitted so as to provide the driver with a clear view both of the interior of the vehicle and also to the rear and rear right of the vehicle. 3)For passenger truck, mirrors shall be fitted so as to provide the driver with a clear view of the rear exit and to the rear and rear right of the vehicle.	
3.Position	For passenger service vehicle(omnibuses, service coaches and school buses), where a second doorway is provided on the left side of the vehicle, a convex mirror shall be so positioned over the step well that the driver, when in his seat and looking into an interior rear vision mirror, can see that passengers are clear of the steps before closing the doors.	

New Zealand VSR No.28, TR No.74 & PSV No.49/59		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
C: Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b :Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

Papua New Guinea Motor Traffic Regulation No.125E		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application		
B: Structure Performance		
B-a: Structure of Parts		
1.Structure	1)A mirror shall be so fitted, that it is not likely to cause injury to passengers in a motor vehicle. 2)A mirror shall be constructed of such material.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	1)A motor vehicle, other than a trailer, shall be so fitted with a mirror. 2)In case that the rear vision of the driver through an interior mirror is obscured, the motor vehicle shall be equipped with two mirrors, one on each side of the vehicle, mounted on the outside of the vehicle.	
2.Field of Vision	The driver of the vehicle, while maintaining his normal driving position, has a clear reflected view of the roadway behind, and along each side of the vehicle.	
C: Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	

Papua New Guinea Motor Traffic Regulation No.125E		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

The Republic of the Philippines Section8. & PNS 1107		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application		
B: Structure Performance		
B-a:Structure of Parts		
1.Reflective Surface Area	The inside mirror and driver's mirror shall be of unit magnification (1:1).	
2.Structure	1)The mirror shall be so mounted for easy adjustment and shall have stable support. 2)Polished or buffed stainless steel used as rearview mirrors shall not be allowed.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	1)Rearview mirrors shall be provided. 2) Passenger's side outside rear-view mirror shall be required when inside rear-view mirror does not provide a sufficient field of view.	
2.Field of Vision	All motor vehicles, trailers and semi-trailers shall be provided with rear-view mirrors to enable the driver on his seat to observe clearly the traffic condition at the left side of the vehicle up to 30 m backward.	
3.Adjustment	1)The driver's side outside mirror shall be adjustable from the driver's seated position.	
C: Performance Requirement		
C-a: Performance of None Parts		
C-b: Performance of Parts Installed to None Vehicle		

The Republic of the Philippines Section8. & PNS 1107		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b:Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

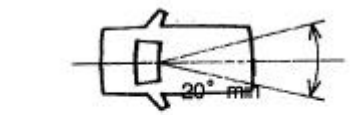
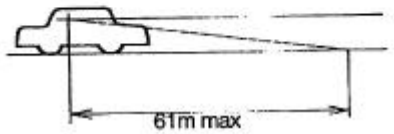
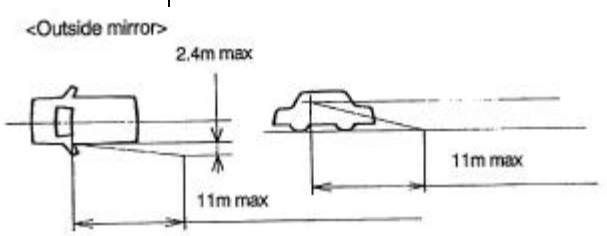
Singapore Road Traffic Rules, C20		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application	Motor vehicles and Trailers	
B: Structure Performance		
B-a:Structure of Parts	None	
B-b:Structure of Parts Installed to Vehicle		
1.No. of Mirrors	1)Every public service vehicle having a seating capacity for more than 6 persons, excluding the driver, and every goods vehicle shall be equipped with at least two mirrors, one of which shall be fitted externally on the driver's side of the vehicle and the other either internally or on the passenger's side exernally. 2)Every motor vehicle, other than a motor-cycle, shall be equipped either internally or externally with a reflecting mirror .	
2.Field of Vision	The mirrors shall be so constructed and fitted to the motor vehicle as to assist the driver to become aware of traffic to the rear and on both sides rearwards.	
C: Performance Requirement		
C-a: Performance of Parts	None	
C-b:Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	

Singapore Road Traffic Rules, C20		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

Chinese Taipei Article 39, Section 17		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application		
B: Structure Performance		
B-a: Structure of Parts		
1.Structure	The condition of mirrors shall be good.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors	For the heavy-duty vehicle which has flat front surface, front mirror shall be installed.	
C: Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	Optional Regulations : CNS D2050	

Thailand Ministerial Regulations No. 22		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger car	
B: Structure Performance		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1.Position	Rearview mirror fitted in the place that enables the driver to see the traffic at the sides and the rear the vehicle clearly at all times.	
C: Performance Requirement		
C-a:Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a:Label Marking Its Own None Requirement		
D-b:Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

U.S.A. FMVSS No.111		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger cars, Multipurpose passenger vehicle, Trucks, Buses, School buses and Motorcycles	
B: Structure Performance		
B-a: Structure of Parts		
1.Reflective Surface Area	<Radius of curvature of convex mirror> 35 in. ≤ r ≤ 65in. *None of the radii of curvature readings shall deviate from the average radius of curvature by more than ± 12.5% .	
2.Coefficient of Reflection	Average value : Single reflectance ≥35%, Multiple reflectance, daytime ≥35%, nighttime ≥4%, electrical failure ≥35% <Test method> The average reflectance of any mirror shall be determined in accordance with SAE Recommended Practice J964, Oct 84.	
3.Structure	1)The mirror mounting shall provide a stable support for the mirror, and shall provide for mirror adjustment by tilting in both horizontal and vertical directions.	

U.S.A. FMVSS No.111		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Structure	2)The mirror and mounting shall be free of sharp points or edges that could contribute to pedestrian injury.	
b:Structure of Parts Installed to Vehicle		
1.No. of Mirrors	PC : Inside 1, D side 1, P side 1 only if the inside mirror can not meet the field of view requirements. Others : same as PC, or, D side 1, P side 1. *When an inside rearview mirror does not provide the view to the rear required, the mirror shall be equipped.	
2.Field of Vision	<Inside mirror> The mirror shall provide a field of view with an included horizontal angle measured from the projected eye point of at least 20° and sufficient vertical angle to provide a view of a level road surface extending to the horizon beginning at a point not greater than 200ft to the rear of the vehicle. A field of view described above may be partially obscured by seated occupants or head restraints. <Outside mirror> The mirror shall provide a view of a level road surface extending to the horizon from a line, perpendicular to a longitudinal plane tangent to the driver's side of the vehicle at the widest point, extending 8ft out from the tangent plane 35ft behind the driver's eyes. A field of view described above may be partially obscured by the rear body and fender contours.	<Inside mirror>   <Outside mirror> 

U.S.A. FMVSS No.111		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Position	1) The outside mirror on driver's side shall not be obscured by the unwiped portion of the windshield. 2)Neither the mirror nor the mounting shall protrude further than the widest part of the vehicle , except to the extent necessary to produce a field of view meeting or exceeding the requirements.	
4.Adjustment	The outside mirror on driver's side shall be adjustable from the driver's seating position.	
C: Performance Requirement		
C-a:Performance of Parts		
1.Impact Reduction	If the mirror is in the head impact area, the mounting shall deflect, collapse or break away without leaving sharp edges, when the reflective surface of the mirror is subjected to a force of90 pounds in any direction that is not more than 45 degrees from the forward longitudinal direction.	
C-b:Performance of Parts Installed to None Vehicle		
D:Label Marking Requirement		
D-a:Label Marking Its Own Requirement		
1.Marking	Each convex mirror shall have permanently and indelibly marked at the lower edge of the mirror's reflective surface, in letters not less than 3/16 of an inch nor more than 1/4 inch high the words "Objects in Mirror Are Closer Than They Appear".	

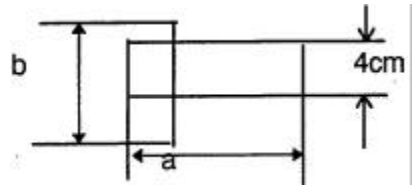
U.S.A. FMVSS No.111		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

Item 96-18. REAR VISION MIRRORS

ECE ECE No. 46		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
A: Application	Motor vehicles of categories M and N	
B:Structure Performance		
B-a: Structure of Parts		

ECE ECE No. 46

TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
1.Dimension	The dimensions of the reflecting surface shall be such that it is possible to inscribe a rectangle of a height of 4cm and of base length “a”, and a segment parallel to the height of the rectangle and of length “b”, as shown below.	

Type of mirror	Interior rearview mirrors	Exterior rearview mirrors	
Class or rearview mirrors	I	II	III
Vehicle categories	M1, M2, M3	M2, M3	M1, N1,N2, N3
A(min. values)	$\frac{15cm}{1 + \frac{1000}{r}}$	$\frac{17cm}{1 + \frac{1000}{r}}$	$\frac{13cm}{1 + \frac{1000}{r}}$
B(min. values)		20	7
			

r : average radius of curvature(mm)

2.Reflective Surface Area

The reflecting surface shall be either flat or spherically convex.

<The lower limit of curvatures>

	Interior	Exterior	
Crass	I	II	III
R	R ≥ 1200mm	R ≥ 1800mm	R ≥ 1800mm

*The difference between ri or r’i and rp at each reference point shall not exceed 0.15r.

The difference between any of the radii of curvature(rp1, rp2 and rp3) and r shall not exceed 0.15r.

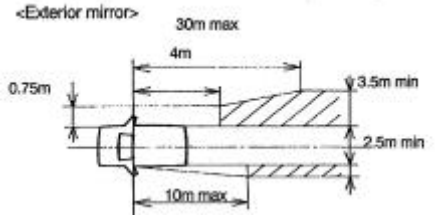
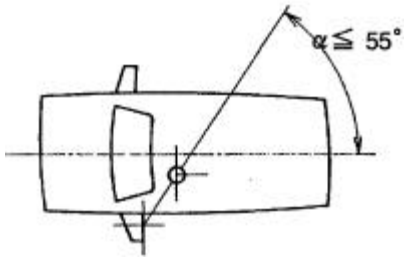
When “r” is not less than 3,000mm, the value of 0.15r quoted in paragraphs 7.2.2.1 and 7.2.2.2 is replaced by 0.25r.

The value of “r” shall not be less than: 1,200mm for interior rearview mirrors(Class I) and “main” exterior rearview mirrors of Class III. 1,800mm for “main” exterior rearview mirrors of Class II.

ECE ECE No. 46

TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Coefficient of Reflection	Normal coefficient of reflection ≥ 40% Night position(for two position) ≥ 4% *The “day” position shall allow the colors of the traffic signals to be recognized.	
4.Structure	1)All rearview mirrors shall be adjustable. 2)All parts, which are in potential static contact with a sphere, either 165mm in dia., in the case of rearview mirrors, or 100mm in dia., in the case of exterior rearview mirrors, shall have a radius of curvature of not less than 2.5mm. 3)The edge of the reflecting surface shall be enclosed in a protective housing which shall have a radius of curvature of not less than 2.5mm at all points and in all directions. If the reflecting surface projects beyond the housing, the radius of curvature of the edge of the projecting part shall be not less than 2.5mm and shall return into the housing under a force of 50N applied to the point of greatest projection relative to the housing in a horizontal direction.	
B-b: Structure of Parts Installed to Vehicle		
1.No. of Mirrors		

Vehicle category	Interior	Exterior	
		Driver’s side	Passenger’s side
M1	1	1	1
M2, M3	1	2	1

ECE ECE No. 46		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
2.Field of Vision	For vehicles driven on the right-hand side of the road. <Interior mirror> The field of vision shall be such that the driver can see at least a 20m-wide flat horizontal portion of the road, centred on the vertical longitudinal median plane of the vehicle, from 60m behind the driver's ocular points to the horizon. <Exterior mirror> 1)Left-hand mirror The field of vision shall be such that the driver can see at least a 2.5m-wide flat, horizontal portion of the road, which is bounded on the right by the plane which is parallel to the median longitudinal vertical plane passing through the outermost point of the vehicle on the left and extend from 10m behind the driver's ocular points to the horizon. 2)Right-hand mirror The field of vision shall be such that the driver can see at least a 3.5m-wide, flat, horizontal portion of the road, bounded on the left by a plane parallel to the median longitudinal vertical plane of the vehicle and passing through the outermost point of the vehicle on the right which extends from 30m behind the driver's ocular points to the horizon. In addition, the road must be visible to the driver over a width of 0.75m from a point 4m behind the vertical plane passing through the driver's ocular points.	<Interior mirror>  <Exterior mirror> 
3.Position	Rearview mirrors shall be so placed that the driver has a clear view of the road to the rear and side of the vehicle. <Exterior rearview mirrors> 1)The exterior rearview mirror on the driver side shall be located so as to from an angle of not more than 55° between the vertical longitudinal median plane of the vehicle and the vertical plane which passes through the center of the rearview mirror and through the center of the straight 65mm line which joins the driver's two ocular points.	

ECE ECE No. 46		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
3.Position	2)Shall be visible through the side windows or through the portion of the windscreen that is swept by the windscreen wiper. (This provision shall not apply to exterior rearview mirrors fitted on the right side of vehicles of categories M2 and M3) 3)Where the bottom edge of an exterior rearview mirror is less than 2m above the ground, this rearview mirror shall not project more than 0.2m beyond the overall width of the vehicle when not fitted with the rearview mirror.	
4.Adjustment	The interior and the driver's side exterior rearview mirror shall be such that the driver can adjust in his driving position.	
C: Performance Requirement		
C-a: Performance of Parts		
1.Impact Reduction	<Interior rearview mirror> 1) The pendulum shall return in such a way that the projection on the release plane of the position taken by the arm makes an angle of at least 20° with the vertical. 2)Should there be a breakage of the mounting of the rearview mirror during the tests, the part remaining shall not project from the base by more than 1cm, and the configuration remaining after the test shall comply with the conditions prescribed in paragraph 6.3 of this regulation. 3)The mirror shall not break during the tests. 4)The fragments of glass still adhere to the back of the protective housing or to a surface firmly attached to the protective housing, except that partial separation of the glass from its backing is permitted, provided this does not exceed 2.5mm either side of the crack. <Exterior rearview mirror> Above mentioned requirement also applies to the exterior rearview mirror.	
2.Bending Test	The test load shall be 25kg applied for one minit. 1)The mirror shall not break. 2)The same as above mentioned " 7.Impact test (4)"	

ECE ECE No. 46		
TEM	CONTENTS	ILLUSTRATION / SUPPLEMENT
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement		
D-a: Label Marking Its Own Requirement		
1.Marking	1)Every rearview mirror shall possess on its protective housing a space large enough to accommodate the approval mark. 2)Trade name or mark of the manufacturer, international approval marks, an approval number must be affixed.	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

ITEM 96-19

Frontal collision protection

APEC Regulation Analysis Findings
Item No. 96-19: Frontal Collision Protection

1. Member Economy Comparison

(1) Canada, Australia, Korea and Japan have a regulation for frontal collision protection that is similar to the U.S.'s FMVSS 208.

(2) Chinese Taipei adopts a regulation that is completely different from FMVSS 208.

2. Item Comparison

(1) Seat belt types (B-b-1): The U.S. requires front air bags for all passenger cars, MPVs and trucks produced on September, 1998 or after. .

(2) Only Chinese Taipei has a requirement for the floor mudguard and bumper (B-b-2).

(3) Seat belt assemblies (C-a-1): The U.S. and Canada set forth a requirement for the seat belt as a separate unit. The U.S. specifies webbing contact force, while Canada does not.

(4) Seat belt warning systems (C-a-2): The U.S. and Canada require both an audible signal and a visual indicator. Australia requires a visual indicator and additionally accepts the use of an audible signal. The U.S. and Canada demand a warning duration of at least 60 seconds, compared to the 4 second or more required by Australia.

(5) Child seat lockability (C-a-3): Only the U.S. has this specification.

(6) Frontal collision (C-b-1): The U.S., Canada, Australia, Korea and Japan apply these requirements which have the following differences among these member economies:

1) The U.S. and Australia specify a sternum deflection limit of 76.2mm. Canada specifies such limit of 65 mm.
Korea and Japan do not have such a specification.

2) The U.S., Canada and Korea apply an impact speed of up to 30mph, Australia up to 48km/h or higher provided injury criteria met, and Japan 50 ± 2km/h.

3) Only Japan does not include the luggage mass factor.

4) In addition to a right-angle collision test, the U.S. and Canada require a 30 deg. angular collision test.

5) The U.S. and Canada require that vehicles equipped with air bags to undergo a collision test using no seat belt.
U.S. has, as the alternative to such test, "sled test" option.

(7) Air bag readiness indicator (C-b-4): The U.S. and Canada apply FMVSS 208. Other member economies do not have requirements for this item.

(8) Air bag on-off indicator (C-b-5): Only the U.S. sets forth requirements for this item, applying FMVSS 208.

(9) Air bag manual on-off device (C-b-6): Only the U.S. sets forth requirements for this item, applying FMVSS 208.

(10) Label (D): The U.S. and Canada apply FMVSS 208. Other member economies do not have specifications for this item.

3. Grouping

* FMVSS type - the U.S., Canada, Australia, Korea, Japan
* Other than FMVSS, ECE and Japan types - Chinese Taipei

*In addition to the frontal collision requirements, the lateral collision and rollover requirements of FMVSS 208 / CMVSS 208/ Korean Safety Regulation No. 102 are also described for reference in the Columns C-b-2 and C-b-3, respectively.

A : Application ; Passenger vehicles

Country	Regulation No.	B-b-1 Type of Seat Belt	B-b-2 The floor, mud guard and bumper	C-a-1 Seat Belt Assembly	C-a-2 Seat Belt Warning System	C-a-3 Child seat lockability
Australia	ADR 69/00	N.A. (However, the type of seat belt is specified in ADR 4)	N.A.	N.A. (However, requirements of seat belt is specified in ADR 4)	Unique Visual indicator must activate for 4 sec.min.(an audible signal in addition is permissible.) ADR 69 accepts U.S. warning system of FMVSS 208.	N.A.
Brunei						
Canada	CMVSS 208	FMVSS 208 1.Type 2 seat belt assembly 2.Type 2 seat belt assembly at rear outboard seating positions. 3.Type 1 or type 2 seat belt assembly at other seating positions.	N.A.	FMVSS 208 *Adjustment and Retractor *Latch mechanism *Seat belt guides *Latch plate access *Position of webbing intersection *Position of inboard receptacle *Tension reliever	FMVSS 208 1.Audible signal for 4-8 sec. 2.Warning light for 60 sec. or more.	N.A.
Chile						
China						
Hong Kong						
Indonesia						
Japan	SRRV 18	N.A.	N.A.	N.A.	N.A.	N.A.
Korea	Safety Regulation -Article 102	N.A.	N.A.	N.A.	N.A.	N.A.

Country	Regulation No.	B-b-1 Type of Seat Belt	B-b-2 The floor, mud guard and bumper	C-a-1 Seat Belt Assembly	C-a-2 Seat Belt Warning System	C-a-3 Child seat lockability
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei	Road Traffic Safety Rule, Article 39-15	N.A.	Unique To be surely installed	N.A.	N.A.	N.A.
Thailand						
United States	FMVSS 208	1.Type 2 seat belt assembly or automatic seat belt assembly at each front outboard seating position. *(Note;Automatic seat belt assembly is unique requirement.)* 2.Type 2 seat belt assembly at rear outboard seating positions. 3.Type 1 or type 2 seat belt assembly at other seating positions.	N.A.	*Adjustment and Retractor *Latch mechanism *Seat belt guides *Latch plate access *Position of webbing intersection *Webbing contact force (US only) *Position of inboard receptacle *Tension reliever	1.Audible signal for 4-8 sec. 2.Warning light for 60 sec. or more.	Child seat lockability (US only)
ECE	N/R					

Country	Regulation No.	C-b-1 Frontal Collision				
			Test dummy	Impact speed	Test vehicle mass	
Australia	ADR 69/00	FMVSS 208 *HIC ≤ 1,000 *Axial force through upper leg ≤ 2,250 lbs (10 kN) *Chest acceleration ≤ 60 g except for 3 millisec. *Compression deflection of sternum ≤ 76.2 mm when hybrid III is used.	Hybrid Ⅲ or Hybrid II until December 31, 1997. Hybrid Ⅲ is required on Jan.1., 1998 and after.	Up to 48 km/h or higher provided injury criteria met	Unladen mass + luggage mass + Test Dummies	Perpendicular
Brunei						
Canada	CMVSS 208	Unique *HIC ≤ 700 for seating positions with air bag. *Head acceleration 80 ≤ G for seating positions without air bag. *Axial force through upper leg ≤ 10 kN. *Chest acceleration ≤ 60 g except for 3 millisec.. *Chest deflection ≤ 65 mm. *Chest deflection ≤ 50 mm for - passenger cars produced Aug. 1., 1999 or after - MPVs and trucks produced Aug. 1., 2000 or after.	Hybrid Ⅲ or Hybrid II until Aug.31., 1997. Hybrid Ⅲ is required on September 1., 1997 and after.	Up to 30 mph	Unladen mass + luggage mass + Test Dummies	Perpendicular and any angle up to 30deg. in either direction.
Chile						
China						
Hong Kong						
Indonesia						
Japan	TRIAS47-1993	SRRV 18 *HIC ≤ 1,000 *Upper leg compression force ≤ 1,000 daN(=1021 kg) *Chest acceleration ≤ 60.0 g (588 m/s^2)within3millisec.	Hybrid Ⅲ or Hybrid II	50 ± 2 km/h	Unladen mass $^{+5\%}_{-0}$ + Test dummies	Perpendicular
Korea	Korean Safety Reg. article 102	FMVSS 208 *HIC ≤ 1,000 *Upper leg compressive force ≤ 1,020 kg *Chest acceleration ≤ 60 g except for 3 millisec. *Deflection of sternum ≤ 76.2 mm when Hybrid Ⅲ is used.	Hybrid Ⅲ or Hybrid II	48.3 km/h	Unloaded mass + luggage mass + Test dummies	Perpendicular

Country	Regulation No.	C-b-1 Frontal Collision				
			Test dummy	Impact speed	Test vehicle mass	Impact angle
Malaysia						
Mexico						
New Zealand						
Papua New Ginea						
Philippines						
Singapore						
Chinese Taipei	Road Traffic Safety rule,Article39 -15	N.A.				
Thailand						
United State	FMVSS 208	*HIC ≤ 1,000 *Axial force through upper leg ≤ 10 kN. *Chest acceleration ≤ 60 g. except for 3 millisec. *Chest deflection ≤ 3 inches when Hybrid III is used. * As the alternative to the frontal impact test with unbelted dummy, "sled test" option is available.	Hybrid III or Hybrid II until September 1., 1997. Hybrid III is required on September 1., 1997 and after.	Up to 30 mph	Unladen mass + luggage mass + Test dummies	Perpendicular and any angle up to 30deg. in either direction.
ECE	N/R					

Country	Regulation No.	C-b-2 Lateral impact			C-b-3 Rollover		
			Test dummy :	Moving barrier impact speed :		Test dummy	Rollover approach speed
Australia	ADR 69/00	N.A.			N.A.		
Brunei							
Canada	CMVSS 208	FMVSS 208 Only applicable to vehicle without seat belt *HIC ≤ 1,000 *Chest acceleration ≤ 60 g except for 3 millisec.	Hybrid II or Hybrid III 50th percentile male dummy.	20 mph (32 km/h)	FMVSS 208 No part of the test dummy shall be outside of the passenger compartment.	Hybrid II or Hybrid III	: 30 mph (48 km/h)
Chile							
China							
Hong Kong							
Indonesia							
Japan	SRRV 18	N.A.			N.A.		
Korea	Korean Safet Reg. article 102	FMVSS 208 *HIC ≤ 1,000 *Chest acceleration ≤ 60 g Except for vehicles with 3 point seat belt and meeting article 104	Hybrid II or Hybrid III 50th percentile male dummy.	32.2 km/h	FMVSS 208 No part of the test dummy shall be outside of the passenger compartment. Except for vehicles with 3 point seat belt and meeting Article 92	Hybrid II or Hybrid III	48.3 km/h

※ C-b-2 and C-b-3 : described for reference

Country	Regulation No.	C-b-2 Lateral impact			C-b-3 Rollover		
			Test dummy	Moving barrier impact speed		Test dummy	Rollover approach speed
Malaysia							
Mexico							
New Zealand							
Papua New Guinea							
Philippines							
Singapore							
Chinese Taipei	Road Traffic Safety rule,Article 39-15						
Thailand		N.A.			N.A.		
United State	FMVSS208	Only applicable to vehicle without seat belt *HIC ≤ 1,000 *Chest acceleration ≤ 60 g except for 3 millisec.	Hybrid II or Hybrid III 50th percentile male dummy.	20 mph (32 km/h)	No part of the test dummy shall be outside of the passenger compartment.	Hybrid II or Hybrid III	30 mph (48 km/h)
ECE	N/R						

※ C-b-2 and C-b-3: described for reference

Country	Regulation No.	C-b-4 Air Bag Readiness Indicator	C-b-5 Air Bag On-Off Indicator	C-b-6 Passenger Air Bag Manual On-Off Device
Australia	ADR 69/00	N.A.	N.A.	N.A.
Brunei				
Canada	CMVSS 208	FMVSS 208 The indicator shall monitor the readiness of air bags. The indicator shall be clearly visible to the driver.		
Chile				
China				
Hong Kong				
Indonesia				
Japan	SRRV 18	N.A.	N.A.	N.A.
Korea	Safety Regulation-Article 102	N.A.	N.A.	N.A.
Malaysia				
Mexico				
New Zealand				
Papua New Ginea				
Philippines				
Singapore				
Chinese Taipei	Road Traffic Safety rule,Article 39-15	N.A.	N.A.	N.A.
Thailand				
United State	FMVSS 208	The indicator shall monitor the readiness of air bags. The indicator shall be clearly visible to the driver.	A telltale light on the dashboard shall be illuminated when the passenger air bag is deactivated.	The air bag on-off device shall be operable by means of the ignition key or separate from the ignition switch.
ECE	N/R			

Country	Regulation No.	D Label				E
		Air bag caution label	Air bag alert label	Air bag Maintenance Label	Temporary Air bag label	Reference Standards Alternative Regulation
Australia	ADR 69/00	N.A.				
Brunei						
Canada	CMVSS 208			FMVSS 208 The recommended schedule for maintenance or replacement of the air bags affixed to the passenger compartment.		
Chile						
China						
Hong Kong						
Indonesia						
Japan	SRRV 18	N.A.				
Korea	Korean Safety Reg. Article 102	N.A.				
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei	Road Traffic Safety rule, Article 39-15	N.A.				
Thailand						
United State	FMVSS 208	To be required on either side of sun visor. Not required for seating positions with smart air bag.	To be required on the sun visor or on the cover of air bag. Not required for seating positions with smart air bag.	The recommended schedule for maintenance or replacement of the air bags affixed to the passenger compartment. Not required for seating positions with smart air bag.	On the instrument panel or other visible place	
ECE	N/R					

19. FRONTAL COLLISION PROTECTION

Australian Design Rules (ADR 69/00)

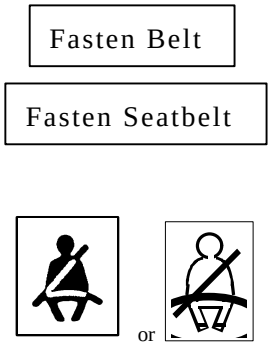
ITEM	CONTENT	Illustration/supplement
A: Application	This standard applies to passenger vehicles (MA, MB, MC) and trucks (NA1).	
B: Performance Requirement	(Regulation) * Head injury criteria (HIC) must not exceed 1,000. * Axial force through each upper leg of test dummy must not exceed 2,250 pounds (10kN). * Chest acceleration must not exceed 60g for more than 3 milliseconds. * When 'Hybrid III' 'Test Dummy' is used, compression deflection of the sternum relative to the spine must not exceed 76.2mm. * When there is no evidence of head contact with any part of the vehicle in front of the original 'Test Dummy' head position, other than with the seatbelt system or of head contact with the 'Test Dummy's' femur and/or knee, as determined in accordance with Clause 11, then the requirement of HIC ≤ 1000 may be met by any of the following: *If a 'Hybrid II' 'Test Dummy' is used, the resultant acceleration measured at the centre of gravity of the head shall not exceed 75g, except for intervals whose cumulative duration is not more than 3 milliseconds, when measured by the accelerometer. *If a 'Hybrid III' 'Test Dummy' is used, the neck injury measurements shall not exceed 3300 N of tension force in the inferior-superior direction. *If either 'Hybrid II' or 'Hybrid III' 'Test Dummies' are used, HIC shall not exceed 700 when calculated between two points in time not separated by more than 15 milliseconds. (Test method) * Place Hybrid test dummies on both front outboard seating positions. * Test dummy : Hybrid III or Hybrid II * Impact speed: up to and including 48 km/h or higher provided injury criteria met, into a fixed concrete barrier that is perpendicular to the line of travel of the vehicle	HIC is calculated by the following equation; $HIC = \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a \cdot dt \right]^{2.5} (t_2 - t_1)$ where, a : The resultant acceleration expressed as a multiple of the acceleration due to gravity. t_1, t_2 :Any two time points in time during the crash of the vehicle which are separated at not more than a 36 milliseconds time intervals. t_1 - t_2:The time separation, divided by second. Vehicle categories have been modified and re-designated. (Effective with the dates in the parentheses.) "MA" : Passenger cars (1. Jul. 1995) "MB" : Forward control vehicles (1. Jan. 1998) "MC" : Off-road passenger vehicles (1. Jan. 1998) "NA1" : Light goods vehicles (1. Jul. 1998)

19. FRONTAL COLLISION PROTECTION

Australian Design Rules (ADR 69/00)		
ITEM	CONTENT	Illustration/supplement
C: Test Vehicle Condition	(Test Vehicle Mass) * The test vehicle, including test devices and instrumentation must be loaded to its 'Unladen Mass' and the 'Luggage Mass', plus the mass of the necessary 'Test Dummies'. * The load placed in the cargo area must be nominally centred on the vehicle. (Vehicle Test Attitude) * The test vehicle attitude must be such that the front and rear 'Suspension Heights' must be at or between the design value in the unladen and fully laden condition as specified by the 'Manufacturer'. * Adjustable 'Seats' must be in the adjustment position midway between the foremost and rearmost position, and if separately adjustable in a vertical direction, must be at the lowest position. If an adjustment position does not exist midway between the foremost and rearmost positions, the closest adjustment position to the rear of the midpoint must be used. * 'Seat' backs must be positioned at the design 'Seat Back Angle'. * Any adjustable 'Seatbelt Anchorages' must be placed at the 'Manufacturers' nominal design position for 'Test Dummy'. * Each adjustable 'Head Restraint' must be placed in its highest adjustment position. * Adjustable lumbar supports must be positioned so that the minimum lumbar support is provided.	

Australian Design Rules (ADR 69/00)		
ITEM	CONTENT	Illustration/supplement
	(Vehicle Test Attitude - continued) * Adjustable steering controls must be adjusted so that the steering wheel hub is at the geometric centre of the locus it describes when it is moved through its full range of driving positions. * Movable vehicle windows and vents can be position at the 'Manufacturers' option. * Convertibles and open-body type vehicles must have the top, if any, in place in the closed passenger compartment configuration. * Doors must be fully closed and latched but not locked.	
D: Set Up Requirements For Hybrid III Test Dummy	* Each 'Hybrid III' 'Test Dummy' must be set up in accordance with clause 7.	
E: Positioning Procedure For Hybrid III Test Dummy	* A 'Hybrid III' 'Test Dummy' must be positioned in each front outboard seating position of a vehicle as specified in clause 8.	
F:Set Up Requirements For Hybrid II Test Dummy	* Each 'Hybrid II' 'Test Dummy' must be set up in accordance with clause 9.	
G:Positioning Procedure For Hybrid II Test Dummy	* A 'Hybrid II' 'Test Dummy' must be positioned in each front outboard seating position of a vehicle as specified in clause 10.	
H: Determination of head contact.	* The determination of whether there was a head contact with any vehicle interior surface or with the 'Test Dummy's' femurs and/or knee must be made in accordance with clause 11.	

19. FRONTAL COLLISION PROTECTION

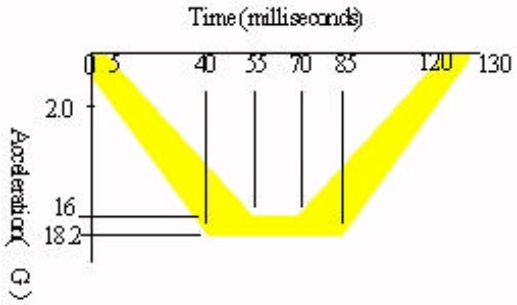
Australian Design Rules (ADR 69/00)		
ITEM	CONTENT	Illustration/supplement
I: Seatbelt Warning System	* The vehicle must be fitted with a seatbelt warning system which activates a continuous or flashing ‘Visual indicator’ for a period of not less than 4 seconds when the vehicle’s ignition switch is moved to the "on" position or to the "start" position. The seatbelt warning system need not operate if the driver’s seatbelt is fastened or is withdrawn more than 10 cm from the refractor. An audible signal in addition to the ‘Visual indicator ‘ is permissible. * The ‘Visual Indicator’ must display the seatbelt telltale below or the words "Fasten Seatbelts" or "Fasten Belts". * The ‘Visual Indicator’ must comply with the requirements of a Group 2 ‘Visual Indicator’ in ADR 18/xx. * A seatbelt warning system which complies with the requirements of clause S7.3 of US Federal Motor Vehicle Safety Standard 208 Occupant Crash Projection, is deemed to comply with the seatbelt warning requirements.	 Seat belt warning words and symbol

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
A: Application	This standard applies to passenger cars, MPVs and trucks.	
B: Performance Requirements 1) Frontal Impact (Perpendicular Impact and 30 deg. angular Impact, as of Sept. 1, 1998 and after.)	(Regulation) * This requirement applies to - Passenger cars - MPVs and trucks with GVWR 10,000 pounds (4,536 kg) or less - Buses with GVWR not more than 8,500 pounds produced on Sept., 1997 or after. * Throughout the test, the test dummy shall be completely contained within the vehicle passenger compartment. * Axial compression force through each upper leg of test dummy shall not exceed 2,250 pounds (10 kN). (USA Only) * Head injury criteria (HIC) shall not exceed 1,000. * When tested with Hybrid III test dummy, chest deflection shall not exceed 3 inches. * Chest acceleration shall not exceed 60g for more than 3 milliseconds. (Canada Only) * Head injury criteria (HIC) shall not exceed 700 for seating position with air bag. * The resultant acceleration at the center of gravity of the test dummy head shall not exceed 80 g. * Chest deflection shall not exceed 65 mm. * Chest deflection shall not exceed 50 mm for *Passenger cars with GVWR ≤ 2,722 kg produced on Sept. 1, 1999 or after, and *MPVs and trucks with GVWR ≤ 2,722 kg produced on Sept. 1, 2,000 or after. * Chest deflection shall not exceed 60 mm for *Passenger cars GVWR > 2,722 kg produced on Sept. 1, 1999 or after, and *MPVs and trucks GVWR > 2,722 kg produced on Sept. 1, 2,000 or after. (Test method) * For the vehicle with air bag, conduct both of a). Impact test with the dummy secured by the seat belt and b) Impact test with the dummy not secured by the seat belt.	HIC is calculated by the following equation; $HIC = \left[\frac{1}{(t_2 - t_1)}\int_{t_1}^{t_2} a \cdot dt\right]^{2.5} \cdot (t_2 - t_1)$ where, a : The resultant acceleration at the center of gravity of the test dummy head, divided by "g". t_1, t_2 :Any two time points separated at not more than 36 milliseconds. t_1-t_2 : The time separation, divided by second. (Alternative for vehicles with air bag, US Only) Effective for vehicles produced in the period of March 19., 1997 to August 31., 2001, the frontal impact test with the condition b) (left) may be replaced with the sled acceleration test outlined in the next page.

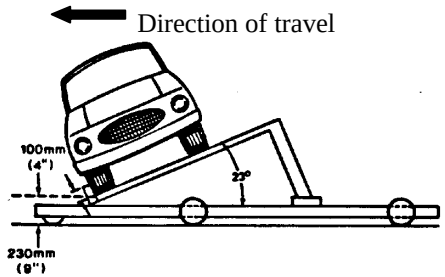
US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
B: Performance Requirements *(continued)* 1) Frontal Impact (Perpendicular Impact and 30 deg. angular Impact, as of Sept. 1, 1998 and after. - *continued*)	(Test method - *continued*) * Load the test vehicle to its unloaded vehicle weight plus its rated cargo/luggage capacity weight plus the weight of the test dummies. - The test dummies shall be Hybrid III or Hybrid II. For vehicles manufactured on or after Sept. 1, 1997, the test dummies shall be Hybrid III. - Test dummies shall be placed on both front outboard seating positions. - The cargo/luggage weight shall be secured in the luggage area. - Fuel tank shall be filled with Stoddard Solvent to 92 to 94 % of the capacity. * Impact a vehicle into a fixed concrete barrier Speed : up to and including 30 mph (48.3 km/h) Angle : perpendicular and any angle up to 30 degrees in either direction Test dummy : (USA) Hybrid III or Hybrid II, (Canada) Hybrid III	
2) Sled Acceleration Test (US Only)	(Regulation) * This requirement is the alternative to the frontal impact test without using seatbelt (test with "condition b)" in the previous page). * This requirement applies to vehicles with air bag. * Comply with all requirements of frontal impact test. (dummy containment, HIC, chest acceleration, chest deflection and upper leg compression force. Stated in the previous page.) * Comply with the neck injury criteria listed below. -Flexion bending moment ≤ 190 N-m -Extension bending moment ≤ 57 N-m -Axial compression ≤ 3,300 N -Axial tension ≤ 4,000 N -Fore-and-aft shear stress ≤ 3,100 N (Test method) *. Mount the test vehicle forward on a dynamic test platform with the longitudinal centerline of the vehicle is parallel to the travel of the platform and tires and wheels removed. * Accelerate the platform approximately to 30 mph. * Decelerate the platform to 0 mph such that all time-acceleration points are contained in the "corridor" (illustrated right).	 "corridor" *(shaded area)*

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)		
ITEM	CONTENT	Illustration/supplement
B: Performance Requirements (continued) 3) Lateral Impact	(Regulation) * This requirement applies to - Passenger cars - MPVs and trucks with GVWR 10,000 pounds (4,536 kg) or less - Buses with GVWR not more than 8,500 pounds produced on Sept., 1997 or after. * This requirement is only applicable to vehicles having no seat belt in front outboard seating position. * Head injury criteria (HIC) shall not exceed 1,000. * Chest acceleration shall not exceed 60g for more than 3 milliseconds. (Test method) * Impact, on either side of the vehicle, a 4,000 pound concrete barrier laterally at 20 mph (32 km/h). * Place the test dummy in the front outboard seating position adjacent to the impacted side.	

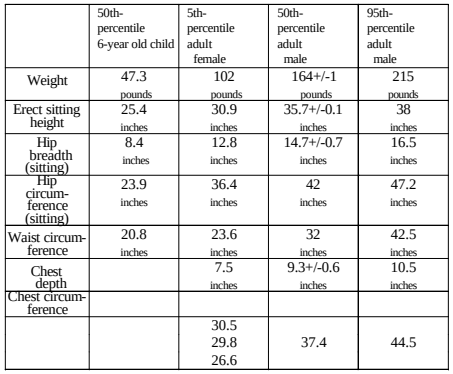
3) Lateral Impact : described for reference

US/Canadian Regulation (FMVSS 208/CMVSS 208)		
ITEM	CONTENT	Illustration/supplement
B: Performance Requirements (continued) 4) Rollover	(Regulation) * This requirement applies to - Passenger cars - MPVs and trucks with GVWR 10,000 pounds (4,536 kg) or less - Buses with GVWR not more than 8,500 pounds produced on Sept., 1997 or after. * This requirement is only applicable to vehicles having no seat belt in front outboard seating position. * Throughout the test, the test dummy shall be completely contained within the outer surface of the vehicle passenger compartment. (Test method) * Place the vehicle on a device having a platform of flat rigid plane at an angle of 23 deg from the horizontal. - The device shall have an unyielding flange of a height of 4 inches (100 mm) and a length sufficient to hold the tires of the vehicle. - The intersection of the flange and upper surface of the platform shall be 9 inches (230 mm) above the ground. * Move the platform horizontally and perpendicularly to the longitudinal axis of the vehicle at a constant speed of 30 mph (48 km/h), and then decelerate the platform to 0 km/h (0 mph) without change of direction and without transverse or rotational movement and departure of the vehicle. The deceleration rate shall be at least 20 times the acceleration due to gravity for a minimum of 0.04 seconds.	

4) Rollover : described for reference

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
C: Seat Belt Assembly Requirements 1) Adjustment and Retractor	(Regulation) * For front outboard designated seating positions, the shoulder and lap belt webbing of any of seat belt systems shall automatically retract to a stowed position, when either of the following occurs (selection is at the manufacturer's option) - when the adjacent vehicle door is in the open position and the seat belt latchplate is released - when the latchplate is released. * That stowed position shall prevent any part of the webbing or hardware from being pinched when the adjacent vehicle door is closed. * A belt system with a tension-relieving device in an open-bodied vehicle with no doors shall fully retract when the tension-relieving device is deactivated. (Test Method) * Position the test dummies with the arms removed and restrain them by the belt systems for those positions. * Outboard armrests, which are capable of being stowed, shall be placed in their stowed position.	 Occupant dimensions
2) Latch Mechanism	(Regulation) * Manual seat belt assembly installed in a passenger car shall have a latch mechanism. * Components of the latch mechanism shall be accessible to a seated occupant in both the stowed and operational positions. * The latch mechanism shall release both the upper torso restraint and the lap belt simultaneously, if the assembly has a lap belt and an upper torso restraint that requires unlatching for a release of the occupant. * The latch mechanism shall release at a single point by a push-button action.	

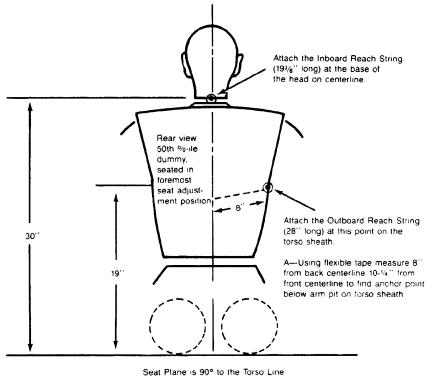
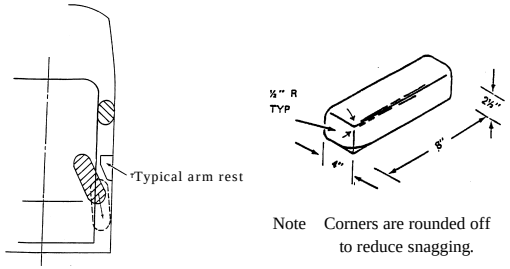
	50th-percentile 6-year old child	5th-percentile adult female	50th-percentile adult male	95th-percentile adult male
Weight	47.3 pounds	102 pounds	164+/-1 pounds	215 pounds
Erect sitting height	25.4 inches	30.9 inches	35.7+/-0.1 inches	38 inches
Hip breadth (sitting)	8.4 inches	12.8 inches	14.7+/-0.7 inches	16.5 inches
Hip circum-ference (sitting)	23.9 inches	36.4 inches	42 inches	47.2 inches
Waist circum-ference	20.8 inches	23.6 inches	32 inches	42.5 inches
Chest depth		7.5 inches	9.3+/-0.6 inches	10.5 inches
Chest circum-ference				
		30.5 29.8 26.6	37.4	44.5

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
C: Seat Belt Assembly Requirements (continued) 3) Seat Belt Guides	(Regulation) * This requirement applies to manual seat belt assembly whose webbing is designed to pass through the seat cushion or between the seat cushion and seat back. This requirements above do not apply to (1) Seats whose seat cushions are movable so that the seat back serves a function other than seating (2) Removable seats (3) Seats which are movable so that the space formerly occupied by the seat can be used for a secondary function. * Under normal conditions; 1) One of the following three seat belt parts shall be maintained on top of or above the seat cushion - the seat belt latchplate - the buckle - the seat belt webbing 2) The remaining two seat belt parts must be accessible under normal conditions. * The buckle and latchplate of a manual seat belt assembly shall not pass through the guides or conduits and fall behind the seat when the events listed below occur in this order: 1) The belt is completely retracted or, if the belt is nonretractable, the belt is unlatched; 2) The seat is moved to any position to which it is designed to be adjusted; and 3) the seat back, if possible, is folded forward as far as possible and then moved backward into position. * The inboard receptacle end of a seat belt assembly installed at front outboard designated seating position shall be accessible with the center arm rest in any position to which it can be adjusted (without having to move the armrest).	“Normal condition” means conditions other than when belt hardware is intentionally pushed behind the seat by a vehicle occupant.

19. FRONTAL COLLISION PROTECTION

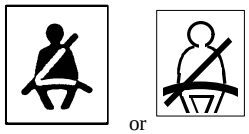
US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
C: Seat Belt Assembly Requirements (continued) 4) Latchplate Access	(Regulation) * Seat belt assembly latchplate located outboard of a front outboard seating position shall also be located within the outboard reach envelope of either the outboard arm or the inboard arm, when the latchplate is in its normal stowed position and any adjustable anchorages are adjusted to the manufacturer's nominal design position for a 50th percentile adult male occupant. - "Outreach envelope" for inboard arm is determined by a $19^{1}/_{8}$ inch (486 mm) long string attached to the head of the dummy. - "Outreach envelope" for outboard arm is determined by a 28 inch (737 mm) long string attached to the sheath of the dummy. (See Illustration)	 Outreach Envelopes for Latch Plate Access Test
	* There shall be sufficient clearance between the vehicle seat and the side of the vehicle interior to allow the test block unhindered transit to the latchplate or buckle.(See Illustration.)	 Note Corners are rounded off to reduce snagging. Clearance Test and Test Block for Latch Plate Access Test
5) Position of Webbing Intersection	(Regulation) * In any Type 2 seat belt assembly, the intersection of the upper torso belt with the lap belt shall be at least 6 inches (150 mm) from the front vertical centerline of 50th percentile adult male occupant, measured along the centerline of the lap belt. (Test method) * Conduct the measurement with the seat in its rearmost and lowest adjustable position and with the seat back in the manufacturer's nominal design riding position.	

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
C: Seat Belt Assembly Requirements (continued)		
6) Webbing Contact Force *(US Only)*	(Regulation) * This requirement applies to manual and automatic seat belt assemblies. This requirement does not apply to manual or automatic seat belt assemblies that incorporate a webbing tension-relieving device. * The upper torso webbing of any seat belt assembly shall not exert more than 0.7 pounds of contact force on the dummy's chest secured by that seat belt. (Test Method) 1) Position the test dummy. 2) Secure the test dummy by the seat belt assembly for the seating position. 3) Pull the webbing 1 inch from the chest of the dummy on the midsagittal line of the chest. 4) Measure the webbing force toward the chest of the dummy and normal to the webbing.	
7) Position of Inboard Receptacle	* The inboard receptacle end of a seat belt assembly at a front outboard seating position shall be accessible without having to move the center armrest, when the armrest is in any adjustable position.	
8) Tension Reliever	* If the vehicle is equipped with tension relieving device (see Supplement) for the shoulder belt, the slack shall be automatically cancelled when the adjacent door is opened.	Tension-relieving device is a device of a type 2 or automatic seat belt assembly that permits introduction of slack in the webbing of the shoulder belt.

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
C: Seat Belt Assembly Requirements (continued) 9) Seat Belt Warning	(Regulation) * A seat belt assembly provided at the driver's seating position shall be equipped with a warning system . * The warning system shall activate a continuous or intermittent audible signal and a continuous or flashing warning light. * The audible signal shall be activated, beginning when the vehicle ignition switch is moved to the "on" or "start" position, (selection is option of the manufacturer) 1) for a period of 4 to 8 seconds, when condition (1) exists. 2) for a period of 4 to 8 seconds, when condition (1) and (2) simultaneously exist. * The warning light shall be activated, beginning when the vehicle ignition switch is moved to the "on" or "start" position, (selection is option of the manufacturer) 1) for 60 seconds or more 2) (Applicable to motorized automatic belts) for 60 seconds or more after the belt webbing is once in its locked protective mode at the anchorage point. 3) (Applicable to motorized automatic belts) while the condition (3) exists. (1) The vehicle's ignition switch is moved to the "on" position or to the "start" position. (2) The driver's lap belt is not in use. The non-use is determined either by 1) or 2) below (Selection is manufacturer's option.) - The belt latch mechanism is not fastened. - The emergency release mechanism is in the released position. - The belt is not extended at least 4 inches (100 mm) from its showed position. (3) (Applicable to motorized automatic belts) The belt webbing is not in its locked, protective mode at the anchorage point. * The warning light shall be visible to the driver and shall display the specified symbol or the words. *(see Illustration)*	Fasten Belts Fasten Seat Belt  or Seat belt Warning Words and Symbol Either one of the above shall be used.

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
C: Seat Belt Assembly Requirements (continued) 10) Child Seat Lockability *(US Only)*	(Regulation) * This requirement applies to passenger cars and to trucks , buses and MPVs with a GVWR of 10,000 pounds or less (4,536 kg or less). * This requirement does not apply to the following vehicle type and seating position. 1) The driver's position 2) Right front seating position equipped with an automatic belt 3) Walk-in van-type vehicles 4) Vehicles manufactured to be sold exclusively to the U.S. Postal Services 5) Designated seating position that is not forward-facing and can not be adjusted to be forward-facing * Each designated seating position shall have a seat belt assembly whose lap belt portion is lockable so that the seat belt assembly can be used to tightly secure a child restraint system. * The means provided to lock the lap belt or lap belt portion of the seat belt assembly 1) shall not consist of any device that must be attached by the vehicle user to the seat belt webbing, retractor, or any other part of the vehicle. 2) shall not require any inverting, twisting or otherwise deforming of the belt webbing. 3) shall not allow the distance between the buckle and attachment to increase by more than 2 inches, when 50 pound tensile load is applied. * Test Condition 1) Seat is in any adjustment position. 2) Any procedures recommended in the vehicle owner's manual to activate any locking feature for the seat belt assembly is completed. 3) The belt system is adjusted so that the webbing length between the belt buckle and attachment hardware or retractor is 5 inches less than the maximum length of the webbing, or shorter.	

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
C: Seat Belt Assembly Requirements (continued) 11) Type of Seat Belt	(Regulation) * Passenger cars shall be equipped with 1) Type 2 seat belt assembly or automatic seat belt system at each front outboard seating position. 2) Type 2 seat belt assembly at rear outboard seating positions. 3) Type 1 or type 2 seat belt assembly at other seating positions.	

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
D: Air Bag Indicators 1) Air Bag Readiness Indicator	(Regulation) * An occupant protection system that deploys in the event of a crash shall have a monitoring system with a readiness indicator that monitors its own readiness. * The readiness indicator shall be clearly visible from the driver's seating position. * If a vehicle is equipped with a single readiness indicator for both a driver and passenger air bag, and if the vehicle is equipped with a on-off device (for passenger air bag), the readiness indicator shall monitor only the readiness of the driver air bag when the passenger air bag has been deactivated by means of the on-off device.	
2) Air Bag On-Off Indicator *(US Only)*	* A telltale light on the dashboard shall be illuminated whenever the passenger air bag is deactivated. The telltale: - Shall be clearly visible from all front seating positions. - Shall be yellow. - Shall have the identifying words "AIR BAG OFF" on the telltale or within 25 mm of the telltale. - Shall not be illuminated at any time when the passenger air bag is not deactivated. - Shall not be combined with the air bag readiness indicator.	AIR BAG OFF Air Bag On-Off Indicator

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
E: Passenger Air Bag Manual On-Off Device *(US Only)*	(Regulation) * Passenger cars , trucks, buses and MPVs may be equipped with a device that deactivates the air bag installed at the right front passenger position in the vehicle, if one of the two conditions is satisfied. - The vehicle has no forward-facing designated seating positions to the rear of the front seating positions. - The distance between the rearward surface of the front seat back and the forward surface of the rear seat back is less than 720 mm.(See Supplement for the distance measurement.) * The air bag on-off device shall be - operable by means of the ignition key for the vehicle. - separate from the ignition switch for the vehicle, so that the driver must take some action with ignition key other than inserting it or turning it in the ignition switch to deactivate the passenger air bag. * Once deactivated, the passenger air bag shall remain deactivated until it is reactivated by means of the on-off device.	The distance shall be measured along a longitudinal line tangent to the highest point of the rear seat bottom in the longitudinal vertical plane described in either (1) or (2) below ; (1) For the vehicle equipped with front bucket seats, the vertical plane at the centerline of the driver's seat cushion. (2) For the vehicle equipped with front bench seating, the vertical plane which passes through the center of the steering wheel rim.

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
F: Label Requirement 1) Air Bag Caution Label *(US Only)*	(Regulation) * Each front outboard seating position with an inflatable restraint shall have a label permanently affixed to the sun visor for such seating position on either side of the sun visor. (selection of the side is the manufacturer's option) * The wording of the label shall be, - for vehicles without air bag on-off device, "a)" in the Illustration. - for vehicle with air bag on-off device, "b)" in the Illustration. * The color or lettering on the label shall contrast with the background of the label. * Except for the information on an air bag maintenance label, no other information shall appear on the same side of the sun visor to which the air bag caution label is affixed. * Except for the information in this standard, or in a utility vehicle label that contains the language required, no other information about air bags or the need to wear seat belts shall anywhere on the sun visor. * At the option of the manufacturer, the label may instead be permanent marking or molding of the required information.	 a) for seating position with air bag on-off switch  b) for seating position without air bag on-off switch  c) For vehicles having no inflatable restraint at any front seating position other than that for the driver (optional) Air Bag Caution Label

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
F: Label Requirement (continued) 2) Air Bag Alert Label *(US Only)*	* If the air bag caution label on a sun visor (other than the sun visor for the driver seating position) is not visible when the sun visor is in the stowed position, an "air bag alert label" shall be permanently affixed either (at the option of the manufacturer) - to that visor or - to the cover of the air bag for the seating position * The label shall be visible when the visor is in the stowed position. * The air bag alert label affixed to the sun visor shall read “Air Bag. See Other Side.” * The color of the lettering on the label shall contrast with the background of the label.	 Right area : Yellow letters on black background. Left area : Black figure in red circle on white background Air Bag Alert Label
3) Removable Label *(US Only)*	* Vehicles equipped with air bag at the right front seating position shall have a warning label, as shown right, on the instrument panel or on the steering wheel. * The label shall be visible from the both outboard front seating positions. * The label need not to permanent. * Vehicles with "smart air bag" (*defined right*) in right front seating position need not to have the labels. * (Definition of "smart air bag") "Smart air bag" is an air bag that meets either of the following- - Does not deploy when it might have adverse effect on infants in rear-facing child seats, and unbelted or improperly belted children. - Does not deploy, by means of sensors other than or in addition to weight sensors, when a total mass of child or child seat is 30 kg or less on the front outboard seating position. - Is designed to deploy in an manner that does not create a risk of serious injury to infants in rear-facing child seats, and unbelted or improperly belted children.	 for vehicles with rear seat  for vehicles without rear seat Upper area : Black letters in yellow background. Lower area : Black letters in white background. "Removable Label "

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
F: Label Requirement (continued) 3) Air Bag Maintenance Label	(Regulation) * If the vehicle manufacturer recommends periodic maintenance or replacement of an inflatable restraint system , the vehicle shall be labeled with the recommended schedule for maintenance or replacement. * The schedule shall be specified by month and year, or in terms of vehicle mileage, or by intervals measured from the date appearing on the vehicle certification label. * The label shall be permanently affixed to the vehicle within the passenger compartment and lettered in English in block capital and numerals not less than 3/32 inches high. * This label may be combined with the air bag caution label to appear on the sun visor. * If some regular maintenance or replacement of the inflatable restraint system in a vehicle is recommend by the vehicle manufacturer, the owner's manual shall also set forth the recommended schedule for maintenance or replacement.	

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
G: Owner's Manual	(Regulation)	
1) Description of the Air Bag System	* The owner's manual for vehicle equipped with an air bag system shall include a description of the air bag system in an easily understandable format.. * The owner's manual shall include a statement to the effect that 1) The vehicle is equipped with an air bag and a lap/shoulder belt at one or both front outboard seating positions. 2) The air bag is a supplemental restraint at those seating positions. * The owner's manual shall include a list of the elements of the system being monitored by the air bag readiness indicator.	
2) Air Bag Caution	* The owner's manual shall also explain that no objects should be placed over or near the air bag on the steering wheel or on the instrument panel, because any such objects could cause harm if the vehicle is in a crash severe enough to cause the air bag to inflate. * The information shall emphasize that all occupants, including the driver, should always wear their seat belts whether or not an air bag is also provided at their seating position to minimize the risk of severe injury or death in the event of a crash. * The owner's manual shall also provide any necessary precautions regarding the proper positioning of occupants, including children, at seating positions equipped with air bags to maximum safety protection for those occupants.	
3) Description of Passenger Air Bag On-Off Switch	* The owner's manual shall provide, in a readily understandable format: (a) Complete instructions on the operation of the on-off switch ; (b) A statement that the on-off switch should only be used when a member of "risk group" is occupying the right front passenger seating position. (c) A warning about the safety consequences of using the on-off device at other times.	"risk group" is defined in the "request form" in Appendix B of 49CFR Part 595.

US/Canadian Regulation (FMVSS 208/CMVSS 208)

ITEM	CONTENT	Illustration/supplement
G: Owner's Manual (continued) 4) Tension Reliever	(Regulation) * If the vehicle is equipped with tension-relieving device (see Supplement), the owner's manual shall include 1) Explanation of the functioning of the device 2) The maximum amount of slack that the manufacturer recommends.	Tension-relieving device is a device of a type 2 or automatic seat belt assembly that permits introduction of slack in the webbing of the shoulder belt.
5) Instruction for Child Seat Locking	* If the means provided to lock the lap belt or lap belt portion of any seat belt assembly makes it necessary for the vehicle user to take some action to activate the locking feature, the owner's manual shall include a description in words and/or diagrams describing how to activate the locking feature so that the seat belt assembly can tightly secure a child restraint system and how to deactivate the locking feature to remove the child restraint system.	

19. FRONTAL COLLISION PROTECTION

US/Canadian Regulation (FMVSS 208/CMVSS 208)		
ITEM	CONTENT	Illustration/supplement
H: Air Bag Installation and Phase-In *(US Only)* (1) Passenger Cars	(Regulation) * Passenger cars shall be equipped with air bag and at each front outboard seating position.	
(2) MPVs and Trucks	(Regulation) * (Phase-in) *80% of* MPVs and trucks produced in the period from Sept. 1., 1997 to Aug. 31., 1998 shall be equipped with air bag and type 2 seat belt assembly at each front outboard seating position. * *Each* MPVs and truck produced on Sept. 1., 1998 or after shall be equipped with air bag and type 2 seat belt assembly at each front outboard seating position.	"Due Care" Clause for phase-in requirement A vehicle shall not be deemed to be in noncompliance with this standard if its manufacturer establishes that it did not have reason to know in the exercise of due care that such vehicle is not in conformity with the requirement of the standard (FMVSS 208).

19. FRONTAL COLLISION PROTECTION

Japanese Regulation (Safety Regulation of Road Vehicles, Article 18, TRIAS 46-1993)

ITEM	CONTENT	Illustration/supplement
A: Application	This Standard shall apply to motor vehicles used exclusively for carriage of passengers except motor vehicles with a riding capacity of 11 persons or more.	
B: Performance Requirement 1) Frontal Impact	(Regulation) (1) The dummy HIC shall not exceed 1,000. (2) The dummy chest resultant acceleration for a cumulative duration of 3 milliseconds shall not exceed 588 m/s^2 (60.0G). (3) The upper leg compressive force of the dummy shall not exceed 1000 daN (1021 kgf) at the right and left sides, respectively. (4) The dummy shall be restrained by the seat belt. (Test method) (1) The dummies shall be mounted in the front seats of the test vehicle on specified condition according to the Dummy Mounting Procedure. (2) Impact a vehicle into a fixed concrete barrier Speed : by coasting at a speed of 50+/- 2 km/h Angle : head-on against the frontal surface of the barrier Test dummy : Hybrid III or Hybrid II	HIC is calculated by the following equation; $HIC = \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} \frac{a_R}{9.8} \cdot dt \right]^{2.5} \cdot (t_2 - t_1)$ where, t_1 - t_2 :The time separation divided by second a_R :Resultant acceleration (unit : m/s^2) t_1 and t_2 :Any two time points during collision (unit : s) but, $\lvert t_1 - t_2 \rvert \leq 36\ ms$

19. FRONTAL COLLISION PROTECTION

Japanese Regulation (Safety Regulation of Road Vehicle, Article 18, TRIAS 47-1993)		
ITEM	CONTENT	Illustration/supplement
C: Test Vehicle Conditions	The test vehicle shall comply with the following conditions. (1) The weight of the test vehicle shall be within a range of between 100% and 105% of the vehicle weight measured when the dummy is not mounted. (2) Regarding vehicle positioning, the test vehicle be at an inclination of +/-3 deg. relative to the horizontal plane in a fore-and-aft direction; an inclination of +/-1 deg. relative to the horizontal plane in a right-and-left direction, and fitted with a dummy. (3) The air inflation pressure of the tires shall be set to the air pressure specified in the Specification Table. (4) The engine shall not be running. However, the ignition switch shall be set to the ON position. (5) If the vehicle height is adjustable depending upon the vehicle speed, the vehicle height shall be adjusted to a 50 km/h running condition (in the case of a mini-sized motor vehicle, for the time being, a 40 km/h running condition). (6) If it is possible to select the driving axle, the driving axle that is normally used shall be selected. (7) The transmission gear shall be set to the neutral position. (8) The parking braking system shall be in a released state. (9) The doors shall be closed securely. (10) To evaluate the deforming conditions in the test, marks shall be affixed on the test vehicle at places that will not be deformed by the test. (11) When the interior materials of the passenger compartment are colored to easily identify the collision positions where the dummy makes contact with the interior materials of the passenger compartment, such colors shall be different from the colors of chalk liquid, etc. applied to the dummy. (12) If the motor vehicle is equipped with a detachable roof, the roof shall be installed in the place. (13) If the motor vehicle is equipped with a sunroof, the sunroof shall be closed. (14) The battery electrolyte of the test vehicle shall be drained.	

19. FRONTAL COLLISION PROTECTION

KOREAN Safety Regulation Article 102 (Occupant crash protection)

ITEM	CONTENT	Illustration /supplement
A: Application	I. Passenger cars II. Mini-passenger vehicles and buses with GVW 4.5t or less except mini-buses	
B Performance Requirement I. Passenger car 1) Frontal Impact	(Regulation) * Injury criteria for dummies on the driver's seating position and front outboard seating position. 1. Head Injury Criteria (HIC) shall not exceed 1,000 2. The resultant acceleration at Upper thorax centre gravity shall not exceed 60g for more than 3 ms. 3. Compressive force axially transmitted through each upper leg shall not exceed 1,020 kg. 4. No part of the test dummy shall be outside the occupant compartment throughout the test. 5. When tested with Hybrid III test dummy, deflection of the sternum relative to the spine shall not exceed 76.2 mm. (Test method) * Place an anthropomorphic test dummy on each front outboard seating position. * Impact a vehicle into a fixed collision barrier - Impact speed : 48.3 km/h - Impact angle : Perpendicular to the line of the vehicle traveling direction - Test dummy : Hybrid II or Hybrid III 50^{th} percentile male dummy	HIC is calculated by the following equation: $HIC = \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a \cdot dt \right]^{2.5} (t_2 - t_1)$ where; a : The resultant acceleration at the centre of gravity of the test dummy head, expressed as a multiple of "g". t_1, t_2 : Any two time points during the crash separated at not more than 36 milliseconds, divided by 1 second.

19. FRONTAL COLLISION PROTECTION

KOREAN Safety Regulation Article 102 (Occupant crash protection)

ITEM	CONTENT	Illustration /supplement
B: Performance equirement (continued) I. Passenger car (continued) 2) Lateral Impact	(Regulation) * Injury criteria for dummies on the driver's seating position and front outboard seating position. 1. Head Injury Criteria (HIC) shall not exceed 1,000. 2. The resultant acceleration at Upper thorax centre gravity shall not exceed 60g. Note: Vehicles with 3 point seat belt on front outboard seating positions and meeting the requirements of Article 104 "Entrance door" are deemed to comply with this requirement. (Test method) * Place an anthropomorphic test dummy on each front outboard seating position. * Impact a vehicle with a moving barrier. - Impact speed : 32.3 km/h - Impact angle : Laterally on either side - Test dummy : Hybrid II or Hybrid III 50 percentile male dummy	HIC is calculated by the following equation: $HIC = \left[\frac{1}{(t_2 - t_1)}\int_{t_1}^{t_2} a \cdot dt\right]^{2.5}(t_2 - t_1)$ where; a : The resultant acceleration at the centre of gravity of the test dummy head, expressed as a multiple of "g". t_1, t_2 : Any two time points during the crash separated at not more than 36 milliseconds, divided by 1 second..
3) Rollover	(Regulation) * No part of the test dummy shall be outside the occupant compartment. Note: Vehicles with 3 point seat belt at front outboard seating positions is deemed to comply with the rollover protection requirement, if the vehicle meet the requirement of Article 92 "roof structure".Convertible is exempted. (Test method) * Place an anthropomorphic test dummy on front lower outboard seating position. - Rollover approach speed: 48.3 km/h - Test dummy : Hybrid II or Hybrid III 50 percentile male dummy	

3) Rollover : described for reference

19. FRONTAL COLLISION PROTECTION

Chinese Taipei (Road Traffic Safety Rule, Article 39-15)		
ITEM	CONTENT	Illustration/supplement
A: Applicability	This standard applies to all vehicles	
B: Requirement	Regulation *The floor, mud guard and bumper shall be surely installed.	

Changes from the previous issue.

1. US/Canada : Canadian injury criteria updated.

2. US/Canada : U.S. passive restraint requirements deleted. U.S. air bag installation requirements updated.

3. US/Canada : U.S. air bag warning label requirements updated.

4. US/Canada : U.S. alternative frontal impact requirement ("sled test") added.

ITEM 20

Noise (Motorcycles)

APEC Regulation Analysis Findings
Item No. 96-20: Noise (Motorcycles)

1. Proximity Stationary Noise (C-1)

    * All the member economies which have a proximity stationary noise requirement adopt a measuring method that is harmonized with ECE 41-02. But their limit values are varied.

2. Distant Stationary Noise (C-2)

    * Only Thailand applies this requirement.

3. Acceleration Noise (C-3)

    * ADR's measurement method is based on the ECE method, although ADR adopts a different limit value.

    * Korea's measurement method is based on the Japanese method. However, Korea requires measurement only on the right side of the vehicle, in contrast to only the left side required by Japan.

4. Steady Running Noise (C-4)

    * The measurement of steady running noise is required only by Japan.

ITEM No. 96-20 Noise (Motorcycles)

A: Application : Motorcycle

Economy	C: Performance requirements	C-1 : Stationary noise (Proximity)	C-2 : Stationary noise (Distant)	C-3 : Acceleration Noise	C-4 Steady Running Noise
Australia	ADR 39/00	ADR 39/00 94 dB (A)		ADR 39/00	
Brunei					
Canada	40 CER PART 205 ECE 41-02			40 CER PART 205 ECE 41-02	
Chile					
China					
Hong Kong	EEC(ECE 41-02) or SRRV 30	Approval level + 5dB(A) or 95, 99 dB(A)		(ECE 41-02 or SRRV 30)	
Indonesia					
Japan	SRRV 30	95, 99 dB(A)		SRRV 30	SRRV 30
Korea	Unique	102, 105 dB(A)		Unique	
Malaysia	Unique	92, 95 dB(A)			
Mexico	Unique			Unique	
New Zealand				Unique	
Papua New Guinea					
Philippines					
Singapore		99 dB (A)		Unique	
Chinese Taipei		95, 99 dB(A)		Unique	
Thailand		100 dB (A)	85 dB (A)	Unique	
U. S. A	40 CER PART 205			40 CER PART 205	
ECE	ECE 41-02	Approval level +5 dB(A)		ECE 41-02	
Microphone position		*0.5 m 45°	*7.5 m		

Economy	D: Labeling Requirement	E: Reference Standards
Australia	ADR 39/00	
Brunei		
Canada		40 CER PART 205 ECE 41-02
Chile		
China		
Hong Kong		EEC(ECE 41-02) or SRRV 30
Indonesia		
Japan	SRRV 30	
Korea		
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand	Unique	
U. S. A	40 CER PART 205	
ECE	ECE 41-02	

Item 96-20: Noise (Motorcycles)

Item	Table No.
A: Application	Table-1
B: Structure Requirements	Table-1
C: Performance Requirements	
C-1: Stationary Noise (Proximity)	Table-2(1/5)~(4/5)
C-2: Stationary Noise (Stationary)	Table-2(5/5)
C-3: Acceleration Noise	Table-3(1/4)~(4/4)
C-4: Steady Running Noise	Table-4(1/1)
D: Labeling Requirements	Table-1
E: Reference Standards	Table-1

Table-1 (1/4)

Noise Regulation for Motorcycles

Item	ECE 41-02	Australia ADR39/00	Canada MVSR 1106	USA 40 CFR PART205	Japan Article 30	(Thailand)
A: Application	Category (L3) Motorcycle (Max. speed 50 km/h<) (50 cm^3<)	Motorcycle	In conformity with ECE 40-01 or USA Reg.	Motorcycle	Motorcycle	Motorcycle
B: Structure Performance	• Fibrous absorbent material must be asbestos-free....etc. (Detail: see ECE41)	–	–	–	Within 30° to left and right of exhaust direction.	–
D: Labeling Requirement	* Components shall bear • Trade name or mark of manufacturer • ECE approval mark and number * Marking shall be clearly legible and indelible	* Components shall be marked with • Trade name or mark of manufacturer * Marking shall be clearly legible and indelible	–	* Model code and similar marking requirements.	* Manufacturer's name, model name, and similar engraving requirements.	* Safety marking is requested.
E: Reference Standards			• ECE 40-01 • USA Reg.			

Table-1 (2/4)

Noise Regulation for Motorcycles

Item	Malaysia EQR1987	Singapore C36,C37	(Chinese Taipei)	Korea Article 73	China	(Hong Kong)
A: Application		Motorcycle ($50 cm^3$<)	Motorcycle	Motorcycle ($50 cm^3$<)		In conformity with ECE 40-01 or Japan Reg.
B: Structure Performance		–	–	–		
D: Labeling Requirement		–	–	–		
E: Reference Standards		• ISO 5130 • Japan Reg.				

Table-1 (3/4)

Noise Regulation for Motorcycles

Item	Brunei	Chile	Indonesia	Mexico	New Zealand TR29	Papua New Guinea R125C
A: Application	N/R		N/R		Motorcycle (ISO 362)	Motorcycle
B: Structure Performance					–	Exhaust orifice must not be directed to side or in other dangerous direction.
D: Labeling Requirement					–	–
E: Reference Standards					• ISO 362 • UK Reg. No.3425	

Table-1 (4/4)

Noise Regulation for Motorcycles

Item	Philippines S.34-JRA4136	Mexico NOM-082-ECOL-1994				
A: Application	Motorcycle					
B: Structure Performance	Must be equipped with a muffler.					
D:Labeling Requirement	–					
E: Reference Standards						

Table-4(1/1)

Motorcycle Noise Regulations in Various Countries (Steady Running Noise)

	Japan Article30
Noise limit dB(A)	≤ 125 cm^3 : 70 125 cm^3 < : 74
Tolerance dB(A)	None
Microphone position	7 m left/right, 1.2 m high from center of motorcycle
Initial speed or engine speed	0.6S or ~ 50 cm^3 : 25 km/h 51 ~ : 35 km/h whichever is lower.
Gear change or range	Gear or range normally used when at the above speed
Remarks	

Table-2 (1/5)

Motorcycle Noise Regulations in Various Countries (Stationary Noise)

(Proximity)

	ECE 41-02	Australia ADR39/00	Canada MVSR 1106	USA 40 CFR PART205	Japan Article 30	(Thailand)
Noise limit dB(A)	Apply provisions on motorcycles in use at approved value + 5 dB(A).	94 dB(A)	N/R	N/R	≤ 125 cm^3 : 95 125 cm^3 < : 99	100
Tolerance dB(A)	None	None			None	None
Microphone position	45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).	45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).			45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).	45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).
Measuring position	Measure at each exhaust port. For exhaust ports spaced 0.3 m or less apart, outermost exhaust port. Otherwise, highest-positioned exhaust port.	Measure at each exhaust port. For exhaust ports spaced 0.3 m or less apart, outermost exhaust port. Otherwise, highest-positioned exhaust port.			Measure at each exhaust port. For exhaust ports spaced 0.3 m or less apart, most rearward exhaust port. Otherwise, outermost exhaust port. Otherwise, highest-positioned exhaust port.	Measure at each exhaust port. For exhaust ports spaced 0.3 m or less apart, outermost exhaust port. Otherwise, highest-positioned exhaust port.
Gear position etc.	Neutral. Otherwise, with driving wheel raised.	Neutral. Otherwise, as specified by maker.			Neutral. Otherwise, with driving wheel raised.	Neutral. Otherwise, with driving wheel raised.
Engine speed	Stabilize at S ≤ 5000 rpm: 0.75S S > 5000 rpm: 0.5S then abruptly close throttle fully.	Stabilize at 0.5S then abruptly close throttle fully.			Stabilize at S ≤ 5000 rpm: 0.75S S > 5000 rpm: 0.5S then abruptly close throttle fully.	Stabilize at S ≤ 5000 rpm: 0.75S S > 5000 rpm: 0.5S then abruptly close throttle fully.
Measurement	Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.	Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.			Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.	Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.
Remarks						

S: Engine speed to produce maximum output

Table-2 (2/5)

Motorcycle Noise Regulations in Various Countries (Stationary Noise)

(Proximity)

	Malaysia EQR1987	Singapore C36,C37	(Chinese Taipei)	Korea Article 73	China	(Hong Kong)
Noise limit dB(A)	$< 90\ cm^3$: 92 $90\ cm^3 \leq$: 95	199	$\leq 50\ cm^3$: 95 $50\ cm^3 \leq$: 99	$50 \leq \sim \leq 125\ cm^3$ $125\ cm^3 \leq$:		Same as EEC or Japan
Tolerance B(A)	None	None	None	None		Same as EEC or Japan
Microphone position	45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).	45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).	45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).	45° from vertical surface that includes exhaust flow to outer side, 0.5 m from exhaust pipe, and same height as exhaust pipe (0.2 m or more).		Same as EEC or Japan
Measuring position	Measure at each exhaust port. For exhaust ports spaced 0.3 m or less apart, outermost exhaust port. Otherwise, highest-positioned exhaust port.	Measure at each exhaust port. For exhaust ports spaced 0.3 m or less apart, most rearward exhaust port. Otherwise, outermost exhaust port. Otherwise, highest-positioned exhaust port.	Measure at each exhaust port. For exhaust ports spaced 0.3 m or less apart, outermost exhaust port. Otherwise, highest-positioned exhaust port.	If more than one exhaust pipe is used, outermost exhaust port; otherwise, exhaust port producing maximum noise.		Same as EEC or Japan
Gear position etc.	Neutral. Otherwise, with driving wheel raised.	Neutral. Otherwise, with driving wheel raised.	Neutral. Otherwise, with driving wheel raised.	Neutral. Otherwise, with driving wheel raised.		Same as EEC or Japan
Engine speed	Stabilize at S ≤ 5000 rpm: 0.75S S > 5000 rpm: 0.5S then abruptly close throttle fully.	Stabilize at S ≤ 5000 rpm: 0.75S S > 5000 rpm: 0.5S then abruptly close throttle fully.	Stabilize at S ≤ 5000 rpm: 0.75S S > 5000 rpm: 0.5S then abruptly close throttle fully.	0.75S		Same as EEC or Japan
Measurement	Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.	Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.	Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.	Measure maximum noise when engine is stable at specified speed.		Same as EEC or Japan
Remarks						

S: Engine speed to produce maximum output

Table-2 (3/5)

Motorcycle Noise Regulations in Various Countries (Stationary Noise)

(Proximity)

	Brunei	Chile	Indonesia	Mexico	New Zealand TR27	Papua New Guinea R125C
Noise limit dB(A)	N/R		N/R		N/R	N/R
Tolerance dB(A)						
Microphone position						
Measuring position						
Gear position etc.						
Engine speed						
Measurement						
Remarks						

S: Engine speed to produce maximum output

Table-2 (4/5)

Motorcycle Noise Regulations in Various Countries (Stationary Noise)

(Proximity)

	Philippines S.34-JRA 4136	Mexico NOM-082-ECOL-1994		
Noise limit dB(A)	N/R			
Tolerance dB(A)				
Microphone position				
Measuring position				
Gear position etc.				
Engine speed				
Measurement				
Remarks				

S: Engine speed to produce maximum output

Table-2 (5/5)

Motorcycle Noise Regulations in Various Countries (Stationary Noise)

(Stationary)

	(Thailand)			
Noise limit dB(A)	85			
Tolerance dB(A)	None			
Microphone position	7.5 m back and 1.2 m high from exhaust pipe orifice.			
Measuring position	7.5 m back and 1.2 m high from exhaust pipe orifice.			
Gear position etc.	Neutral. Otherwise, with driving wheel raised.			
Engine speed	Stabilize at S ≤ 5000 rpm: 0.75S S > 5000 rpm: 0.5S then abruptly close throttle fully.			
Measurement	Measure peak noise value after engine stabilizes at specified rpm until it stabilizes at idling.			
Remarks				

S: Engine speed to produce maximum output

Table-3 (1/4)

Motorcycle Noise Regulations in Various Countries (Acceleration Noise)

		ECE 41-02	Australia ADR3900	Canada MVSR 1106	USA 40 CFR PART205	Japan Article 30	(Thailand)
Noise limit dB(A)		≤ 80 cm^3 : 75 80 cm^3 <. ≤ 175 cm^3 : 77 175 cm^3 < : 90	≤ 80 cm^3 : 77 80 cm^3 <. ≤ 175 cm^3 : 80 175 cm^3 < : 82	Same as U.S.A. or Australia	Public road : 80 Non public road ≤ 170 cm^3 : 80 170 cm^3 < : 82	≤ 125 cm^3 : 72 125 cm^3 < : 75	None
Tolerance dB(A)		1	1	Same as U.S.A. or Australia	None	None	None
Microphone position		7.5 m left/right, 1.2 m high from center of motorcycle	7.5 m left/right, 1.2 m high from center of motorcycle	Same as U.S.A. or Australia	7.5 m left/right, 1.2 m high from center of motorcycle	7.5 m left/right, 1.2 m high from center of motorcycle	None
Acceleration distance [m]		20	20	Same as U.S.A. or Australia	Min. 10	20	None
Initial speed or engine speed	Manual	0.75S or 50 km/h, whichever the lower.	0.75S or 50 km/h, whichever the lower.	Same as U.S.A. or Australia	0.5S or engine speed less 0.1S at end of acceleration, whichever is lower. Engine rpm at end of acceleration:	0.75S or ~ 50 cm^3 : 25 km 51 ~ 250 cm^3 : 40 km 251 cm^3 ~ : 50 km whichever is lower.	None
	Automatic	Choose from among 30 km/h, 40 km/h, 50 km/h, 0.75 Vm, 0.75S depending on use of selector.	Choose from among 30 km/h, 40 km/h, 50 km/h, 0.75 Vm, 0.75S depending on use of selector.	Same as U.S.A. or Australia	~ 175 cm^3 : 0.95S 176 cm^3 ~ 575 cm^3: (109-0.08D)S/100 676 cm^3 : 0.55S Here, "D" is the value to express engine power	0.75Vm or ~ 50 cm^3 : 25 km/h 51 ~ 250 cm^3: 40 km/h 251 cm^3 ~ 50 km/h whichever is lower.	None
Gear change	Manual	4th gear or less: 2nd 5th gear or more, but 175 cm^3 or less: 3rd; 176 cm^3 or more, 2nd and 3rd. If it exceeds 1.1S during acceleration, 3rd for all.	4th gear or less: 2nd 5th gear or more, but 175 cm^3 or less: 3rd; 176 cm^3 or more, 2nd and 3rd. If it exceeds 1.1S during acceleration, 3rd for all.	Same as U.S.A. or Australia	2nd But if acceleration distance is 10 m or less, higher gear.	3rd gear or less : 2nd 4th gear : 3rd 5th gear or more : 4th If it overruns, raise by one gear.	None
	Automatic	Highest range where kick-down does not occur	Highest range where kick-down does not occur	Same as U.S.A. or Australia	Lowest range	Range normally used in city driving	None
Remarks		When measured in 2nd and 3rd, mean is noise value. For multiple measurement of automatic transmission motorcycles, maximum value is noise level.	When measured in 2nd and 3rd, mean is noise value. For multiple measurement of automatic transmission motorcycles, maximum value is noise level.	Same as U.S.A. or Australia	Choose acceleration start position so as to capture engine speed at end of acceleration. Should satisfy regulated values even after traveling 6000 km on public roads or 3000 km on non-public roads.		

S: Engine speed to produce maximum output

Vm: Maximum speed

Table-3 (2/4)

Motorcycle Noise Regulations in Various Countries (Acceleration Noise)

		Malaysia EQR 1987	Singapore C36,C37	(Chinese Taipei)	Korea Article 73	China	(Hong Kong)
Noise limit dB(A)			N/R	≤ 50 cm³ : 72 50 cm³ <. ≤ 100 cm³ : 75 100 cm³ < : 78	50 cm³ <. ≤ 125 cm³ : 71 125 cm³ <. ≤ 500 cm³ : 74 500 cm³ < : 77		≤ 80 cm³ : 77 50 cm³ <. ≤ 175 cm³ : 79 175 cm³ < : 82 Same as 1st stage of EEC or Japan
Tolerance dB(A)				None	None		Same as EEC or Japan
Microphone position				7.5 m left/right, 1.2 m high from center of motorcycle	7.5 m left/right, 1.2 m high from center of motorcycle		Same as EEC or Japan
Acceleration distance [m]				20	20		Same as EEC or Japan
Initial speed or engine speed	Manual			0.75S or ~ 50 cm³ : 25 km/h 51 ~ : 40 km/h whichever is lower.	0.75S or ~ 50 cm³ : 25 km/h 51 ~ 125 cm³ : 40 km/h 126 cm³ ~ : 50 km/h whichever is lower.		Same as EEC or Japan
	Automatic			0.75Vm or ~ 50 cm³ : 25 km/h 51 ~ : 40 km/h whichever is lower.	0.75Vm or 51 ~ 125 cm³ : 40 km/h 126 cm³ ~ : 50 km/h whichever is lower.		Same as EEC or Japan
Gear change	Manual			3rd gear or less : 2nd 4th gear : 3rd 5th gear or more : 4th	3rd gear or less : 2nd 4th gear : 3rd 5th gear or more : 4th		Same as EEC or Japan
	Automatic			Range normally used where maximum acceleration is possible.	Range normally used where maximum acceleration is possible.		Same as EEC or Japan
Remarks				* If it overruns, use one step higher gear.	* If it overruns, use one step higher gear.		

S: Engine speed to produce maximum output

Vm: Maximum speed

Table-3 (3/4)

Motorcycle Noise Regulations in Various Countries (Acceleration Noise)

		Brunei	Chile	Indonesia	Mexico	New Zealand TR27	Papua New Guinea R125C
Noise limit dB(A)		N/R		N/R		≤ 125 cm^3 : 82 125 cm^3< : 86	N/R
Tolerance dB(A)						None	
Microphone position						ISO362	
Acceleration distance [m]							
Initial speed or engine speed	Manual						
	Automatic						
Gear change	Manual						
	Automatic						
Remarks							

S: Engine speed to produce maximum output Vm: Maximum speed

Table-3 (4/4)

Motorcycle Noise Regulations in Various Countries (Acceleration Noise)

		Philippines S.34-JRA 4136	Mexico NOM-082-ECOL-1994		
Noise limit dB(A)			≤ 499 cm^3 : 86 450 cm^3 <. : 89		
Tolerance dB(A)			None		
Microphone position			7.5 m left/right, 1.2 m high from center of motorcycle		
Acceleration distance [m]			15		
Initial speed or	Manual		40km/h		
	Automatic				
Gear change	Manual		2nd		
	Automatic				
Remarks					

S: Engine speed to produce maximum output

Vm: Maximum speed

ITEM 96-21

Filament lamps

APEC Regulation Analysis Findings
Item No. 96-21: Filament Lamps

1. Only ECE provides requirements for filament lamps.

2. Australia adopts the ECE filament lamp regulation as an alternative.

3. Other member economies have not introduced a filament lamp regulation.

4. A comparison of specific requirements for filament lamps is as follows:

(1) ECE specifies in its technical requirements a rated voltage, rated power, test voltage, target value, reference luminous flux, measuring luminous flux, reference axis, reference surface, geometric shape, filament position and size.

(2) Base (C-a-2)
ECE requires the use of the filament lamp base specified in the IEC Publication 63.3 No.3 Edition.

(3) Marking (D)
ECE requires an ECE approval mark to be affixed on each bulb.

(4) FMVSS-type member economies - Not applicable
ECE-type member economies - Australia, ECE

Item No. 96-21 Filament lamps

A: Application: Passenger Vehicles

Member Economies	C-a-1 Technical Requirement	C-a-2 Cap	D Marking	E Reference Standards Alternative Regulations
Australia	ECE	ECE.		
Brunei				
Canada				
Chile				
China				
Hong Kong				
Indonesia				
Japan				
Korea				
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei				
Thailand				
U.S.A				
ECE	ECE Rated voltage, Rated wattage, Test Voltage, Objective values, Reference luminous flux, Measuring luminous flux, Reference axis, Reference plane, Geometric shape, Filament position and dimension	ECE Cap shall comply with IEC publication 61 3rd edition.	ECE Approval mark	

Economy: Australia
Title of Standard: ADR 51/00

A. Application:

Vehicles

C-a-1. Technical Requirement

1. Rated Voltage
2. Rated Wattage
3. Test Voltage
4. Objective Values
5. Reference Luminous Flux
6. Measuring Luminous Flux
7. Reference Axis
8. Reference Plane
9. Geometric Shape
10. Filament Position and Dimension

C-a-2 Cap

Cap shall comply with IEC publication 61 third Edition.

D Marking

N/A

Economy: ECE
Title of Standard: ECE Reg. No.37-03

A. Application:

Vehicles

C-a-1. Technical Requirement

1. Rated Voltage
2. Rated Wattage
3. Test Voltage
4. Objective Values
5. Reference Luminous Flux
6. Measuring Luminous Flux
7. Reference Axis
8. Reference Plane
9. Geometric Shape
10. Filament Position and Dimension

C-a-2 Cap

Cap shall comply with IEC publication 61 third Edition.

D Marking

Every fillament bulbs shall bear approval mark.

ITEM 96-22

Prevention of fire risks

APEC Regulation Analysis Findings
Item No. 96-22: Prevention of Fire Risks

1. Member Economy Comparison

(1) Concerning the prevention of fire risks, the U.S.(FMVSS 301), Canada and Korea have similar regulations. But Korea does not provide requirements related to lateral collision.

(2) The Japanese regulation and ECE R84-01 are similar.

2. Item Comparison

(1) Frontal impact test (C-b-1):

1) The U.S., Canada and Korea specify an impact speed of up to 30mph, while Japan requires a slightly faster 50 ± 2km/h.

2) The fuel leakage limit is 1 oz/min (28g/min) for the U.S., Canada and Korea, and a slightly higher 30g/min for Japan.

3) The specified duration of leakage volume measurement is 5 minutes for Japan and 25 minutes for the U.S., Canada and Korea.

(2) Rear-end impact test (C-b-2): The same requirements as those for C-b-1.

(3) Lateral moving barrier test (C-b-3): The U.S. and Canada subscribe to FMVSS 301. Japan and Korea do not require this test.

(4) Static rollover (C-b-4): The U.S., Canada and Korea adopt FMVSS 301. Japan does not have this regulation.(5) Antisiphoning requirement (C-b-5): The U.S. and Canada apply FMVSS 301, while Korea and Japan do not have this requirement.

ITEM No. 96-22 Prevention of fire risks

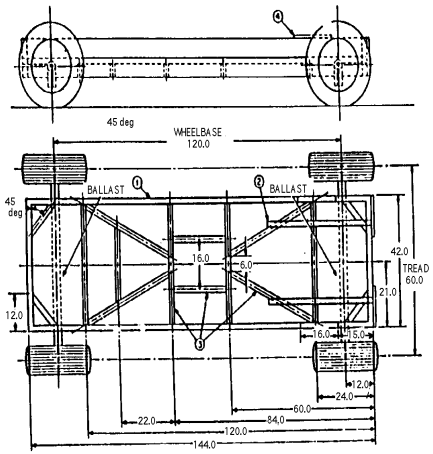
A : Application ; Passenger vehicles

Country	Regulation No.	C-a-1 Hydraulic internal pressure test	C-b-1 Frontal impact test		C-b-2 Rear end impact test		C-b-3 Lateral moving barrier test		C-b-4 Static rollover	C-b-5 Antisiphoning requirement
			Rate of leakage :	Velocity of impact :	Rate of leakage	Velocity of impact :	Rate of leakage	Velocity of impact :	Rate of leakage	
Australia										
Brunei Canada	CMVSS 301	N.A.	FMVSS 301 • Max.1 oz for 1st 1 min. • Max.5 ozs for 5 min. • Max. 1 ozs/min. for subsequent 25 min.	Up to 30 mph	FMVSS 301 • Max.1 oz for1st one min. • Max.5 ozs for 5 min. • Max. 1 ozs/min. for subsequent 25 min.	Up to 30 mph	FMVSS 301 • Max.1 oz for1st one min. • Max.5 ozs for 5 min. • Max. 1 ozs/min. for subsequent 25 min.	Up to 20 mph	FMVSS 301 • Max.5 ozs for 5 min. at each 90° increment • 1 oz/min. while increment of 90°	FMVSS 301 For alcohol fuel vehicle, prevention of siphoning fuel with a hose.
Chile										
China										
Hong Kong										
Indonesia										
Japan	SRRV15	N.A.	SRRV15 • Max.30g for1st one min. • Max.150g for 5 min.	50 +/-2 km/h	SRRV15 • Max.30g for1st one min. • Max.150g for 5 min.	50 +/-2 km/h	N.A.	N.A.	N.A.	N.A.
Korea	Korean Safety Reg. article 91	N.A.	FMVSS 301 • Max.28g for 1st 1 min. • Max.141g for 5 min. • Max. 28g/min. for subsequent 25 min.	at 48.3 km/h	FMVSS 301 • Max.28g for1st 1 min. • Max.141g for 5 min. • Max. 28g/min. for subsequent 25 min.	at 48.3 km/h	N.A.	N.A.	FMVSS 301 • Max.141g for 5min. at each 90°increment • 28g/min. while increment of 90°	N.A.

Country	Regulation No.	C-a-1 Hydraulic internal presssure test	C-b-1 Frontal impact test		C-b-2 Rear end impact test		C-b-3 Lateral moving barrier test		C-b-4 Static rollover	C-b-5 Antisiphoning requirement
			Rate of leakage :	Velocity of impact :	Rate of leakage	Velocity of impact :	Rate of leakage	Velocity of impact :	Rate of leakage	
Malaysia										
Mexico										
New Zealand										
Papua New Guinea										
Philippines										
Singapore										
Chinese Taipei										
Thailand										
United States	FMVSS 301	N.A.	*Max.1 oz for1st one min. *Max.5 ozs for 5 min. *Max. 1 ozs/min. for subsequent 25 min.	Up to 30 mph	*Max.1 oz for1st one min. *Max.5 ozs for 5 min. *Max. 1 ozs/min. for subsequent 25 min.	Up to 30 mph	*Max.1 oz for1st one min. *Max.5 ozs for 5 min. *Max. 1 ozs/min. for subsequent 25 min.	Up to 20 mph	*Max.5 ozs for 5 min. at each 90° increment *1 oz/min. while increment of 90°	For alcohol fuel vehicle, prevention of siphoning fuel with a hose.
ECE	ECE R34-01	Without crack or leak for 1 min.at 0.3kg/cm2	Max.30g/min.	48.3-53.1 km/h	Max.30g/min.	35-38 km/h	N.A.	N.A.	N.A.	N.A.

Country	Regulation No.	D Markinng	E Reference Standards Alternative Regulations
Australia			
Brunei			
Canada		N.A.	N.A.
Chile			
China			
Hong Kong			
Indonesia			
Japan		N.A.	N.A.
Korea		N.A.	N.A.
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
United States		N.A.	N.A.
ECE		N.A.	N.A.

US/Canadian Regulation (FMVSS 301/CMVSS 301)

ITEM	CONTENT	Illustration/supplement
A: Application	* This standard applies to - passenger cars, MPVs and trucks with GVWR 10,000 pounds or less and - school buses with GVWR more than 10,000 pounds that use fuel with boiling point above 32 F.	
B: Fuel Spillage Requirement 1) Barrier Impact (Frontal, Lateral and Rear Crash Test)	(Regulation) * These requirements apply to passenger cars and to MPVs and trucks with GVWR 10,000 pounds or less. * Fuel spillage shall not exceed - 1) From the barrier impact until motion of the vehicle has ceased, 1 ounce by weight. 2) In the 5-minute period following the cessation of the vehicle motion, total of 5 ounces by weight. 3) For the subsequent 25-minute period, 1 ounce by weight during any 1-minute interval. (Test method) * Condition - Loading : 50th percentile adult male dummy at front outboard seating positions. - Other : If the vehicle has an electrically driven fuel pump that normally runs when the vehicle's electrical system is activated, the fuel pump shall be operating. * Frontal barrier crash test Impact the vehicle into a fixed collision barrier. - Impact speed : up to 30 mph - Impact direction : perpendicular and any angle up to 30 deg. in right and left. * Lateral moving barrier crash test Impact the vehicle laterally on either side by a moving barrier. - Impact speed : up to 20 mph - Impact direction : perpendicular to vehicle centerline.	 (Dimensions are in inch) Specification of the Moving Barrier

US/Canadian Regulation (FMVSS 301/CMVSS 301)

ITEM	CONTENT	Illustration/supplement
B: Fuel Spillage Requirement (continued) 1) Barrier Impact (Frontal, Lateral and Rear Crash Test) (continued)	(Test method) - *continued* * Rear moving barrier crash test Impact the rear of the vehicle by a moving barrier. - Impact speed : up to 30 mph - Impact direction : from the rear	
2) Rollover	(Regulation) * These requirements apply to passenger cars and to MPVs and trucks with GVWR 10,000 pounds or less. * At each successive 90 deg. increment, fuel spillage shall not exceed - 1) For the first 5 minutes from the onset of rotational motion, a total of 5 ounces by weight. 2) During any 1 minute interval in the remaining test period, 1 ounce by weight. (Test method) * Following the frontal crash test, lateral moving barrier crash test or rear moving barrier impact test, rotate the vehicle on its longitudinal axis to each successive increment of 90 deg.	
C: Antisiphoning Requirement	(Regulation) * This requirement applies to vehicle manufactured to operate on alcohol fuel (e.g., methanol, ethanol) or a fuel blend containing at least 20 percent alcohol fuel. * Each vehicle shall have means that prevents a hose made of vinyl plastic or rubber, with a length of 120 cm (47.2 inches) and an outside diameter of not less than 5.2 mm (0.20 inches), from contacting the level surface of the liquid fuel in the vehicle's fuel tank or fuel system, when the hose is inserted into the filler neck attached to the fuel tank filled to any level from 90 to 95 percent of capacity.	

Japanese Regulation (Safety Regulation of Road Vehicles, Article15, TRIAS 33-1994)		
ITEM	CONTENT	Illustration/supplement
A: Application	This Standard shall apply to the fuel tanks and fuel lines of ordinary-sized motor vehicles exclusively for carriage of passengers, small-sized motor vehicles or mini-sized motor vehicles except motor vehicles with a passenger capacity of 11 persons or more.	
B: Fuel spillage Requirement 1) Barrier Impact (Frontal and Rear-end collision test)	(Regulation) The amount of fuel flowing out or dripping from various parts of the test vehicle to the outside shall not exceed 30g for the first one minute and also shall not exceed 150g for a period of 5 minutes. (Test method) (1) Frontal collision test Impact the vehicle into a fixed collision barrier Impact Speed : 50+/- 2 km/h Impact Angle : Head-on against the frontal surface of the barrier, In this case, the lateral deviation between the median longitudinal plane of the test vehicle struck and the median plane of the barrier shall not exceed 300mm.	

Japanese Regulation (Safety Regulation of Road Vehicles, Article15, TRIAS 33-1994)		
ITEM	CONTENT	Illustration/supplement
	(2) Rear-end collision test Impact the impactor into the rear end of the test vehicle placed under the stationary state. Impact Speed : 50+/- 2 km/h (between 35km/h and 38km/h in the case of mini-sized motor vehicles). Impact Angle : Horizontally and also in a direction parallel to the median longitudinal plane of the test vehicle. In this case, the lateral deviation between the median longitudinal plane of the test vehicle struck and the median plane of the impactor shall not exceed 300mm.	

Japanese Regulation (Safety Regulation of Road Vehicles, Article15, TRIAS 33-1994)		
ITEM	CONTENT	Illustration/supplement
2)Test vehicle condition	The test vehicle condition shall be as follows. (1) The weight of the test vehicle shall be equivalent to or more than the vehicle weight. However, in the case of a motor vehicle equipped with spare tire and tools, etc., the test may be conducted with these accessories attached on the test vehicle. (2) As for those parts mounted on the test vehicle, it is permissible to use those other than genuine parts or to remove them, except for those parts with the possibility of interfering with the fuel tank and fuel line. (3) A fuel substitute liquid shall be used. This shall have such viscosity and specific gravity similar to those of the fuel used. (4) The fuel level of the fuel tank shall not be less than 90% of the rated fuel tank capacity. (5) It is permissible for systems other than the fuel tank and fuel lines to be empty. (6) The fuel tank and fuel lines shall be coated with a suitable paint so that any fluid leakage resulting from the collision may be detected easily. However, this does not apply to cases where any fluid leakage resulting from the collision can be easily detected by using a colored fluid substitute. (7) The fuel lines shall be filled with a substitute fluid. (8) The test vehicle shall be equipped with a braking device, etc.,. so that the amount of fuel leakage may be measured as soon as possible after the collision. (9) The engine shall not be running. (10) The electrical fuel pump shall be operating when the test vehicle collides with the barrier. However, this provision shall not apply to those electrical type fuel pumps which cease operation when the ignition key is set to the ON position when the engine stalls. (11) The transmission shall be in neutral.	

KOREAN Safety Regulation Article 91 (Fuel System)

ITEM	CONTENT	Illustration/supplement
A: Applicability	This standard applies to the passenger car and the bus with gross vehicle weight of 4.5 tons or less, which are powered by gasoline or diesel fuel engine.	
B: Requirement I passenger car	(Regulation) *Each passenger car except mini-passenger car shall not exceed the fuel spillage limits after any applicable barrier collision or rollover tests as specified below:	

Kinds of test	Fuel spillage limits from impact until motion of the vehicle has ceased	Fuel spillage limits for the first 5 min. after motion of vehicle has ceased.	Fuel spillage limits for the subsequent 25 minute period
Frontal collision at 48.3 km/h	28 g or less	141 g	28 g/min.
Rear collision at 48.3 km/h	28 g or less	141 g	28 g/min.
	Fuel spillage limit for the first 5 minutes from onset of rotational motion		Fuel spillage limit from onset of one 90°increment to onset of the next 90°increment
Static rollover after a test above	141 g at each successive 90°increment		28 g/min. at each successive 90°increment

(Test Method)

*Frontal collision :

Impact a test vehicle traveling longitudinally forward at 48.3 km/h into the fixed collision barrier perpendicularly to the travel line of vehicle.

*Rear collision :

Impact a moving barrier traveling at 48.3 km/h into the rear of test vehicle at rest, perpendicularly to the travel line of barrier.

*Static rollover test :

After the test 1 or 2 above, rotate the test vehicle on its longitudinal axis to four successive 90 deg. increment, with the axis kept horizontal.

Item96-22. PREVENTION OF FIRE RISKS

<table>
<tr><td colspan="3">KOREAN Safety Regulation Article 91 (Fuel System)</td></tr>
<tr><td>ITEM</td><td>CONTENT</td><td>Illustration/supplement</td></tr>
<tr><td>B: Requirement
II Mini-passenger car and bus with GVW of 4.5 tons or less</td><td>(Regulation)
*Each mini-passenger car and each bus with gross vehicle weight (GVW) of 4.5 tons or less shall not exceed the fuel spillage limits after collision tests as specified below.

<table><tr><th>Kinds of test</th><th>Fuel spillage limit</th></tr><tr><td>Frontal collision at 40 km/h</td><td>30 g/min.</td></tr><tr><td>Rear collision at 35 km/h</td><td>30g/min.</td></tr></table>
(Test Method)
*Frontal collision :
Impact a test vehicle traveling longitudinally forward at 40 km/h into the fixed collision barrier perpendicular to the travel line of vehicle
*Rear collision :
Impact a moving barrier traveling at 48.3 km/h into the rear of test vehicle at rest, perpendicularly to the travel line of barrier.</td><td></td></tr>
</table>

Item96-22. PREVENTION OF FIRE RISKS

<table>
<tr><td colspan="7">Chinese Taipei Regulation (Road Traffic Safety Rule, Article 39-19)</td></tr>
<tr><td>ITEM</td><td colspan="4">CONTENT</td><td colspan="2">Illustration/supplement</td></tr>
<tr><td>A: Applicability</td><td colspan="4">This standard applies to the heavy-duty buses and the trucks, the tractors and the vehicles exclusively carrying small children</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>B: Requirements
1. Installation

2. Marking

3. Maintenance</td><td colspan="4">Regulation
* The heavy-duty buses and trucks, the tractors and the vehicles exclusively carrying small children shall equipped with a fire extinguisher of the types specified in the column C.

* The extinguisher shall be installed at the place easy to pick it up for a driver.

* The extinguisher shall be fixed by appropriate means so as to prevent it from shaking, rolling and shocking.

* The outer surface of extinguisher case shall be clearly labeled the validity date and instruction for handling the extinguisher and also be drawn the license plate number of the vehicle by paint.

* The extinguisher shall be inspected at least by one month before the expiration of term .

* The pressure gage of extinguisher, if equipped, shall point to the effective pressure range of the gage dial.</td><td colspan="2">Note:
1.Halide type uses Halide 1011, 1211, 1301 or 2402 as the extinguishant.
2.Powder type uses such chemical powder as potassium, phosphate, etc. as the extinguishant.
3.CO_2 type uses compressed carbon dioxide as the extinguishant.
4.Foam type uses chemically made foam or mechanically made foam by air and/or water as the extinguishant.</td></tr>
<tr><td>C: Type of fire extinguisher and the number of set</td><td>Type of fire extinguisher (See note for type.)</td><td>Heavy-duty buses</td><td colspan="2">Heavy-duty trucks
Wheel base<4m | Wheel base≥4m</td><td>Tractors</td><td>Small children -carrying vehicles</td></tr>
<tr><td></td><td>1.Halide hydrocarbon</td><td>Type 3 1 set</td><td>Type 5 1 set
or Type 3 2 set</td><td>Type 5 1 set</td><td>Type 5 1 set</td><td>Type 3 1 set</td></tr>
<tr><td></td><td>2.Powder</td><td>Type 5 1 set</td><td>Type 10 1 set</td><td>Type 10 1 set</td><td>Type 10 1 set</td><td>Type 5 1 set</td></tr>
<tr><td></td><td>3.Carbon dioxide (CO_2)</td><td>Type 5 1 set</td><td>10 pound 1 set</td><td>10 pound 1 set</td><td>10 pound 1 set</td><td>Type 5 1 set</td></tr>
<tr><td></td><td>4.Foam</td><td>Type 8L 1 set</td><td>Type 8L 1 set</td><td>Type 8L 1 set</td><td>Type 8L 1 set</td><td>Type 8L 1 set</td></tr>
</table>

EUROPE/ECE R.34-01		
ITEM	CONTENT	Illustration/supplement
A: Application	This regulation applies to passenger cars whose engine uses a liquid fuel.	
B: Components subject to this regulation	This regulation applies to the following components. -fuel tank -fuel hose -fuel pipe -all other parts of the fuel installation	

EUROPE/ECE R.34-01		
ITEM	CONTENT	Illustration/supplement
C: Performance Requirements		
1) Test of the fuel tank	(Regulation) The fuel tank shall be made of a fire resistant metallic material. The liquid fuel tank shall be subjected to a hydraulic internal-pressure test. During the test, the tank shell must not crack or leak. (Test method) The test shall be carried out on an isolated tank unit complete with standard filler pipe, filler neck and cap and shall be completely filled with water. After all communication with the outside has been cut off, the pressure shall be gradually increased through the pipe connexion, through which fuel is fed to the engine, to a relative pressure of 0.3 kg/cm^2, which shall be maintained for one minute.	
2) The test of the fuel tank made of a plastics material	(Regulation) The tank shall fulfill the requirements such as an impact resistance, a mechanical strength, a fuel permeability, a resistance of fuel and a resistance to high temperature. (Test method) The test method shall be in accordance with the Annex 5, ECE R. 34-01.	

EUROPE/ECE R.34-01		
ITEM	CONTENT	Illustration/supplement
C: Performance Requirements (continued) 3) Test of the vehicle	(Regulation) -In the frontal impact test against a barrier (see hereunder A) and in the rear end impact test (see hereunder B), no more than a slight leakage of liquid in the fuel installation shall occur on collision. -The rate of leakage must not exceed 30 g/min, if there is continuous leakage in the fuel installation after the collision. -No fire maintained by the fuel shall occur. -The battery must be kept in position by its securing device during and after the test. (Test method) The vehicle shall be fitted with all normal components and equipment. A) The frontal impact test -The fuel installation must be filled to at least 90% of its capacity. - The velocity on impact must be between 48.3 - 53.1 km/h. B) The rear end impact test -The impactor may either be secured to a moving barrier or form part of a pendulum. -The velocity of impact shall be between 35 - 38 km/h. -Total weight of impactor shall be 1,100 ±20 kg. -Ground clearance of the lower edge of the impacting surface shall be 175 ± 25 mm	

ITEM 96-23

Registration plate illumination

APEC Regulation Analysis Findings
Item No. 96-23: Registration Plate Illumination

1. The U.S.(FMVSS 108), Canada, Japan and Korea have similar requirements for registration plate illumination.

2. Australia's regulation is similar to the corresponding ECE regulation.

3. In addition to its own regulation, New Zealand requires ECE/ADR/Japanese/FMVSS as alternatives.

4. A comparison of specific requirements for registration plate illumination is as follows.

(1) Light distribution (C-a-1): Australia, Canada, Japan, Korea and U.S. specify 8 light distribution test points, compared to ECE's 12 points. However, the test point positions differ among the member economies according to the size of the registration plate. The light distribution value is identical, although the ECE type ($2.5cd/m^2$) and the FMVSS type (8 lux) use different numerical units.

(2) Uniformity (C-a-2): Japan-Korea, Canada-U.S. and Australia-ECE respectively have their similar requirements concerning the uniformity of registration plate illumination. (3) Color of light (C-a-3): White light is required by Australia, Canada, Indonesia, Japan, Korea, Malaysia, New Zealand, Papua New Guinea, Philippines, Chinese Taipei, Thailand, U.S. and ECE.

(4) Incident angle (C-a-4): An incident angle of 8~ is specified by Australia, Canada, Japan, Korea, U.S. and ECE.

(5) Visibility (C-b-1): Australia and ECE specify a geometric visibility angle, while Japan, Korea, New Zealand, Papua New Guinea and Thailand specify a minimum visible distance of 20m. Indonesia sets forth a minimum visible distance of 50m.

(6) Exposure (C-b-2): Australia, Canada, Korea, New Zealand, Papua New Guinea, Thailand, U.S. and ECE have an exposure requirement, and their requirements are identical.

Item No.96-23 Registration plate lamp

A: Application: Passenger Vehicles

Member Economies	C-a-1 Photometry	C-a-2 Uniformity	C-a-3 Color	C-a-4 Incident Angle	C-a-5 bulb	C-a-6 Mechanical
Australia	ADR48 2.5cd/m^2 at 8 points	ADR48 (similar ECE 4) (B2-B1)/Distance $\subseteq$ 2*B0	com (White)	com (8 deg. or more to a plane of test plate)		
Brunei						
Canada	FMVSS 108 8 lux at 8 points	FMVSS 108 Max / Min $\subseteq$ 20	com (White)	com (8 deg. or more to a plane of test plate)		FMVSS 108 (See below)
Chile						
China						
Hong Kong						
Indonesia			com (White)			
Japan	SRRV 36 8 lux at 8 points	SRRV 36 (Max1+Max2)/(Min1+Min2) $\subseteq$ 20	com (White)	com (8 deg. or more to a plane of test plate)		
Korea	FMVSS 108 8 lux at 8 points	SRRV 36 (Max1+Max2)/(Min1+Min2) $\subseteq$ 20	com (White)	com (8 deg. or more to a plane of test plate)		
Malaysia			com (White)			
Mexico						
New Zealand			com (White)			
Papua New Guinea			com (White)			
Philippines			com (White)			
Singapore						
Chinese Taipei			com (White)			
Thailand			com (White)			
U.S.A	FMVSS 108 8 lux at 8 points	FMVSS 108 Max / Min $\subseteq$ 20	com (White)	com (8 deg. or more to a plane of test plate)		FMVSS 108 Vibration test Moisture test Dust test Corrosion test
EC	ECE 4 2.5 cd/m^2 at 12 points	ECE 4 (B2-B1)/Distance $\subseteq$ 2*B0	com (White)	com (8 deg. or more to a plane of test plate)	ECE 4 Regulation No.37 bulb	

Member Economies	C-b-1 Visibility	C-b-2 Beam leakage	C-b-3 Electrical Connection	D Marking	E Reference Standards Alternative Regulation
Australia	ECE 4 Horizontal: 30L - 30R Vertical : 5U - 5D	com.(No light is projected to the rear)			
Brunei					
Canada		com.(No light is projected to the rear)			
Chile					
China					
Hong Kong					
Indonesia	Unique Visible from 50 m behind the car				
Japan	Unique Visible from 20 m behind the car				
Korea	Unique Visible from 20 m behind the car	com.(No light is projected to the rear)			
Malaysia					
Mexico					
New Zealand	Unique Visible from 20 m behind the car	com.(No light is projected to the rear)			SRRV, FMVSS ECE, ADR
Papua New Guinea	Unique Visible from 20 m behind the car	com.(No light is projected to the rear)			
Philippines					
Singapore					
Chinese Taipei					
Thailand	Unique Visible from 20 m behind the car	com.(No light is projected to the rear)			
U.S.A		com.(No light is projected to the rear)		FMVSS (Optional) DOT symbol	
EC	ECE 4 Horizontal: 30L - 30R Vertical : 5U - 5D	com.(No light is projected to the rear)		ECE 4 Tradename or mark. Bulb category.	

Economy: Australia
Title of Standard: ADR 48/00 and 13/00

A. Application:

Vehicles

C-a-1.Photometry

Minimum Intensity 2.5 cd/m^2

Test points: See EC Reg No.4-00

C-a-2 Uniformity

The gradient of the luminance value between any two points shall not exceed 2 x B0/cm.

Here B0 being minimum gradient of the luminance.

$$\frac{B2 - B1}{\text{distance}(1 - 2)} \leq 2 \times B0$$

C-a-3 Color

White

C-a-4 Incident angle

The incident light shall make an angle of 8 degree or more to a plane of the test plate.

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

See EC Reg. No.4-00

C-b-2 Beam Leakage

No white light shall be emitted from a lamp in a rearward direction.

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: Canada

Title of Standard: Motor Vehicle Safety Regulations 108
SAE J 587 Oct 1981

A. Application:

Vehicles

C-a-1 Photometry

Minimum Intensity: 8 lux at specified test points.

Test points: See U.S.A FMVSS 108

C-a-2 Uniformity

Uniformity: Maximum and Minimum luminance rate shall not exceed 20/1

C-a-3. Color

White

C-a-4 Incident angle

The incident light shall make an angle of 8 degree or more to a plane of the test plate.

C-a-5 Bulb

N/A

C-a-6 Mechanical

Vibration test - SAE J 575

Moisture test - SAE J 575

Dust test - SAE J 575

Corrosion test SAE J 575

C-b-1 Visibility

N/A

C-b-2 Beam Leakage

No white light is projected from the illumination devices directly to the rear of the vehicles.

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: Indonesia
Title of Standard: Vehicle and Drivers (Government Regulation) No.44/1993
Article 37

A. Application:

Vehicles

C-a-1 Photometry

N/A

C-a-2 Uniformity

N/A

C-a-3 Color

White

C-a-4 Incident angle

N/A

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

The number plate shall be readable from a distance of at least 50m behind the vehicle

C-b-2 Beam Leakage

N/A

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: Japan
Title of Standard: Safety Regulations for Road vehicles Article 36

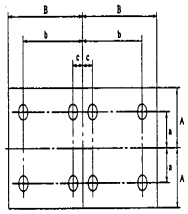
A Application

Vehicles

C-a-1 Photometry

Minimum Intensity: 8 lux (15 lux for small-sized number plate) at specified test points.

Test points:



Unit: mm

Category of number plate lamp	A	B	a	b	c
Number plate lamp for large-sized number plates	110	220	60	170	25
Number plate lamp for medium-sized number plates	82.5	165	50	125	25
Number plate lamp for small-sized number plates	62.5	115	35	90	25

C-a-2 Uniformity

$$\text{Uniformity} = \frac{\text{Mean value of two highest illumination intensity readings}}{\text{Mean value of two least illumination intensity readings}} \leq 20$$

C-a-3. Color

White

C-a-4 Incident angle

The incident light shall make an angle of 8 degree or more to a plane of the test plate.

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

The light shall render the figures clearly visible from a distance of 20 m to the car.

C-b-2 Beam Leakage

N/A

C-b-2 Electrical Connection

N/A

D Marking

N/A

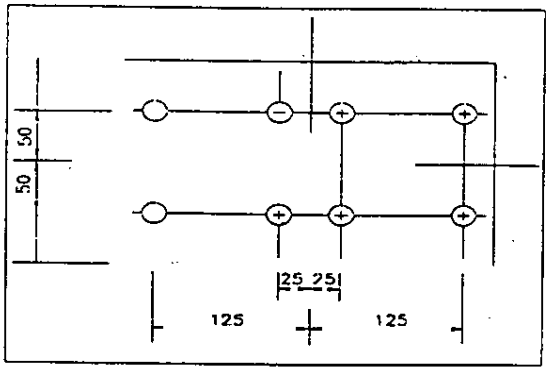
Economy: Korea
Title of Standard: The Regulation of the Motor Vehicle Safety Standards
Article 41

A. Application: Vehicles

C-a-1.Photometry

Minimum luminous flux at each test point shall not be less than 8 lux.

Test points:



C-a-2 Uniformity

The average of the two highest illuminations shall be not more than 20 times the average of the two lowest illuminations.

C-a-3 Color

White

C-a-4 Incident angle

The incident angle between the outermost edge of the light emitting surface and the farthest point of the registration plate shall be not less than 8 degrees.

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

N/A

C-b-2 Beam Leakage

The light source shall not be directly visible from behind.

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: New Zealand
Title of Standard: Vehicle Standards Regulations 1990 Article 22

A. Application:

Vehicles

C-a-1.Photometry

N/A

C-a-2 Uniformity

N/A

C-a-3. Color

White

C-a-4 Incident angle

N/A

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

The figures and letters shall clearly visible in the night at minimum distance of 20m to the rear.

C-b-2 Beam Leakage

The beam of light from the lamp shall not be directed rearwards.

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: Papua New Guinea
Title of Standard: Motor Traffic Regulation No. 100

A. Application:

Vehicles

C-a-1.Photometry

N/A

C-a-2 Uniformity

N/A

C-a-3. Color

White

C-a-4 Incident angle

N/A

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

The figures and letters of the rear number plate are clearly visible from a distance of 20 m.

C-b-2 Beam Leakge

The beam of the light from the lamp are not visible from the rear of the vehicle.

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: Philippines
Title of Standard: Administrative Order No. AO-91-005 Section 8-b
Republic Act No.4136 S.34

A. Application:

Vehicles

C-a-1 Photometry

N/A

C-a-2 Uniformity

N/A

C-a-3. Color

White

C-a-4 Incident angle

N/A

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

N/A

C-b-2 Beam Leakage

N/A

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: Chinese Taipei
Title of Standard: Road Traffic Safety Regulations Article 39 12-7-8

A. Application:

Vehicles

C-a-1 Photometry

N/A

C-a-2 Uniformity

N/A

C-a-3 Color

White

C-a-4 Incident angle

N/A

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

N/A

C-b-2 Beam Leakage

N/A

C-b-3 Electrical Connection

N/A

D Marking

N/A

Economy: Thailand
Title of Standard: No.22 1994 MVA Article 2 (1) (h)

A. Application:

Vehicles

C-a-1 Photometry

N/A

C-a-2 Uniformity

N/A

C-a-3 Color

White

C-a-4 Incident angle

N/A

C-a-5 Bulb

N/A

C-a-6 Mechanical

N/A

C-b-1 Visibility

The light shall be bright enough so as to enabling the reading of license plate clearly within a distance of not less than 20 m from the rear of the car.

C-b-2 Beam Leakage

There shall also be fitted a shade to prevent the light from beaming to the rear.

C-b-3 Electrical Connection

N/A

D Marking

N/A

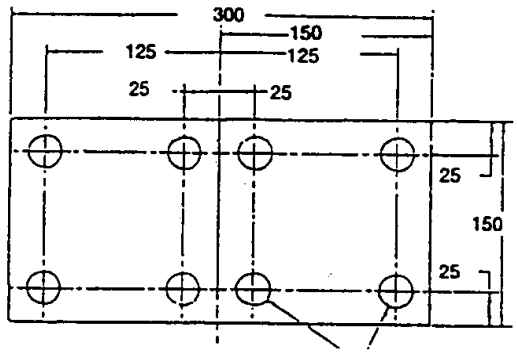
Economy: U.S.A
Title of Standard: Federal Motor Vehicle Safety Standards 108
SAE J 587 Oct 1981

A. Application: Vehicles

C-a-1.Photometry

Minimum Intensity: 8 lux at specified test points.

Test points:



C-a-2 Uniformity

Maximum and Minimum luminance rate shall not exceed 20/1

C-a-3. Color

White

C-a-4 Incident angle

The incident light shall make an angle of 8 degree or more to a plane of the test plate.

C-a-5 Bulb

N/A

C-a-6 Mechanical

Vibration test - SAE J 575

Moisture test - SAE J 575

Dust test - SAE J 575

Corrosion test SAE J 575

C-b-1 Visibility

N/A

C-b-2 Beam Leakage

No white light is projected from the illumination devices directly to the rear of the vehicle.

C-b-3 Electrical Connection

N/A

D Marking

Lamps may be labeled with a symbol DOT, which shall constitute a certification that it conforms to applicable FMVSS.

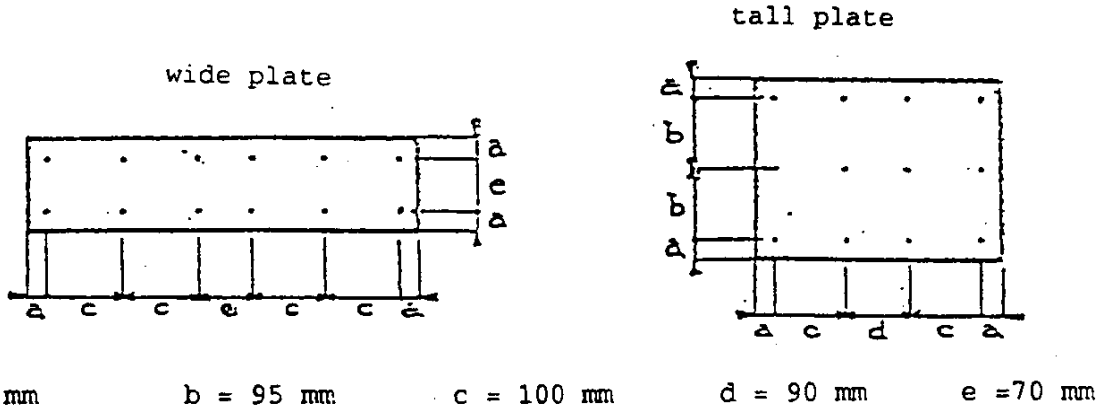
Economy: ECE
Title of Standard: ECE Regulation No. 4-00

A. Application: Vehicles

C-a-1.Photometry

Minimum Intensity: 2.5 cd/m^2

Test points:



a = 25 mm b = 95 mm c = 100 mm d = 90 mm e =70 mm

C-a-2 Uniformity

Uniformity: The gradient of the luminance value between any two points shall not exceed 2 x B0/cm. Here B0 being minimum gradient of the luminance.

$$\frac{B2 - B1}{\text{distance (1 - 2)}} \leq 2 \times B0$$

C-a-3. Color

White

C-a-4 Incident angle

The incident light shall make an angle of 8 degree or more to a plane of the test plate.

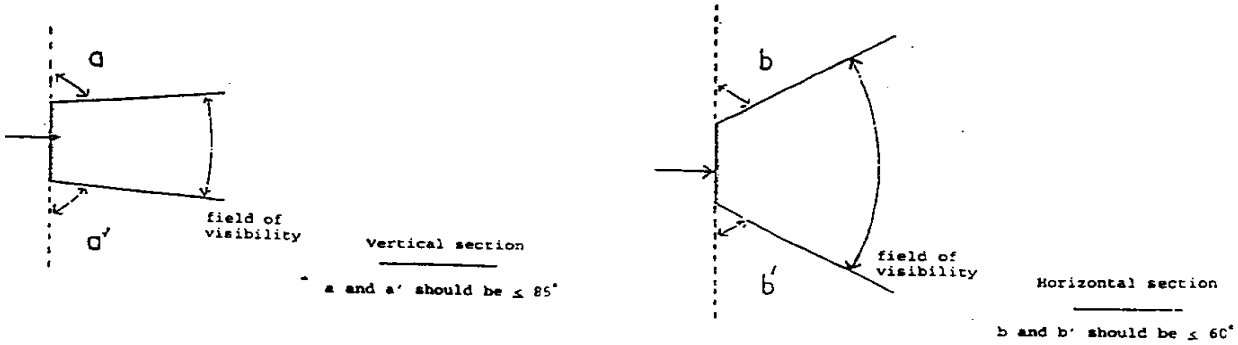
C-a-5 Bulb

Bulb shall be regulated by Regulation No. 37

C-a-6 Mechanical

N/A

C-b-1 Visibility



C-b-2 Beam Leakage

No white light shall be emitted from a lamp in a rearward direction.

C-b-2 Electrical Connection

N/A

D Marking

Illuminating devices must bear the trade name or mark of the maker or manufacturer of the illuminating device and approval mark

ITEM 96-24

Front fog lamps

APEC Regulation Analysis Findings
Item No.96-24: Front Fog Lamps

1. Australia, People's Republic of China, Japan, Korea and New Zealand adopt a front fog lamp regulation that is nearly or partially identical with the ECE regulation.

2. Hong Kong, Indonesia and Chinese Taipei specify only the color of light.

3. In addition to its own regulation, New Zealand requires ECE/ADR/Japanese/FMVSS as alternatives.

4. A comparison of specific requirements for registration plate illumination is as follows.

(1) Light distribution (C-a-1): Australia, People's Republic of China, Japan, Korea and New Zealand adopt an ECE-type requirement for light distribution.

(2) Color of light (C-a-2): White or yellow light is required by Australia, People's Republic of China, Hong Kong, Indonesia, Japan, New Zealand, Chinese Taipei and ECE.

(3) Aiming device (C-a-3): ECE require the installation of a light aiming device.

(4) Bulb (C-a-4): People's Republic of China requires the use of those fog lamp bulbs prescribed in ECE R37.

Item No. 96-24 Front fog lamp

A: Application: Passenger Vehicles

Member Economies	C-a-1 Photometry	C-a-2 Color	C-a-3 Aiming device	C-a-4 Bulb	C-a-5 Mechanical
Australia	ADR 50	ADR 50 (White or Yellow)			
Brunei					
Canada					
Chile					
China	ECE19	com (White or Yellow)		ECE 19 Regulation No.37 bulb	
Hong Kong		com (White or Yellow)			
Indonesia		com (White or Yellow)			
Japan	SRRV 33(similar ECE19)	SRRV 33 (White or Yellow)			
Korea	ECE 19				
Malaysia					
Mexico					
New Zealand		com (White or Yellow)			
Papua New Guinea					
Philippines					
Singapore					
Chinese Taipei		com (White or Yellow)			
Thailand		com (White or Yellow)			
U.S.A					
ECE	ECE19 Max Min (lx) Zone A: 1.0 0.15 Zone B: 1.0 Zone C: 0.5 Zone D: 1.5 Zone E: 0.5	ECE19 (White or Yellow)	ECE 19 (Aiming device shall be fitted.)	ECE19 Regulation No.37 bulb	ECE19 Photometric stability test Plastic lens test

Member Economies	C-b-1 Electrical Connection	D Marking	E Reference Standards Alternative Regulation
Australia			
Brunei			
Canada			
Chile			
China			
Hong Kong			
Indonesia			
Japan			ECE 19
Korea			
Malaysia			
Mexico			
New Zealand			SVVR, FMVSS, ECE, ADR
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
U.S.A			
ECE		ECE 19 Tradename or mark. Bulb category.	

Economy: Australia
Title of Standard: ADR 50/00

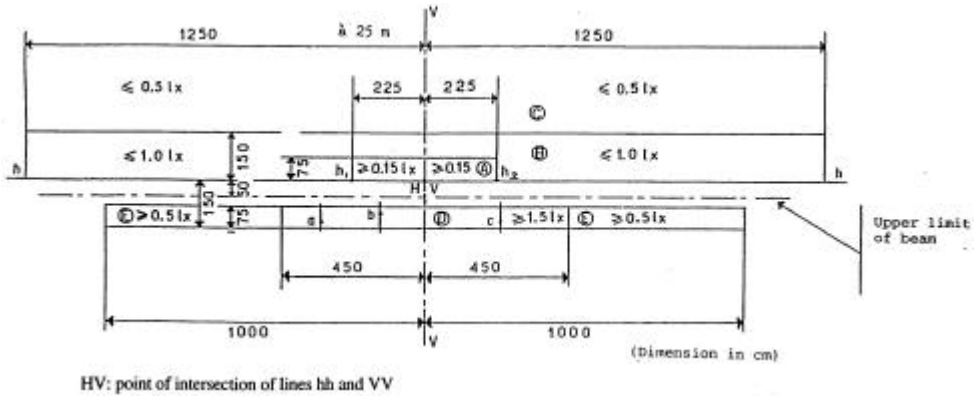
A. Application:

MotorVehicles

C-a-1.Photometry

The beam shall produce on the screen, over a width of not less than 2.25m on both sides of the line VV, a symmetrical cut-off approximating sufficiently closely to the horizontal to enable adjustment to be performed with its aid.

Position on measuring screen		Illumination required, in lux
Zone	Zone limits	
A	225 cm on both sides of the line VV and 75 cm above hh	≥ 0.15 and ≤ 1
B	1,250 cm on both sides of the line VV and 150 cm above hh, including hh (except zone A)	≤ 1
C	1,250 cm on both sides of the line VV and starting from 150 cm above hh. The luminous intensity of the front fog lamp in any direction forming an angle of more than 15 above the horizontal shall be limited to 200 cd	≤ 0.5
D	450 cm on both sides of the line VV and comprised between the parallels to hh respectively situated 75 and 150 cm below hh	On each vertical line in this zone there shall be at least one point (a,b,c) where the illumination is ≥ 1.5
E	From 450 cm to 1,000 cm on both sides of zone D and comprised between the parallels to hh respectively situated 75 and 150 cm below hh	On each vertical line in this zone there shall be at least one point where the illumination is ≥0.5



HV: point of intersection of lines hh and VV

C-a-2. Color

White or Yellow.

C-a-3 Aiming

N/A

C-a-4 Bulb

N/A

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

D Marking

N/A

Economy: China
Title of Standard: GB-4660-94

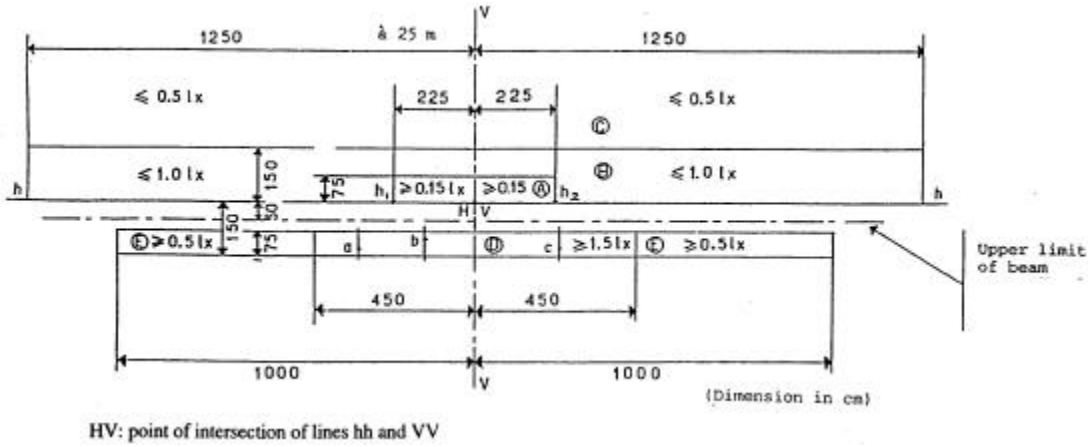
A. Application:

Vehicles

C-a-1.Photometry

The beam shall produce on the screen, over a width of not less than 2.25m on both sides of the line VV, a symmetrical cut-off approximating sufficiently closely to the horizontal to enable adjustment to be performed with its aid.

Position on measuring screen		Illumination required, in lux
Zone	Zone limits	
A	225 cm on both sides of the line VV and 75 cm above hh	≥ 0.15 and ≤1
B	1,250 cm on both sides of the line VV and 150 cm above hh, including hh (except zone A)	≤ 1
C	1,250 cm on both sides of the line VV and starting from 150 cm above hh. The luminous intensity of the front fog lamp in any direction forming an angle of more than 15 above the horizontal shall be limited to 200 cd	≤ 0.5
D	450 cm on both sides of the line VV and comprised between the parallels to hh respectively situated 75 and 150 cm below hh	On each vertical line in this zone there shall be at least one point (a,b,c) where the illumination is ≥ 1.5
E	From 450 cm to 1,000 cm on both sides of zone D and comprised between the parallels to hh respectively situated 75 and 150 cm below hh	On each vertical line in this zone there shall be at least one point where the illumination is ≥0.5



HV: point of intersection of lines hh and VV

C-a-2. Color

White or Yellow

C-a-3 Aiming

N/A

C-a-4 Bulb

Filament lamp shall be F2, H1, H2, H3, H4.

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

D Marking

N/A

Economy: Hong Kong
Title of Standard: Road Traffic Regulation 102

A. Application:

Vehicles

C-a-1.Photometry

N/A

C-a-2. Color

White or Yellow

C-a-3 Aiming

N/A

C-a-4 Bulb

N/A

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

D Marking

N/A

Economy: Indonesia
Title of Standard: Vehicle and Drivers (Government Regulation) No.44/1993 Article 52,53

A. Application:

Vehicles

C-a-1.Photometry

N/A

C-a-2. Color

White or Yellow

C-a-3 Aiming

N/A

C-a-4 Bulb

N/A

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

D Marking

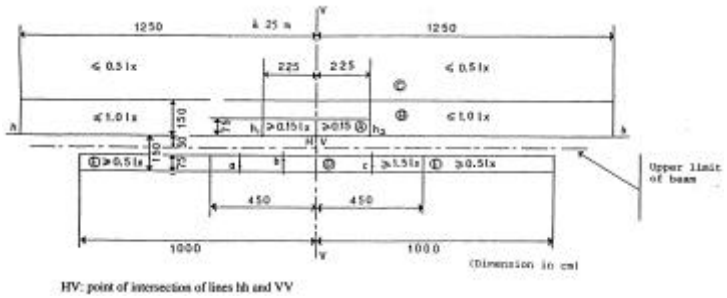
N/A

Economy: Japan
Title of Standard: Safety Regulation for Road Vehicle Article 33
Type Designation Procedure for Front Fog Lamp

A. Application:

Vehicles

C-a-1.Photometry



HV: point of intersection of lines hh and VV

Zone	Maximum	Minimum
A	1.0	0.15
B	1.0	
C	0.5	
D		1.5
E		0.5

C-a-2. Color

White or Selective yellow

C-a-3 Aiming

N/A

C-a-4 Bulb

N/A

C-a-5 Mechanical

Heat test
Stability test
Plastic lens test

C-b-1 Electrical Connection

N/A

D Marking

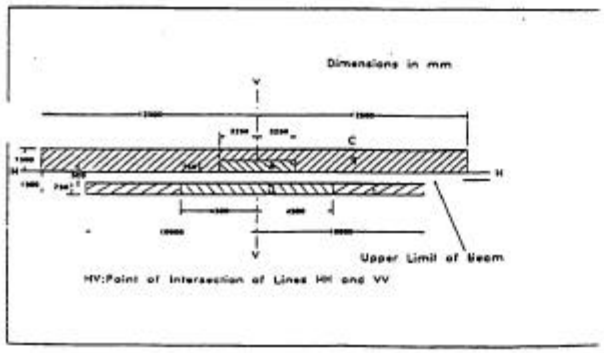
N/A

Economy: Korea
Title of Standard: The Regulation of the Motor Vehicle Safety Standards
Article 38 Item 2, Article 106

A. Application:

Vehicles

C-a-1.Photometry



Appendix 20 Luminous Intensity Standard of Auxiliary Headlamp
(Article 106 Item 2)

Measurement Zone	Luminous Intensity
Zone A (2250L~2250R and H~750U)	not less than 95 but not more than 625
Zone B (1250OL~1250OR and H~1500U except Zone A)	625 or less
Zone C (1250OL~1250OR and above 1500U)	315 or less
Zone D (4500L~4500R and 7500~15000)	940 or more
Zone E (10000L~10000R and 7500~15000 except Zone D)	315 or more

Note :
1. The position of maximum luminous intensity shall be located 50 centimeters below the H line.
2. Measurement Zones are described below.

C-a-2. Color

N/A

C-a-3 Aiming

N/A

C-a-4 Bulb

N/A

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

D Marking

N/A

Economy: New Zealand
Title of Standard: Vehicle Standards Regulations 1990 Article 24

A. Application:

Vehicles

C-a-1.Photometry

Equivalent with ECE No.19

Equivalent with ADR No.50/00

C-a-2. Color

Equivalent with ECE No.19

Equivalent with ADR No.50/00

C-a-3 Aiming

Equivalent with ECE No.19

C-a-4 Bulb

N/A

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

D Marking

N/A

Economy: Chinese Taipei
Title of Standard: Road Traffic Safety Regulations Article 39 12-7-2

A. Application:

Vehicles

C-a-1.Photometry

N/A

C-a-2. Color

Yellow or Selective yellow

White for small size vehicle

C-a-3 Aiming

C-a-4 Bulb

N/A

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

Economy: Thailand
Title of Standard: The Ministerial Regulation No.22

A. Application:

Passenger vehicle

C-a-1.Photometry

The focus of the illuminated area of the fog light shall not be less than 2 degree below the horizontal line from the lamp or not less than 0.20m from the horizontal line at a distance of 7.50m and not deviate to the right.

C-a-2. Color

White or Yellow

C-a-3 Aiming

C-a-4 Bulb

N/A

C-a-5 Mechanical

N/A

C-b-1 Electrical Connection

N/A

Economy: ECE
Title of Standard: ECE Reg. No.19-02

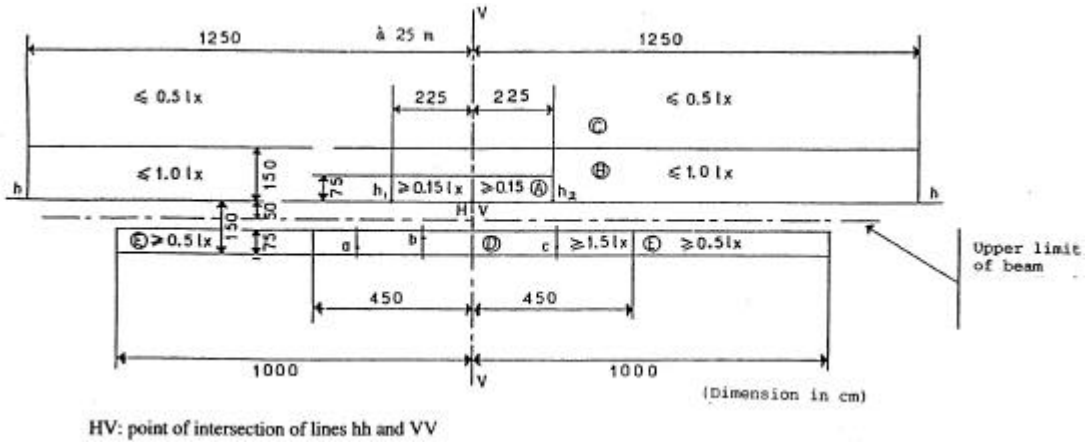
A. Application:

Vehicles

C-a-1.Photometry

The beam shall produce on the screen, over a width of not less than 2.25m on both sides of the line VV, a symmetrical cut-off approximating sufficiently closely to the horizontal to enable adjustment to be performed with its aid.

Position on measuring screen		Illumination required, in lux
Zone	Zone limits	
A	225 cm on both sides of the line VV and 75 cm above hh	≥ 0.15 and ≤ 1
B	1,250 cm on both sides of the line VV and 150 cm above hh, including hh (except zone A)	≤ 1
C	1,250 cm on both sides of the line VV and starting from 150 cm above hh. The luminous intensity of the front fog lamp in any direction forming an angle of more than 15 above the horizontal shall be limited to 200 cd	≤ 0.5
D	450 cm on both sides of the line VV and comprised between the parallels to hh respectively situated 75 and 150 cm below hh	On each vertical line in this zone there shall be at least one point (a,b,c) where the illumination is ≥ 1.5
E	From 450 cm to 1,000 cm on both sides of zone D and comprised between the parallels to hh respectively situated 75 and 150 cm below hh	On each vertical line in this zone there shall be at least one point where the illumination is ≥0.5



HV: point of intersection of lines hh and VV

C-a-2. Color

White or Yellow

C-a-3 Aiming

Front fog lamp shall be fitted with a device enabling them to be so adjusted on the vehicles as to comply with the rules applicable to them.

C-a-4 Bulb

If the device is not of the sealed beam type, the category of filament lamp, H1, H2, H3, H4, H7, H8, HB3, HB4, H27W/1, H27W/2 shall be specified.

C-a-5 Mechanical

Test for stability of Photometric performance.
Requirement for plastic materials.

C-b-1 Electrical Connection

N/A

D Marking

Bear the trade name or mark of the manufacturer. Bear the category of filament bulb of the lamp, this is not valid for sealed beam type lamps.

ITEM 96-25

Rear fog lamps

APEC Regulation Analysis Findings
Item No. 96-25: Rear Fog Lamps

1. Japan, Australia and ECE have similar regulations for rear fog lamps.

2. Chinese Taipei specifies only the color of light.

3. Japan specifies light distribution, the color of light, and electrical connection.

4. A comparison of specific requirements for rear fog lams is as follows.

(1) Light distribution (C-a-1): Australia adopts the ECE regulation. Japan applies its unique regulation.

(2) Color of light (C-a-2): Red light is required by Australia, Japan, Chinese Taipei and ECE.

(3) Luminous area (C-a-3): Australia adopts the ECE requirement for the luminous surface area of the rear fog lamp.

(4) Visibility (C-b-1): Australia adopts the ECE requirement for the visibility of the rear fog lamp.

(5) Electrical connection (C-b-2): Australia, Japan and ECE provide an electrical connection requirement. Australia and Japan adopt the previous ECE regulation, while ECE has introduced a new regulation requiring a more complex circuit for prevention of tampering.

Item No.96-25 Rear fog lamp

A: Application: Passenger Vehicles

Member Economies	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb	C-a-5 Mechanical
Australia	ADR 52 Max: 300cd, Min: 150cd on axis H 10L-10R and V 5U-5D, 75cd rhombus area.	ADR 52 (Red)	ADR 52 Max.: 140cm^2		ADR 52 Heat test
Brunei					
Canada					
Chile					
China					
Hong Kong					
Indonesia					
Japan	SRRV 37-2 Intensity shall exceed tail lamp.	SRRV 37-2 (Red)			
Korea					
Malaysia					
Mexico					
New Zealand					
Papua New Guinea					
Philippines					
Singapore					
Chinese Taipei		com (Red)			
Thailand					
U.S.A					
EC	ECE 38 Max: 300cd, Min: 150cd on axis H 10L-10R and V 5U-5D, 75cd rhombus area.	ECE 38 (Red)	ECE 38 Max.: 140cm^2	ECE 38 RegulationNo.37 bulbs	ECE 38 Heat test

Member Economies	C-b-1 Visibility	C-b-2 Electrical Connection	D Marking	E Reference Standards Alternative Regulation
Australia	ADR 52 Horizontal : 25°R-25°L Vertical : 5°U-5°D	ADR 52 Turn on when headlamps and front fog lamps are lit. Turn off independently of other lamps.		
Brunei				
Canada				
Chile				
China				
Hong Kong				
Indonesia				
Japan		SRRV 37-2 Turn on when headlamps and front fog lamps are lit. Turn off independently of other lamps.		similar ECE 48
Korea				
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei				
Thailand				
U.S.A				
EC	ECE 38 Horizontal : 25°R-25°L Vertical : 5°U-5°D	ECE 38 Turn on when headlamps and front fog lamps are lit. Turn off independently of other lamps. Alarm system shall be installed to prevent abuse use.	ECE 38 Tradename or mark. Bulb category.	

Economy: Australia
Title of Standard: ADR 52/00

A. Application:

Vehicles (Fitment optional)

C-a-1.Photometry

1. The intensity along the H and V axes between 10° to the left and 10° to the right and between 5° up and 5° down, shall not be less than 150 cd.
2. The intensity of the light emitted in all directions in which the light can be observed shall not exceed 300 cd per light.
3. Outside the axis, no intensity measured within the rhombus defined by the extreme direction of measurement is below 75 cd.

C-a-2. Color

Red : Within the limits of following tricromatic co-ordinates.

Limit towards yellow : $y \leq 0.335$

Limit towards purple: $z \leq 0.008$

C-a-3 Luminous Area

Apparent surface in the direction of the reference axis shall not exceed 140cm^2.

C-a-4 Bulb

N/A

C-a-4 Mechanical

Heat resistance test

C-b-1 Visibility

Horizontal angle : 25° to the right and 25° to the left.

Vertical angle : 5° upwards and 5° downward.

C-b-2 Electrical Connection

1. The rear fog lamp can operate only when the dipped beam or main beam headlamps or the front fog lamps or a combination of these are switched on.
2. They must be such that when the rear fog lamp is switched on it is capable of operating together with the main beam, the dipped beam and the front fog lamps.
3. When the rear fog lamp is switched on, operating the main-beam or dipped-beam control shall not extinguish the rear fog lamps.
4. If the front fog lamps exist, the extinguishing of the rear fog lamps must be possible independently from that of the front fog lamps.

Economy: Japan
Title of Standard: Safety Regulations for Road Vehicles Article 37-2

A. Application:

Vehicles

C-a-1.Photometry

The luminous intensity of the rear fog lamp shall exceed that of the tail lamp.

C-a-2. Color

Red

C-a-3 Luminous Area

N/A

C-a-4 Bulb

N/A

C-a-4 Mechanical

N/A

C-b-1 Visibility

N/A

C-b-2 Electrical Connection

The lamp shall be wired so that it may be turned on only when the headlamp or the auxiliary headlamps are lit. It may be turned off while the headlamps or the auxiliary headlamps are lit.

D Marking

N/A

Economy: Chinese Taipei
Title of Standard: Road Traffic Safety Regulations Article 39 12-7-2

A. Application:

Vehicles

C-a-1.Photometry

N/A

C-a-2. Color

Red

C-a-3 Luminous Area

N/A

C-a-4 Bulb Wattage

N/A

C-a-4 Mechanical

N/A

C-b-1 Visibility

N/A

C-b-2 Electrical Connection

N/A

Economy: ECE
Title of Standard: ECE Reg. No.38-00

A. Application:

Vehicles

C-a-1.Photometry

1. The intensity along the H and V axes between 10° to the left and 10° to the right and between 5° up and 5° down, shall not be less than 150 cd.
2. The intensity of the light emitted in all directions in which the light can be observed shall not exceed 300 cd per light.
3. Outside the axis, no intensity measured within the rhombus defined by the extreme direction of measurement is below 75 cd.

C-a-2. Color

Red : Within the limits of following tricromatic co-ordinates.

Limit towards yellow : $y \leq 0.335$

Limit towards purple: $z \leq 0.008$

C-a-3 Luminous Area

Apparent surface in the direction of the reference axis shall not exceed 140cm^2.

C-a-4 Bulb

Bulbs shall be regulated by ECE Regulation No.37.

C-a-4 Mechanical

Heat resistance test

C-b-1 Visibility

Horizontal angle : 25° to the right and 25° to the left.

Vertical angle : 5° upwards and 5° downward.

C-b-2 Electrical Connection

1. Cannot switched on unless the main beams, dipped beamed or front fog lamp are lit.
2. Can be switched off independently of other lamp.
3. Rear fog lamp may continue to operate until position lamp are switched off and shall them remain off until deliberately switch on.
4. Whilst the rear fog lamp switched in “on “ position warning shall be given if the ignition is switched off or the ignition key is withdrawn and the driver door is opened.

D. Marking

Bear the trade name or mark of the manufacturer. Bear the category of the filament bulb of the lamp, this is not valid for lamps with non replaceable lamp sources.

ITEM 96-26

Reflex reflectors

APEC Regulation Analysis Findings
Item No. 96-26: Reflex Reflectors

1. Canada and Korea have a reflex reflector regulation similar to the U.S.'s FMVSS regulation.

2. New Zealand requires ECE/ADR/Japanese/FMVSS at alternatives.

3. People's Republic of China has a regulation that is similar to ECE.

4. Other member economies apply their unique requirements, although the number of their requirements are few.

5. A comparison of specific requirements for reflex reflectors is as follows.

(1) Light distribution (C-a-1): A specific light distribution value is established by Australia, Canada, Korea, People's Republic of China, U.S., Japan and ECE. Light distribution regulations can be divided into an ECE group (Australia, People's Republic of China, Japan, ECE) and an FMVSS group (the U.S., Canada, Korea). Although FMVSS demands a higher light distribution value, the ECE regulation (including requirements other than the light distribution value) is more strict as a whole.

(2) Color of reflecting light (C-a-2): All member economies require red light for the rear reflex reflector. In the member economies where front side reflex reflectors are specified, amber reflecting light is acceptable for the front side reflectors in all these member economies.

(3) Luminous area (C-a-3): People's Republic of China adopts the ECE requirement for the luminous surface area of the reflex reflector. Brunei Darussalam, Korea, Hong Kong, Japan and Thailand specify their unique luminous area values.

(4) Durable requirements (C-a-5): Requirements concerning the durability of reflex reflectors can be divided into two groups.

FMVSS group - U.S., Canada
ECE group - ECE, Australia, Japan

ITEM No. 96-26 Reflex Reflector

A : Application Passenger Car

Economy	A. Application	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b Position	C-b-1 Visibility	C-b-2 Connection	D Marking	E Reference Standards Alternative Regulation
Australia	All vehicles	ADR 47/00 Min.: 300 mcd/lx (at H-V, 0.33 dig.)	Front: Colorless Side: Amber (Red) Rear: Red (ADR 13/00)			Heat test Water test Motor fuels test Oils test Corrosion test Rear face abrasion Stability test Color-fastness					ECE 3
Brunei	Motor Vehicles		Red	Not less than 2 in. in diameter							
Canada	Motor vehicles	CMVSS (SAE J594e) Red: Min.: 420 mcd/lx (at H-V, 0.2 deg.)	Front: Colorless Front side : Amber Center: Amber Rear side : Red Rear: Red			CMVSS (SAE J575 Dec 88) Vibration Test Moisture Test Dust Test Corrosion Test	CMVSS table I to IV				
Korea	Motor vehicles	Red: Min.: 420 mcd/lx (at H-V, 0.2 deg.)	Front side : Yellow or Amber Rear side : Amber or Red Rear: Red	Small vehicle: Not less than 10 sq. cm Others: Not less than 20 sq.cm							
China	Motor vehicles	ECE No. 3-02 Class IA Red Min.: 300 mcd/lx (at H-V, 0.33 dig.)	Red	Not a triangle shape Maximum dimension is less than 200mm							
Hong Kong	Motor vehicles			Not less than 40 mm in diameter or equivalent							
Indonesia	Motor vehicles		Red	Not triangle	Clean and effecient						
Japan	Motor vehicles	SRRV 35 and 38	Frontside: White or Amber Center: Amber Rear: Red	10 sq. cm. or more		Heat Resistance Test Resistance to Lubricating Oils Tests Resistance to Fuel Test Corrosion Test others	SRRV 35 and 38				
Malaysia											
Mexico											
New Zealand	Motor vehicles			at least 65mm dia. For heavy goods vehicle			Traffic regulation 62				ECE 3 76/757/EEC ADR 47/00 SRRV FMVSS JID D5500
Papua new	Motor vehicles		Red								
Philippines	Motor vehicles		Red					Visible from 100 at night			
Singapore	Passenger Cars										
Chinese Taipei											FMVSS
Thailand	Motor Cars		Red	Unique				Visible from 150 at night			
USA	Motor vehicles	FMVSS(SAE J594f) Red: Min.: 420 mcd/lx (at H-V, 0.2 deg.)	Front: Colorless Frontside: Amber Center: Amber Rearside: Red Rear: Red			FMVSS (SAE J575e) Vibration Test Moisture Test Dust Test Corrosion Test	FMVSS table I to IV				
ECE	ECE 48-01	ECE No. 3-02 Class IA Red Min.: 300 mcd/lx (at H-V, 0.33 dig.)	Front: Colorless Side: Amber (Red) Rear: Red (ECE 48-01)	Class IA: N/R Class IIIA: N/R Class IVA: Not less than 25 sq. cm	More than 2.10m width, the reflector sheet of a circular shape must have a diameter not less than 5cm. or if it is of an equilateral triangular shape, square or rectangular shape, each side must be at least 5cm. long, as the case may be.	Class IA & IIIA Heat test Water test Motor fuels test Oils test Corrosion test Rear face abrasion Stability test Color-fastness	ECE 48-01	ECE 48-01		Approval mark	

Economy : Australia

Title of Standard : 3rd Australia Design Rule 47/00

A. Application : All vehicle

C-a-1 : Photometry :

Class IA : except triangle

Table of minimum CIL values for red retro-reflecting device Class IA

Class	Angle divergence α	Illumination angle (in degrees)			
		Vertical V	0deg.	±10deg..	±5deg..
		Horizontal H	0deg..	0deg..	±20deg..
IA*	0.33deg..		300	200	100
	1.5deg..		5	2.8	2.5

* : CIL values for Class IA retro-reflector device must be at least equal to those in the above table multiplied as follows,

Red retro-reflector : coefficient 1

Amber retro-reflector : coefficient 2.5

Colorless retro-reflector : coefficient 4

C-a-2 : Color : Red, White or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical :

Mechanical test table

Tests	Class IA
Heat	O
Water	O
Motor fuels	O
Oils	O
Corrosion	O
Rear face abrasion	O

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/REconomy : Brunei

Title of Standard : Road Traffic Regulations 24

A. Application : Motor Vehicles

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : Not less than 2inches in diameter

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Canada

Title of Standard : CMVSS No.108 and TSD No.108

A. Application : Motor Vehicles

C-a-1 : Photometry : SAE J594e Table 1

C-a-2 : Color :

Front Side	: Amber
Rear Side	: Red
Rear	: Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/A

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test
Moisture Test
Dust Test
Corrosion Test

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/A

Economy : China

Title of Standard : GB/T 11564-89

A. Application : Motor Vehicles

C-a-1 : Photometry :

Minimum reflection standards at each test point (milli-candela per incident lux)

Observation Angle (degree)	Incident Angle (degree)			
	Vertical	0	10~–10	5~–5
	Horizontal	0	0	20~–20
0.33		300	200	100
1.5		5	2.8	2.5

C-a-2 : Color : Red

C-a-3 : Luminous Area : Not a triangle shape
Maximum dimension is less than 200mm

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Hong Kong

Title of Standard : Road Traffic (Safety Equipment) Regulations

A. Application : Motor Vehicles

C-a-1 : Photometry : N/R

C-a-2 : Color : N/R

C-a-3 : Luminous Area : Not less than 40mm in diameter or equivalent

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Clean and efficient condition

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Indonesia

Title of Standard : Government Regulation No.44/1993

A. Application : Motor Vehicles

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : Not a triangle form

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Japan

Title of Standard : Safety Regulations for Road Vehicles Article 38and 35
Type Approval Standard for Reflex Reflectors
Motor Vehicle Inspection Procedures 4-28 and 4-25

A. Application : Motor Vehicles

C-a-1 : Photometry :

Minimum reflection standards at each test point (milli-candela per incident lux)

Observation Angle (degree)	Incident Angle (degree)			
	Vertical	0	10~–10	5~–5
	Horizontal	0	0	20~–20
0.33		300	200	100
1.5		5	2.8	2.5

C-a-2 : Color :

Front : White or Amber
Front Side, Center Side : Amber
Rear Side : Red
Rear : Red

C-a-3 : Luminous Area :

For photometric measurements, only the illuminating surface contained within a circle of 120mm diameter shall be considered, and the illuminating surface itself shall be limited to 75 square centimeter though the surface of the retro reflecting optical units need not necessarily attain this area.
Size of reflecting surface is 10 square centimeter or more.

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical :

Heat Resistance Test
Resistance to Lubricating Oils Tests
Resistance to Fuel Test
Corrosion Test
Resistance of the Accessible Rear Face of Mirror-Backed Retro Reflecting Devices

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Korea
Title of Standard : The Regulations of the Motor Vehicle Safety Standards
Article 49, 80, 106

A. Application : Motor Vehicle

C-a-1 : Photometry :

Minimum reflection standards at each test point (milli-candela per incident lux)

Observation Angle (degree)	Incident Angle (degree)				
	0	10U	10D	20L	20R
0.2	420	280	280	140	140
1.5	6	5	5	3	3

C-a-2 : Color :

Rear : Red
Front Side : Yellow or Amber
Rear Side : Red or Amber

C-a-3 : Luminous Area :

Mini and small Motor Vehicles : 10 square centimeters
Others : 20 square centimeters

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : New Zealand

Title of Standard : Vehicle Safety Regulation 17, Traffic Regulation 62

A. Application : Every motor vehicle

C-a-1 : Photometry : N/R

C-a-2 : Color : N/R

C-a-3 : Luminous Area : at least 65mm dia. For heavy goods vehicle

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulations No. 101

A. Application : Motor vehicle

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Philippines

Title of Standard : Motor Vehicle Inspection System, Section 8 e

A. Application : Motor vehicle

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : Visible from a distance of 100m at night

C-b-2 : Electrical Connection : N/R

Economy : Singapore

Title of Standard : Motor Vehicle Construction and Use Rules 47

A. Application : Passenger car

C-a-1 : Photometry :

C-a-2 : Color :

C-a-3 : Luminous Area :

C-a-4 : Bulb Wattage :

C-a-5 : Mechanical :

C-b-1 : Visibility :

C-b-2 : Electrical Connection :

Economy : Chinese Taipei

Title of Standard : N/A

A. Application : N/A

C-a-1 : Photometry : N/A

C-a-2 : Color : N/A

C-a-3 : Luminous Area : N/A

C-a-4 : Bulb Wattage : N/A

C-a-5 : Mechanical : N/A

C-b-1 : Visibility : N/A

C-b-2 : Electrical Connection : N/A

Economy : Thailand

Title of Standard : Ministerial Regulations No. 22 Article 2 (2)

A. Application : Motor car

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area :

More than 2.10m width, the reflector sheet of a circular shape must have a diameter not less than 5cm. or if it is of an equilateral triangular shape, square or rectangular shape, each side must be at least 5cm. long, as the case may be.

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : Visible from a distance of 150m at night

C-b-2 : Electrical Connection : N/R

Economy : U.S.A.

Title of Standard : FMVSS No.108

A. Application : Motor Vehicles

C-a-1 : Photometry :

SAE J594f Table 1 unit : mcd/lux

Observation Angle (degree)	Entrance Angle (degree)				
	0	10U	10D	20L	20R
0.2	420	280	280	140	140
1.5	6	5	5	3	3

Note : Yellow values shall be 2.5 times indicated red values and white values shall be 4 times indicated red values.

C-a-2 : Color :

Front Side : Amber

Rear and Rear Side : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test

Moisture Test

Dust Test

Corrosion Test

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : ECE

Title of Standard : ECE Uniform Regulation No. 3-02

A. Application : N/R

C-a-1 : Photometry :

Class IA : except triangle
Class IIIA : equilateral triangle
Class IVA : except triangle

Table of minimum CIL values for red retro-reflecting device Class IA and IIIA

Class	Angle divergence α	Illumination angle (in degrees)			
		Vertical V	0deg..	±10deg..	±5deg..
		Horizontal H	0deg..	0deg..	±20deg..
IA*	0.33deg..		300	200	100
	1.5deg..		5	2.8	2.5
IIIA	0.33deg..		450	200	150
	1.5deg..		12	8	8

* : CIL values for Class IA retoro-reflector device must be at least equal to those in the above table multiplied as follows,

Red retoro-reflector : coefficient 1
Amber retoro-reflector : coefficient 2.5
Colorless retoro-reflector : coefficient 4

Table of minimum CIL values for red retro-reflecting device Class IVA

Color	Angle divergence α	Illumination angle (in degrees)						
		Vertical V	0	±10deg..	0	0	0	0
		Horizontal H	0	0	±20deg..	±30deg..	±40deg..	±50deg..
White	0.33deg..		1800	1200	610	540	470	400
	1.5deg..		34	24	15	15	15	15
Amber	0.33deg..		1125	750	380	335	290	250
	1.5deg..		21	15	10	10	20	10
Red	0.33deg..		50	300	150	135	115	100
	1.5deg..		9	6	4	4	4	4

C-a-2 : Color : Red, White or Amber

C-a-3 : Luminous Area :

Class IA : N/R

Class IIIA : N/R

Class IVA : Not less than 25cm^2

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical :

Mechanical test table

Tests	Class		
	IA	IIIA	IVA
Heat	O	O	O
Water	O	O	O
Motor fuels	O	O	O
Oils	O	O	O
Corrosion	O	O	O
Rear face abrasion	O	O	O
Stability	O	O	X
Color-fastness	O	O	X
Impact	X	X	O

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

ITEM 96-27

Diesel engine emissions (buses, trucks)

APEC Regulation Analysis Findings
Item No. 96-27: Diesel Engine Emission (Buses, Trucks)

1. All member economies but New Zealand and Papua New Guinea apply a regulation for gaseous emission and/or smoke. New Zealand and Papua New Guinea have an abstract regulation stating that an excessive amount of smoke must not be emitted.

2. A comparison of specific requirements for diesel engine emission is as follows.

(1) Gaseous emission (C-a): At present Brunei Darussalam, People's Republic of China, Indonesia, New Zealand and Papua New Guinea do not regulate gaseous emissions. The other member economies, which do regulate gaseous emissions, have regulations based the corresponding regulation of Japan, ECE or U.S.
Roughly half of member economies base their gaseous emission regulations on the ECE regulation, and the other half on the U.S. regulation. Australia recognizes the Japanese, ECE and U.S. regulations as alternatives, while Chili and Hong Kong accepts the ECE and U.S. regulations as alternatives. The gaseous emission limits of most member economies are based on the previous ECE or U.S. limits of years ago.

(2) Free acceleration smoke (C-b): Because free acceleration smoke measurement can be effectively applied to periodic in-use vehicle inspections and roadside crackdown inspections, many member economies do so, setting forth various limits suitable for the local condition.

(3) Full-load smoke (C-c): A full-load smoke regulation is adopted by many member economies except Brunei Darussalam, Hong Kong, Indonesia, New Zealand, Papua New Guinea, Philippines and Singapore. Hong Kong, Philippines and Singapore suspended its full-load smoke regulation, when it implemented more stringent gaseous emission regulation. The member economies which regulate full-load smoke emissions base their regulations on the corresponding regulation of Japan, ECE or U.S.

Item No.96-27 Diesel Engine Emissions (Buses, Trucks)

A : Application : Buses, Trucks

Member Economies	C : Performance Requirements			D : Labeling	E : Reference Standards / Alternative Standards	
	C-a Gaseous Emission	C-b Free Acceleration Smoke	C-c Full Load Smoke		E-a Gaseous Emission	E-b Full Load Smoke
Australia	ADR 70/00 US 1991, US 1994 ECE R49.02(A) Japan 1994		ADR 30/00	ADR 30/00	ECE, US, Japan	ECE
Brunei		50% Bosch				
Canada	US 1990		US	Unique	US	US
Chili	ECE R49.02(B) US 1994	15% Opacity	6% Opacity		ECE, US	
China		3.5~4.5 FSN	4.0~4.5 FSN			
Hong Kong	ECE R49.02(B) US 1998	35 Hartridge			ECE, US	
Indonesia		50% Bosch				
Japan	SRRV 31	40% Bosch	40% Bosch	SRRV 31		
Korea	Unique	30% Bosch	35% Bosch		ECE	
Malaysia	ECE R49 ECE R49.02(A)	50 Hartridge	ECE R24.03		ECE	ECE
Mexico	US 1998		US		US	US
New Zealand						
Papua New Guinea						
Philippines	ECE R49.01	51 Hartridge				
Singapore	ECE R49.02(A)	50 Hartridge		Unique		
Chinese Taipei	US 1990 Equivalent	40% Bosch	40% Bosch	Unique	US	Japan
Thailand	ECE R49.02(A)		ECE R24.03	Unique	ECE	ECE
USA	US 1998		US	US		
ECE	ECE R49.02(B)		ECE R24.03	ECE		

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Australia (ADR 70/00 & 30/00) (1/1)		
ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission (ADR 70/00) Diesel truck with GVW more than 3500 kg Diesel bus with 10 or more seats Smoke Emission (ADR 30/00) All diesel vehicles.	
Requirements	<u>Gaseous Emission</u> ECE R49.02 (A) Alternative standards : US 1991 or 1994 standards 91 / 542 / EEC (A) Japan 1994 Standards <u>Smoke Emission</u> Full Load Smoke Same standards as those in ECE R24.03 Measurement points : 4 engine speeds speed representing increments of 2/5, 3/5, 4/5 and 5/5 of the range from the speed which is 45% of max. power speed or 1000 rpm, whichever is the higher, to max. power speed Alternative standards : US Standards ECE R24 BS AU141a	
Labeling	Label showing compliance with ADR 30/00 and engine built date (month and year) is necessary.	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Brunei (Road Traffic Regulations, Section 33A) (1/1)		
ITEM	CONTENT	Illustration / supplement
Application	All vehicles	
Requirements	No motor vehicle shall be used which emits any smoke, visible vapor, grit, sparks, ashes, cinders, or oily substances, the emission of which causes or is likely to cause in jury or annoyance to any person, or damage to property, or which endangers or is likely to endanger the safety of any person. <u>Smoke</u> Free Acceleration Smoke under inspection program : 50% (Bosch)	
Labeling	None	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Canada (Canadian Motor Vehicle Safety Standards 1101, 1102, 1103 & 1104) (1/1)

ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission (Standard 1103) Diesel vehicles with GVW more than 3855.6 kg (8500 lbs) Smoke Emission (Standard 1104) Diesel vehicles with GVW more than 3855.6 kg. (8500 lbs).	
Requirements	Gaseous Emission CO: 15.5 / HC: 1.3 / NOx: 6.0 / PM: 0.60 [g/bhp-hr] Test Mode : US transient mode Manufacturers are to market vehicles meeting USA standards in accordance with Memorandum of Understanding concluded between the government and automobile manufacturers. Smoke Emission Full Load Smoke Acceleration mode : 20% opacity Lugging mode : 15% opacity Peak : 50% opacity Test Mode : US test mode	
Labeling	Label showing engine displacement, engine tune-up, etc. is necessary.	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Chili (Ministry of Transport and Telecommunications, No. 55 dated March 8, 1994) (1/1)

ITEM	CONTENT	Illustration / supplement
Application	Diesel vehicles with GVW 3860 kg or more.	
Requirements	Gaseous Emission 1994.9.1 ECE Test Mode [g / kWh]: CO 4.5, HC 1.1, NOx 8.0, PM 0.36* US Test Mode [g / bhp-hr]: CO 15.5, HC 1.3, NOx 5.0, PM 0.25 * Factor of 1.7 is applied for engine of 85kW or less. 1998.9.1 ECE Test Mode [g / kWh]: CO 4.0, HC 1.1, NOx 7.0, PM 0.15 US Test Mode [g / bhp-hr]: CO 15.5, HC 1.3, NOx 5.0, PM 0.10 US test mode standards are alternative ones. Smoke Emission Brackening index : 3.5 Smoke under load : 6% opacity Smoke under free acceleration : 15% opacity	
Labeling	None	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

China (GB141761.6 & GB14761.7) (1/1)

ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission No requirement for diesel vehicles with GVW more than 3500 kg. Smoke Emission All diesel vehicles	
Requirements	<u>Smoke</u> Full Load Smoke New model : 4.0 FSN Existing model : 4.5 FSN Measurement points 6 or 7 points between rated speed and min. speed. These points must include max. torque speed and max. power speed. min. speed : 45% of rated speed or 1000 rpm, whichever is higher. Free Acceleration Smoke Before 1995.7.1 New model : 4.0 FSN Existing model : 4.5 FSN In-use vehicle : 5.0 FSN After 1995.7.1 New model : 3.5 FSN Existing model : 4.0 FSN In-use vehicle : 4.5 FSN	
Labeling	None	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Hong Kong (Air Pollution Control (Vehicle Design Standards) (Emission) Regulations, Section 7A) (1/1)

ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission Diesel vehicles with GVW more than 3500 kg Smoke Emission All diesel vehicles	
Requirements	Gaseous Emission US 1998 regulation or 96/1/EC (B) (ECE R49.02 (B)) Effective Date : 1998.10.1 * 0.25 is applied to engine having a cylinder swept volume of less than $0.7dm^3$ and rated power speed of more than 3000 rpm Smoke Emission Free acceleration smoke Certification : $1.00m^{-1}$ (35 Hartridge) Effective Date : 1997.4.1 In-use vehicle : 60 Hartridge for vehicles produced 1989 or earlier 50 Hartridge for vehicles produced 1990 or later Effective Date : 1995.1.1	
Labeling	None	

	CO	HC	NOx	PM	
US 1998	20.8	1.74	5.36	0.13	
96 / 1 / EC (B)	4.0	1.1	7.0	0.15 / 0.25*	[g / kWh]

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Indonesia (Decree of the Minister of Communication, Number KM 8-1989) (1/1)		
ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission : No requirement Smoke Emission All diesel vehicles	
Requirements	Smoke Free Acceleration Smoke : 50% (Bosch)	
Labeling	None	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Japan (Safety Regulations for Road Vehicles, Article 31 & 31-2) (1/3)

ITEM: Application

Gaseous Emission
Diesel vehicles with GVW more than 2500 kg

Smoke Emission
All diesel vehicles

ITEM: Requirements

Gaseous Emission

		CO	HC	NOx	PM
1994	max. value	9.2	3.8	*7.8 / 6.8	0.96
	mean value	7.4	2.9	*6.0 / 5.0	0.70
1997 - 98	max. value	9.2	3.8	5.8	0.49
	mean value	7.4	2.9	4.5	0.25

* DI engine / IDI engine [g / kWh]

Effective Date		New Model Vehicle	Existing Vehicle
1994		1994.10.1	1995.9.1
1997 - 98	GVW ≤ 3.5t	1997.10.1	1999.7.1
	3.5t < GVW ≤ 12t	1998.10.1	1999.9.1
	12t < GVW	1999.10.1	2000.10.1

1994 NOx standard applicable to DI engine vehicles in designed areas

	max. value	mean value	Effective Date
2.5t < GVW ≤ 5t :	6.8	5.0	1996.4.1
5t < GVW :	7.8	6.0	1993.12.1

[g / kWh]

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Japan (Safety Regulations for Road Vehicles, Article 31) (2/3)

ITEM	CONTENT	Illustration / supplement

Test Mode : steady - state 13- mode

Mode No.	Engine Speed	Percent Load	Weighting Factor
1	Idle	--	0.205
2	40% of max. power speed	20	0.037
3	40% of max. power speed	40	0.027
4	Idle	--	0.205
5	60% of max. power speed	20	0.029
6	60% of max. power speed	40	0.064
7	80% of max. power speed	40	0.041
8	80% of max. power speed	60	0.032
9	60% of max. power speed	60	0.077
10	60% of max. power speed	80	0.055
11	60% of max. power speed	95	0.049
12	80% of max. power speed	80	0.037
13	60% of max. power speed	5	0.142

Smoke Emission

Full Load Smoke & Free Acceleration Smoke
1994 : 40% (Bosch)
1997 - 98 : 25% (Bosch)
Effective Date : Same as that for gaseous emission

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Japan (Safety Regulations for Road Vehicles, Article 31) (3/3)		
ITEM	CONTENT	Illustration / supplement
	Measurement points for full load test : Three points 1. 40% of max. power speed or 1000 rpm, whichever is higher. 2. 60% of max. power speed. 3. max. power speed	
Labeling	Label showing approval number and type for exhaust emission control devices is necessary for vehicles of which approval is obtained under the type notification system.	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Korea (Notice of Ministry of Environment, Feb. 1991)

(1/1)

ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission Diesel vehicle with GVW 3000 kg or more. Smoke Emission Diesel vehicle with GVW 3000 kg or more.	
Requirements	<u>Gaseous Emission</u> CO / HC / NOx / PM [g / kWh] 1996 . 1 . 1 : 4.9 / 1.2 / 11.0 / 0.9 2000 . 1 . 1 : 4.9 / 1.2 / 6.0 / *0.1 / 0.25 * urban bus / others Test Mode : ECE 13- mode <u>Smoke Emission</u> Full Load Smoke 1996.1.1 : 35% (Bosch) 2000.1.1 : 25% (Bosch) Test Mode : Same as Japan 3-mode ? Free Acceleration Smoke 1996.1.1 : 30% (Bosch)	
Labeling	?	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Malaysia (Environmental Quality (Control of Emission from Diesel Engine) Regulations 1996) (1/1)

ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission Diesel vehicles with GVW more than 3500 kg Smoke Emission All diesel vehicles.	
Requirements	Gaseous Emission (see table below) Test Mode : ECE 13-mode Smoke Emission Full Load Smoke : Same as ECE R24.03 Not applied to new model which is subject to more stringent gaseous emission standard. Free Acceleration Smoke : 50 Hartridge	
Labeling	None	

Effective Date	CO	HC	NOx	PM
* 1996.9.1	14	3.5	18	--
** New Model on and after 1997.1.1	4.5	1.1	8.0	0.36

[g / kWh]

* Same as ECE R49.

** Same as ECE R49.02 (A) except that there is no relaxation applicable to vehicle with 85 kW or less engine power.

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Mexico (NOM - CCAT - 007 - ECOL / 1993) (1/1)

<table>
<tr><th>ITEM</th><th>CONTENT</th><th>Illustration / supplement</th></tr>
<tr><td>Application</td><td>Diesel vehicles with GVW more than 3857 kg</td><td></td></tr>
<tr><td>Requirements</td><td>
<u>Gaseous Emission</u>
<table>
<tr><th>Model Year</th><th>CO</th><th>HC</th><th>NOx</th><th>PM</th></tr>
<tr><td>1993</td><td>15.5</td><td>1.3</td><td>5.0</td><td>0.25</td></tr>
<tr><td>1994 - 1997</td><td>15.5</td><td>1.3</td><td>5.0</td><td>*0.07 / 0.10</td></tr>
<tr><td>1998 and later</td><td>15.5</td><td>1.3</td><td>4.0</td><td>*0.05 / 0.10</td></tr>
</table>
[g / bhp-hr]
* heavy urban bus / other
Test Mode : US transient mode

<u>Smoke Emission</u>
Full Load Smoke : 1993 and later model years
Acceleration mode : 20% opacity
Lugging mode : 15% opacity
Peak : 50% opacity
Test Mode : US test mode
</td><td></td></tr>
<tr><td>Labeling</td><td>None</td><td></td></tr>
</table>

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

New Zealand (Traffic Regulations 1976, Section 28) (1/1)		
ITEM	CONTENT	Illustration / supplement
Application	All vehicles	
Requirements	No person shall operate any motor vehicle which emits an excessive amount of smoke or visible vapor. The following limit will be applied after the date to be fixed by the Minister. Ringelmann Chart No. 2 or 40% opacity by test method to be determined.	
Labeling	None	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Papua New Guinea (Motor Traffic Regulation, Regulation No. 125C) (1/1)		
ITEM	CONTENT	Illustration / supplement
Application	All vehicles	
Requirements	A person shall not operate a vehicle in such a manner that an excessive amount of smoke, likely to cause danger, damage or annoyance to other road users, is emitted from the exhaust or from any other part of the vehicle.	
Labeling	None	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Philippines (Rules and Regulations for the Prevention, Control and Abatement of Air Pollution from Motor Vehicle (1979)) (1/1)

ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission Diesel vehicles with GVW more than 3500 kg Smoke Emission All diesel vehicles	
Requirements	Gaseous Emission	

	CO	HC	NOx	PM
* 1998.7.1	11.2	2.4	14.4	--
** 2000.1.1	4.5	1.10	8.0	0.36

[g / kWh]

* Same as ECE R49.01
** Same as ECE R49.02(A) except that there is no relaxation applicable to vehicle with 85kW or less engine power.

Test Mode : ECE 13-mode

Smoke Emission

		Relaxation	
		Turbocharged	Altitude > 1000m
Registered on or before 1996.12.31	2.5 m^{-1}	3.5 m^{-1}	4.5 m^{-1}
Registered on or after 1997.1.1	1.65m^{-1}	2.65m^{-1}	3.65m^{-1}
Registered on or after 2000.1.1	1.2 m^{-1}	2.2 m^{-1}	3.2 m^{-1}

Labeling	Label showing engine displacement, applicable emission regulation code, engine tune-up, etc. is necessary.	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Singapore (Road Traffic (Motor Vehicles, Construction and Use) Rules, Rule 38) (1/1)		
ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission Diesel vehicles with GVW more than 3500 kg Smoke Emission All diesel vehicles	
Requirements	<u>Gaseous Emission</u> 1997.7.1 91/542/EEC(A) (ECE R49.02(A)) or Japan 1994 1998.7.1 91/542/EEC(A) (ECE R49.02(A)) <u>Smoke Emission</u> Free Acceleration Smoke : 50 Hartridge	
Labeling	Label showing compliance with 91/542/EEC(A) is necessary.	

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Taiwan (Emission Standards of Air Pollutants for Transportation Vehicles, Article 5) (1/1)

<table>
<tr><th>ITEM</th><th>CONTENT</th><th>Illustration / supplement</th></tr>
<tr><td>Application</td><td>Gaseous Emission
Diesel vehicle with GVW 3500 kg. or more

Smoke Emission
All diesel vehicles</td><td></td></tr>
<tr><td>Requirements</td><td><u>Gaseous Emission</u>
<table><tr><th></th><th>CO</th><th>HC</th><th>NOx</th><th>PM</th></tr><tr><td>1993. 7. 1</td><td>10.0</td><td>1.3</td><td>6.0</td><td>0.7</td></tr><tr><td>1999. 7. 1</td><td>10.0</td><td>1.3</td><td>5.0</td><td>0.1</td></tr></table>[g / bhp-hr]
Test Mode : US transient mode

<u>Smoke Emission</u>

Full Load & Free Acceleration Smoke
1993.7.1 : 40% (Bosch)
1999.7.1 : 35% (Bosch)

Measurement points for full load test : Three points
1. 40% of max. power speed or 1000 rpm whichever is higher.
2. 60% of max. power speed.
3. max. power speed</td><td></td></tr>
<tr><td>Labeling</td><td>Label showing engine family name, engine displacement, engine tune-up, compliance statement, etc. is necessary.</td><td></td></tr>
</table>

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

Thailand (Thai Industrial Standard 1290 - 2538) (1/1)

<table>
<tr><th>ITEM</th><th>CONTENT</th><th>Illustration / supplement</th></tr>
<tr><td>Application</td><td>Gaseous Emission
Diesel trucks with GVW more than 3500 kg
Diesel passenger cars with 10 or more seats

Smoke Emission
All diesel vehicles</td><td></td></tr>
<tr><td>Requirements</td><td><u>Gaseous Emission</u>
1998.5.12 : Same as ECE R49.02 (A)

<table>
<tr><th></th><th>CO</th><th>HC</th><th>NOx</th><th>PM</th></tr>
<tr><td>Type Approval</td><td>4.5</td><td>1.1</td><td>8.0</td><td>0.36*</td></tr>
<tr><td>COP</td><td>4.9</td><td>1.23</td><td>9.0</td><td>0.4*</td></tr>
</table>
[g / kWh]
* Compliance for vehicle with 85kW or less engine power is judged by dividing the test result by 1.7.

1999.1.1 : Same as ECE R49.02 (B)

<table>
<tr><th></th><th>CO</th><th>HC</th><th>NOx</th><th>PM</th></tr>
<tr><td>Type Approval
COP</td><td>4.0</td><td>1.1</td><td>7.0</td><td>0.15/0.25*</td></tr>
</table>
[g / kWh]
* 0.25 is applied to engine having a cylinder swept volume of less than 0.7dm^3 and rated power speed of more than 3000 rpm

<u>Smoke Emission</u>
Same as ECE R24.03 in both type approval and conformity of production requirements.
Effective Date : 1997.1.1</td><td></td></tr>
<tr><td>Labeling</td><td>Label showing symbol and number of Thai Industrial Standard is necessary.</td><td></td></tr>
</table>

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

USA (40 CFR Part 86) (1/1)

<table>
<tr><th>ITEM</th><th>CONTENT</th><th>Illustration / supplement</th></tr>
<tr><td>Application</td><td>Gaseous Emission
Diesel vehicles with GVW more than 8500 lbs. (3856 kg)

Smoke Emission
Diesel vehicles with GVW more than 8500 lbs. (3856 kg).</td><td></td></tr>
<tr><td>Requirements</td><td><u>Gaseous Emission</u>

<table>
<tr><th></th><th>CO</th><th>HC</th><th>NOx</th><th>PM</th><th>NMHC+NOx</th></tr>
<tr><td>1994 model year</td><td>15.5</td><td>1.3</td><td>5.0</td><td>*0.07 / 0.10</td><td></td></tr>
<tr><td>1996 model year</td><td>15.5</td><td>1.3</td><td>5.0</td><td>*0.05 / 0.10</td><td></td></tr>
<tr><td>1998 model year</td><td>15.5</td><td>1.3</td><td>4.0</td><td>*0.05 / 0.10</td><td></td></tr>
<tr><td>2004 model year</td><td>15.5</td><td></td><td></td><td>*0.05 / 0.10</td><td>2.4</td></tr>
</table>
* urban bus / other [g / bhp-hr]

Test Mode : Transient mode
Mode in which engine speed and load vary every second and which simulates actual driving condition in New York and Los Angeles.

<u>Smoke Emission</u>
Full Load Smoke
Acceleration mode : 20% opacity
Lugging mode : 15% opacity
Peak : 50% opacity

Test Mode : Combination of acceleration, lugging and transition.</td><td></td></tr>
<tr><td>Labeling</td><td>Label showing engine family name, engine displacement, engine tune-up, compliance statement, etc. is necessary.</td><td></td></tr>
</table>

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

ECE (ECE R49.02 & R24.03) (1/4)

ITEM	CONTENT	Illustration / supplement
Application	Gaseous Emission (ECE R49.02) All diesel vehicles except passenger cars with GVW more than 3500 kg Smoke Emission (ECE R24.03) All diesel vehicles.	
Requirements	<u>Gaseous Emission</u> Standards for Type Approval	

	CO	HC	NOx	PM	
A 1992.7.1	4.5	1.1	8.0	0.36*	
B 1995.10.1	4.0	1.1	7.0	0.15	[g / kWh]

* Factor of 1.7 is applied for engine of 85 kW or less.

Standards for Conformity of Production

	CO	HC	NOx	PM	
A 1993.10.1	4.9	1.23	9.0	0.40*	
B 1996.10.1	4.0	1.1	7.0	0.15	[g / kWh]

* Factor of 1.7 is applied for engine of 85 kW or less.

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

ECE (ECE R49.02 & R24.03) (2/4)

ITEM	CONTENT	Illustration / supplement

Test Mode : Steady-state 13- mode

Mode No.	Engine Speed	Percent Load	Weighting Factor
1	idle	--	0.25 / 3
2	intermediate	10	0.08
3	intermediate	25	0.08
4	intermediate	50	0.08
5	intermediate	75	0.08
6	intermediate	100	0.25
7	idle	--	0.25 / 3
8	rated	100	0.10
9	rated	75	0.02
10	rated	50	0.02
11	rated	25	0.02
12	rated	10	0.02
13	idle	--	0.25 / 3

Rated speed :

Max. full load speed allowed by governor.

Intermediate speed :

Max. torque speed if it is within the range of 60% to 75% of rated speed.
60% of rated speed in other cases.

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

ECE (ECE R49.02 & R24.03) (3/4)

ITEM	CONTENT	Illustration / supplement

Smoke Emission

Standards for Type Approval

Full Load Smoke

Nominal Gas Flow (liter/sec.)	Light Absorption Coefficient (m^{-1})	Nominal Gas Flow (liter/sec.)	Light Absorption Coefficient (m^{-1})
≤ 42	2.26	130	1.32
45	2.19	135	1.30
50	2.08	140	1.27
55	1.985	145	1.25
60	1.90	150	1.225
65	1.84	155	1.205
70	1.775	160	1.19
75	1.72	165	1.17
80	1.665	170	1.155
85	1.62	175	1.14
90	1.575	180	1.125
95	1.535	185	1.11
100	1.495	190	1.095
105	1.465	195	1.08
110	1.425	≥ 200	1.065
115	1.395		
120	1.37		
125	1.345		

Measurement points :

Sufficient points between max. rated speed and min. rated speed.

At least, measurements at min. rated speed, max. torque speed, max. power speed and max. rated speed are necessary.

max. rated speed : max. speed allowed by governor.

min. rated speed : highest of the following three speeds.

Item 96-27. Diesel Engine Emissions (Buses, Trucks)

ECE (ECE R49.02 & R24.03) (4/4)		
ITEM	CONTENT	Illustration / supplement
	45% of max. power speed 1000 rpm min. speed allowed by idling control Free Acceleration Smoke : 0.5^{-1}+ Limits in full load for nominal gas flow value corresponding to max. light absorption coefficient measured during full load test. (applied only to turbocharged engine) Standards for Conformity of Production Free Acceleration Smoke : 0.5^{-1}+ Smoke value obtained in type approval test. If failed, full load test is conducted.	
Labeling	Gaseous Emission Label showing approval number is necessary. Smoke Emission Label showing approval number and free acceleration Smoke value obtained in type approval test is necessary.	

ITEM 96-28

Emergency exits (Buses)

APEC Regulation Analysis Findings
Item No. 96-28: Emergency Exits (Buses)

1. Member Economy Comparison

Hong Kong, Indonesia, Japan, Korea, Singapore, U.S., Papua New Guinea, Australia and New Zealand have a regulation for the emergency exits of buses. Particularly, the U.S., Australia and New Zealand set forth detailed requirements for bus emergency exits. No member economy accept the similar regulations of other members as alternatives.

2. Item Comparison

(1) Scope: Australia designates applicable buses to have a seating capacity of 16 or more persons, while Japan and Korea specify 30 or more persons. The other member economies named in the above section 1 apply their regulations to all buses.

(2) Installation positions: Indonesia, Japan, Korea and New Zealand regulate only doors. Papua New Guinea and New Zealand regulate windows and hatches as well.

(3) Size of the emergency exit: Japan, Korea, Singapore, Australia and New Zealand specify a width in the 40-50cm range and a height in the 120-150cm range. Indonesia and Papua New Guinea specify only a width.

(4) Location: Member economies require the location of the emergency exit to be marked. In addition, Hong Kong, Australia and New Zealand require that the method of operating the emergency exit be displayed.

3. Grouping

Emergency exit regulations may be divided into the U.S.- Australia-New Zealand group (which adopt detailed requirements) and the group consisting of remaining member economies. In particular, the U.S. regulation is the most detailed.

ITEM No. 96-28 Emergency Exits

A: Application : Buses

Economy	Application	Number Location	Warning
Australia	Bus of more than 16 passengers		
Brunei			
Canada			
China			
Hong Kong	Bus and light bus	N/A	Clearly indicated
Indonesia	Bus	One at both sides (24 passengers) Two at both sides (27 to 50 passengers) Three at either (side more than 50)	
Japan	Bus (more than 30 passengers), infant carrying vehicle	One on the right side or rear	legibly indicated if illuminated, lamp be green
Korea	Bus of more than 30 passengers	One on the left or rear	easily visible
Malaysia			
Mexico			
New Zealand	Bus, trolley bus, service coach, school bus		
Papua new guinea	Bus first registered 87/1/1	one door on the right, or window on the right of roof	Clearly defined and displayed
Philippines			
Singapore	Public service bus	One on the opposite side of entrance	mean of operation be clearly indicated
Chinese Taipei			
Thailand	Buses	Side or rear	Instruction on haw to open
USA	Buses		
ECE			

The requirements of regulation in certain countries such as USA, Australia, New Zealand are so sophisticated and complicated that it seems rather difficult to sum up in one table

Emergency exits (buses)

Australia Regulation (ADR 44/02)		
Item	Content	Illustration/Supplement
A. Application	*MD3, MD4 and ME vehicles (more than 16 passengers in addition to the driver and crew).	
B. Structural requirement 1)location of the emergency exits	In the case of each passenger compartment, deck or section shall have an emergency exit placed in three out of the following surfaces- roof, front face, rear face *right-hand side and left-hand side In the case of the top deck of a double deck vehicle *the floor 2)In the case of a double deck vehicle *either the front face or rear face of each deck 3)Where access between decks or sections is used as an emergency exit for each deck or section that access can be considered as one of the required surface.	
2)dimension of the emergency exit	1)Minimum dimensions Area Height Width emergency door -- 1250 mm 550 mm emergency window 0.4 m2 500 600 Area Length Width escape hatch 0.4 600 500	

3)General requirements	1)Types of Emergency Exit *Emergency Door, Emergency Window, and Escape Hatch 2)Number a)Every vehicle shall have at least either; *one 'Service Door' and one emergency door, or two separate 'Service Doors' b)Total number in each compartment, deck or section is as follows: *4 exits less than 26 occupants(including the driver & standees for each component, deck or section) 5 exits 26-36 occupants 6 exits greater than 36 occupants *each rigid section of an articulated bus shall be treated as a separate section for the purpose of calculating the minimum number of emergency exits. *In the case of a multi-deck vehicle, an articulated or a multi-section vehicle, access between decks or section may be considered as an emergency exit for each deck or section. c)Each escape hatch may count only as one of the above mentioned number of emergency exits. d)If the driver's compartment is not accessible from the inside of vehicle it shall have two emergency exits, both of which shall not be in the same surface; where one of the exits is a window it shall comply with the requirements of emergency windows. e)A ' Service Door' with an aperture width of at least 600 mm may count as two emergency exits and a emergency window of at least 0.8 mm2 area and with an aperture width of at	

least 1000mm wide may count as two emergency windows.

f)A window may serve as an emergency exit provided that it meets the emergency exit requirements.

g)Every ‘ Service Door’ shall be capable of being easily opened from inside and from outside the vehicle when the vehicle is stationary(but not necessarily when the vehicle is moving). However, this requirement shall be not be construed as precluding the possibility of locking the door from outside, provided that the door can always be opened from the inside.

3)All emergency exits shall be so constructed to minimize the probability of their jamming even if the body of the vehicle is distorted by impact.

4)Technical conditions

a)Emergency doors

*Be capable of being easily opened manually from inside and outside.

*Not be of the of the slide-in-cavity type.

*Not be equipped with a power-operated control system.

*The outside handles of emergency doors shall be not more than 1800 mm above the ground when the vehicle is standing unladen on level ground.

*Open outwards. straps, chains or other restraining devices are permitted, provided that they do not prevent the door from opening to and remaining open at an angle of at least 100 degrees.

	*The initial opening operation of emergency doors which are not also 'Service door's' shall include sequential movement of 2 separate devices, with the primary opening device being designed to prevent inadvertent operation. *Latches shall be of the two-stage type. *Each emergency door with bottom edge between 1000 mm and 2000 mm above the ground shall have a means to assist the occupants in descending to the ground, such bas footrests. *Each emergency door with bottom edge over 2000 mm above the ground shall be equipped with self-supporting steps or equivalent to provide safe evacuation of occupants to the ground. b)Emergency windows *Be capable of operation from both inside and from outside. *Be equipped with a window-ejecting device. *Be capable of being easily and instantaneously operated by on adult by means of a device. *Be locked from the outside. *Be made of readily-breakable safety glass. *Open or eject towards the exterior. *The height of the lower edge of an emergency window from the level of the floor immediately below it shall be not more than 1000 mm. *Each emergency window with bottom edge between 1000 mm and	

	2000 mm above the ground shall have a means to assist the occupants in descending to the ground, such as footrests. *Each emergency window bottom edge over 2000 mm above the ground shall be equipped with self-supporting steps or equivalent provide safe evacuation of occupants to the ground. c)Escape hatches *Be of sliding or ejectable type. Opening fore is not exceed 500N. *Be capable of being easily opened from the inside and outside. *be located along the longitudinal center line of the vehicle. 5)Interior arrangement omitted	
4)Warning	1)Each emergency door and each emergency window shall be conspicuously marked in a color which contrasts with the background by an inscription reading “EMERGENCY EXIT” inside the vehicle in letters at least 25 mm high and outside the vehicle in letters at least 50 mm high. The marking on the outside of the vehicle shall be on retroreflective material. Each escape hatch shall be likewise marked inside. 2)Internal signs Conspicuous signs indicating the location of all emergency exits shall be visible from the ‘Aisle’	

	The signs shall: *include the word “EXIT” in letters at lest 25 mm high. *be red on a white background or vice versa. *be permanently illuminated whilst the vehicle is in operation. It shall be either illuminated or ‘Self-illuminating’ for at least 15 minutes after the vehicle ceases operation or 15 minutes after loss of battery power. 3)Marking of controls The emergency controls of ‘Service Door’s’ and of all emergency exits shall be marked in a color which contrasts with the background and at least 10 mm in size on ‘ Self-illuminating’ material on the outside the vehicle either by a representative symbol or by a clearly-worded inscription. 4)Instructions for operation Clear instructions concerning the method of operation shall be placed on ‘Self-illuminating’ material inside and on retoreflective material outside the vehicle, on or close to every control of an emergency exit. 5)In case of emergency exits other than ‘Service door’ a)When the engine is started and/or the vehicle is in motion then a warning is given if; *activation of the primary opening device of an emergency door or the opening/ejection device of an emergency window has occurred *an emergency door, window or hatch is locked from the outside	

	*an emergency door or window is not securely closed. b)The warning device shall give a visible and audible warning at the driver's position. c)The warning device of an emergency door or window shall be operated by the movement of the door or window catch or other device and not only the movement of the door or window itself.	

Emergency exits (buses)

Hong Kong Regulation (road Traffic Regulation CAP.374 No.26)		
Item	Content	Illustration/Supplement
A. Application	*Every bus and light bus *Except secondary emergency exit and emergency exit provided in the roof.	
B. Structural requirement 1)location of the emergency exits	1)None	
2)dimension of the emergency exit	1)None	
3)General requirements	1)The doors of emergency exits shall not be fitted with any system of power operation. 2)Open outwards. 3)In a single-decked bus or half-decked bus, or in the lower deck of a double-decked bus *Be so situated that passenger can step directly from the passage to the outside. 4)Except in the case of an emergency exit provided in the roof of a half-decked bus *Be readily accessible to passenger.	

4)Warning	1)The means of operation of doors shall be clearly indicated. 2)Except in the upper deck of a double-decked bus or in the roof of a half -decked bus. *The means of operation of doors shall be readily accessible to persons of normal height standing at ground level outside. 3)Be clearly marked as such inside and outside the vehicle in English and Chinese writing.	

Emergency exits (buses)

Indonesia Regulation (Government Regulation No.44/1993 article 92,93)		
Item	Content	Illustration/Supplement
A. Application	*Every bus .	
B. Structural requirement 1)location of the emergency exits	1)Both sides aside from the exit/entry door	
2)dimension of the emergency exit	refer to 3)general	
3)General requirements	1)Number of emergency exit *one at both sides, not exceed 24 passengers. *two at both sides, between 27 and 50 passengers. *three at either side, exceed 50 passengers. *on the left side, in sub-article (2), may be one less if the rear wall has a door whose width is at least 430 mm. 2)In sub-article(2), may be in the form of windows and/or doors. 3)In the case of the form of windows. *measuring at least 600 mm by 400 mm and if the measuring is 1200 mm by 430 mm this is equal to having two emergency exits. *easy and quick to open or destroyed or remove. *the corners of the windows functioning as emergency exits are not sharp-pointed. *not hampered by protecting sticks or bars.	

	4)In the case of the form of door fitted on the right side wall. *having a width of at least 430 mm. *easy to open at any time from inside.	
4)Warning	1)An emergency exit shall be marked with writing stating the emergency exit and giving an explanation about how to open it. 2)A seat close to an emergency exit must be easily taken off or folded.	

Emergency exits (buses)

Japan Regulation (safety regulation for road vehicles article 26)		
Item	Content	Illustration/Supplement
A. Application	* Infant-carrying vehicles and motor vehicles with a passenger capacity of 30 persons or more. * Except emergency motor vehicles and motor vehicles provided only seats directly accessible from the entrance.	
B. Structural requirement 1)location of the emergency exits	1)On the right side at the rear or on the rear of the passenger compartment.	
2)dimension of the emergency exit	1)In case of a motor vehicles with a passenger capacity of 30 persons or more, except the case of unavoidable. * 400 mm or more in effective width * 1200 mm or more in effective height 2)In unavoidable case due to the protrusion of wheel covers, etc. the emergency exit located on the right side at the rear. * 250 mm or more at the part up to the height of 450 mm above the floor surface and 400 mm or more at the higher part , respectively in effectively width. And moreover *1200 mm or more in effective height 3)In unavoidable cases(except the case of the preceding item)due to the presence of forward-facing seats, the emergency exit located on the right side at the rear. *300 mm or more at the part up to the height of 650 mm	

	400 mm or more at the higher part, respectively, in effective width. And moreover *1300 mm or more in effective height 4)In case of an infant-carrying vehicle with a passenger capacity of less than 30 persons. * 300 mm or more in effective width *1000 mm or more in effective height	
3)General requirements	1)The emergency exit shall be have an outward opening door which can be securely closed under normal conditions and which may be opened from both inside and outside of the passenger compartment without using any key or other special tool in the event or fire, collisions and other emergencies, and which will not close by its own weight after it is opened. 2) Any obstacles such as bumper draws hooks, etc. shall not protrude around the emergency exit and not step shall be provided between the lower edge of the exit and the floor. 3)The seat near the emergency exit shall be easily detached or folded so as not to obstruct escape.	
4)Warning	1)The location of the emergency exit and the method of opening the door shall be legibly indicated at or near the emergency door. When a lamp is used to indicate the location of the emergency exit, the color of the light shall be green. 2)A warning device shall notify the driver when the emergency exit opens.	

Emergency exits(buses)

Korea Regulation (Motor vehicle safety standards Article 30)		
Item	Content	Illustration/Supplement
A. Application	* Each motor vehicle with a designated seating capacity of 30 or more * Except motor vehicles provided that 1)the dimensions of windows are larger than those of the emergency exit 2)the tempered glass window whose dimensions are not less than 120 cm in effective width and not less than 40 cm in effective height	
B. Structural requirement 1)location of the emergency exits	1)On the rear left side or on the rear of the body.	
2)dimension of the emergency exit	1) not less than * 40 cm in effective width * 120 cm in effective height	
3)General requirements	1)The emergency door shall open outward, can be opened without using a key or other special tools. 2)There shall be no device near the emergency exit to obstruct escape and no step at the opening of the emergency exit. 3)The seats near the emergency exit shall be removed or folded easily.	

4)Warning	1)The location of the emergency exit and the operation instructions to open the emergency exit door shall be provided near the emergency exit where they are easily visible. 2)Each motor vehicle(except vehicles with a hinged window whose size is suitable for an emergency exit) shall be provided with at least two tools for breaking windows to escape and with the label which indicates escaping instruction in the occupant compartment.	

Emergency exits (buses)

New Zealand Regulation (Dixon's road traffic low PSVR 1978 reg. 38)		
Item	Content	Illustration/Supplement
A. Application	*Omnibuses, trolley omnibuses, service coaches, and school buses.	
B. Structural requirement 1)location of the emergency exits	refer to 3)general	
2)dimension of the emergency exit	refer to 3)general	
3)General requirements	1)Comply with one of the following a)In the case of a door A door situated at the extreme rear or on the right side and having no part directly opposite the entrance doorway. The emergency doorway shall be at least 558 mm in width and at least 1220 mm in height; but when the lower portion conforms to the sweep of a wheel arch, at least 300 mm clear width shall be provided at the floor level, or when the upper portion conforms to the sweep of the rear of the body, a height of at least 1220 mm at the center of the door opening. The emergency door, if situated on the right side, shall be hinged on its forward edge. The device for opening the emergency door shall be of ample strength and of a type approved by the [Director].	.

	If a portion of a passenger seat obstructs an emergency doorway to an extent that the effective opening is reduced to less than 460 mm in width above the seat cushion, that portion of the seat shall be readily moveable. b)A push-out window hinged at the lower edge and fitted at the extreme rear of the passenger compartment having a minimum area of 7100 cm2 and having a height of at least 530 mm for a length of at least 1220 mm. The space between the back of the rearmost seat and the window shall be no greater than 900 mm and shall be decked in and clear of obstruction throughout for the full width of the vehicle. Assess to the window shall have a minimum dimension of 530 at any point. c)A push-out window hinged at the lower edge and fitted on the right side towards the rear of the vehicle, and having a minimum clear area of 7100 cm2 and a height of not less than 530 mm. d)At least one opening window on each side of the vehicle towards the rear of the compartment, each window when open to expose an effective opening measuring at least 610 mm vertically by 530 mm horizontally with corners having a maximum radius of 100 mm. (2) Each vehicle designed for the carriage of more than 20 passengers which does not have a second door way on the left side towards the rear shall be fitted with an escape hatch in the roof having a minimum area of 3550 cm2 and having a width or length not less than 550 mm. (3)Be clear of obstruction both inside and outside.	

	(4) Be capable of being opened from both inside and outside. (5) In the case of the form of an opening window, in subclause (1)(b)/ a light chain or chains may be fitted to prevent the window opening fully if the release handle is inadvertently operated. The chain shall be of such a type or of such construction that it is capable of being readily broken or disconnected in an emergency.	
4)Warning	1)The frames shall be painted a contrasting color inside the vehicle. And shall be indicated by a prominent notice displaying the words " Emergency Exit" and words or symbols indicating the method of opening the exit. 3)A device warning the driver of the opening of the emergency doors shall be fitted to the door lock.	

Emergency exits (buses)

Papua new guinea Regulation (Motor traffic ACT CAP.243 No.125Q)		
Item	Content	Illustration/Supplement
A. Application	* Bus is first registered after 1 January 1987	
B. Structural requirement 1)location of the emergency exits	1)In the case of a door on the right side or 2)In the case of a push out or sliding window on the right side, in the roof or the rear	
2)dimension of the emergency exit	1)Not less than 53 cm in width. 2)Minimum clear area of 3500 cm2	
3)General requirements	1)None	
4)Warning	1)Be clearly defined and 2)Display instructions for opening the exit.	

Emergency exits (buses)

Singapore Regulation (road Traffic Rules CAP.276 No.76,77,80,81)		
Item	Content	Illustration/Supplement
A. Application	*Public service vehicle	
B. Structural requirement 1)location of the emergency exits	1)Every vehicle shall be provided with not less than two exits(one of which may be emergency exit) both of which shall not be situated on the same side. 2)In the case of emergency exit from the upper deck of a double-decked vehicle otherwise than on the near-side.	
2)dimension of the emergency exit	1)The size of an emergency exit from the upper deck of a double-decked vehicle shall not be less than 1.52m by 0.46m. 2)Between every emergency exit and a gangway there shall be a passage which is a) not of less width than *300 mm up to a height of 760 mm above the level of the deck. *360 mm at height exceeding 760 mm above the level of the deck b) so designed that a vertical line projected upwards from the center line of the passage at floor level shall, to a height of 760mm from the floor level, be laterally not less than 150mm from any part of the vehicle.	

3)General requirements	1)Open outwards. 2)In case of a single-decked vehicle, or the lower deck of a double -decked vehicle *Passenger can step directly from the passage to the outside 3)Be easily accessible to the passengers. 4)Not be a power-operated door controlled by the driver.	
4)Warning	1)The means of operation of doors shall be clearly indicated. 2)Except emergency exits in the upper deck of a double-decked bus or in the roof of a half-decked bus, *The means of operation of doors shall be readily accessible to persons of normal height standing at ground level outside. 3)Be clearly marked as such inside and outside the vehicle .	

Emergency exits (buses)

Thailand (Ministerial regulation No.9)		
Item	Content	Illustration/Supplement
A. Application	Buses	
B. Structural requirement 2)location of the emergency exits	*entrance and emergency exit, the entrance is at the side or rear of the vehicle.	
3)dimension of the emergency exit	The type and description of the passenger transport vehicle and small vehicles which must have entrance and emergency exit, the quantity, size, and the position of the entrance and emergency exit must be conformed to those prescribed or approved by the Department of Land Transport.	
3)General requirements	*Side entrance the stair must not be overhanged from the vehicle body. *rear entrance the stair may be overhanged from the vehicle body	
4)Warning	The emergency exit, which is at the right side or the rear, has a full width and length door pane, a sign saying that it is an emergency exit together with an instruction on how to open it in Thai language.	

Emergency exits (buses)

FMVSS 217 (USA)		
Item	Content	Illustration/Supplement
1. Application	All busses	
2. Structural requirement -1.Opening for emergency exit	Other than school bus 40% of 67 times of designated seating positions (sq. in.). School bus 432 times of designated seating positions (cm2)	
-2. Size of emergency exit	Other than school bus of GVWR 10,000lb and more Exits on both sides and one rear exit which conforms to followings: Push-out window and emergency exit can be released by operating one or two mechanisms in the range of Fig. 1, 2 and 3. They can be opened by the hand of one person by mean of a) rotary or straight motion of 20 lbs in Fig. 1 or 3 or b) straight motion of 60lbs in Fig. 2 or 3 Other than school bus of GVWR 10,000lb and less Device which conforms to followings: Push-out window and emergency exit can be released by operating one or two mechanisms in the range of Fig. 1, 2 and 3. They can be opened by the hand of one person by mean of a) rotary or straight motion of 20 lbs in Fig. 1 or 3 or b) straight motion of 60lbs in Fig. 2 or 3. or Opening admitting ellip-solid of axes of 20 in and 13 in or Doors School bus	

	Right side hinged outward opening rear emergency door (left side hinge allowable to GVWR 4536kg and less vehicle) and additional emergency exit area of AEEA attained by a) front hinged left side door located in the middle of passenger compartment, b) roof exit which is front hinged and can be opened from inside and out side of the vehicle, c-1) front hinged right side door (left side, if more than two doors available), c-2) roof exit equally located and can be opened from inside and outside or c-3) emergency window provided equally to both sides. AEEA = TA - FSDA - RDEA AEEA = additional emergency exit area TA = total area (432 x number of designated seating positions FSDA = front service door area RDEA = rear door exit area or Left side emergency door of forward hinged and located in the middle of the passenger compartment and emergency window of 41cm x 122cm size located on the both sides and additional emergency area of AEEA attained by a) front hinged left side door located in the middle of passenger compartment, b) roof exit which is front hinged and can be opened from inside and out side of the vehicle, c-1) front hinged right side door (left side, if more than two doors available), c-2) roof exit equally located and can be opened from inside and outside or c-3) emergency window provided equally on both sides. AEEA = TA - FSDA - SDEA - POWA AEEA = additional emergency exit area TA = total area (432 x number of designated seating positions) FSDA = front service door area SDEA = side door exit area POWA = push-out window area	

3. Release of emergency exit	Other than school bus Push-out window and emergency exit can be released by operating one or two mechanisms in the range of Fig. 1, 2 and 3. They can be opened by the hand of one person by mean of a) rotary or straight motion of 20 lbs in Fig. 1 or 3 or b) straight motion of 60lbs in Fig. 2 or 3. School bus Emergency door can be released by one person from both inside and outside with upward motion of 178 N force in the range of Fig. 3A and 3D. Emergency exit window can be released by not more than two mechanism from inside rotary or straight motion of 89N of low force access region in Fig. 1 and 3 or straight motion of 178N of high force access region in Fig. 2 and 3. Roof exit can be released by not more than two mechanism from both inside and outside rotary or straight motion of 89N of low force access region in Fig. 1 and 3 or straight motion of 178N of high force access region in Fig. 2 and 3.	
4.Extension of emergency exit	Other than school bus Push-out window and emergency exit have area which allows ellipse of 20 in x 13 in. School bus Rear emergency exit is large enough to permit 114 cm x 61 cm x 30 cm. (45 in x 22 in x 6 in for vehicles of GVWR 4537kg and less) Side emergency exit is large enough 114 cm x 61 cm. Emergency roof exit can be manually extended by one person 41 cm high and 41 cm wide.	

5. Identification	Other than school bus Each emergency exit should be designated as “Emergency Exit” or “Emergency Door” legible to a person of visual acuity of 20/40(Snellen ratio) under nighttime illumination of the bus and have instruction for operation within 6 in. School bus Each emergency exit should be designated as “Emergency Exit” or “Emergency Door” with letters of at least 5 cm high of a colour contrasting with its background. Operating instruction should be located within 15 cm. Exits should be marked with minimum 3 cm wide retroflective tape of red, white or yellow colour.	

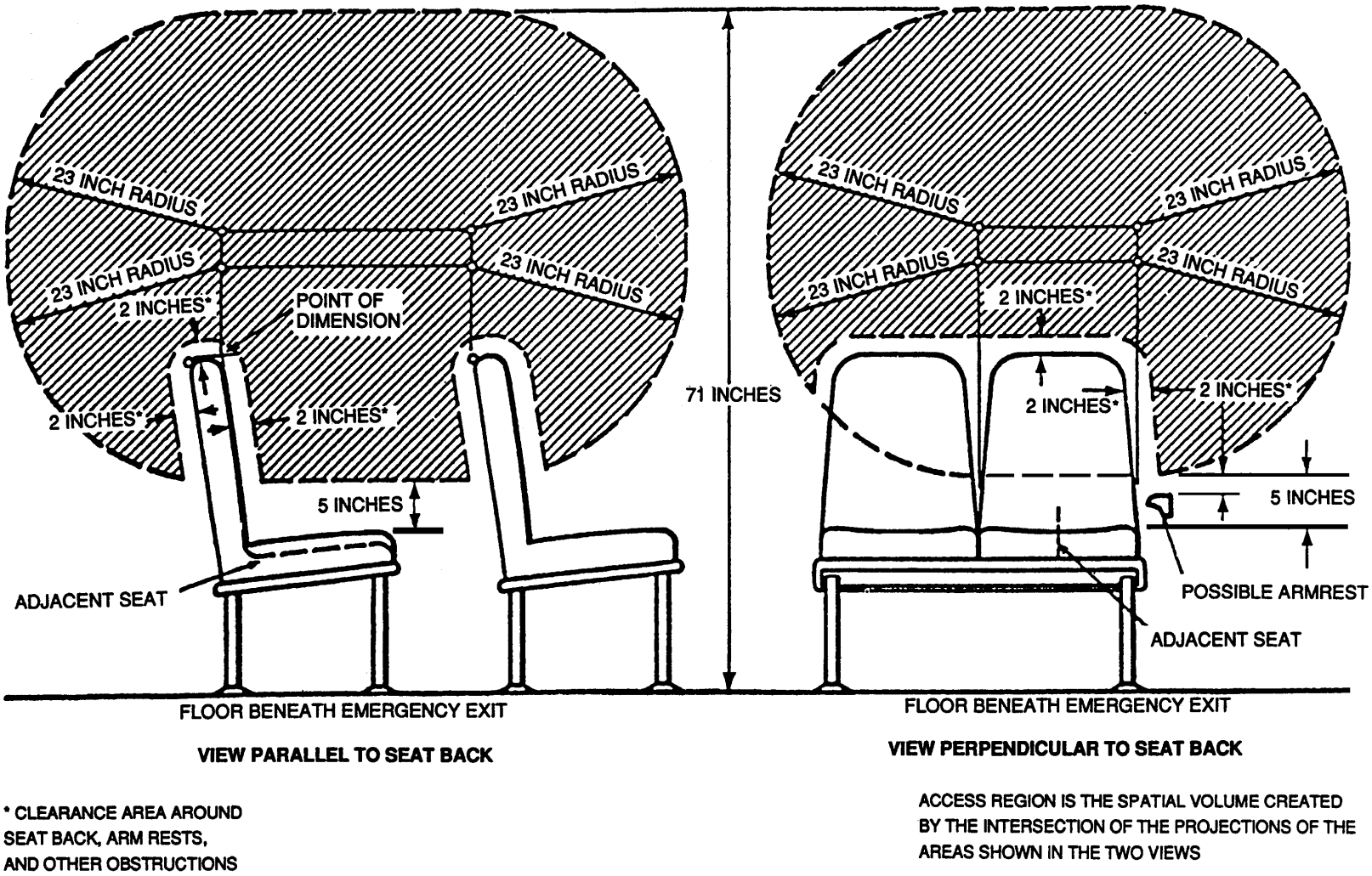


Figure 1. Low-force access region for emergency exits having adjacent seat

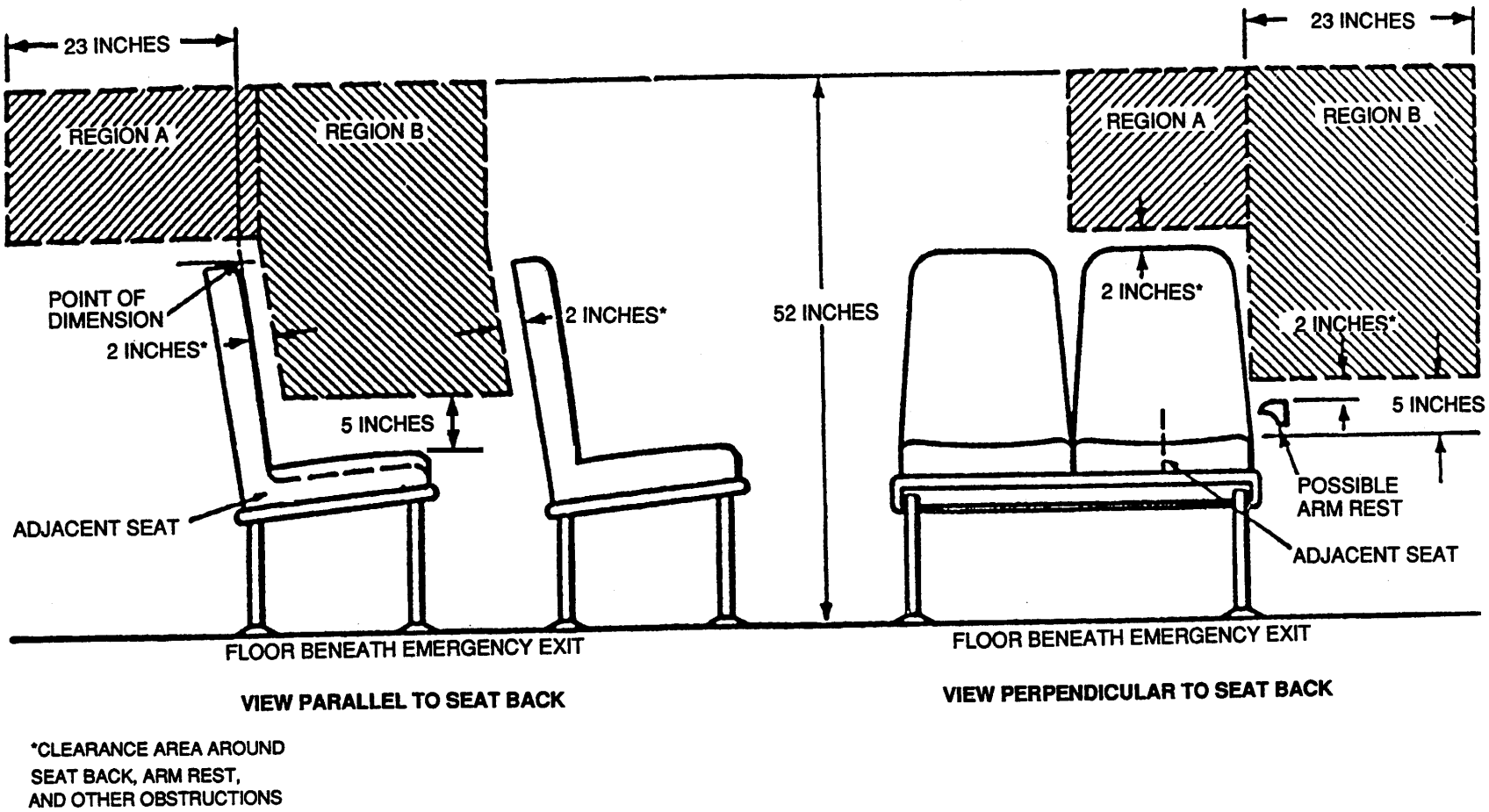
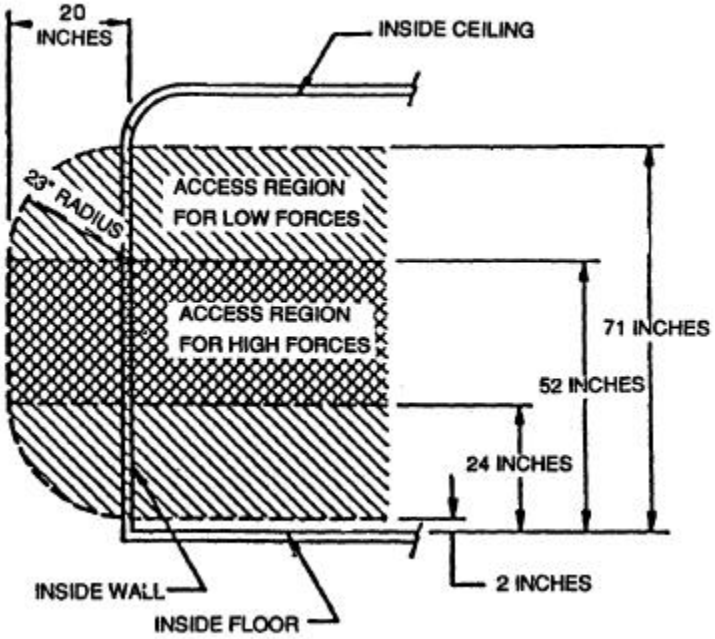
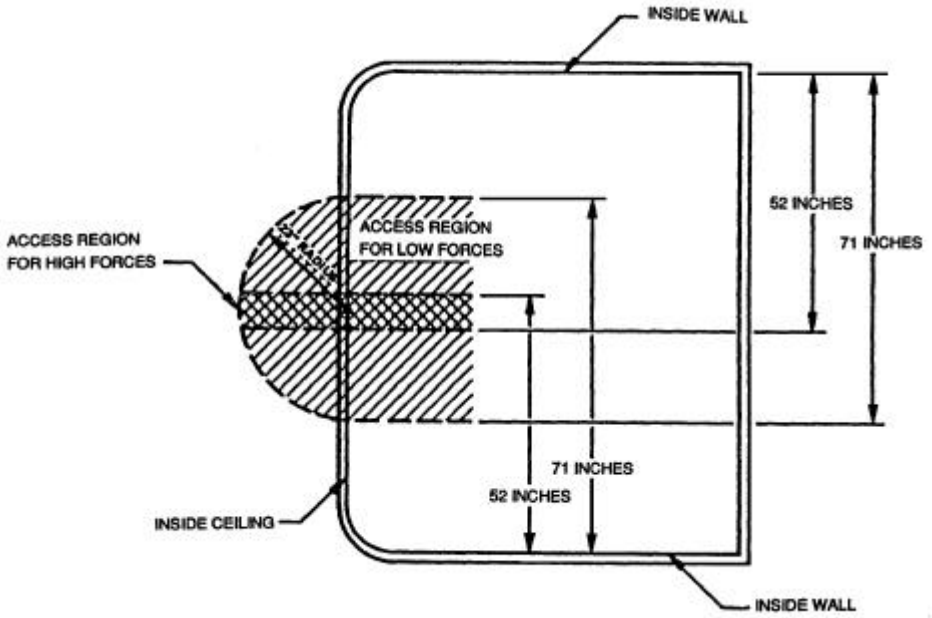


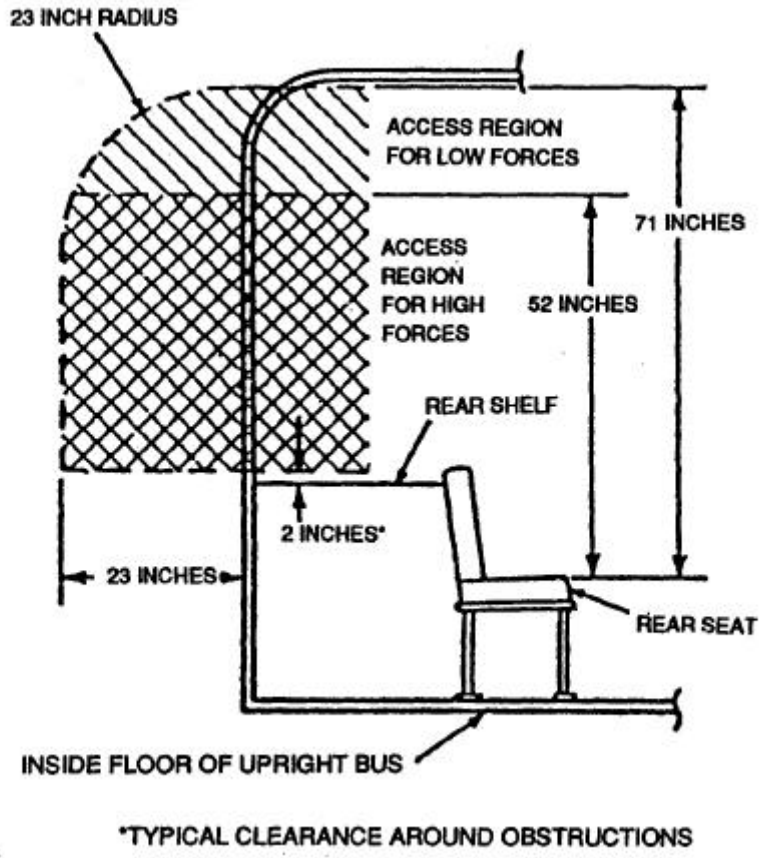
Figure 2. High-force access regions for emergency exits having adjacent seats



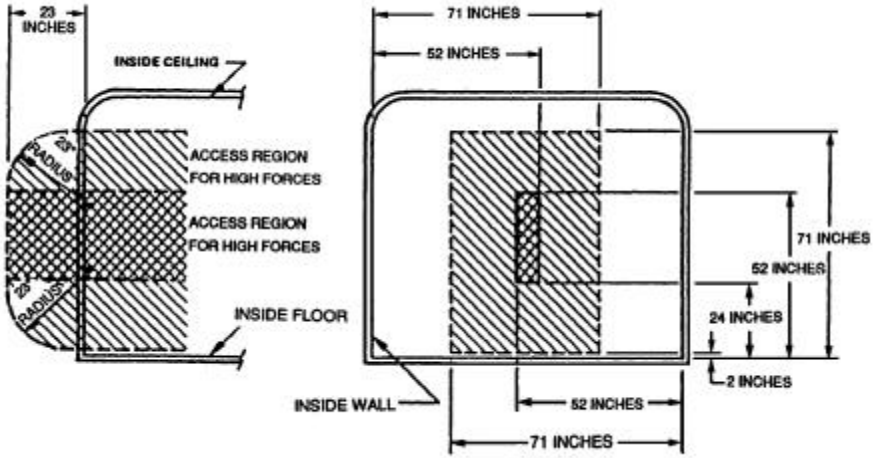
3A. Side emergency exit



3B. Roof emergency exit



3C. Rear emergency exit with rear obstruction



3D. Rear emergency exit without rear obstruction

Figure 3. Low and High-force access regions for emergency exit without adjacent sets

ITEM 96-29

Controls (Motorcycles)

APEC Regulation Analysis Findings
Item No. 96-29: Controls (Motorcycles)

1. Australia, Canada, Japan, U.S., ECE and Korea adopt a regulation for motorcycle controls.

2. A comparison of specific requirements for motorcycle controls is as follows.

(1) Switch position: Australia, Canada, Japan, U.S. and ECE have the same requirements for the switch installation positions listed below.

* Driving beam / passing beam control - left side on the handle bar.
* Horn switch - left side on the handle bar.
* Direction indicator switches - on the handle bar.

(2) Switch operating method: Australia, Canada, Japan, U.S. and ECE have the same requirements for switch operating methods listed below.

* Driving beam / passing beam control - up/down.
* Horn switch - push to activate.
* Direction indicator switches - on the handle bar.
* Ignition switch off - counterclockwise.

(3) Identifications (and positions) of controls: ECE specifies the marking of symbols only. The other member economies which require the identification of switches permit the marking of either words or symbols. All these member economies adopt symbols similar to those prescribed in ISO 6727.

(4) Display (and color) of telltale: ECE requires the marking of symbols only. The other member economies which require the display of telltales permit the marking of either words or symbols. The requirement for lamp color is similar among all member economies, except for the color of Japan's turn signal lamps.

(5) Labeling: Only ECE requires the affixing of approval numbers.

ITEM No.96-29 Controls

A: Application : Motorcycle

Economy	B: Structure Requirement	B-1 : Switch Position	B-2 : Operating Method	B-3 : Identification (and Position) of Control
Australia	ADR 57/00	ECE R60-00	ECE R60-00	ADR 57
Brunei				
Canada	FMVSS 123	ECE R60-00	ECE R60-00	FMVSS 123
Chile				
China				
Hong Kong				
Indonesia				
Japan	SRRV 10	SRRV 10	SRRV 10	SRRV 10
Korea	Article 65	Unique		
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei				
Thailand				
U. S. A	FMVSS 123	ECE R60-00	ECE R60-00	SRRV 10
ECE	ECE R60-00	ECE R60-00	ECE R60-00	ECE R60-00

Economy	B-4 display (and color) of telltale	D: Labeling Requirements	E: Reference Standards
Australia	ADR 57 & ECE 60-00		ISO 6727
Brunei			
Canada	FMVSS 123 & ECE 60-00		ISO 6727
Chile			
China			
Hong Kong			
Indonesia			
Japan	SRRV 10		ISO 6727
Korea			
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
U. S. A	FMVSS 123 & ECE 60-00		ISO 6727
ECE	ECE 60-00	ECE 60-00	ISO 6727

Item 29: Controls (Motorcycles)

Item	
A: Application	Table-1
B: Structure Requirement	Table-1
C: Performance Requirement	N/A
D: Labeling Requirement	Table-1
E: Reference Standard	Table-1

Table-1 (1/3)

Item	ECE R60-00	Australia ADR 57/00
A. Application	Motorcycle	Motorcycle
B. Structure Requirement		
B.1 Switch position		
1.1 Driving beam/Passing beam control	1.1 On handlebars: left side	1.1 On handlebars: left side
1.2 Horn	1.2 On handlebars: left side	1.2 On handlebars: left side
1.3 Direction indicators	1.3 On handlebars	1.3 On handlebars
1.4 Supplemental engine stop	1.4 On handlebars: right side	
B.2 Operating method		
2.1 Driving beam/Passing beam control	2.1 Driving beam: up Passing beam: down	2.1 Driving beam: up Passing beam: down
2.2 Horn	2.2 Push to activate	2.2 Push to activate
2.3 Ignition switch	2.3 Off: Counterclockwise from other positions	2.3 Off: Counterclockwise from other positions
	* Detail: See Attachment-1	
	* The controls on the handlebars specified below, shall be such that they can be reached without the removal of the driver's hands from the respective handgrips. • Front brake • Rear brake • Clutch • Audible warning device • Driving beam/Passing beam control • Direction indicators control	* The position of each control should be such that the control can be operated without the removal of the driver's hands from the handgrip.
B.3 Identification (and position) word of control		
3.1 Ignition	3.1 See Attachment-3	3.1 Ignition (Off)
3.2 Supplemental engine stop	3.2 See Attachment-3	3.2 Engine stop (Off, Run)
3.3 Manual choke	3.3 See Attachment-3	3.3 Choke (—)
3.4 Electric starter	3.4 See Attachment-3	3.4 — (Start)
3.5 Head lamp upper-lower beam control	3.5 See Attachment-3	3.5 Light (Hi, Lo)
3.6 Horn	3.6 See Attachment-3	3.6 Horn (—)
3.7 Turn signal	3.7 See Attachment-3	3.7 Turn (L, R) * For symbol display, follow ISO 6727.
B.4 Display (and colour) of telltale		
4.1 Neutral indicator	4.1 — (Green)	4.1 Neutral (Green)
4.2 Upper beam indicator	4.2 — (Blue)	4.2 Main beam or High beam (Blue)
4.3 Turn signal indicator	4.3 — (Green) * Detail: Attachment-3	4.3 — (Green or Yellow)
D. Labeling Requirement	Display of approval mark required.	
E. Reference Standard	ISO 6727 (cf.: Attachment-4)	ISO 6727

Table-1 (2/3)

Item	Canada CMVSS 123	U.S.A. FMVSS 123
A. Application		
B. Structure Requirement		
B.1 Switch position		
1.1 Driving beam/Passing beam control	1.1 On handlebars: left side	1.1 On handlebars: left side
1.2 Horn	1.2 On handlebars: left side	1.2 On handlebars: left side
1.3 Direction indicators	1.3 On handlebars	1.3 On handlebars
1.4 Supplemental engine stop		
B.2 Operating method		
2.1 Driving beam/Passing beam control	2.1 Driving beam: up Passing beam: down	2.1 Driving beam: up Passing beam: down
2.2 Horn	2.2 Push to activate	2.2 Push to activate
2.3 Ignition switch	2.3 Off: Counterclockwise from other positions	2.3 Off: Counterclockwise from other positions
		* Detail: See Attachment-2
	* The position of each control should be such that the control can be operated without the removal of the driver's hands from the handgrip.	* The position of each control should be such that the control can be operated without the removal of the driver's hands from the handgrip.
B.3 Identification (and position) word of control		
3.1 Ignition	3.1 Ignition (Off)	3.1 Ignition (Off)
3.2 Supplemental engine stop	3.2 Engine stop (Off, Run)	3.2 Engine stop (Off, Run)
3.3 Manual choke	3.3 Choke (—)	3.3 Choke (—)
3.4 Electric starter	3.4 — (Start)	3.4 — (Start)
3.5 Head lamp upper-lower beam control	3.5 Light (Hi, Lo)	3.5 Light (Hi, Lo)
3.6 Horn	3.6 Horn (—)	3.6 Horn (—)
3.7 Turn signal	3.7 Turn (L, R)	3.7 Turn (L, R)
	* For symbol display, see Attachment-2.	* For symbol display, see Attachment-2.
B.4 Display (and colour) of telltale		
4.1 Neutral indicator	4.1 Neutral (Green)	4.1 Neutral (Green)
4.2 Upper beam indicator	4.2 High beam (—)	4.2 High beam (—)
4.3 Turn signal indicator	4.3 — (Green or Yellow)	4.3 — (Green or Yellow)
		* Detail: Attachment-2
D. Labeling Requirement		
E. Reference Standard	ISO 6727	ISO 6727

Table-1 (3/3)

Item	Japan Article 10	Korea Article 65
A. Application	Motorcycle	Motorcycle 50 cm^3 <
B. Structure Requirement		
B.1 Switch position		
1.1 Driving beam/Passing beam control	1.1 On handlebars: left side	
1.2 Horn	1.2 On handlebars: left side	
1.3 Direction indicators	1.3 On handlebars	
1.4 Supplemental engine stop	1.4 On handlebars: right side	
B.2 Operating method		
2.1 Driving beam/Passing beam control	2.1 Driving beam: up Passing beam: down	
2.2 Horn	2.2 Push to activate	
2.3 Ignition switch	2.3 Off: Counterclockwise from other positions	
	* The position of each control should be within 500 mm of the center of the handlebar and the driver should be able to operate the control easily while seated in the driving position.	
B.3 Identification (and position) word of control		
3.1 Ignition	3.1 — (Off)	
3.2 Supplemental engine stop	3.2 — (Off, Run)	
3.3 Manual choke	3.3 — (—)	
3.4 Electric starter	3.4 — (Start)	
3.5 Head lamp upper-lower beam control	3.5 Light (Hi, Lo)	
3.6 Horn	3.6 Horn (—)	
3.7 Turn signal	3.7 Turn (L, R)	
	* For symbol display, follow ISO 6727.	
B.4 Display (and colour) of telltale		
4.1 Neutral indicator	4.1 Neutral (Green)	
4.2 Upper beam indicator	4.2 High beam (Blue)	
4.3 Turn signal indicator	4.3 Turn (Amber)	
D. Labeling Requirement		
E. Reference Standard	ISO 6727	

Attachment-1

ECE R 60 Structure Requirement

1. General Requirements

1.1 All the driver-operated controls specified below shall be within the reach of the driver when seated in the driving position.

1.2 The position of the controls on the handlebars specified below:

- Front brake
- Rear brake
- Clutch
- Audible warning device
- Driving beam / Passing beam control
- Direction indicators control

Shall be such that they can be reached without the removal of the driver's hands from the respective handgrips.

2. Special requirements

2.1 Engine controls

2.1.1 Starting

2.1.1.1 Engine ignition switch:
In the case of a rotary switch, the direction of motion shall be clockwise from the ignition "off" position to the ignition "on" position.

2.1.1.2 Starter switch:
No special requirement.

2.1.1.3 Combined ignition / starter switch:
In the case of a rotary switch, the direction of motion shall be clockwise, passing from the "off" position to the ignition "on" position to the starter energizing position.

2.1.2 Speed

2.1.2.1 Speed control

The speed of the engine shall be controlled by a hand-operated control

Position of control : on handlebars—right side

Type of control : rotating handgrip on handlebars

Direction of rotation : anticlockwise to increase speed

2.1.3 Stop

2.1.3.1 engine cut-out:

Position of control: on handlebars – right side

2.2 Brakes

2.2.1 Front (wheel) brake:

Position of control : on handlebars—right side forward

Type of control : hand lever

2.2.2 Rear (wheel) brake

2.2.2.1 Vehicles equipped with manually operated clutch:

Position of control : on frame –right side

Type of control : pedal

2.2.2.2 Vehicles having no manual clutch control

2.2.2.2.1 Vehicles equipped with riding pedals must, and vehicles equipped with a platform or with footrests integrated into a platform which have a maximum design speed not exceeding 100 Km/h may, conform to the requirement.

Position on control : on handlebars – left side forward

Type of control : hand lever

2.2.2.2.2 All other vehicles

Position of control : on frame—right side

Type of control : pedal

2.2.2.3 Nothing in the requirements set out in paragraphs 2.2.2.1 or 2.2.2.2.1 of this Regulation shall prohibit a moped equipped with riding pedals from being equipped with a rear (wheel) brake operated by a back-pedaling device actuated by the riding pedals

2.2.3 Combined service brake:

Nothing in the requirements set out in paragraphs 2.2.1 or 2.2.2 of this Regulation shall prohibit a vehicle from being equipped with a combined service brake (see paragraph 2.12). Position and type of control : as specified in paragraphs 2.2.1 and 2.2.2

2.2.4 Parking brake :

No special requirement.

Type of control : hand lever or pedal

2.3 Transmission

2.3.1 Clutch: operation control

Position of control : on handlebars – left side forward

Type of control : hand lever

Note : The above-mentioned requirement shall not prohibit, as a device for operating the clutch, the use of a combined foot lever control for both clutch operation and gear selection

2.3.2 Gear selection control

2.3.2.1 In the case of vehicles equipped with a gear selection control operated independently of the clutch operating control

Position of control : on frame –left side

type of control : foot lever or rocker arm

2.3.2.1.1 Movement of the foot lever or the forward part of the rocker arm in an upward direction shall progressively, select gears giving an increased forward speed and conversely for the selection of gears giving a reduced speed. A separate, positive “neutral” position shall be provided.

2.3.2.1.2 Movement of the foot-operated gear selection control in a forward or a rearward direction is also permitted. In this case, movement of the foot lever in a rearward direction shall progressively select gears giving an increased speed and conversely for the selection of gears giving a reduced speed. A separate, positive “neutral” position shall be provided.

2.3.2.2 In the case of vehicles equipped with a gear selection control operated in conjunction with the clutch operating control:

Position of control : on handlebars—left

type of control : rotating handgrip on handlebars

2.3.2.2.1 Rotating of the handgrip anticlockwise shall, progressively, select gears giving an increased forward speed and conversely for the selection of gears giving a reduced speed. A separate, positive “neutral” position shall be provided.

2.4 Lighting and signaling controls

2.4.1 Audible Warning Divice

2.4.1.1 In the case of vehicles equipped with a gear selection control independently of the clutch operating control :

Position of control : on handlebars—left side
type of control : button

2.4.1.2 In the case of vehicle equipped with a gear selection control operated in conjunction with the clutch operating control;

Position of control : on handlebars – right side
Type of control : button

2.4.2 Lighting

2.4.2.1 Light control switch

In the case of rotary switch, operation of the switch in a clockwise direction shall engage, progressively, the vehicle’s position lights and then the vehicle’s main lights.

This shall not prevent the inclusion of additional switch positions provided that they are clearly indicated. The light control switch may be combined with the ignition desired.

2.4.2.2 Driving Beam / Passing Beam Switch

2.4.2.2.1 In the case of vehicle equipped with a gear selection control operated independently of the clutch operating control:

Position of control : on handlebars – left side

2.4.2.2.2 In the case of vehicles equipped with a gear selection control operated in conjunction with the clutch operating control :

Position of control : on handlebars – right side

2.4.2.3 Optical Warning Device

The control for this device shall be adjacent to the Driving Beam / Passing Beam Switch or shall be an additional function of the latter.

2.4.3 Direction indicators switch

Position of control : on handlebars

The control shall be so designed that, when viewed from the rider’s seat, operation of the left hand portion, or movement to the left, of the control actuates the left side indicators and vice versa for the right side indicators. The control shall be clearly marking in such a manner as to indicate the side of the vehicle on which the control actuates the indicators.

2.5 Fuel supply controls

2.5.1 Cold starting device

The control shall be so placed as to be reasonably and conveniently accessible to the rider.

2.5.2 Manual fuel shut-off control

The control shall havve separate positive positions for “OFF”, “ON” and “RESERVE”

(where a reserve supply is provided). The control shall be in the ON position when it is in the direction downstream of the flow of fuel from the tank to the engine: in the OFF position when it is in a direction perpendicular to the flow of fuel, and in the RESERVE position (where applicable) when it is in the direction upstream of the flow of fuel

2.5.2.1 Where a machine is so equipped, the rider must be able to switch to the reserve fuel supply when in the seated position.

Table 1 - 3 of FMVSS 123

Attachment-2(1/2)

Table 1 Motorcycle control location and operation requirements

Equipment control -column 1	Location - column 2	Operation - column 3
1.Manual clutch or integrated clutch and gear change. ……	Left handlebar ……	Squeeze to disengage clutch
2.Foot operated gear change	Left foot control ……	An upward motion of the operator's toe shifts transmission toward lower numerical gear ratios (commonly referred to as "higher gears").and a downward motion toward higher numerical gear ratios (commonly referred to as "lower gears"). If three or more gears are provided it shall, not be possible to shift from the highest gear directly to the lowest gear, or vice versa.
3.Head lamp upper-lower beam control	Left handlebar ……	Up for upper beam, down for lower beam. If combined with the headlight on-off switch, means shall be provided to prevent inadvertent actuation of the "off" function. Push to activate.
4.Horn ……		
5. Turn signal lamps ……	……do ……	"Off"-counterclockwise from other positions. Rotate to operate. "on" and "Off" are separated by 90 degrees of rotation. "Off" and "Reserve"(if provided) are separated by 90 degrees of of rotation. Sequence order: "On"-"Off"-"Reserve".
6.Ignition ……	Handlebars……	
7.Manual fuel shutoff control……	……	Self -closing to idle in a clockwise direction after retease of hand.
8.Supplemental engine stop……	……	
9.Supplemental engine stop ……	right handlebar ……	Squeeze to engage.
10.front wheel brake ……	……do ……	Depress to engage
11.rear wheel brakes ……	……do ……	
	Right foot control[1]…… Left handlebar permissible for motor - driven cycles.	

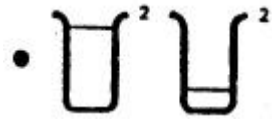
1 See S5.2.1 for requirements for vehicles with a single control for front and rear brakes, and with a supplemental rear brake control

Table2 Motorcycle Display Illumination and Operation Requirements

Display -column 1	Illumination- column 2	Operation - column 3
1. Speedometer ……	Yes……	The display is illuminated whenever the headlamp is activated
2.Neutral indication……	Green display lamp……	The display lamp illuminates when the gear selector is in neutral position.

Table 1 - 3 of FMVSS 123

Attachment-2(1/2)

	Column 1	Column 2	Column 3	Column 4
	Equipment	Control and Display Identification word	Control and Display Identification symbol	Identification at appropriate position of control or display
1	Ignition	Ignition		Off
2	Supplement engine stop(off Run)	Engine stop		Off, Run
3	Manual choke or Mixture Enrichment	Choke or Enrichener		
4	Electric Starter			Start [1]
5	Headlamp Upper-Lower beam control	Lights		Hi, Lo
6	Horn	Horn		
7	Turn Signal	Turn		L, R
8	Speedometer	M.P.H.		M.P.H [4]
9	Neutral Indicator	Neutral		
10	Upper Beam Indicator	High Beam		
11	tachometer	R.P.M. or r/min.		
12	Fuel Tank Shutoff valve (Off, On, Res.)	Fuel		Off, On, Res

1.Required only if electric starter is separate from ignition switch
2.Framed areas may be filled.
3.The pair of arrows is a single symbol. When the indicators for left and right turn operate independently however, the two arrows will be considered separate symbols and may be spaced accordingly/
4.M.P.H. increase in a clockwise direction. Major graduations and numerals appear at 10 mph intervals, minor graduations at the 5 mph intervals. (37 F.R. 17474-August 29, 1972.Effective :9/1/74)

Annex 4

CONTROLS, TELL-TALES AND INDICATORS FOR WHICH, WHEN FITTED IDENTIFICATION IS MANATORY, AND SYMBOLS TO USED FOR THAT PURPOSE 1/

1. This annex specifies the symbols, i.e., conventional signs, used to identify certain, controls, indicators and tell-tales on a motor cycle or a moped and to facilitate their usage. It also indicates the colours of possible optical tell-tales which warn the driver of the operation or malfunctioning of the devices and equipment connected to the corresponding controls.

2. This annex is applicable to those controls which, when used, are fitted on the instrument panel or in the immediate vicinity of the motor cycle or the moped driver. This definition of application does not signify the mandatory presence of each and every control listed in this annex.

3. The symbols must be such that, when viewed by the driver, from the seated position, they are recognizable as shown in paragraph 5 below.

4. The symbols shall stand out clearly against the background, being either light on a dark background or dark on a light background.

5. The symbol must be placed on, or adjacent to, the control or tell-tale to be identified. Where this is not possible, the symbol and the control or tell-tale must be joined by a continuous line as short as possible.

6. If, in a symbol, a motor cycle/(a moped) or parts of a motor cycle/(a moped) are shown in a side view, a motor cycle/(a moped) driving from right to left shall be assumed.

7. Focused light shall be represented by parallel rays and diffuse light by divergent rays.

8. When the following colours are used on the optical tell-tales, they shall have the meaning indicated below:

Red : Danger
Yellow (Amber) : Caution
Green : Safe

(Blue shall be used only for the headlamp driving beam tell-tale.)

1/ In conformity with the International Standards ISO 6727 - 1981 and 4129-1978.

In order to ensure correct graphic presentation and observance of the exact proportions, the symbols are reproduced in accordance with the ISO grid system (see also appendix to this annex).

9. Designation and illustration of the symbols

Figure 1
Headlamp beam control Driving beam
Colour of tell-tale light : blue

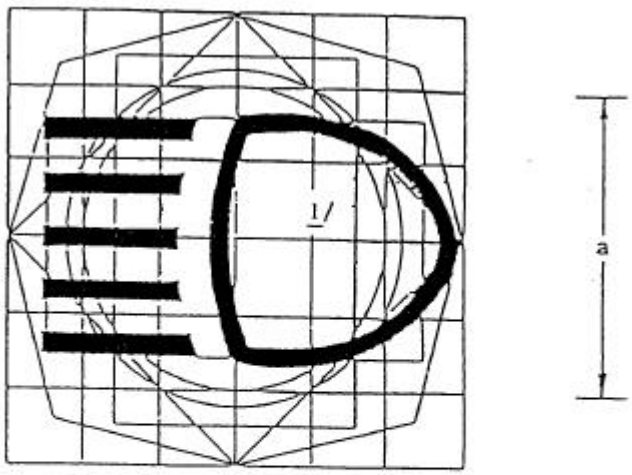


Figure 2
Headlamp beam control passing beam

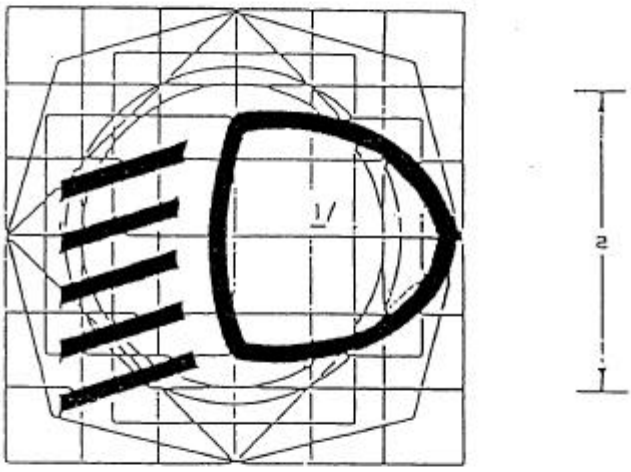
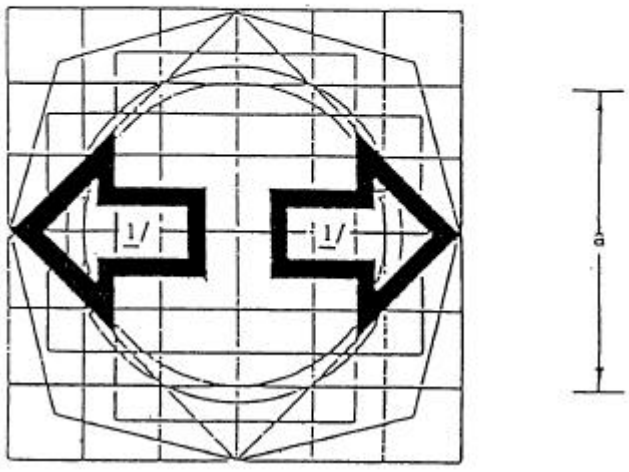


Figure 3
Turn signal
Colour of tell-tale light : green



See foot-notes at the end of this annex

Figure 4

Hazard warning (alternative)
Colour of tell-tale light: red
or
Simultaneous operation of both arrows of figure 3

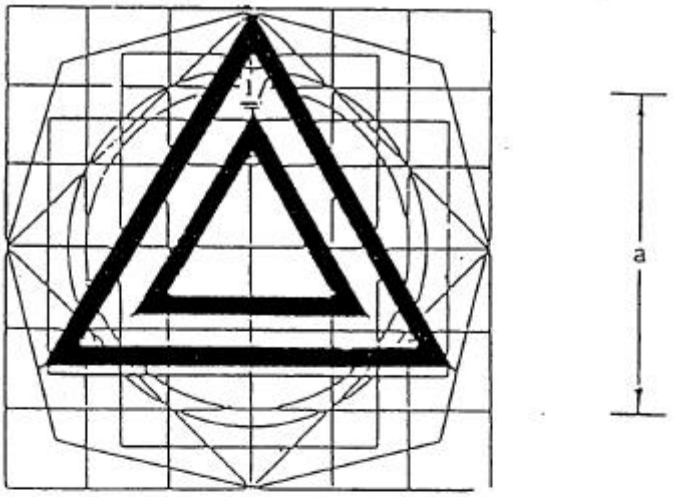


Figure 5

Manual choke
Colour of tell-tale light: amber

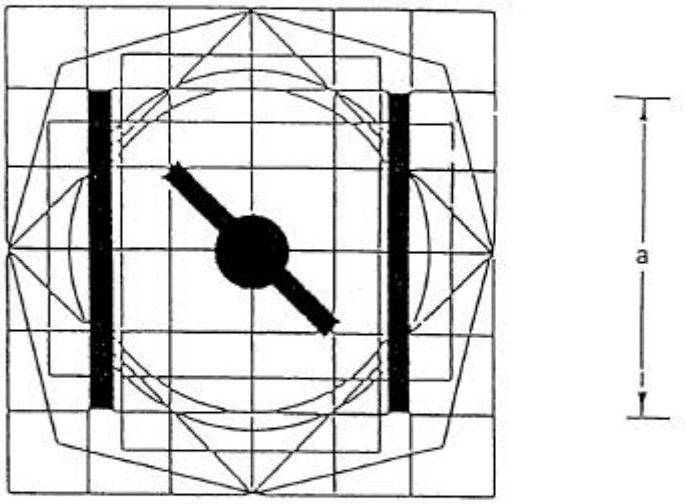


Figure 6

Horn

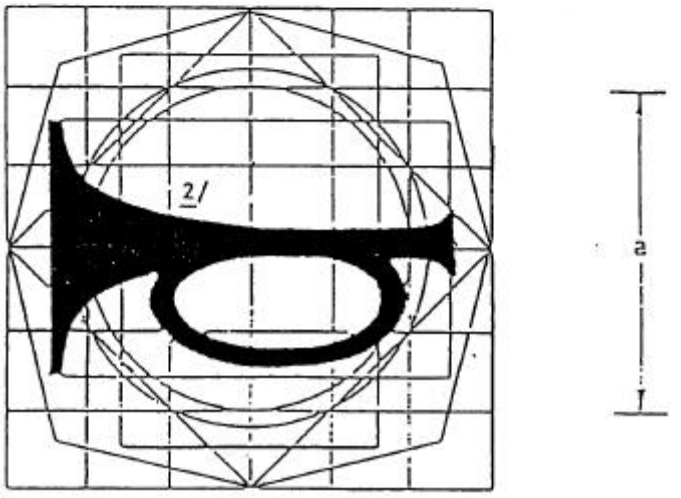


Figure 7

Fuel
Colour of tell-tale light: amber

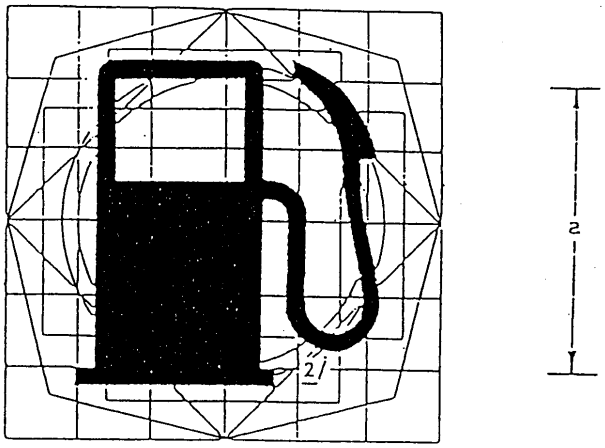


Figure 8

Engine coolant temperature
Colour of tell-tale light: red

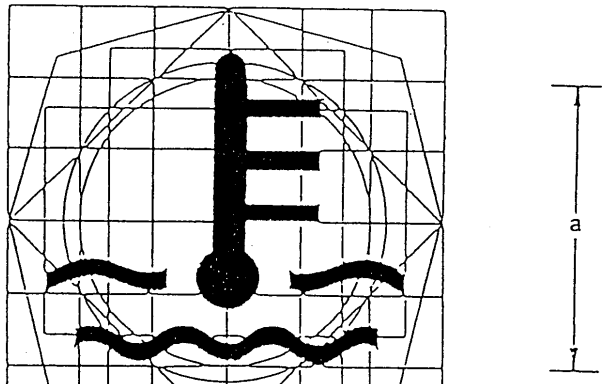


Figure 9

Battery charging
Colour pf tell-tale light: red

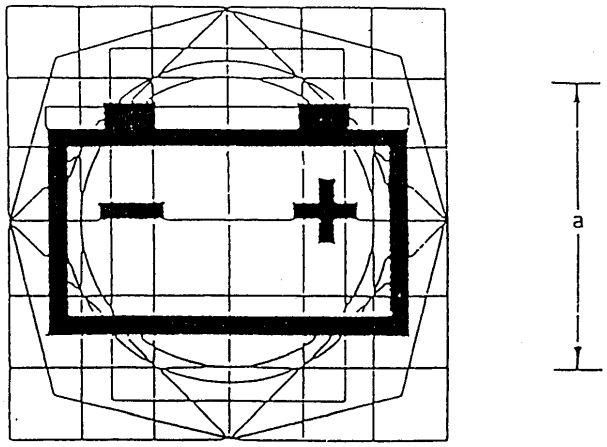


Figure 10

Engine oil
Colour of tell-tale light: red

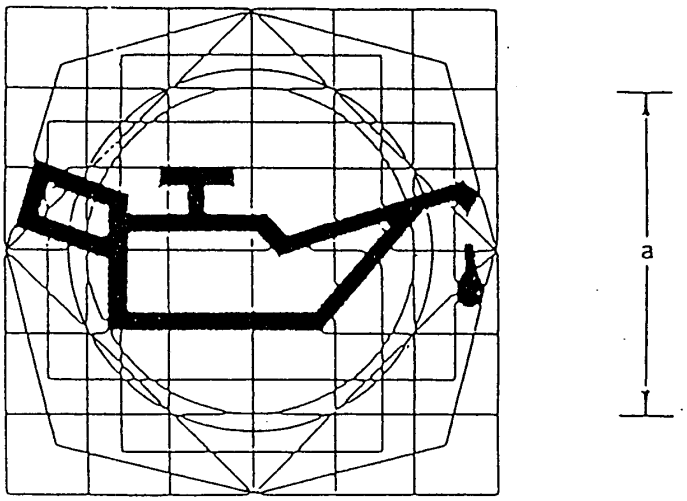


Figure 11

Front fog light 3/
Colour of tell-tale light: green

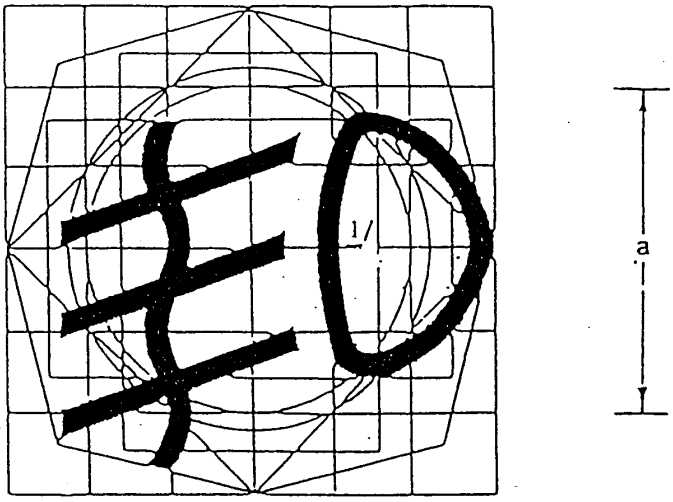


Figure 12

Rear fog light 3/
Colour of tell-tale light: amber

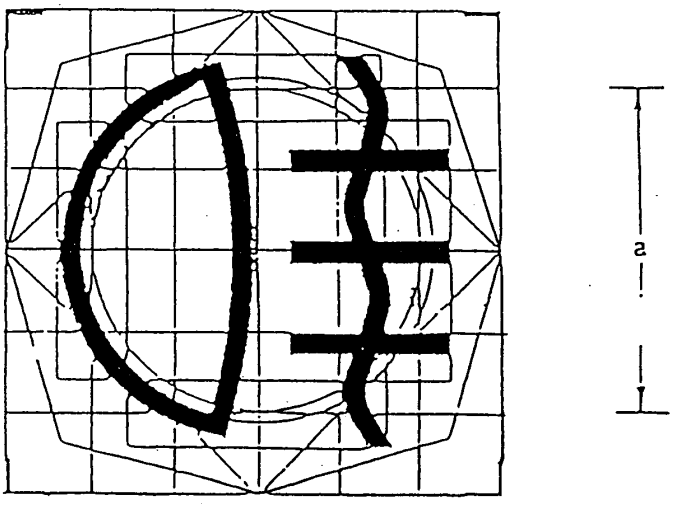


Figure 13

Fuel tank shut off valve -position "off"

Fuel tank shut off valve-position "on"

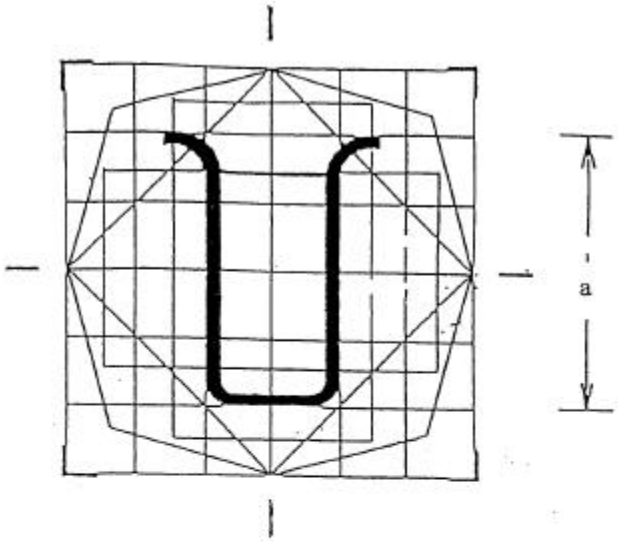
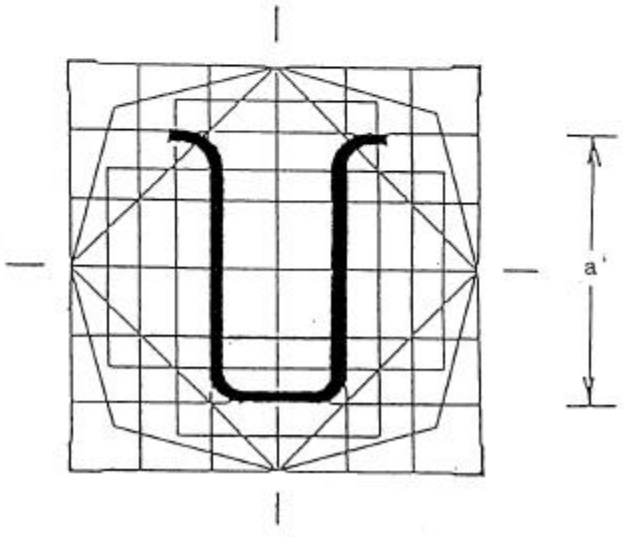


Figure 14
Fuel tank shut off valve -position "reserve"



Figures 15A, B

Ignition control or
supplemental engine stop

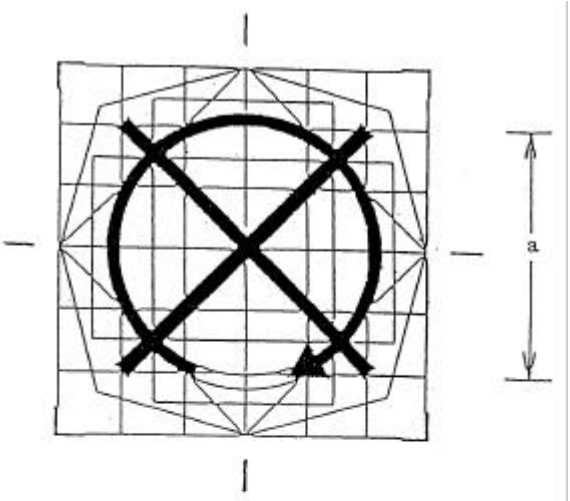


Figure 15A - position "off"

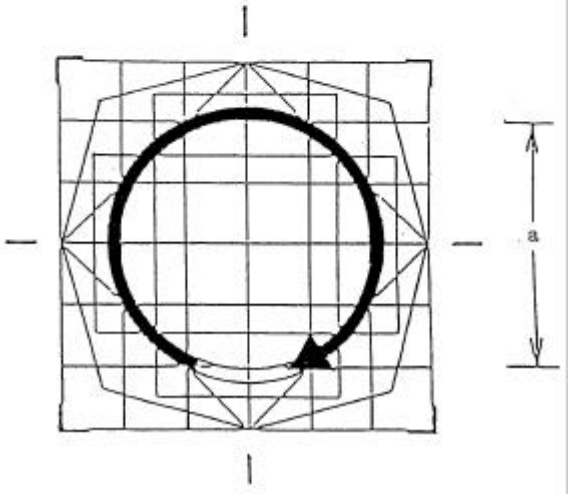


Figure 15B - position "run"

Figures 16A, B, C

Lighting switch (may be combined with ignition control)

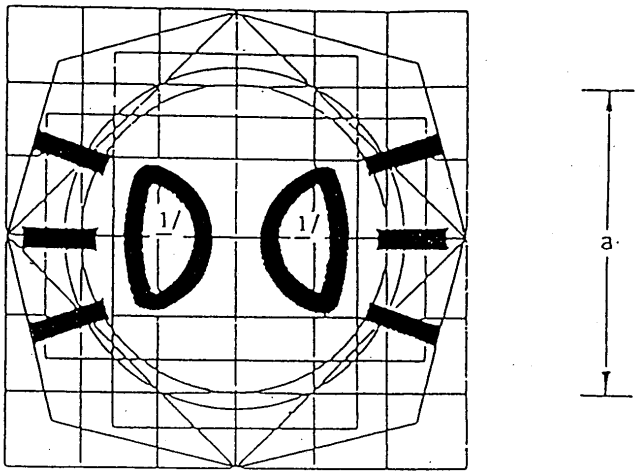


Figure 16A

Position light
Colour of tell-tale light: green

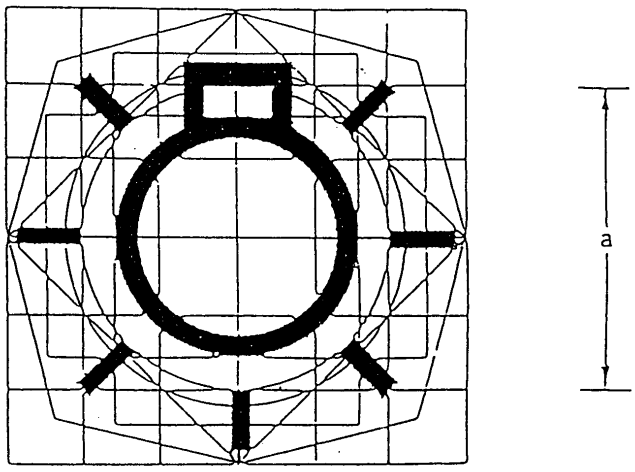


Figure 16B
Master lamp switch
Colour of tell-tale light: green

Figure 16C

Parking light

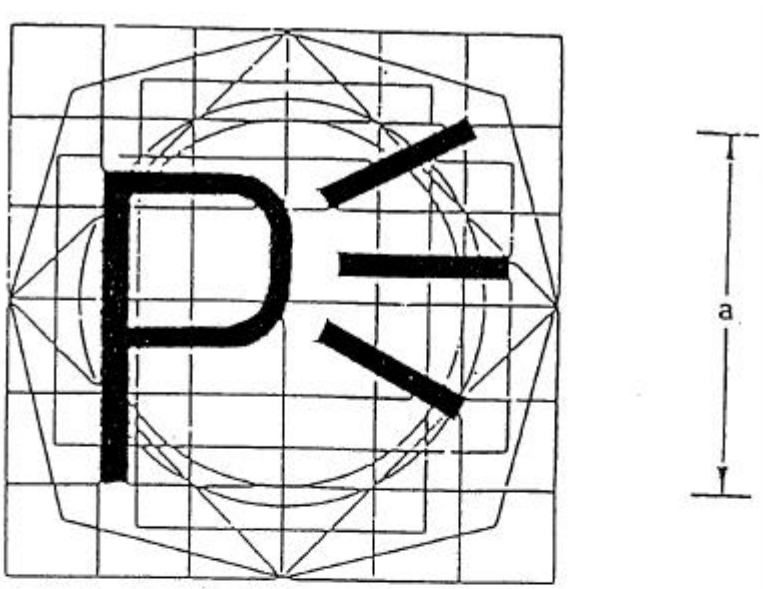


Figure 17

Neutral indicator
Colour of tell-tale light: green

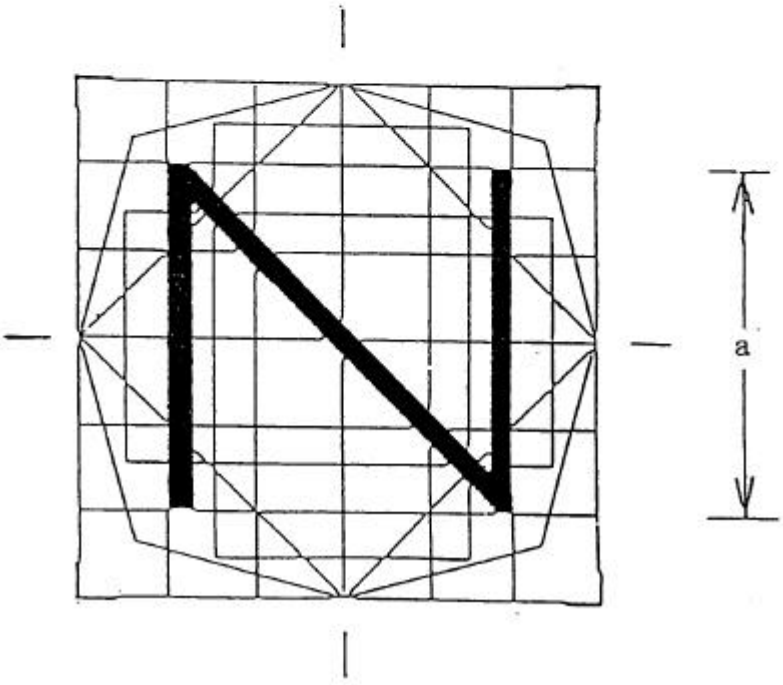
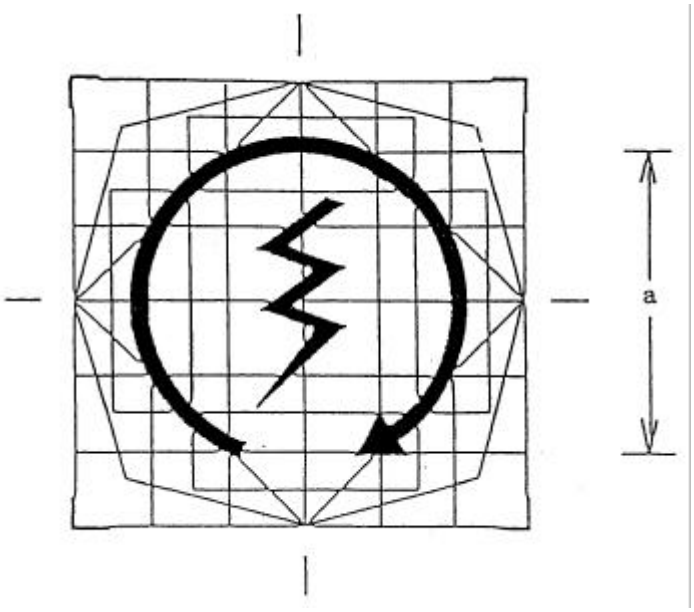


Figure 18
Electric starter



Notes

1/ The interior of the symbol may be entirely in a dark colour.

2/ The dark part of this symbol may be replaced by its outline, in which case the portion shown here as white must be entirely in a dark colour.

3/ if one control is used for both front and rear fog lights, the symbol used shall be the one designated "front fog light ".

Annex 4 - Appendix

CONSTRUCTION OF THE BASIC PATTERN FOR THE SYMBOLS SHOWN IN ANNEX 4

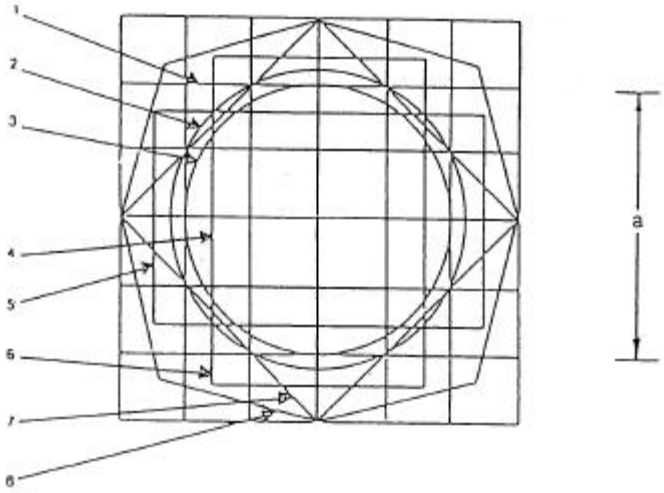


Figure 1

Basic pattern

The basic pattern comprises:

1. A basic square of side 50 mm; this dimension is equal to the nominal dimension, 'a', of the basic pattern;

2. A basic circle of 56 mm diameter having approximately the same area as the basic square (1);

3. A second circle of 50 mm diameter, being the inscribed circle of the basic square (1);

4. A second square whose corners touch the basic circle (2) and whose sides are parallel to those of the basic square (1);

5 and 6. Two rectangles having the same area as the basic square (1); they are mutually perpendicular, each being drawn to cross opposite sides of the basic square symmetrically;

7. A third square whose sides pass through the points of intersection of the basic square (1) and the basic circle (2) and are at an angle of 45° , giving the largest horizontal and vertical dimensions of the basic pattern;

8. An irregular octagon, formed by lines at an angle of 30° to the sides of the square (7).
The basic pattern is superimposed on a 12.5 mm grid which coincides with the basic square (1).

INTERNATIONAL STANDARD ISO 6727-1981(E)

Road vehicles - Motorcycles- Symbols for controls, indicators and telltales

1 Scope

This international standards specifies the symbols, i.e. conventional signs, used to identify certain controls, indicators and telltales on a motorcycle and to facilitate their usage. 1)
It also indicates the colours of possible optical telltales which warn the driver of the operation or malfunctioning of the devices and equipment connected to the corresponding controls.

2 Field of application

This international standard is applicable to those control which, when used, are fitted on the instrument panel or in the immediate vicinity of the motorcycle driver. (A motorcycle being as defined in ISO 3833.) This definition of application does not signify the mandatory presence of each and every control listed in this International standard.

3 Reference

ISO 2575, Road vehicles – symbols for controls, indicators and telltales.
ISO 3833, Road vehicles – Types – Terms and definitions.

4 General

4.1 The symbols must be such that, when viewed by the driver, from his normal seated position, they are recognizable as shown in clause 5.
4.2 Symbols on controls and telltales shall have a good contrast with their background.
4.3 The symbol must be placed on, or adjacent to, the control or telltale to be identified. Where this is not possible, the symbol and the control or telltale must be joined by a continuous line as short as possible.
4.4 If, in a symbol, a motorcycle or parts of a motorcycle are shown in a side view, a motorcycle driving from right to left shall be assumed.
4.5 Focused light shall be represented by parallel rays and diffuse light by divergent rays.
4.6 When the following colours are used on the optical telltales, they shall have the meaning indicated below:

Red : Danger
Yellow(Amber) : caution
Green : Safe

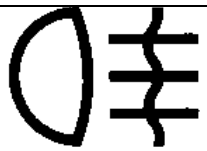
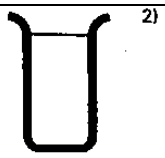
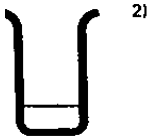
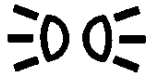
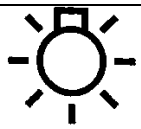
(Blue shall be used only for the headlight upper beam telltale.)

---

1) Prints of these symbols for reproduction purpose may be obtained from the ISO central secretariat.

No.	Control, indicator or telltale designation		Symbol	Colour of telltale
5.1	Headlamp beam control	Main beam	 2)	Blue
		Dipped beam	 2)	
5.2	Turn signal		 2)	
5.3	Hazard warning alternatives		Simultaneous operation of both arrows of 5.2	Amber or green
			 2)	Red
5.4	Manual choke (cold starting aid)			
5.5	Horn			
5.6	Fuel			Amber
5.7	Engine coolant temperature			Red
5.8	Battery charging			Red
5.9	Engine oil		 2)	Red
5.10	Front fog lamp 1)		 2)	Green

1) If one control is used for both front and rear fog light, the symbol used shall be the one designated “front fog lamp”.
2)The framed areas of these symbols may be solid.

No.	Control, indicator or telltale designation		Symbol	Colour of telltale
5.11	Rear fog lamp 1)			Amber
5.12	Fuel tank shut off valve	Off		
		On	 2)	
		Reserve	 2)	
5.13	Ignition control of supplemental engine stop	Off		
		Run		
5.14	Lighting switch(may be combined with ignition contorl)	Position lamp		
		Master lamp switch		
		Parking lamp		
5.15	Neutral indicator			Green
5.16	Electric starter			

1) If one control is used for both front and rear fog light, the symbol used shall be the one designated “front fog lamp”.
2)The framed areas of these symbols may be solid.

ITEM 96-30

EMC
(Electromagnetic compatibility)

APEC Regulation Analysis Findings
Item No. 96-30: EMC (Electromagnetic Compatibility)

1. Member Economy Comparison

   Canada and People's Republic of China adopt the same EMC regulation, and both specify a permissible frequency range that is wider than that provided in ECE R10.

2. Item Comparison

   Regarding the radiation limit (C-b-1), Canada and People's Republic of China adopt the same limit.

ITEM NO.96-30 : EMC

A : Application ; Passenger vehicles

Country	Regulation No.	C-b-1		D Label	E Reference STDs
		Radiation limit	Test site		
Australia					
Brunei					
Canada	ICES 002	72/245/EEC • 50 µV/m in 30-75MHz • 50-120 µV/m in 75-400 MHz • 400-1000 µV/m in 400-1.000 MHz	30m radias	A compliance label in English and French	CAN/CSA-C108.4-M92
Chile					
China	GB14023	72/245/EEC • 50 µV/m in 30-75MHz • 50-120 µV/m in 75-400 MHz • 400-1000 µV/m in 400-1.000 MHz	30m radias	N.A.	N.A.
Hong Kong					
Indonesia					
Japan					
Korea					
Malaysia					
Mexico					
New Zealand					
Papua New Guinea					
Philippines					
Singapore					
Chinese Taipei					
Thailand					
United States					
ECE	ECE R 10	• 50 µV/m in 40-75 Mhz • 50-120µV/m in 75-250MHz	Within an ellipse of 20 m*17.3m	An international approval mark	

Item 96-30. EMC (Electro Magnetic Compatibility)

CANADA ICES 002

ITEM	CONTENT	Illustration/supplement
A: Application	All vehicles and other devices with spark ignited internal combustion engine	
B: Limits of Interference	(Regulation) The limit for impulse electric filed strength of radio noise are shown in Figure 1. -Only one of the band widths listed needs to be chosen for testing. -Measurement shall be made over the frequency range of 30 to 1,000 MHz.	
C: Measuring Requirement	(Regulation)	
1) Test Site	The test site shall be free from electromagnetic reflecting surfaces within at least 30 m from a point midway between the vehicle or device and the antenna.	
2) Antenna Position	-Horizontal distance: 10.0+/- 0.2 m -Height of Center of the antenna 3.00+/- 0.05m	
3) Engine	Engine shall be operated during measurement as shown in table 1.(See Illustration) Note: Test method shall be in accordance with the CAN/CSA-C 108.4-M92	

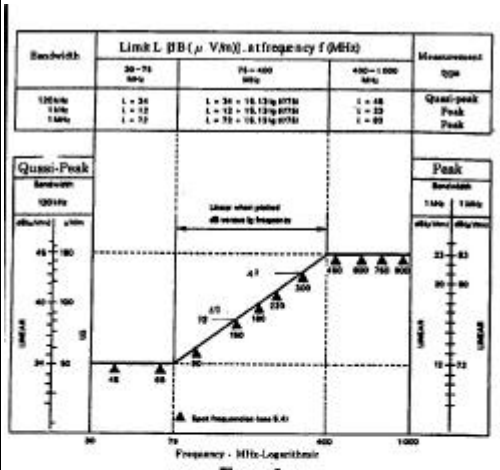


Figure 1
Limits of Interference

Table 1
Engine Operating Speeds

	Method of measurement	
	Quasi-peak	Peak
Number of cylinders	Engine speed	
One	2 500 r/min	Above idling
More than one	1 500 r/min	Above idling

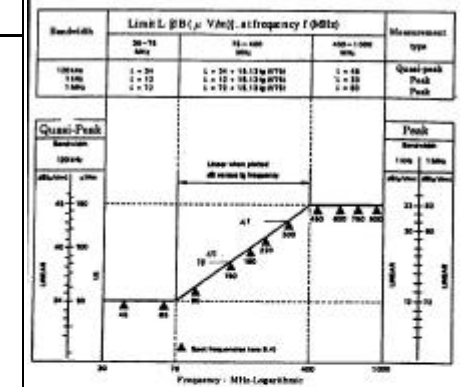
Note: *The measuring conditions for vehicles equipped with an electric propulsion motor are under consideration.*

Item 96-30. EMC (Electro Magnetic Compatibility)

CANADA ICES 002		
ITEM	CONTENT	Illustration/supplement
D : Label Requirement	(Regulation) A label of notice indicating compliance must be affixed to the apparatus (or in the user's manual) in English and in French as provided in the Annex.	Annex Suggested text for the notice indicating compliance with this Standard:

Item 96-30. EMC (Electro Magnetic Compatibility)

PEOPLE 'S REPUBLIC OF CHAINA NATIONAL STANDARD GB14023-92

ITEM	CONTENT	Illustration/supplement
A: Application	All vehicles and other devices with spark ignited internal combustion engine	
B: Limits of Interference	(Regulation) The limit for impulse electric filed strength of radio noise are shown in Figure 1. -Only one of the band widths listed needs to be chosen for testing. -Measurement shall be made over the frequency range of 30 to 1,000 MHz.	 Figure 1 Limits of Interference Table 1 Engine Operating Speeds Method of measurement: Quasi-peak / Peak Number of cylinders: Engine speed One: 2 500 r/min / Above idling More than one: 1 500 r/min / Above idling Note: The measuring conditions for vehicles equipped with an electric propulsion motor are under consideration.
C: Measuring Requirement 1) Test Site 2) Antenna Position 3) Engine	(Regulation) The test site shall be free from electromagnetic reflecting surfaces within at least 30 m from a point midway between the vehicle or device and the antenna. -Horizontal distance: 10.0+/- 0.2 m -Height of Center of the antenna 3.00+/- 0.05m Engine shall be operated during measurement as shown in table 1.(See Illustration)	

Item 96-30. EMC (Electro Magnetic Compatibility)

ECE Regulation No. 10-01

ITEM	CONTENT	Illustration/supplement
A: Application	All vehicles and other devices with spark ignited internal combustion engine	
B: Limits of Interference	(Regulation) The radiation limits based on quasi-peak measurement shall be ; - 50μV/m in the 40-75MHz frequency band - 50-120μV/m in the 75-250MHz frequency band This limit is increasing linearly with frequencies above 75MHz. If measurements are made with peak-measuring equipment, the readings expressed in μV/m shall be divided by 10. On the vehicle type submitted for approval with regard to radio interference suppression, the measured values shall be not less than 20% below the reference limits.	
C: Measuring Requirement 1) Test Site 2) Antenna Position	(Regulation) The measuring site shall be a level area free from appreciable wave reflecting surfaces within an ellipse having a major axis of 20m and a minor axis of 17.3m. - Height of center of the dipole: 3m - The horizontal distance: 10m Engine shall be operated during measurement as shown in Table 1. At each of the measuring points, readings shall be taken with the dipole in a horizontal and in a vertical position. Measurements shall be made within the range 40 to 250MHz. It is considered that a vehicle will most probably meet the required suppression limits over the whole frequency range if it meets them for the following six preferred spot frequencies within the range of : 45, 65, 90, 150, 180, and 220 (±5MHz).	Table 1 Engine operating speeds <table><tr><td rowspan="2">Number of cylinders</td><td colspan="2">Method of measurement</td></tr><tr><td>Peak</td><td>Quasi-peak</td></tr><tr><td>One</td><td>Above idling</td><td>2500r/min</td></tr><tr><td>More than one</td><td>Above idling</td><td>2500r/min</td></tr></table>

ECE Regulation No. 10-01		
ITEM	CONTENT	Illustration/supplement
D: Label Requirement	(Regulation) There shall be affixed conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark. The approval mark shall be clearly legible and be indelible, and be placed close to or on the vehicle data plate.	

ITEM 96-31

Tyres and wheels (Buses, trucks)

APEC Regulation Analysis Findings
Item No. 31: Tires and Wheels (Buses, Trucks)

The regulations of member economies for the tires and wheels of commercial vehicles can be divided into the following three types:

1) Those providing requirements to be observed by vehicle users.

2) Those providing tire and rim selection to be observed by vehicle makers.

3) Those providing tire safety standards to be observed by tire producers.

1. Regulations Applied to Commercial Vehicle Users (e.g., road traffic laws)

These regulations are in force in Brunei Darussalam, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, Papua New Guinea, Singapore and Chinese Taipei. The principal requirements of the regulations pertain to:

1)	Prevention of damage to road surfaces	4 economies
2)	Damage to tires	5 economies
3)	TWI	4 economies
4)	Tire and rim matching	3 economies
5)	Different tire type	2 economies
6)	Wheels	2 economies

2. Tire and Rim Selection to Be Observed by Commercial Vehicle Makers

The FMVSS 120, CMVSS 120 and ADR 24 regulations of the U.S., Canada and Australia, respectively, pertain to tire and rim selection. The U.S. and Canadian regulations are nearly identical, specifying tire-rim selections, axle load rating, etc. which are prescribed in the world's seven major regulations. The U.S. and Canada define the tire load rating and gross axle weight in terms of gross axle weight rating, while Australia in terms of gross vehicle mass.

As for tire performance requirements, the U.S. and Canada subscribe to FMVSS 119, and Australia accepts FMVSS 119 and ECE 54 as alternatives. The U.S. and Canada require commercial vehicle makers to indicate on the rim what tires are suitable. Australia requires that appropriate tires, rims, air pressure, load capacity, etc. be indicated in placards and affixed at an easily noticeable spot on the vehicle.

3. Tire Safety Regulations to Be Observed by Tire Producers

The FMVSS 119, CMVSS 119, and ECE 75 regulations of the U.S., Canada, and Europe, respectively, pertain to safety regulations applied to tire producers. These four regulations contain similar tire strength and endurance tests. High-speed tests, however, can be divided into the FMVSS and ECE types, as follows:

1] 8 PR or less, inner radius less than 15
2] LI 121 or less, speed Q or more
3] 0 -(max. speed - 40 km/h) x 10 min.

(max. speed - 40 km/h) x 10 min.
(max. speed - 30 km/h) x 10 min.
(max. speed - 20 km/h) x 10 min.
(max. speed - 10 km/h) x 10 min. * For 1,707 mm drum diameter

4. Labeling Requirements

FMVSS and ECE have many common labeling requirements, and FMVSS differs from that of ECE regulations in that it requires the labeling of the maximum load rating, corresponding inflation pressure, actual number of plies, and composition of the cord material.

Labeling is required, in principle, on both side walls of the tire, but the manufacturing date and approval mark may be marked only on one side wall. In the case of tires with non-symmetrical patterns, ECE allows single-side labeling.

The following tire approval marks are used in the following member economies:

U.S., Canada	DOT
ECE	E

ITEM No. 31 Tyres and wheels

«A: application»→ Buses, Trucks

ECONOMY	Prevention of Road Surface	Damage of Tyre	Tread Wear Indicator	**Tyre & Rim**
Australia	No damage to the surface of a road			tyres fitted to one axle must be the same type of carcass construction rims to the dimension specified in the nominated national industry standards
Brunei	No damage to the surface of a road	Any parts of the cord, carcass fabric is not exposed		
Canada				
Chile				
China				
Hong Kong	No damage to the surface of a road	No brake in its fabric, no cut (excess 25mm, 10% of the width), no separation, partial failure of the structure	At least 1mm depth	
Indonesia				
Japan	No damage road surface	Free from any notable damage (cracks, bare cords etc.)	1.6mm or more	
Korea	No damage road surface	No visible evidence of cracking,exposure of cords	1.6mm or more	
Malaysia	No damage to the surface of a road			Be fitted with suitable size and design
Mexico				
New Zealand		Not wear damaged cords	Not less than 1.5mm	Muched tyres and rims of sufficient load
Papua New Guinea		Free from any damage a clearly visible tread pattern		
Philippines				
Singapore				Pneumatic tyre of a suitable size and
Chinese Taipei		Free from defect		
Thailand				
United States				
ECE				

ECONOMY	Load	Different type tyre	Wheel
Australia			
Brunei			
Canada			
Chile			
China			
Hong Kong		Different types of structure shall not be fitted to the same axle or front and rear axle	
Indonesia			Ensure safety
Japan			
Korea	With in maximum permissible load as specified in the industrial standards		Securely fixed, no damage, cracking, excessive corrosion
Malaysia			
Mexico			
New Zealand	(1) Sufficient load capacity for the service (2) Sum of load capacities not less than GVM	Tyres on the same axle shall be of the same size and nominal construction	
Papua New Guinea		Different types of structure are not fitted to the same axle or front and rear axle	
Philippines			
Singapore			
Chinese Taipei			
Thailand			
United States			
ECE			

Tyres and Rim Selection

	U.S.A FMVSS 120	CANADA CMVSS 120	AUSTRALIA ADR 24
Scope	Tyre and rim selection, Rim marking requirement		Tyre and rim appropriate to vehicle load capacity. Rim size and speed characteristics.
Tyre Performance Requirement	FMVSS 119	FMVSS 119 CMVSS 119	AS 2230 FMVSS 119 ECE 54 JIS D 4230
Retread Tyre	FMVSS 119 (DOT mark) for a new tyre	FMVSS 119 for a new tyre CMVSS 119 JIS D 4230	AS 1973
Tyre Load Rating and Gross Axle Weight	Not less than GAWR		Not less than GVM (Gross Vehicle Mass)
Rim Marking	T = TRA E = ETRTO J = JATMA D = DIN B = BSI S = STRO A = ATRA N = Independent list		None
Labeling	Label information written in block-type characters each of whose size is not less than 2.4 mm; (1) Tyre: Load capacity and air pressure are not less than GAWR (2) Rim: Rim type shall comply with the applicable tyre.		(a) Placards; Tyres, rims, air pressure, load capacity, and so on shall be indicated in solid placards and affixed in an easily noticeable place. (b) Specified in Nominated standards
Motorcycle (L-Group)	(Requirements are included in applicable regulations.)		(a) Same axle, same type of carcass and ply (b) Load capacity are not less than GVM (c) Type load is specified in nominated standards.
Non-Pneumatic Tyre	Specified	None	None

MOTOR VEHICLE STANDARDS ACT
A national standard determined under section 7 of the Act

AUSTRALIAN DESIGN RULE 24/02

TYRE AND RIM SELECTION

The function of this Australian Design Rule is to specify requirements for tyres and '*Rims'* appropriate to vehicle load capacity, *'Rim'* size and speed characteristics.

24.0.1 Not used.

24.0.2 *'Normal Loaded Vehicle Mass of a Passenger Vehicle'* — the sum of:

24.0.2.1 the '*Unladen Mass'* together with:

24.0.2.2 the heaviest regular production options, if such individual options have a mass of 2.3 kg or more; plus

24.0.2.3 68 kg for each of 2 front *'Seat'* occupants; plus

24.0.2.4 if the designated '*Seating Capacity*' is 5 or more, 68 kg for a rear '*Seat'* passenger.

24.0.3 *'Normal Loaded Vehicle Mass of a Vehicle other than a Passenger Vehicle*' — the sum of:

24.0.3.1 the '*Unladen Mass*' together with:

24.0.3.2 the heaviest regular production options, if such individual options have a mass of 2.3 kg or more; plus:

24.0.3.3.1 68 kg for the front '*Seat'* occupant if only one front seating position is

provided; or

24.0.3.3.2 68 kg for each of 2 front *'Seat'* occupants if more than one front seating position is provided; plus:

24.0.3.4 one third of the difference between this mass and the *'Maximum Loaded Vehicle Mass of a Vehicle other than a Passenger Vehicle'* distributed evenly over the loading space area or in the case of *'Partially Completed Vehicles'* over the rear *'Axle' or 'Axle Group'*.

24.0.4 *'Maximum Loaded Vehicle Mass of a Passenger Vehicle'* — the sum of:

24.0.4.1 the *'Unladen Mass'* together with:

24.0.4.2 the heaviest regular production options, if such individual options have a mass of 2.3 kg or more, with a full capacity of lubricating oil, coolant and fuel; plus

24.0.4.3 additional loading equivalent to 68 kg at each seating position; plus

24.0.4.4 the number of seating positions times 13.6 kg for luggage in the appropriate luggage space, with the centre of gravity of the luggage load at the centre of the luggage space.

24.0.5 *'Maximum Loaded Vehicle Mass of a Vehicle other than a Passenger Vehicle'* — the *'Gross Vehicle Mass'* or *'Gross Trailer Mass'*.

24.0.6 *'Vhicle Normal Load on the Tyre'* — that load on an individual tyre that is determined by distributing to each *'Axle'* or *'Axle Group'* its share of the weight arising from the relevant *'Normal Loaded Vehicle Mass'* and dividing by the number of tyres on the *'Axle'* or *'Axle Group'*.

24.0.6.1 For a passenger vehicle the load attributable to the occupants may be distributed as in Table 1.

24.0.7 *'Winter Tread'* (includes tyres known as "Mud and Snow", "M&S" or "Snow") — a tyre whose *'Tread'* pattern and whose structure are primarily designed to ensure in mud and fresh or melting snow a performance better than that of an ordinary (road-type) tyre. The *'Tread'* pattern of a *'Winter Tread'* generally consists of *'Groove'* (rib) and/or solid block elements more widely spaced than on an ordinary (road-type) tyre.

TABLE 1

Designated *'Seating Capacity'*	Occupant Distribution	Occupant Mass to be Added to Mass on *'Axle'*	
		Front *'Axle'*	Rear *'Axle'*
4 or less	2 in Front *'Seat'*	73 kg	63 kg
5 or more	2 in Front *'Seat'* 1 in Second *'Seat'*	87 kg	117 kg

24.1.1 The tyres shall not be fitted with cleats or any other gripping devices of a type which would cause damage to roads, bridges or culverts.

24.1.2 Provision of *'Pneumatic Tyres'* and Maximum Cold Inflation Pressure

24.1.2.1 All vehicles shall be equipped with *'Pneumatic Tyres'*.

24.1.2.2 The *'Manufacturer'* shall not specify a cold inflation pressure greater than 825 kPa.

24.3.1 Placard

24.3.1.1 A placard of durable material shall be permanently affixed to the vehicle in a

prominent position and shall display:

24.3.1.1.1 For each *'Axle'* or *'Axle Group'* the tyre size designation(s) and the size and profile of the *'Rims'* to which they are fitted.

24.3.1.1.2 The recommended cold inflation pressure(s) (expressed in kPa**) for each *'Axle'* or *'Axle Group'* at maximum load as determined by Clause 24.3.2.1. Recommended pressures for other conditions may be included.

24.3.1.1.3 The load carrying capacities of each *'Axle'* or *'Axle Group'* as determined by Clause 24.3.4.4.

24.3.1.1.4 The statement:

"The sum of the load carrying capacities of the tyres fitted to any axle or axle group of this vehicle shall not be less than the relevant load shown above."

24.3.1.1.5 A statement concerning tyre *'Speed Category'*, as specified in Clause 24.3.3.

24.3.1.2 The tyre shall not be referred to by name of manufacturer or brand name on the placard.

24.3.2 Tyre Pressures

24.3.2.1 The recommended cold inflation pressure for the tyres of an *'Axle'* or *'Axle Group'* at maximum load shall not be less than the pressure specified in the *'Nominated Standard'* for the tyre size designation at the tyre load determined from the load carrying capacity of that *'Axle'* or *'Axle Group'* as shown on the tyre placard.

24.3.2.2 This recommended cold inflation pressure shall not exceed the maximum pressure specified in the *'Nominated Standard'*.

24.3.3 *'Speed Category'* Statement

24.3.3.1 For forward-control passenger vehicles (MB) or off-road passenger vehicles (MC) fitted with light truck tyres:

Either the statement:

24.3.3.1.1 : "The tyres fitted to this vehicle shall have a speed category not less than "N" (140 km/h).",

if the *'Maximum Vehicle Speed 24/00'* is ≥ 140 km/h; or

24.3.3.1.2 : "The tyres fitted to this vehicles shall have a speed category not less than "*" ("¯" km/h).",

if the *'Maximum Vehicle Speed 24/00'* is < 140 km/h.

where: "*" is the *'Speed Category'* symbol (Table 4 of ADR 23/... "Passenger Car Tyres" refers) appropriate to the *'Maximum Vehicle Speed 24/00'* of the vehicle; and
"¯" is the equivalent speed in km/h.

24.3.3.2 For light omnibuses (MD), heavy omnibuses (ME), N-Group and T-Group vehicles fitted with light truck or truck tyres; and T-Group vehicles fitted with passenger car tyres:

Either the statement

24.3.3.2.1 "The tyres fitted to this vehicle shall have a speed category not less than "L" (120 km/h)."; or

24.3.3.2.2 "The tyres fitted to this vehicle shall have a speed category at least equal to the recommended maximum vehicle operating speed, "..." km/h).",

if the recommended maximum vehicle operating speed is less than 120 km/h.

where "..." is the vehicle *'Manufacture's'* recommended maximum vehicle operating speed.

24.3.4 Selection of Tyres and *'Rims'*

24.3.4.1 All tyres fitted to an *'Axle'* shall be of the same type of *'Carcass'* construction, but may vary in respect of *'Cord'* materials and number of *'Plies'*.

24.3.4.2 The *'Rims'* shall be constructed to the dimensions of a *'Rim'* specified for the tyre size designation as an approved fitment in the *'Nominated Standard'*.

24.3.4.3 The tyre and *'Rim'* combinations on the vehicle shall be included in the recommended combinations displayed on the placard.

24.3.4.4 The sum of the load carrying capacities of the tyres fitted on each *'Axle'* or *'Axle Group'* shall not be less than the minimum specified on the vehicle's tyre placard. This minimum shall be not less than the lowest of:

24.3.4.4.1 the manufacturer's *'Gross Axle Load Rating'* for *'Axle'* or *'Axle Group'*;

24.3.4.4.2 the *'Vehicle Maximum Load on the Tyre'* multiplied by the number of tyres on the *'Axle'* or *'Axle Group'*;

24.3.4.4.3 the maximum load carrying capacity as listed in the appropriate *'Nominated Standard'* for the tyres fitted on that *'Axle'* or *'Axle Group'*; or

24.3.4.4.4 the maximum statutory permissible load for that *'Axle'* or *'Axle Group'*.

24.3.4.5 Speed Rating

24.3.4.5.1 Requirements for forward-control passenger vehicles [MB] and off-road passenger vehicles [MC] fitted with light truck tyres:

The *'Speed Category'* of the tyres fitted shall not be less than either 140 km/h or the *'Maximum Vehicle Speed 24/00'*, if this is less than 140 km/h.

24.3.4.5.2 Requirements for all other vehicles:

The *'Speed Category'* of the tyres fitted, when loaded to the *'Axle'* capacity specified on the tyre placard, shall not be less than either 120 km/h or the recommended maximum operating speed specified on the placard, if this is less than 120 km/h.

24.3.4.6 Performance Requirements

24.3.4.6.1 All Vehicles Fitted with New Light Truck or Truck Tyres

The tyres fitted shall comply with the technical requirements of at least one of the following:

24.3.4.6.1.1 Australian Standard 2230–1979: "New Pneumatic Highway Tyres other than Passenger Car Tyres" or 2230–1990 "Pneumatic Tyres Light Truck and Truck/Bus-New".

24.3.4.6.1.2 (US) Federal Motor Vehicle Safety Standard 119–1973; FR38–218: "New Pneumatic Tyres for Vehicles other than Passenger Cars".

24.3.4.6.1.3 ECE Regulation 54/00 – "Tyres for Commercial Vehicles"; or

24.3.4.6.1.4 Japanese Industrial Standard JIS D4230–1986 – "Tyres for Automobiles".

24.3.4.6.2 T-Group Vehicles Fitted with Retreaded Tyres

Retreaded tyres may be fitted to T-Group vehicles.

24.3.4.6.2.1 Retreaded passenger car and light truck tyres shall comply with the technical requirements of AS 1973–1993 "Retreaded Pneumatic Passenger Car and Light Truck Tyres".

24.3.5 If passenger car tyres are also recommended as suitable by the vehicle *'Manufacturer'* for fitment to a motor vehicle, the requirements of Section 24.2 shall be met for such tyres.

24.4.1 Carcass construction

All tyres fitted to an *'Axle'* shall be of the same type of *'Carcass'* construction, but may vary in respect of *'Cord'* materials and number of *'Plies'*.

24.4.2 Load capacity

The sum of the load carrying capacities recommended for all the tyres and *'Rims'* with which the vehicle is equipped shall be not less than the *'GVM'*.

24.4.3 *'Maximum Load Ratings'* of tyres shall comply with those listed for the tyre size designation in one of the *'Nominated Standards'*, or the tyre manufacturer's warranted maximum tyre load.

THE ROAD TRAFFIC ENACTMENT 1954

SECTION 2 — USE OF VEHICLES

31. (l) All the tyres or tracks of a vehicle shall at all times while the vehicle is being used be of such a design and maintained in such condition as will not in any way cause damage to the surface of the road or danger to persons on or in the vehicle or other persons using the road.

(2) In addition to the requirements of paragraph (1), no pneumatic tyres shall be used on a road in such a condition that any part of the cord carcass fabric thereof is exposed.

MVSR 120

Tire Selection and Rims for Vehicles
Other Than Passenger Cars

120. (1) Subject to subsection (5), the tires of every bus, chassis-cab, motorcycle, motor driven cycle, moped, multipurpose passenger vehicle, trailer, trailer converter dolly and truck shall meet the requirements of the Motor Vehicle Tire Safety Regulations.

(2) Every motor vehicle described in subsection (1) shall be equipped with rims that are listed by the manufacturer of the tires as being suitable for use with the tires of the motor vehicle in accordance with subsection 1(1) or 2(1) of Schedule V to the Motor Vehicle Tire Safety Regulations.

(3) The sum of the maximum load ratings of the tires fitted to an axle shall

(a) be not less than the gross axle weight rating (GAWR) of the axle system as specified in the vehicle's statement of compliance label as required by section 6 of the Regulations;

(b) where the statement of compliance label shows more than one GAWR for the axle system, be not less than the GAWR corresponding to the size designation of the tires fitted to the axle; and

(c) where the size designation of the tires fitted to the axle does not appear on the statement of compliance label, be not less than the lowest GAWR appearing on the label.

(4) For the purpose of determining the sum referred to in subsection (3), where a bus, chassis-cab, multipurpose passenger vehicle, trailer, trailer converter dolly or truck is equipped with a passenger car tire, the maximum load rating of that tire shall be divided by a factor of 1.10.

(5) A bus, chassis-cab, trailer, trailer converter dolly or truck may, at the request of the purchaser, be equipped at the place of manufacture of the vehicle with retreaded or used tires if those tires

(a) are owned or leased by the purchaser;

(b) have a total maximum load rating that meets the requirements of subsection (3);

(c) have not been the subject of a notice of defect;

(d) have a tread depth greater than 1.5 mm (1/16 inch); and

(e) were originally manufactured to comply with

(i) in the case of used tires, the requirements of the Motor Vehicle Tire Safety Regulations, and

(ii) in the case of retreaded tires, Canada Motor Vehicle Tire Safety Standard 119, United States Federal Motor Vehicle Safety Standard 119 or Japanese Industrial Standard JIS D4230.

(6) Each rim fitted to a vehicle described in subsection (1) shall be marked with

(a) a letter indicating the source of the rim's published nominal dimensions, which letter shall be

(i) "T" if the nominal dimensions are published by the Tire and Rim Association, Inc.,

(ii) "E" if the nominal dimensions are published by the European Tire and Rim Technical Organization,

(iii) "J" if the nominal dimensions are published by the Japan Automobile Tire Manufacturers' Association, Inc.,

(iv) "D" if the nominal dimensions are published by the Deutsches Institut f¸r Normung,

(v) "M" if the nominal dimensions are published by the Society of Motor Manufacturers and Traders Limited,

(vi) "B" if the nominal dimensions are published by the British Standards Institution,

(vii) "S" if the nominal dimensions are published by the Scandinavian Tire and Rim Organization, or

(viii) "N" if the nominal dimensions are contained in a list that is required to be furnished pursuant to paragraph 1(1)(a) or 2(1)(a) of Schedule V to the Motor Vehicle Tire Safety Regulations;

(b) the rim size designation;

(c) in the case of a multipiece rim, the rim type designation;

(d) a designation that identifies the manufacturer of the rim by

(i) name,

(ii) trademark, or

(iii) symbol; and

(e) the date of manufacture of the rim, expressed in numerals showing

(i) the month, day and year, or

(ii) the month and year.

(7) The markings referred to in subsection (6) shall

(a) be in lettering not less than 3 mm (1/8 inch) high; and

(b) be impressed to a depth or embossed to a height of not less than 0.13 mm (.005 inch) as measured from the surrounding surface.

(8) The markings referred to in paragraphs (6)(a) to (c) shall appear on the weather side of the rim.

(9) The markings referred to in paragraphs (6)(d) and (e) may appear on any part of the rim.

(10) In the case of wheels of single piece construction, the markings referred to in subsection (6) may appear on the wheel disc.

(11) In the case of rims of multipiece construction,

(a) the markings referred to in subsection (6) shall appear on the rim base; and

(b) the markings referred to in paragraphs (6)(b) to (d) shall appear on each other part of the rim in addition to the rim base.

(12) Subject to subsection (14), the compliance label required by subsection 6(1) of these Regulations shall display, after each GAWR,

(a) the size designation of tires appropriate for that GAWR;
(b) the size designation and, if applicable, the type designation of rims appropriate for the tires specified pursuant to paragraph (a); and

(c) the cold inflation pressure, in kilopascals or pounds per square inch, for the

tires specified pursuant to paragraph (a).

(13) The tires specified pursuant to paragraph (12)(a) and the rims specified pursuant to paragraph (12)(b) need not be the tires and rims with which the vehicle is equipped.

(14) At the option of the manufacturer, the information required by subsection (12) may be listed on a separate tire information label affixed to the vehicle in the manner, location and form described in section 6 of the Regulations.

National Standard
of
the People's Republic of China

Tyres

GB/T	6326–94	Tyres terms
GB	2978–89	Series of passenger car tyres
GB	1191–89	Passenger car diagonal tyres
GB	9743–88	Radial tyres of passenger car
GB	2977–89	Series of truck tyres
GB	516–89	Truck diagonal tyres
GB	9744–88	Radial tyres of truck
GB	2983–91	Series of motorcycle tyres
GB	518–91	Motorcycle tyres

Test method of tyres

GB	4502–84	Endurance test for passenger car tyres (drum method)
GB	4503–84	Strength test for passenger car tyres
GB	4504–84	Bead unseating resistance test for tubeless passenger car tyres
GB	7034–86	High speed test for passenger car tyres (drum method)
GB	4501–84	Endurance test for truck and bus tyres (drum method)
GB	6327–86	Strength test for truck and bus tyres
GB/T	13203–91	Strength test for motorcycle tyres
GB/T	13204–91	High speed performance test for motorcycle tyres (drum method)
GB/T	13205–91	Endurance test for motorcycle tyres (drum method)
GB/T	521–93	Method of measuring tyre peripheral dimensions
GB/T	7035–93	High speed performance test for light truck tyres (drum method)

GB/T 521–93 Method of measuring tyre peripheral dimensions

GB 516 Truck diagonal tyres
GB 2977 Series of truck tyres
GB 9744 Truck radial tyres
HG/T 2177 Appearance quality of diagonal tyres

GB 516–89

5.1.1. Tyre strength

Breaking energy at every point shall not be less than the value specified in table 11 after strength resting. Minimum breaking energy of rayon carcass tyre shall be computed in accordance with 60% value specified in table 11.

Table 11–Minimum breaking energy of truck tyres

N•m (kgf•cm)

ply rating / tyre	4	6	8	10	12	14	16	18	20
mini truck tyre	136 (1390)	204 (2080)	272 (2770)	—	—	—	—	—	—
light-duty truck tyre nominal rim diameter 14 and less	192 (1960)	272 (2770)	384 (3920)	—	—	—	—	—	—
light-duty truck tyre nominal rim diameter 15 and over	—	362 (3690)	515 (5250)	576 (5880)	644 (6570)	712 (7260)	—	—	—
truck tyre	—	—	893 (9110)	1412 (14410)	1785 (18210)	2283 (23280)	2599 (26500)	2825 (28810)	3051 (31110)

GB 9744–88

4.1.1 Strength

After completion of strength test, breaking energy of every point shall not be less than the value specified in table 5.

Table 5–Minimum breaking energy value of truck tyres

N•m (kgf•cm)

ply rating / tyre	6	8	10	12	14	16	18
light truck tyre nominal rim diameter code 15 and over	362 (3690)	515 (5250)	576 (5880)	644 (6570)	712 (7260)	—	—
truck tyre	—	893 (9110)	1412 (14410)	1785 (18210)	2283 (23280)	2599 (26500)	2825 (28810)

2. Test methods

2.1. Test conditions

2.1.1. Mount the tyre on a test rim. Maintain the tyre and rim assembly at an ambient temperature of 38 ± 3°C for at least 3 h. Test shall be carried out at this temperature.

2.1.2. Inflation pressure, load, rim shall conform to the requirements of current GB standard.

2.1.3. The test of truck, bus and trailer tyres specified in GB standard of truck tyres shall be carried out in accordance with tables 1–2. The test of light truck, medium and small bus, trailer tyres shall be carried out in accordance with tables 3–4.

Table 1–Test condition of truck, bus, trailer tyres (1)

pressure (kgf/cm^2)	pressure corresponding to maximum load of ply rating as specified					
load (kgf)	maximum load corresponding to maximum load of ply rating specified load rate (%)					
ply rating	8 and below	10	12	14	16 and over	
speed (km/h)	80	65	65	55	50	

NOTES: 1. When single and dual tyres shall be used as specified, take inflation pressure corresponding to maximum load of single tyre ply rating as standard.

2. When single and dual tyres shall be used as specified, take maximum load corresponding to single tyre ply rating as standard.

3. Test speed of tyre with off-the-road pattern in 10 PR and over is 10 km/h less than the tyre with general pattern in the same PR.

Table 2–Test condition of truck, bus and trailer tyres (2)

test stage	time (h)	load rate (%)				
		ply rating				
		8 and below	10	12	14	16 and over
1	7	75	70	65	65	65
2	16	95	90	85	85	85
3	24	115	105	100	100	100

Table 3–Test condition of light truck, medium small bus and trailer tyres (1)

pressure (kgf/cm^2)	inflation pressure corresponding to maximum load of ply rating specified		
load (kgf)	maximum load corresponding to ply rating specified load rate (%)		
ply rating	6, 8	10, 12	14
speed (km/h)	80	65	55

NOTES: 1. When single and dual tyres shall be used as specified, take inflation pressure corresponding to maximum load of single tyre ply rating as standard.

2. When single and dual tyres shall be used as specified, take maximum load corresponding to single tyre ply rating as standard.

Table 4–Test condition of light truck, medium small bus and trailer tyres (2)

test stage	load rates (%)	test time (h)		
		ply rating		
		6, 8	10, 12	14
1	75	4	7	7
2	95	6	16	16
3	115	24	24	24

2.1.4. The time from drum start-up to the speed specified shall be within in 5 min.

GB 516–89

5.1.2. Endurance

After endurance test for 47 h, there shall be no visual evidence of tread, carcass, ply, bead separation, broken cords, ply cracking, open splices, chunking, cracking on test tyres.

GB 9744–88

4.1.2. Endurance

After completion of endurance test of 47 h, there shall be no visual evidence of tread, sidewall, ply cords, bead separations, broken cords, ply cracking, open splices, chunking, cracking.

CHINA

ITEM	CONTENT	**ILLUSTRATION / SUPPLEMENT**

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
GB/T 7035–93	High speed performance test for light truck tyres	
4.	Test methods	
4.1.	Test conditions	
4.1.1.	Test temperature shall be maintained at 38 ± 3 C.	
4.1.2.	For test tyre, there shall be no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chunking, broken cords, cracking, open splices or bead deformation which are not conformed to the specifications of HG/T 2177 or GB 9744.	
4.1.3.	Test rim shall meet the requirements set forth in GB 516 or GB 2977.	
4.1.4.	Maintain the tyre and rim assembly at a test temperature of 38 ± 3 C for more than 3 h, after inflating it to the pressure corresponding to the maximum load. Then, readjust the tyre pressure to that specified.	
4.2.	Test procedures	
4.2.1.	Mount the tyre and rim assembly on the drum tester and test it in accordance with the specifications of table 1.	
4.2.2.	Remove the tyre from drum surface immediately after testing it in accordance with stage №1 and allow the tyre to cool to 38 ± 3 C, and then readjust the pressure to that specified. Reapply the same load, and without interruption or readjustment of inflation pressure, rotate the test wheel for the test stages of №2 to №4.	
4.2.3.	Speed increasing from drum start-up to the speed specified shall not exceed 5 min, and the speed increasing of other stage testing shall not exceed 1 min.	
4.2.4.	Remove the tyre from drum surface and measure the inflation pressure after	

running the tyre in accordance with the procedure of No4 test stage. Release the pressure after tyre cooling and inspect the tyre in accordance with the quality requirements as follows.

Table 1–Test condition of high speed performance

nominal rim diameter code	10	12, 14	15, 16	
ply rating	4, 6, 8	4, 6, 8, 10	6, 8, 10	12, 14
pressure (kPa)	pressure corresponding to maximum load of single			
test load (kg)	single maximum load × 0.88			
test stage	test speed ×test time (km/h ×min)			
1	80 ×120	80 ×120	80 ×120	80 ×120
2	90 ×30	110 ×30	100 ×30	80 ×30
3	100 ×30	120 ×30	110 ×30	90 ×30
4	110 ×30	130 ×30	120 ×30	100 ×30

NOTES: The tolerance of inflation pressures ± 10 kPa; the tolerance of test load is ± 2% given value; the tolerance of test speed is ± 1%.

GB 516–89

5.1.3. High speed performance

After high speed test of light-duty (including mini) truck tyres, there is no visual evidence of tread, ply, bead separation, cracking, chunking, broken cords, open splices.

ITEM	CONTENT	**ILLUSTRATION / SUPPLEMENT**
	GB 9744–88	
4.1.3.	High speed performance After completion of high speed test, there shall be no visual evidence of separation, cracking, chunking, broken cords, open splices.	
	GB 516–89	
8.1.	marks	
8.1.1.	The marks specified in items 8.1.1.1 ~ 8.1.1.6 shall be moulded on both sides of each tyre; and the marks specified in 8.1.1.1, 8.1.1.2 and 8.1.1.7 shall have on each flap.	
8.1.1.1.	Size;	
8.1.1.2.	Trade mark and manufacturer (or place name);	
8.1.1.3.	Ply rating;	
8.1.1.4.	Production number and framework material, structure code.	
8.1.1.5.	Running direction mark (for tread directional tread pattern);	
8.1.1.6.	Standard rim;	
8.1.1.7.	Checking stamp;	
8.1.2.	The marks specified in 8.1.1.1 ~ 8.1.1.6 shall be moulded on the tyre; Other marks shall use paint that shall not be washed away by water.	
	GB 9744–88	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
7.1.	Marks	
7.1.1.	The marks specified in items 7.1.1.1 ~ 7.1.1.6 must be moulded on both sides of each tyre; the marks specified in items 7.1.1.1, 7.1.1.2 and 7.1.1.7 must be moulded on each flap.	
7.1.1.1.	Size;	
7.1.1.2.	Trade mark and manufacturer (or place name);	
7.1.1.3.	Ply rating;	
7.1.1.4.	Production number and framework material, structure code;	
7.1.1.5.	Running direction code (for the directional tread pattern);	
7.1.1.6.	Standard rim;	
7.1.1.7.	Checking stamp.	
7.1.2.	The marks of 7.1.1.1 ~ 7.1.1.6 items on the tyres shall be moulded; other marks shall use the paint that shall not be washed away by water.	
GB 9744–88		
4.1.4.	Tread wear indicators Each tyre shall have at least four tread wear indicators spaced approximately equally around the circumference of the tyre that enable a person inspecting the rest depth 2.00 mm of groove to determine visually. The symbol showing tread wear indicators position shall be moulded on both shoulders of the tyres.	

GB 516–89

5.1.4. Tread wear indicators

Each tyre shall have at least four tread wear indicators spaced approximately equally around the circumference of the tyre that enable a person inspecting the tyre visually. The indicator shall be moulded at 2.00 m from the base of pattern block.

The symbol showing tread wear indicators position shall be moulded on both shoulders of the tyres.

Every motor vehicle

21. Tyre of soft or elastic material

A tyre shall not be deemed to be soft or elastic material unless the said material is either—

(a) continuous round the circumference of the wheel; or

(b) fitted in sections so that so far as reasonably practicable no space is left between the ends thereof,

and is of such thickness and design as to minimize, so far as reasonably possible, vibration when the vehicle is in motion, and so constructed as to be free from any defect which might in any way cause damage to the surface of a road.

22. Tyres

(1) Subject to paragraphs (2) and (7), no wheel of a motor vehicle or trailer shall be fitted with a pneumatic tyre that—

(a) is unsuitable having regard to the use to which the motor vehicle or trailer is being put or to the types of tyres fitted to its other wheels;

(b) is not so inflated as to make it fit for the use to which the motor vehicle or trailer is being put;

(c) has a break in its fabric, or has a cut in excess of 25 mm in length or 10% of the section width of the tyre, whichever is the greater, measured in any direction on the outside of the tyre and deep enough to reach the body cords;

(d) has any lump or bulge caused by separation or partial failure of its structure;

(e) has any portion of the ply or cord structure exposed: or

(f) does not—

(i) in the case of a motor cycle the cylinder capacity of the engine of which does not exceed 50 cm^3, show throughout at least $^3/_4$ of the breadth of the tread and round the entire outer circumference of the tyre a pattern the relief of which is clearly visible; and

(ii) in the case of any other motor vehicle or any trailer, have a tread pattern (excluding any tie-bar) with a depth of at least 1 mm throughout at least $^3/_4$ of the breadth of the tread and round the entire outer circumference of the tyre:

(2) Paragraph (1) shall not prohibit the use on a road of a motor vehicle or trailer by reason only of the fact that a wheel of the vehicle or trailer is fitted with a tyre which is not fully inflated if the tyre and the wheel to which it is fitted are so constructed as to make the tyre in that condition fit for the use to which the motor vehicle or trailer is being put and the outer sides of the wall of the tyre are so marked as to enable the tyre to be identified as having been so constructed.

(3) No motor vehicle or trailer shall be fitted with a recut pneumatic tyre the fabric of which has been cut or exposed by the recutting process.

(4) Without prejudice to paragraphs (1) and (3), all the tyres of a motor vehicle or trailer shall cat all times while the vehicle or trailer is used on a road be maintained in such condition as to be fit for the use to which the vehicle or trailer is being put and as to be free from any defect which might in any way cause damage to the surface of the road or danger to persons on or in the vehicle or to other persons using the road.

(5) Pneumatic tyres of different types of structures shall not be fitted to the same axle of a vehicle.

(6) A motor vehicle or trailer shall not be fitted with—

(a) a diagonal-ply tyre or a bias-belted tyre on the rear axle and a radial-ply tyre on the front axle; or

(b) a diagonal-ply tyre on the rear axle and a bias-belted tyre on the front axle.

(7) Paragraph (1) shall not apply to a land tractor, or land implement, or to an agricultural trailer when the trailer is being towed by a land tractor and nothing in paragraph (1) or (3) shall apply to a broken down vehicle or to a vehicle proceeding to a place where it is to be broken up, in either case being towed by a motor vehicle at a speed not exceeding 20 km/h.

(8) For the purposes of this regulation—

"bias-belt tyre" means a pneumatic tyre, the structure of which is such that the ply cords extend to the bead so as to be laid at alternate angles of substantially less than 90 degrees to the peripheral line of the tread, and are constrained by a circumferential belt comprising two or more layers of substantially inextensible cord material laid at alternate angles smaller than those of the ply cord structure;

"diagonal-ply tyre" means a pneumatic tyre, other than a bias-belted tyre, the structure of which is such that the ply cords extend to the bead so as to be laid at alternate angles of substantially less than 90 degrees to the peripheral line of the tread;

"radial-ply tyre" means a pneumatic tyre, the structure of which is such that the ply cords extend to the bead so as to be laid at an angle of substantially 90 degrees to the peripheral line of the tread, the ply cord structure being stabilized by a substantially inextensible circumferential belt.
"type of structure," in relation to a tyre, means a type of structure of a tyre of a kind as defines in this paragraph.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT

Every motor vehicle

(1) Every motorized vehicle, trailer car and linked car must possess a wheel system encompassing wheels and wheel axles.

(2) The wheels as referred to in sub-article (1) are in the form of wheel rims and tyres with inflatable inner tubes as well as wheel axles and combined wheel axles, which can all ensure safety.

(3) The tyres with inflatable inner tubes as referred to in sub-article (2) must possess sufficient adhesion, both on dry roads and on wet roads.

(4) The design of wheel axles and/or combined wheel axles as referred to in sub-article (2) must take into account the class of the road to be passed.

(5) Further stipulation on the wheel system and wheel axles and/or combined wheel axles as referred to in sub-article (1) and sub-article (4) shall be laid down in a Ministerial Decree.

Motor Vehicle shall comply with the following requirements for ground-contact section and contact pressure.

(1) No ground-contact section shall be constructed in such a way that it damages road surfaces;

(2) For pneumatic tires or a solid tires whose ground-contact section is 25 mm or thicker, the pressure of the ground-contact section shall not be more than 150 kg/cm of the width of the ground-contact section;

(3) For caterpillar tracks, the pressure of the ground-contact area shall not be more than 3 kg/cm^2 of the ground-contact area;

(4) Ground-contact sections other than those in Items (2) and (3) as well as those of sledges, the pressure of the ground-contact section shall not exceed 100 kg/cm of the width of the ground-contact section;

(5) For tractors, the requirements of Items (2), (3) and (4) shall be met even when coupled to a trailer.

1. The running system of a motor vehicle shall be secure to ensure safe operation.

2. Pneumatic tire shall comply with the following requirements. However, the requirement of Item (2) shall not apply to a motor vehicle with a maximum speed of less than 40 km/h or a trailer drawn thereby:

(1) The tires shall be free from any notable damage such as cracks, bare cords, etc;

(2) The ground-contact section of a tire shall have a tread to reduce the likelihood of slipping. In this case, the tread depth (except for tires mounted on large-sized special motor vehicles and trailers drawn by the aforesaid motor vehicles) shall be 1.6 mm or more (0.8 mm, in the case of tires mounted on two-wheeled motor vehicles with or without sidecars) at any part of the said treads.

3. Tire chains shall be able to be attached firmly to the running system to ensure safe

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	operation.	

THE REGULATIONS OF THE MOTOR VEHICLE SAFETY STANDARDS

CHAPTER 2
SAFETY STANDARDS FOR MOTOR VEHICLES
AND TWO-WHEELED MOTORCYCLES

Section 1 SAFETY STANDARDS FOR MOTOR VEHICLES

Article 10 & 12 Running Gear

1. The pneumatic tires of a motor vehicle shall meet each of the following items.

   (1) The load of pneumatic tire of a motor vehicle in the loaded state shall be within the maximum permissible load as specified in the Industrial Standards of the country of that tire manufacturer (in case where the pneumatic tires are not specified in the Industrial Standards, the maximum permissible load specified by that tire manufacturer).

   (2) Each pneumatic tire shall have no visible evidence of cracking or exposure of cords, and the depth of grooves shall be maintained or kept not less than 1.6 mm.

2. Each tire of a motor vehicle and other parts of a running gear shall be securely fixed, shall have no cracking or excessive corrosion or damages.

3. Each motor vehicle (excluding passenger vehicles) shall be equipped with mud flaps behind the wheels.

Vehicles

Except where otherwise provided in these rules, a tyre shall not be deemed to be of soft or elastic material unless the said material is either—

(i) continuous round the circumference of the wheel, or

(ii) fitted in sections so that so far as reasonably practicable no space is left between the ends thereof.

and is of such thickness and design as to minimize, so far as reasonably possible, vibration when the vehicle is in motion, and so constructed as to be free from any defect which might in any way cause damage to the surface of a road.

(1) Every motor vehicle shall be so constructed that the entire weight of the vehicle is transmitted to the road surface by circular wheels or by tracks:

Provided that—

(i) no part of a wheel or its fittings may project more than $3^{1}/_{2}$ inches beyond the extreme outer lateral face of any tyre when fully inflated;

(ii) in the case of a tracked vehicle the parts of the track which come into contact with the road surface shall be flat and have a minimum width of $^{1}/_{2}$ inch. The total area of each track actually in contact with the road surface at any one time shall not be less than 36 square inches in respect of each ton of the unladen weight.

(2) All wheels of a motor vehicle which are equipped with tyres other than pneumatic tyres shall have a rim diameter of not less than 27 inches:

Provided that this rule shall not apply—

(i) to any motor vehicle or trailer not exceeding 30 cwts. in weight

unladen designed for use in works or on private premises and used on a road only in passing from one part of the works or premises to another or to works or premises in the immediate neighbourhood;

(ii) to a land-tractor or any motor vehicle designed for use and used by or on behalf of Government or a local authority solely in connection with street cleaning or road construction or repairs, the collection or disposal of the contents of gullies, latrines or cesspools;

(iii) to any mobile crane.

Every wheel of a motor vehicle other than a road roller shall be equipped with pneumatic tyres:

Provided that this rule shall not apply to the following motor vehicles if they are equipped with tyres of soft or elastic material on every wheel—

(i) land tractors;

(ii) motor vehicles designed for use and used by or on behalf of Government or a local authority solely in connection with street cleansing, the collection or disposal of refuse, or collection or disposal of the contents of gullies latrines or cesspools or to a turn-table fire escape, or to a tower waggon;

(iii) motor vehicles designed for use in works or on private premises and used on a road only in passing from one part of the works or premises to another or to works or premises in the immediate neighbourhood; and

(iv) trailers or semi-trailers being plant owned by Government or a local authority, used on a road construction of repairs even if such plant is not equipped with tyres of soft or elastic material.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	All the wheels of a vehicle shall be fitted with pneumatic tyres of suitable size and design.	

TRAFFIC REGULATIONS 1976

71. Tyres

(1) No person shall on any road use on any motor vehicle a pneumatic tyre that has worn or damaged cords apparent by external examination.

[(2) No person shall on any road use on any motor vehicle a pneumatic tyre having a tread pattern (excluding any tie-bar or tread-depth indicator strip) of less than 1.5 mm in depth across at least three quarters of the breadth of the tread and around the entire circumference of the tyre. Nothing in this subclause shall apply with respect to any motor vehicle that is not capable of a speed in excess of 30 km/h, nor to any trailer drawn by such a vehicle, nor to any trailer that has a gross weight of less than 1,000 kg, nor to any [moped], nor to any tyre on a twin wheel fitted to a vehicle that is not principally designed for the carriage of passengers unless both the tyres fitted to that twin wheel have a tread pattern less than that specified as aforesaid.]

(3) No person shall on any motor cycle fitted with a motor the total piston displacement of which does not exceed 60 cm^3 or on any [moped] a pneumatic tyre the tread pattern of which is not clearly visible across at least three-quarters of the breadth of the tread and around the entire circumference of the tyre.

(4) Notwithstanding anything in [subclauses (2) and (3)] of this regulation, the use of a tyre in breach of those provisions shall not be an offence if, before the occasion on which the tyre was so used,—

(a) The owner of the motor vehicle had taken all reasonable steps to obtain a new or retreaded or recapped tyre to replace the tyre that did not comply with the requirements of the relevant subclause but such a tyre was not obtainable; and

(b) The owner had placed with a supplier an order for such a tyre, which order was still in force.

(5) No person shall on any road use on any motor vehicle, or sell for such use, a pneumatic tyre which has had its designed tread-depth increased by the process of regrooving subsequent to manufacture.

(6) Subclause (5) of this regulation shall not apply to tyres used by heavy motor vehicles at speeds below 50 km/h and specially designed and constructed for the process of regrooving subsequent to manufacture.

Subcl (2) substituted by reg 8, SR 1978/72, and as amended by reg 2(3), DSR 1984/31.
Subcl (3) amended by reg 2(3), SR 1984/31.
Subcl (4) amended by reg 16, SR 1980/31.

71.1 Exemptions: For exemptions from this regulation, see reg 89 of these regulations.

71.2 Road work vehicles: By notice in the 1969 *Gazette*, p 863, vehicles designed and used exclusively or principally for road construction or earth-moving purposes are exempted from subcl (2) of this regulation.

71.3 Vehicles registered etc after 1 November 1990: As to vehicles first registered after, or which undergo modifications or repairs after, 1 November 1990 see also reg 14 of the Transport (Vehicle Standards) Regulations 1990, and the Second Schedule to those regulations.

71.4 Owner liability: In terms of s 41A of the Transport Act 1962 (as amended by 1992/108) regs 71(1) and 71(2) are "stationary vehicle offence" and proceedings under either may be taken against the person who allegedly committed the offence, against a registered owner of the vehicle and/or against any person who at the time of the offence was lawfully entitled to possession of the vehicle. See the statutory presumptions, and the limited

range of statutory defences, set out in that section.

The Passenger Service Vehicle Construction Regulations 1978

SR 1978/15

13. Tyres and rims

(1) Each tyre of a passenger-service vehicle shall be pneumatic and of good quality and construction throughout, and shall be maintained in a safe and satisfactory condition.

(2) Every passenger-service vehicle shall be equipped with matched tyres and rims of sufficient load capacity to meet reasonable requirements of service. In determining the types and sizes of the tyres required, the load tables and data as published from time to time by the tyre manufacturer, and any tables and data provided by the British Standards Institute, the European Tyre and Rim Technical Organisation, the Tyre and Rim Association of the United States of America, or the Tyre and Rim Association of Australia may be utilised by the Secretary with any variation thereof that he considers reasonable. The appropriate inflation pressure shall be that recommended for the tyre and the service, and, so far as practicable and subject to any inflation pressure limits imposed by the Heavy Motor Vehicle Regulations 1974.

13.1 Cross-reference: See reg 8 of the Heavy Motor Vehicle Regulations 1974, and reg 14 of the Transport (Vehicle Standards) Regulations 1990.

The Goods Service Vehicle (Constructional) Regulations 1936

SR 1936/80
(Reprinted, SR 1961/94)

3. Tyres

(1) Every tyre on a road wheel of a vehicle shall be made of rubber or other elastic material.

(2) Every such tyre shall at all times be in a safe condition.

3.1 Tyres: See reg 8 of the Heavy Motor Vehicle Regulations 1974 as to maximum inflation of tyres; and also see reg 14 of the Transport (Vehicle Standards) Regulations 1990.

The Transport (Vehicle Standards) Regulations 1990

SR 1990/247

Tyres and Rims

14. Tyres and rims

(1) Tyres on the same axle shall be of the same nominal size and be of similar construction.

(2) Each tyre shall be pneumatic and of good quality and construction throughout, and shall comply with the appropriate vehicle standard.

(3) Tyres and rims shall be matched and be of sufficient load capacity to meet reasonable requirements of service, and the sum of the load capacity of all the tyres and rims shall be not less than the gross vehicle mass.

(4) Pneumatic tyres shall have a tread pattern (excluding any tie-bar or tread-depth indicator strip) of not less than 1.5 mm in depth across at least three-quarters of the breadth of the tread and around the entire circumference of the tyre.

(5) The appropriate inflation pressure shall be that recommended by the vehicle manufacturer for the tyre, having regard to the loading and the service and, so far as is practicable, the tyre shall be kept inflated at that pressure.

(6) This regulation shall not apply to any space saving spare wheel supplied by the vehicle manufacturer for temporary use only and used in the event of a road wheel being disabled.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
14.1	Cross-reference: See reg 71 of the Traffic Regulations 1976 for further tyre requirements.	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
1	Scope	
	This standard specifies requirements for pneumatic tires.	
5.2	Performance Requirements	
	Each tire of a size and type designation specified in the annexes shall be capable of meeting any applicable requirements set forth below when mounted on a test rim. The performance for such tire will be based on documented test results conducted on the same type and group of tires specified in sub-clauses 4.1 and 4.2, sampled and inspected in accordance with clause 6 of this standard.	
5.2.1	Physical Dimensions	
5.2.1.1	Preparation of Tire for Dimensional Examination—The tire shall be mounted on the rim specified in the annexes and inflated to the applicable inflation pressure specified in Table 5 for passenger tires or applicable inflation pressure specified in the annexes for light truck or truck and bus tires. The tire shall be allowed to stand for a minimum of 24 hours at room temperature and the pressure adjusted to within 10 kPa of the pressure specified in Table 5 (for passenger tires) or annexes (for light truck or truck and bus tires).	
5.2.1.2	Tire Overall Diameter—The tire overall diameter shall be determined to the nearest millimetre by measuring the outside circumference of the inflated tire with a steel tape and dividing by 3.1416. The diameter may be determined by means of a tape calibrated to directly show the tire diameter.	
5.2.1.3	Tire Overall Width—The tire overall width is the average maximum width of the inflated tire including the sidewalls, sideribs, bars, decorations, letters or numerals. The width shall be measured to the nearest millimetre at four different points equally around the tire and the results averaged.	
5.2.1.4	Size Factor—The minimum size factor shall be in accordance with those	

specified in the annexes.

5.2.1.5 Tread Depth—The depth of the centerline tread elements for truck tires shall be measured as designated in the internationally accepted "Tread Design Guide". For other types of tires and for truck tires not specified in the guide, the tread depth shall be measured at the first major groove nearest the tread centerline, avoiding any wear indicators.

Table 3–A–Minimum Breaking (Plunger) Energy for Light Truck and Truck/Bus Tires

Ply Rating (Load Range)	Breaking Energy, J					
	Light Truck (19 mm Plunger Diameter)		Truck & Bus (32 mm Plunger Diameter)		Truck & Bus (38 mm Plunger Diameter)	
	All 305 mm or small rim diameter	All others and 445 mm or smaller rim diameter	Tube type larger	Tubeless type larger than 445 mm rim diameter	Tube type	Tubeless type larger than 445 mm rim diameter
2 (A)	68	226	–	–	–	–
4 (B)	136	294	–	–	–	–
6 (C)	203	362	768	576	–	–
8 (D)	271	514	893	734	–	–
10 (E)	339	576	1412	972	–	–
12 (F)	407	644	1785	1412	–	–
14 (G)	–	712	–	–	2282	1695
16 (H)	–	768	–	–	2599	2090
18 (J)	–	–	–	–	2825	2230
20 (L)	–	–	–	–	3051	–
22 (M)	–	–	–	–	3220	–
24 (N)	–	–	–	–	3390	–

NOTE: For Rayon Cord Tires, applicable energy values are 60% of those in the above table.

7 Method of Tests

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
7.1	Test Rim—Any rim of the applicable rim width specified in the annexes as measuring rim width for a particular tire size designation with the rim dimensions shown in the latest Tire and Rim Association Yearbook, the Tire and Rim Association Engineering Design, the Tire and Wheel Engineering Data Book of the Society of Motor Manufacturers Association, Japan Automobile Tire Manufacturers' Association (JATMA), the latest European Tire and Rim Technical Organization (ETRTO) or an approved equivalent test rim.	
7.3	Tire Strength	
7.3.1	Mount the tire on a test rim and inflate it to the applicable inflation pressure specified in Table 5 for passenger tires or the applicable inflation pressure specified in the annexes for light truck or truck and bus tires. Use inflation pressure for dual tire usage when both single and dual tire inflation pressures and load are shown in the annexes. If the tire is tubeless, a tube may be inserted to prevent loss of air during the test in the event of puncture. Condition the tire at room temperature for at least 3 hours and readjust its pressure to the original pressure used.	
7.3.2	Force a cylindrical steel plunger rod with a hemispherical end perpendicularly into the tread rib as near to the centerline as possible, avoiding penetration into the groove, at the rate of 50 mm/min ± 10 mm/min. The diameter of the plunger rod for the tire is shown in Table 6.	
7.3.3	Record the force and penetration at 5 points, or 3 points in the case of tires 305 mm (12-in) rim diameter or less, equally spaced around the circumference of the tire. If the tire fails to break before the plunger is stopped by reaching the rim, record the force and penetration as the rim is reached. Compute the breaking energy for each test point by means of the following formula:	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT

W =

where:

W is the energy, J
F is the force, N
P is the penetration, m

7.3.4 Determine the breaking energy value for the tire, computing the average of the five or three values obtained.

5.2.4 Tire Endurance—When tested in accordance with sub-clause 8.4, the tires shall show no visual evidence of tread, sidewall, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices. The tire pressure at the end of the test shall not be less than the adjusted pressure at the beginning of the test run.

7 Method of Tests

7.1 Test Rim—Any rim of the applicable rim width specified in the annexes as measuring rim width for a particular tire size designation with the rim dimensions shown in the latest Tire and Rim Association Yearbook, the Tire and Rim Association Engineering Design, the Tire and Wheel Engineering Data Book of the Society of Motor Manufacturers Association, Japan Automobile Tire Manufacturers' Association (JATMA), the latest European Tire and Rim Technical Organization (ETRTO) or an approved equivalent test rim.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
7.4	Tire Endurance	
7.4.1	Prior to testing, the tire shall exhibit no visual evidence of tread, sidewall, ply, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices.	
7.4.2	Mount the tire on a test rim and inflate it to the applicable pressure specified in Table 5 for passenger tires or to the inflation pressure specified in the annexes for light truck and bus tires. Use inflation pressure corresponding to single tire usage when both single and dual tire inflation pressure and loads are shown. Condition the tire assembly to 38°C ± 3°C for at least 3 h and readjust the pressure to the initial pressure specified immediately before testing. Condition the tire assembly to 38°C ± 3°C for at least 3 h and readjust the pressure to the initial pressure specified immediately before testing.	
7.4.3	Mount the tire and wheel assembly on a test axle and press it against a flat-faced steel test wheel 1707.6 mm in diameter and at least as wide as the tread width of the tire to be tested, or an equivalent test wheel, with the applicable test load specified in Table 7. For the test load follow the specified percentage shown in Table 7 using the maximum load rating or load index (see sub-clause 8.7) marked on the tire sidewall. The corresponding maximum load rating for each load index is shown in Table 12. If the load rating or load index is not marked on the sidewall, use the maximum load for the tire size designation as shown in the applicable index. Use maximum single load when both single and dual tire maximum loads or indices are specified. During the test, the air surrounding the test area shall be 38°C ± 3°C.	

Table 7–Tire Endurance Test Conditions

Tire Category	Ply Rating	Step	Speed km/h	Duration h		Test Load % maximum load
Passenger	A1 1	1	80	First	4	85
		2	80	Next	6	90
		3	80	Next	24	100
Light Trucks	4, 6 and 8	1	80	First	7*	75
		2	80	Next	16**	97
		3	80	Next	24	114
Light Trucks, Truck and Bus	10	1	64	First	7	70
		2	64	Next	16	88
		3	64	Next	24	106
	12	1	64	First	7	66
		2	64	Next	16	84
		3	64	Next	24	101
	14	1	56	First	7	66
		2	56	Next	16	84
		3	56	Next	24	101
	16	1	48	First	7	66
		2	48	Next	16	84
		3	48	Next	24	101

* Four hours for tire sizes subject to high speed requirements.
** Six hours for tire sizes subject to high speed requirements.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT

7.4.4 Apply the test conditions specified in Table 6 without pressure adjustment or interruption. When unavoidable interruptions in excess of one hour are encountered such as power failure, a tube failure or a week-end shutdown, the following procedures must be done:

a) Run one hour with the initial load.

b) Continue the test with conditions at moment of interruption.

c) In case of tube failure, examine the tire for carcass damage. If the tire is fit for testing, replace the tube and continue test with a) and b).

7.4.5 Immediately after running the tire within the required time, measure the tire inflation pressure. The test operator shall mark (with crayon) all areas of failure which may not be evident upon cooling while the tire is inflated and hot. After cooling to room temperature (minimum of 3 h cooling before demounting), the tire shall be dismounted and inspected internally. The areas marked by the test operator shall be cut and thoroughly examined for tread, sidewall, ply, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices.

5.2.5 High Speed Performance Test—This requirement applies only to passenger car tires. When passenger car tires are tested in accordance with sub-clause 7.5, there shall be no visual evidence of tread, sldewall, ply, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices; The tire pressure at the end of the test shall not be less than the adjusted pressure at the beginning of the test run.

7 Method of Tests

7.1 Test Rim—Any rim of the applicable rim width specified in the annexes as measuring rim width for a particular tire size designation with the rim dimensions shown in the latest Tire and Rim Association Yearbook, the Tire and Rim Association Engineering Design, the Tire and Wheel Engineering

Data Book of the Society of Motor Manufacturers Association, Japan Automobile Tire Manufacturers' Association (JATMA), the latest European Tire and Rim Technical Organization (ETRTO) or an approved equivalent test rim.

7.5 High Speed Performance

This requirement applies only to passenger car tires. Two different test procedures are used in the high speed test depending on the prescribed maximum speed limit of the tire. Determination of which high speed to use is specified in sub-clauses 7.5.1 and 7.5.2.

7.5.1 Use the following test procedures for passenger car tires without speed symbol marking, for passenger car tires with speed symbol marking of T, U, H, V, W and Z as specified in sub-clause 8.7 whose corresponding maximum speed limit does not exceed 180 km/h.

7.5.1.1 Prior to testing, the tire shall exhibit no visual evidence of tread, sidewall, ply, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices.

7.5.1.2 Mount the tire on test rim and inflate it to the applicable pressure specified in Table 5 for passenger tires. Condition the tire assembly to 38°C ± 3°C for at least 3 h and readjust the pressure to the initial pressure specified.

7.5.1.3 Mount the tire on test rim on test axle and press it against a flat-faced steel wheel 1707.6 mm in diameter and at least as wide as the tread width of the tire to be tested or an equivalent test wheel. For the test load, use 88% of the tire's maximum load rating or load index as marked in the tire sidewall. The corresponding maximum load for each load index is shown in Table 12. If the load rating or load index is not marked on the sidewall, use the maximum load for the tire size designation as shown in the applicable annex. Use maximum single load when both single and dual maximum loads or indices are specified. During the test, the air surrounding the test area shall be 38°C ± 3°C.

7.5.1.4 Conduct the test in accordance with Table 8 and without pressure adjustment or other interruptions during the test periods from steps 2 to 4. When unavoidable interruptions in excess of one hour are encountered such as power failure, a tube failure or a week-end shutdown, the following procedures must be done:

a) Run one hour with the initial test load.

b) Continue the test with conditions at moment of interruption.

c) In case of tube failure, examine the tire for carcass damage. If the tire is fit for testing, replace the tube and continue test with a) and b).

7.5.1.5 At the end of the two-hour break-in period (Step 1), allow the tire to cool to 38 ± 3°C and if inflation pressure is below initial pressure, readjust the pressure to the applicable pressure specified in Table 4 for passenger tires. Pressure shall never be reduced, excess pressure would indicate that proper cooling has not been accomplished. Allow additional cooling time until pressure equals initial pressure in this case.

7.5.2 Use the following test procedures for passenger car tires with speed symbol markings of T, U, H, V, W and Z whose prescribed maximum speed limits exceed 180 km/h as specified in sub-clause 8.7:

7.5.2.1 Prior to testing, the tire shall exhibit no visual evidence of tread,. sidewall, ply, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices.

7.5.2.2 Mount the tire on a test rim specified for the size of tire shown in the annexes and inflate it to the test pressure applicable for the speed symbol marking on the tire as specified in Table 5.

7.5.2.3 Condition the tire assembly to 38°C ± 3°C for at least three hours and readjust

the pressure to that specified in sub-clause 7.5.2.2.

Table 8–Passenger Tire High Speed Performance Test per sub-clause 7.5.1

Step	Duration, h	Running Speed, km/h
1	2 (Break-in period, see sub-clause 7.5.1.5)	80
2	0.5	120
3	0.5	128
4	0.5	136
Total	3.5	

Table 9–Test Speed Schedule

Speed Symbol	Maximum Test Speed km/h	Initial Test Speed km/h
T	180	150
U	190	160
H	200	170
V	230	200
W	270	240
Z	270	240

NOTE: Accelerate road wheel to the initial test speed specified in Table 9 in ten minutes as shown in Table 10. Use a minimum of ten speed increments to achieve a uniform acceleration from 0 to the initial test speed. Run succeeding speed steps and test duration per Table 10.

7.5.2.4 Mount the tire and rim assembly on the test wheel axle/hub and press it against the flat-faced steel wheel, 1707.6 mm in diameter and at least as wide as the tire tread width to be tested or an approved equivalent test wheel. Apply to the test wheel axle a load equal to 80% and 72.8% of the maximum load

rating or load index (see sub-clause 8.7) branded on the tire sidewall for T, U, H speed symbols and V speed symbol respectively. If the load rating or load index is not marked on the sidewall, use the maximum load for the tire size designation as shown in the applicable annex. Use the maximum single load when both single and dual maximum loads or indices are specified.

7.5.2.5 Conduct the test in accordance with the speed schedule in Table 9 and procedure in Table 10. During the duration of the test, pressure adjustment and test interruption are not allowed.

Table 10–Test Speed Procedure per sub-clause 7.5.2

Speed Step	Speed, km/h	Test Duration, min	Instruction
1	0 to initial test speed (Table 8)	Uniform Acceleration in 10	Use minimum of 10 speed increments to achieve a uniform acceleration
2	Initial test speed	10	-
3	Initial + 10 km/h	10	-
4	Initial + 20 km/h	10	-
5	Maximum test speed (Table 9)	20	After test, coast down and inspect for failure

NOTE: After completion of the goal (Step 5), stop the test wheel and tires. Estimated coast down time is 2 $^1/_2$ minutes. Visually inspect the tire for any Indication of failure.

7.5.3 At the end of the test, the test operator shall mark (with crayon) all areas of failure which may not be evident upon cooling while the tire is inflated and hot. After cooling to room temperature (minimum of 3 h cooling before demounting), the tire shall be demounted and inspected internally. The areas marked by the test operator shall be cut and thoroughly examined for tread, sidewall, ply, cord, inner liner or bead separation, chunking, broken cords,

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	cracking or open splices.	
8	Marking	
8.1	Registered tradename or brandname	
8.2	Registered trademark	
8.3	Nominal size including ply rating and/or load range	
8.4	Tubeless tire shall be branded with the word “Tubeless”.	
8.5	All 4 PR passenger tires need not be marked with plyrating and/or load range.	
8.6	The words “Made in the Phils.” or Country of origin if imported.	
8.7	Speed Symbols or Markings—Tires with P-metric and new ISO size designation are normally marked on the sidewall with the load index and speed symbol to indicate maximum load (Table 12) and prescribed maximum speed (Table 11) permitted for the tire.	

ITEM CONTENT ILLUSTRATION / SUPPLEMENT

8.7.1 ISO New Tire Size Designation

Passenger Tire

185 / 70 R 13 84 H

nominal rim diameter	speed symbol
tire construction code	(see sub-clause 8.7)
nominal aspect ratio	load index (see Table 12)
nominal section width	

Light Truck Tire

195 /75 R16 LT* 107 / 105 L

tire classification code (light truck)	speed symbol
nominal rim diameter	load index: single/dual
tire construction code	
nominal aspect ratio	
nominal section width	

* May use letter “C” instead of “LT”. The “LT” can also be placed before the nominal section width.

8.7.2 Other speed symbol/category system uses the same speed symbol shown in Table 11 but the speed symbol is included in the tire size designation immediately before the tire construction code “R” as in 185/70HR13, 185HR13 and 205/50VR15.

8.7.3 Sldewall marking for Bias Light Truck/Truck and Bus Tires. The following

shall be marked on both sidewalls of the tire adjacent to the tire size and ply rating specified in clause 8:

a) Maximum load single ------- kg at ---------- kPa cold

b) Maximum load dual ------- kg at ---------- kPa cold

NOTE: The above values for the tire are to be obtained in the maximum load and inflation pressure tables as shown in this standard. The numbers and letters for the above markings are to have a minimum height of 3 mm.

Vehicles

(1) A tyre fitted to a motor vehicle shall—

(a) be free from any defect that is—

(i) apparent by external examination; and

(ii) likely to render the use of the vehicle unsafe; and

(b) subject to Subsection (5), have a clearly visible tread pattern on all surfaces that normally come into contact with the road surface.

(2) A person shall not operate a motor vehicle if—

(a) pneumatic tyres of different types of structure are fitted to the same axle of the vehicle; or

(b) a diagonal ply tyre or a bias belted tyre is fitted on the rear axle, and a radial ply tyre is fitted on the front axle, of the vehicle.

(3) Subject to Subsection (4), a person shall not cause the designed tread depth of a tyre that is fitted to a motor car, motor cycle or other vehicle, to be increased by the process of regrooving.

(4) Notwithstanding subsection (3), a tyre that is—

(a) specifically designed and constructed for the process of regrooving; and

(b) used on a motor truck, or on a machine, operated at a speed below 50 kph, may be regrooved subsequent to manufacture.

(5) A rubber-tyred road roller may be fitted with a smooth, treadles tyre.

Every motor vehicles

(1) Subject to paragraph (2), every wheel of a motor vehicle or a trailer when the trailer is being drawn on a road shall be equipped with a pneumatic tyre of a suitable size or design.

(2) Subject to rule 66 in the case of any of the following vehicles every wheel thereof shall be fitted with a pneumatic tyre, or a tyre of soft or elastic material of a suitable size and design:

(a) motor tractors, light locomotives and heavy locomotives;

(b) motor vehicles trailers designed for use and used by or on behalf of the Government solely in connection with street cleansing, the collection or disposal of refuse or of the contents of drains, gullies, latrines or cess-pools;

(c) turntable fire-escapes;

(d) tower wagons; and

(e) motor-cars each not exceeding 1.5 metric tons in weight unladen.

Every wheel of a vehicle shall be fitted with a pneumatic tyre of a suitable size and design.

(1) The wheels of every vehicle which is a taxi shall be fitted with pneumatic tyres which shall be—

(a) of such dimension as may be approved by the Registrar; and

(b) inflated to such pressure as the Registrar may specify.

(2) The size and pressure of the tyres for any taxi shall be displayed on the dashboard of the taxi.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	Every motor vehicles It shall be free from any defect of Tires, Wheels, Screws and Nuts.	

Thailand The ministerial regulation No.9

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Buses and trucks 1. The passenger transport vehicle standards 1,2,3,4,5,6,7 and small vehicles must have the following equipment and additional components: (a) Metal wheel and pneumatic inflatable tyres with a capacity capable of safety carrying the full load. 2. Animal or Goods Transport vehicle type 1,2,3,4,5 and 9 must have the following equipment and additional components (a) Metal wheel and pneumatic inflatable tyres with a capacity capable of safety carrying the full load.	

This Standard applies to new pneumatic tires designed for highway use on multipurpose passenger vehicles, trucks, buses, trailers, and motorcycles.

Each manufacturer of tires shall ensure that a listing of the rims that may be used with each tire that he produces is provided to the public. Each rim listing shall include dimensional specifications and a diagram of the rim. However a listing complied in accordance with paragraph (a) need not include dimensional specifications or a diagram of a rim if the rim's dimensional specifications and diagram are contained in each listing published in accordance with paragraph (b).

(a) Listed by manufacturer name or brand name in a document furnished to dealers of the manufacturer's tires to any person upon request and in duplicate: Tire Division National Highway Safety Administration.

(b) Contained in publications, current at the date of manufacture of the tire or any later date, of at least one of the following organizations :

- The Tire and Rim Association
- The European Tyre and Rim Technical Organization
- Japan Automobile Tire Manufacturers' Association
- Deutsche Industrie Nom
- British Standards Institution
- Scandinavian Tire and Rim Organization
- The Tyre and Rim Association of Australia

Mount the tire on a model rim assembly and inflate to the pressure corresponding to the maximum load, or maximum dual load where there is both a single and dual load marked on the tire.

Force a cylindrical steel plunger with a hemispherical end and of the diameter specified for the tire size, perpendicularly into tread as near to the centerline as possible, at a rate of 2 inches per minute, until the tire breaks or the plunger is stopped by the rim, and record the force and distance of penetration just before the plunger is stopped by the rim at five test points equally

spaced around the circumference of the tire.

And compute the breaking energy for each test point by means of the following formula:
w = [(F × P) / 2] where W = Energy, F = Force and P = Penetration

Determine the breaking energy value for the tire by computing the average of the five values.

A tire's average breaking energy shall be not less than the specified value for that tire's size and load range.

Mount the tire and a model rim assembly and inflate it to the inflation pressure corresponding to the maximum load rating marked on the tire. Use single maximum load value when the tire is marked with both single and dual maximum load.

Mount the tire and wheel assembly on a test axle and press it again a flat-faced steel test wheel 67.23 inches in diameter and at least as wide as the tread of the tire.

Apply the test load and rotate the test wheel as specified for the type of tire tested conducting each successive phase of the test without interruption.

During the test, an ambient temperature shall be maintained at 95 ± 5 deg. F.

After completion of the test, there shall be no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chucking, broken cords, cracking, or open splices. And the tire pressure at the end of the test shall be not less than the initial pressure.

This requirement is applied only to motorcycle tires and to non-speed-restricted tires of 14.5 inch nominal rim diameter or less marked load range A, B, C, or D.

Mount the tire and a model rim assembly and inflate it to the inflation pressure corresponding to the maximum load rating marked on the tire. Use single maximum load value when the tire is marked with both single and dual maximum load.
Mount the tire and wheel assembly on a test axle and press it again a flat-faced steel test wheel 67.23 inches in diameter and at least as wide as the tread of the tire.

Apply a force of 88% of the maximum load rating marked on the tire (use single maximum load value when the tire is marked with both single and dual maximum loads) and rotate the test wheel at 250 rpm for 2 hours and then without interruption or readjustment of inflation pressure, rotate the test wheel at 375 rpm for 30 minutes, then at 400 rpm for 30 minutes, and then at 425 rpm for 30 minutes,

After completion of the test, there shall be no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chucking, broken cords, cracking, or open splices. And the tire pressure at the end of the test shall be not less than the initial pressure.

Each tire shall be marked on each sidewall with the following informations (a) through (j). The markings shall be in letters and numerals not less than 0.078 inch high and raised above or sunk below the tire surface not less than 0.015 inch, except that the marking depth shall be not less than 0.010 inch in the case of motocycle tires.

Markings may appear on only one sidewall in the case of motocycle tires and recreational boat, baggage, and special trailer tires.

(a) The symbol DOT which shall constitute a certification that the tire conforms to applicable Federal Motor Vehicle Safety Standards. This number may be marked on only one sidewall.

(b) The tire identification number. This number may be marked on only one sidewall.

(c) The tire size designation

(d) The maximum load rating and corresponding inflation pressure of the tire, shown as follows :
(Mark on tires rated for single and dual load)
Max load single – lbs at – psi cold.
Max load dual – lbs at – psi cold.
(Mark on tires rated for single load)
Max load – lbs at – psi cold.

(e) The speed restriction of the tire, if 55 miles/hour or less, shown as follows: Max speed – mph

(f) The actual number of plies and the composition of the ply cord material in the sidewall, and if different, in the tread area.

(g) The words “tubeless” or “tube type” as applicable.

(h) The words “regroovable” if the tire is designed for regrooving.

(i) The words “radial” if the tire is a radial ply tire.

(j) The letter designating the tire load range.

Each tire of that size designation shall have a maximum load rating that is not less than the published maximum load rating, or if there are differing published ratings for the same tire size designation, not less than the lowest published maximum load rating.

Each tire shall be labeled with the symbol DOT which shall constitute a certification by a tire manufacturer himself that the tire conforms to applicable Federal Motor Vehicle Safety Standards.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
ß571.120	Standard No. 120; Tire selection and rims for motor vehicles other than passenger cars.	
S1.	*Scope.* This standard specifies tire and rim selection requirements and rim marking requirements.	
S2.	*Purpose.* The purpose of this standard is to provide safe operational performance by ensuring that vehicles to which it applies are equipped with tires of adequate size and load rating and with rims of appropriate size and type designation.	
S3.	*Application.* This standard applies to multipurpose passenger vehicles, trucks, buses, trailers, and motor-cycles, to rims for use on those vehicles, and to non-pneumatic spare tire assemblies for use on those vehicles.	
S4.	*Definitions.* All terms defined in the Act and the rules and standards issued under its authority are used as defined therein. *Rim base* means the portion of a rim remaining after removal of all split or continuous rim flanges, side rings, and locking rings that can be detached from the rim. *Rim size designation* means rim diameter and width. *Rim diameter* means nominal diameter of the bead seat. *Rim width* means nominal distance between rim flanges. *Rim type designation* means the industry or manufacturer’s designation for a rim by style or code. *Weather side* means the surface area of the rim not covered by the inflated tire.	
S5.	*Requirements.*	

S5.1 *Tire and rim selection.*

S5.1.1 Except as specified in S5.1.3, each vehicle equipped with pneumatic tires for highway service shall be equipped with tires that meet the requirements of §571.109, New pneumatic tires, or §571.119, New pneumatic tires for vehicles other than passenger cars, and rims that are listed by the manufacturer of the tires as suitable for use with those tires, in accordance with S4.4 of §571.109 or S5.1 of §571.119, as applicable, except that vehicles may be equipped with a non-pneumatic spare tire assembly that meets the requirements of §571.129, New non-pneumatic tires for passenger cars, and S8 of this standard. Vehicles equipped with such an assembly shall meet the requirements of S5.3.3, S7, and S9 of this standard.

S5.1.2 Except in the case of a vehicle which has a speed attainable in 3.2 kilometers of 80 kilometers per hour or less, the sum of the maximum load ratings of the tires fitted to an axle shall be not less than the gross axle weight rating (GAWR) of the axle system as specified on the vehicle's certification label required by 49 CFR part 567. If the certification label shows more than one GAWR for the axle system, the sum shall be not less than the GAWR corresponding to the size designation of the tires fitted to the axle. If the size designation of the tires fitted to the axle does not appear on the certification label, the sum shall be not less than the lowest GAWR appearing on the label. When a tire subject to FMVSS No. 109 is installed on a multipurpose passenger vehicle, truck, bus, or trailer, the tire's load rating shall be reduced by dividing by 1.10 before calculating the sum (i.e., the sum of the load ratings of the tires on each axle, when the tires' load carrying capacity at the recommended tire cold inflation pressure is reduced by dividing by 1.10, must be appropriate for the GAWR).

S5.1.3 In place of tires that meet the requirements of Standard No. 119, a truck, bus, or trailer may at the request of a purchaser be equipped at the place of manufacturer of the vehicle with retreated or used tires owned or leased by the

purchaser, if the sum of the maximum load ratings meets the requirements of S5.1.2. Used tires employed under this provision must have been originally manufactured to comply with Standard No. 119, as evidenced by the DOT symbol.

S5.2 *Rim marking.* Each rim or, at the option of the manufacturer in the case of a single-piece wheel, wheel disc shall be marked with the information listed in paragraphs (a) through (e) of this paragraph, in lettering not less than 3 millimeters high, impressed to a depth or, at the option of the manufacturer, embossed to a height of not less than 0.125 millimeters. The information listed in paragraphs (a) through (c) of this paragraph shall appear on the weather side. In the case of rims of multi piece construction, the information listed in paragraphs (a) through (e) of this paragraph shall appear on the rim base and the information listed in paragraphs (b) and (d) of this paragraph shall also appear on each other part of the rim.

(a) A designation which indicates the source of the rim's published nominal dimensions, as follows:

(1) "T" indicates The Tire and Rim Association.
(2) "E" indicates The European Tyre and Rim Technical Organization.
(3) "J" indicates Japan Automobile Tire Manufacturers' Association, Inc.
(4) "D" indicates Deutsche Industrie Norm.
(5) "B" indicates British Standards Institution.
(6) "S" indicates Scandinavian Tire and Rim Organization.
(7) "A" indicates The Tyre and Rim Association of Australia.
(8) "N" indicates an independent listing pursuant to S4.4.1(a) of Standard No. 109 or S5.1(a) of Standard No. 119.

(b) The rim size designation, and in case of multipiece rims, the rim type designation. For example: 20 × 5.50, or 20 × 5.5.

(c) The symbol DOT, constituting a certification by the manufacturer of the rim that the rim complies with all applicable motor vehicle safety standards.

(d) A designation that identifies the manufacturer of the rim by name, trademark, or symbol.

(e) (l) Any manufacturer that elects to express the date of manufacture by means of a symbol shall notify NHTSA in writing of the full names and addresses of all manufacturers and brand name owners utilizing that symbol and the name and address of the trademark owner of that symbol, if any. The notification shall describe in narrative form and in detail how the month, day, and year or the month and year are depicted by the symbol. Such description shall include an actual size graphic depiction of the symbol, showing and/or explaining the interrelationship of the component parts of the symbol as they will appear on the rim or single piece wheel disc, including dimensional specifications, and where the symbol will be located on the rim or single piece wheel disc. The notification shall be received by NHTSA at least 60 calendar days prior to first use of the symbol. The notification shall be mailed to the Office of Vehicle Safety Compliance, National Highway Traffic Safety Administration, 400 Seventh Street SW., Washington, DC 20590. All information provided to NHTSA under this paragraph will be placed in the public docket.

(2) Each manufacturer of wheels shall provide an explanation of its date of manufacturer symbol to any person upon request.

S5.3 *Label information*. Each vehicle shall show the information specified in S5.3.1 and S5.3.2 and, in the case of a vehicle equipped with a non-pneumatic spare

tire, the information specified in S5.3.3, in the English language, lettered in block capitals and numerals not less than 2.4 millimeters high and in the format set forth following this section. This information shall appear either—

(a) After each GAWR listed on the certification label required by §567.4 or §567.5 of this chapter; or, at the option of the manufacturer,

(b) On the tire information level affixed to the vehicle in the manner, location and form described in §567.4 (b) through (f) of this chapter, as appropriated for each GVWR–GAWR combination listed on the certification label.

S5.3.1 *Tires.* The size designation (not necessarily for the tires on the vehicle) and the recommended cold inflation pressure for those tires such that the sum of the load ratings of the tires on each axle (when the tires' load carrying capacity at the specified pressure is reduced by dividing by 1.10, in the case of a tire subject to FMVSS No.109) is appropriate for the GAWR as calculated in accordance with S5.1.2.

S5.3.2 *Rims.* The size designation and, if applicable, the type designation of Rims (not necessarily those on the vehicle) appropriate for those tires.

Truck Example

Suitable Tire—Rim Choice

GVWR: 7,840 kilograms (17,280 pounds)

GAWR: Front—2,850 kilograms (6,280 pounds) with 7.50-20 (D) tires, 20 × 6.00 rims at 520 kPa (75 psi) cold single

GAWR: Rear—4,990 kilograms (11,000 pounds) with 7.50-20 (D) tires, 20 × 6.00 rims, at 450 kPa (65 psi) cold dual

GAWR: 13,280 kilograms (29,279 pounds)

GAWR: Front—4,826 kilograms (10,640 pounds) with 10.00-20 (F) tires, 20 × 7.50 rims, at 620 kPa (90 psi) cold single

GAWR: Rear—8,454 kilograms (18,639 pounds) with 10.00-20 (F) tires, 20 × 7.50 rims, at 550 kPa (80 psi) cold dual

S5.3.3 The non-pneumatic tire identification code, with which that assembly is labeled pursuant to S4.3(a) of §571.129.

S6 *Load Limits for Non-Pneumatic Spare Tires.* The highest vehicle maximum load on the tire for the vehicle shall not be greater than the load rating for the non-pneumatic spare tire.

S7 *Labeling Requirements for Non-Pneumatic Spare Tires or Tire Assemblies.* Each non-pneumatic tire or, in the case of a non-pneumatic tire assembly in which the non-pneumatic tire is an integral part of the assembly, each non-pneumatic tire assembly shall include, in letters or numerals not less than 4 millimeters high, the information specified in paragraphs S7 (a) and (b). The information shall be permanently molded, stamped, or otherwise permanently marked into or onto the non-pneumatic tire or non-pneumatic tire assembly, or shall appear on a label that is permanently attached to the tire or tire assembly. If a label is used, it shall be subsurface printed, made of material that is resistant to fade, heat, moisture and abrasion, and attached in such a manner that it cannot be removed without destroying or defacing the label on the non-pneumatic tire or tire assembly. The information specified in paragraphs S7 (a) and (b) shall appear on both sides of the non-pneumatic tire or tire assembly, except, in the case of a non-pneumatic tire assembly which has a particular side that must always face outward when mounted on a vehicle, in which case the information specified in paragraphs S7 (a) and (b) shall only be required on the outward facing side. The information shall be positioned on the tire or tire assembly such that it is not placed on the tread or the outermost edge of the tire and is not obstructed by any portion of any non-pneumatic rim

or wheel center member designated for use with that tire in this standard or in Standard No. 129.

(a) FOR TEMPORARY USE ONLY; and

(b) MAXIMUM 80 KM/H (50 M.P.H.).

S8 *Requirements for Vehicles Equipped with Non-Pneumatic Spare Tire Assemblies*

S8.1 *Vehicle Placarding Requirements.* A placard, permanently affixed to the inside of the spare tire stowage area or equally accessible location adjacent to the non-pneumatic spare tire assembly, shall display the information set forth in S7 in block capitals and numerals not less than 6 millimeters high preceded by the words “IMPORTANT–USE OF SPARE TIRE” in letters not less than 9 millimeters high.

S8.2 *Supplementary Information.* The owner’s manual of the vehicle shall contain, in writing in the English language and in not less than 10 point type, the following information under the heading “IMPORTANT–USE OF SPARE TIRE”:

(a) A statement indicating the information related to appropriate use for the non-pneumatic spare tire including at a minimum the information set forth in S8 (a) and (b) and either the information set forth in S5.3.6 or a statement that the information set forth in S5.3.6 is located on the vehicle placard and on the non-pneumatic tire;

(b) An instruction to drive carefully when the non-pneumatic spare tire is in use, and to install the proper pneumatic tire and rim at the first reasonable opportunity; and

(c) A statement that operation of the vehicle is not recommended with more than one non-pneumatic spare tire in use at the same time.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
S9	*Non-Pneumatic Rims and Wheel Center Members*	
S9.1	*Non-Pneumatic Rim Requirements.* Each non-pneumatic rim that is part of a separable non-pneumatic spare tire assembly shall be constructed to the dimensions of a non-pneumatic rim that is listed pursuant to S4.4 of §571.129 for use with the non-pneumatic tire, designated by its non-pneumatic tire identification code, with which the vehicle is equipped.	
S9.2	*Wheel Center Member Requirements.* Each wheel center member that is part of a separable non-pneumatic spare tire assembly shall be constructed to the dimensions of a wheel center member that is listed pursuant to S4.4 of §571.129 for use with the non-pneumatic tire, designated by its non-pneumatic tire identification code, with which the vehicle is equipped.	

* This regulation applies to new pneumatic tyres primarily designed for use by all road vehicles;

* It does not however apply to:
New tyres for private (passenger) cars and their trailers;
Tyres designed for cycles and motor cycles;
Tyres of a speed category below 80 km/h.

* Application for approval of pneumatic tyre shall be submitted by the holder of the manufacturer's name or trade name or by his duly accredited representative.
It shall specify:

- The tyre size designation
- The manufacturer's name or trade mark;
- The category of use (normal, special or snow);
- The structure;
- The speed category;
- The load-capacity indices;
- Whether the tyre is intended to be used with or without an inner tube;
- The overall dimensions: overall section width and outer diameter;
- The factor x
- The rim on which the tyre can be mounted;
- The measuring rim and test rim;
- The measuring pressure and test and pressure index;
- The additional load/speed combination in cases;
- Drawings or phtograghs in triplicate of the side walls and tread of the tyres and by a dimensioned drawing of the cross-section of the tyre submitted for approval;

*1. Section width of a tyre

* The section width shall be obtained by means of the following formula:
$S = S1 + K(A – A1)$
Where : S is the "section width" expressed in mm and measured on the measuring rim;
S1 is the "nominal section width" (in mm) as shown on the side wall;
A is the width (expressed in mm) of the measuring rim;
A1 is the width (expressed in mm) of the theoretical rim.
K shall be taken to equal 0.4.

*2. Outer diameter of a tyre :

* The outer diameter of a tyre shall be obtained by means of the following formula:
$D = d + 2H$
Where: D is the outer diameter expressed in mm.
d is the conventional number expressed in mm.
H is the nominal section height in mm, equal to: $H=0.01 \cdot Sl \cdot Ra$,
S1 is the nominal section width in mm, and Ra is the nominal aspect ratio.

*3. Methods of measuring pneumatic tyres

The dimensions of pneumatic tyres shall be measured by the procedure described in annex 6 attached herewith.

*4. Tyre section-width specifications

The overall width of a tyre may be less than the section width or widths determined pursuant to paragraph 2.(1)*1. above.
It may exceed that value by the following percentage:
in diagonal (bias-ply)tyres : 8%
in radial-ply tyres : 4%

For tyres of a nominal value shall not be exceeded by more than 2% for radial-ply tyres or

4% for diagonal tyres.

*5. Tyre outer-diameter specifications

The outer-diameter of a tyre must not be outside the values Dmin and Dmax obtained from the following formulae:
Dmin = d + (2H•a), Dmax = d + (2H•b)
"H" and "d" are as defined as in paragraph 2.(1)*2. above.
Coefficient "a" = 0.97, and "b" are 1.04 for normal use radial tyres and 1.06 for special use radial tyres and 1.07 for normal use diagonal tyres and 1.09 for special use diagonal tyres.
And for snow tyres, the overall diameter (Dmax) established in conformity with above may be exceeded by 1%.

*1. The pneumatic tyre shall undergo at least one endurance test carried out by the procedure described in annex 7 (attached herewith) to this Regulation.

*2. A tyre which, after undergoing the endurance test, does not exhibit any tread separation, ply separation, cord separation, chunking or broken cords shall be deemed to have passed the test.

*3. The outer diameter of the tyre, measured six hours after the endurance test, must not differ by more than ± 3.5% from the outer diameter as measured before the test.

ITEM | CONTENT | **ILLUSTRATION / SUPPLEMENT**

* Pneumatic tyres submitted for approval shall display on both side walls in the case of symmetrical tyres and at least on the outer side wall in the case of asymmetrical tyres:

- The manufacturer's name or trade mark;
- The tyre-size designation;
- An indication of the structure as follows:
  On radial-ply tyres: the letter "R" placed in front of the rim diameter marking and, optionally, the word "RADIAL".
- An indication of the tyre's nominal speed category in the form of the symbol;
- An indication of a second speed category in case.
- The inscription M+S or M•S or M&S in the case of a snow tyre;
- The load-capacity indices;
- The words "TUBELESS" if the tyre is designated for use without an inner tube;
- The word "REGROOVABLE" moulded into or on to each sidewall if the tyre can be regrooved;
- The data of manufacture in the form of a group of three digits that may be placed on one sidewall only;
- An indication, by the "PSI" index, of the inflation pressure to be adopted for the load/speed endurance test.
- Tyre shall exhibit a free space sufficiently large to accommodate an approval mark.
- The approval mark that is given as an example of the arrangement.
- The markings and the approval mark referred to above paragraphs shall be moulded on to or into the tyres. They shall be clearly legible and situated in the lower area of the tyre on at least one of its sidewall.

a = 12 mm (min)

Annex 7
PROCEDURE FOR LOAD/SPEED ENDURANCE TESTS

1. Preparing the tyre

1.1. Mount a new tyre on the test rim specified by the manufacturer pursuant to paragraph 4.1.11. of this Regulation.

1.2. Use a new inner tube or combination of inner tube, valve and flap (as required) when testing tyres with inner tubes.

1.3. Inflate the tyre to the pressure corresponding to the pressure index specified by the manufacturer pursuant to paragraph 4.1.12. of this Regulation.

1.4. Condition the tyre-and-wheel assembly at test-room temperature for not less than three hours.

1.5. Readjust the tyre pressure to that specified in paragraphs 1.3. above.

2. Test procedure

2.1. Mount the tyre-and-wheel assembly on the test axle and press it against the outer face of a smooth power-driven test drum 1.70 m ± 1% in diameter having a surface at least as wide as the tyre tread.

2.2. Apply to the test axle a series of test loads expressed in per cent of the load indicated, in annex 4 to this Regulation, opposite the load index engraved on the sidewall of the tyre, in accordance with the test programme below. Where the tyre has load-capacity indices for both single and twinned utilization, the reference load for single utilization shall be taken as the basis for the test loads.

2.2.1. In the case of a tyre with a load capacity index 121 or less and a speed category above P test procedures are as specified in paragraph 3.

2.2.2. For all other tyre types the endurance test programme is shown in appendix 1 to this annex.

ENDURANCE–TEST PROGRAMME
(see appendix 1 to this annex)

2.3. The tyre pressure must not be corrected throughout the test and the test load must be kept constant throughout each of the three test stages.

2.4. During the test the temperature in the test-room must be maintained at between 20°C and 30°C or at a higher temperature if the manufacturer so agrees.

2.5. The endurance-test programme shall be carried out without interruption.

3. Load/speed test programme for tyres with a load capacity index 121 or less and a speed category Q and above

3.1. Load placed on the wheel as a percentage of the load corresponding to the load index:

3.1.1. 90% when tested on a test drum 1.70 m ± 1% in diameter;

3.1.2. 92% when tested on a test drum 2.0 m ± 1% in diameter.

3.2. Initial test speed: speed corresponding to the speed category symbol less 20 km/h;

3.2.1. Time to reach the initial test speed 10 min.

3.2.2. Duration of the first step = 10 min.

3.3. Second test speed: speed corresponding to the speed category symbol less 10 km/h;

3.3.1. Duration of the second step = 10 min.

3.4. Final test speed: speed corresponding to the speed category symbol;

3.4.1. Duration of the final step = 30 min.

3.5. Total test duration: 1 h.

4. Equivalent test methods

If a method other than that described in paragraph 2. above is used, its equivalence must be demonstrated.

Annex 7, Appendix 1
ENDURANCE–TEST PROGRAMME

Load index	Tyre speed category	Test-drum speed		Load placed on the wheel as a percentage of the load corresponding to the load index		
		Radial-ply min^{-1}	Diagonal (bias-ply) min^{-1}	7 h.	16 h.	24 h.
122 or more	F	100	100	66%	84%	101%
	G	125	100			
	J	150	125			
	K	175	150			
	L	200	-			
	M	225	-			
121 or less	F	100	100			
	G	125	125			
	J	150	150			
	K	175	175			
	L	200	175	70%	88%	106%
				4 h.	6 h.	
	M	250	200	75%	97%	114%
	N	275	-	75%	97%	114%
	P	300	-	75%	97%	114%

NOTES:

(1) “Special-use” tyres (see paragraph 2.1.3. of the Regulation) should be tested at a speed equal to 85% of the speed prescribed for equivalent normal tyres.

(2) Tyre with a Load Index of 122 or more of speed categories above M are not yet produced. Approval cannot be granted to them under this Regulation.

Annex 7, appendix 2

RELATION BETWEEN THE PRESSURE INDEX AND THE UNITS OF PRESSURE

Pressure Index ("PSI")	bar	kPa
20	1.4	140
25	1.7	170
30	2.1	210
35	2.4	240
40	2.8	280
45	3.1	310
50	3.4	340
55	3.8	380
60	4.1	410
65	4.5	450
70	4.8	480
75	5.2	520
80	5.5	550
85	5.9	590
90	6.2	620
95	6.6	660
100	6.9	690
105	7.2	720
110	7.6	760
115	7.9	790
120	8.3	830
125	8.6	860
130	9.0	900
135	9.3	930
140	9.7	970
145	10.0	1000
150	10.3	1030
.....	.....	.....

ITEM 96-32

Lighting installation (motorcycles)

APEC Regulation Analysis Findings
Item No. 96-32: Lighting Installation (Motorcycles)

1. Member Economy Comparison

(1) The U.S. and Canada subscribe to FMVSS 108.

(2) Australia has a regulation for motorcycle lighting installation that is similar to the corresponding ECE regulation.(3) The Korean regulation is similar to Japan's SRRV. The Thai regulation resembles partly the corresponding ECE regulation and partly Japan's SRRV.

(4) Hong Kong and Indonesia lack detailed requirements in many items.

(5) Other member economies do not have specific requirements for motorcycle lighting installation.

2. Item Comparison

(1) Regarding headlamps (B-a, C-a), member economies require the installation of one or two headlamps at most, and their installation positions slightly vary. Member economies require white light for headlamps, with some member economies also allowing yellow light. Specifications for luminous intensity and light distribution vary among member economies.

(2) As for lamps other than headlamps (B-b - B-f, C-b - C-f), member economies are nearly identical in the required number of lamps but slightly vary in installation positions and light distribution. Although there are minor differences, member economies basically require yellow or similar colors for front lamps and red or similar colors for rear lamps.

(3) Regulations for motorcycle lighting installation can be divided into the following groups:

* FMVSS group - U.S., Canada
* ECE group - ECE, Australia
* Japan group - Japan, Korea, Thailand

Item No. 96-32 Lighting installation

A: Application Motorcycles

Member Economies	B: Structure requirement (General specification)	B-a: Headlamp	B-b: Registration plate lamp
Australia		ADR 19/01 (1 or 2 lamps, not more than 100 mm away from the edge of passing lamp, may be reciprocally incorporated or grouped with other front lamps but not be combined,)	
Brunei			
Canada		FMVSS 108 (height : 560-1370 mm)	FMVSS 108 (at rear registration plate)
Chile			
China			
Hong Kong		Unique(1 or 2 lamps, in the pair lamps shall be operated at the same time)	
Indonesia		Unique (not more than 2 lamps)	Unique (one lamp)
Japan		SRRV32(1 or 2 lamps, height : 1.2 m or less, symmetrical, the outmost edge shall be within 400 mm of the outer part of the vehicle)	SRRV32 (shall be turned on whenever the headlamps are turned on)
Korea	Unique (the lamp may be used for two or more purposes)	Unique (not more than 2 headlamps, height: 50-120 cm)	
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines	Unique (electric system shall be suitably covered)		
Singapore			
Chinese Taipei			
Thailand		Unique(not more than 2 lamps, symmetrical at the same level, height :50-120 cm)	Unique (not more than 2 lamps at the bottom or side of licence plate)
U.S.A		FMVSS 108 (1 or 2 lamps, height: 22-54 inches(55.9-137.2 cm))	
ECE	ECE53 (mandatory: driving lamp, passing lamp, direction indicator, stop lamp, resistration plate lamp, front position lamp, rear position lamp, rear reflex reflector)	ECE 53 (1 lamp, not more than 100 mm away from the edge of passing lamp, may be reciprocally incorporated or grouped with other front lamps but not be combined, passing lamp : 500-1,200 mm)	ECE 53 (1 lamp, may be grouped or combined but not be reciprocally incorporated with other rear lamps)

Member Economies	B-c: Tail lamp	B-d: Rear reflex reflectors	B-e: Stop lamp
Australia	ADR 19/01 (one lamp, height: 350•`1,200 mm)		ADR 19/01 (one lamp, height: 350-1,200 mm, may be grouped or reciprocally incorporated but not be combined with other lamps)
Brunei			
Canada	FMVSS 108 (mounted symmetrically, height : 380•`1830 mm)	Unique(symmetrical, height : 380-1530 mm)	FMVSS 108 (mounted symmetrically, height : 380-1830 mm)
Chile			
China			
Hong Kong			
Indonesia	Unique (one lamp)		Unique (one lamp)
Japan	SRRV 32(only one tail lamp , height : 2 m or less)	SRRV 32(not be triangular, height: 1.5 m or less, on the center at the rear)	SRRV 32(only one stop lamp, the luminous intensity increase 5 times or more than that of tail lamp, height:2 m or less)
Korea			
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand	Unique (not more than 2 lamps, height: 35cm 120 cm)		Unique (not more than 2 lamps, height: 35-120 cm)
U.S.A	FMVSS 108 (height : 15-72 inches)	FMVSS 108 (height : 15-60 inches)	FMVSS 108 (height : 15-72 inches)
ECE	ECE 53 (1 lamp, height : 350-1,200 mm)	ECE 53 (one, height : 350-900 mm)	ECE 53 (1 lamp, height : 350-1,200 mm)

Member Economies	B-f: Direction indicator lamp	C: Performance requirement	C-a: Headlamp
Australia	ADR 19/01 (two indicators at both the front and the rear, minimum distance between illuminating surfaces: 300 mm(front), 240 mm(rear), height: 350-1,200 mm, may be grouped but not be combined or reciprocally incorporated with other lamps)	ADR 19/01 (no red lamp shall be visible towards the front, no white lamp towards the rear)	ADR 19/01 (geometric visibility: not less than 5° with the axis of reference of the headlamp)
Brunei			
Canada	FMVSS 108(one on each side with separation distance of 400 mm for the front and 230 mm for the rear, height: 380-2110 mm)		
Chile			
China			
Hong Kong			not less than 18 watts
Indonesia	Unique (a pair of lights at the front and rear, fixed parallel on the right and left sides)		Unique (white or yellow, can illuminate at least 40 m for near sight and 100 m for far sight)
Japan	SRRV 32(at least one each side symmetrically, the distance between lamps 250 mm for the front 150 mm for the rear, height : 2.3 m or less)		SRRV 32(may discern obstacle on the road at a distance of 100 m at night,the colour : white or light-yellow)
Korea	Unique (height: not less than 35 cm, spacing of the lamp: not less than 25 cm for the front,not less than 15 cm for the rear)		Unique(white or yellow, luminous intensity per lamp :5,000-150,000 cd(high beam),1,000-12,500 cd(low beam))
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand	Unique (height: 35-120 cm)		Unique (white or amber, in case of 2 lamps they shall give out the same colour of light)
U.S.A	FMVSS 108 (height : 15-83 inches, horizontal separation distance: 16 inches(front), 9 inches(rear))		
ECE	ECE 53 (two front indicators, two rear indicators,the space between the inner edges: not less than 560 mm, height: 350-1,200)		ECE 53 (white or selective yellow,)

Member Economies	C-b: Registration plate lamp	C-c: Tail lamp	C-d: Rear reflex reflectors
Australia		ADR 19/01 (geometric visibility: horizontal angle: 80• ‹to left and right, vertical angle: 15• ‹above and below the horizontal)	ADR 19/01 (geometric visibility: horizontal angle: 30• ‹to left and right, vertical angle: 15• ‹above and below the horizontal)
Brunei			
Canada			Unique (colour: red for the rear, yellow for the front)
Chile			
China			
Hong Kong			
Indonesia	Unique (be visible from the distance of at least 30 m from the back)	Unique (red, be visible from the distance of at least 300 m)	
Japan	SRRV 32(visible from a distance of 20 m to the rear, the colour : white)	SRRV 32(visible at night from a distance of 300 m from the rear, the colour : red)	SRRV 32(visible at night from a distance of 150 m from the rear when illuminated by headlamp, the colour : red)
Korea			
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand	Unique (white, enable the reading the plate at a distance of not less than 20 m)	Unique (red)	
U.S.A			
ECE	ECE 53 (white)	ECE 53 (red)	ECE 53 (red)

Member Economies	C-e: Stop lamp	C-f: Direction indicator lamp	D : Label	E : Reference, Alternative
Australia	ADR 19/01 (geometric nisibility: horizontal angle: 45• ‹to left and right, vertical angle: 15• ‹ above and below the horizontal)			
Brunei				
Canada		Unique(colour :yellow for the front, red or yellow for the rear)		
Chile				
China				
Hong Kong				
Indonesia	Unique (red, shall have the strength of the light greater than that of stop lamp)			
Japan	SRRV 32(visible in daytime at a distance of 100 m from the rear, the colour : red)	SRRV 32(visible in daytime at a distance of 100 m to the intented direction, flash rate 60-120 cpm,the colour : amber)		
Korea		Unique (yellow or amber, flash rate: 60-120 cpm, luminous intensity per lamp : 30-750 ccl)		
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei				
Thailand	Unique (red, brighter than tail if housed in the same unit as tail light)	Unique (amber for the front, red or amber for the rear, same colour on both the left and right side)		
U.S.A		FMVSS 108 (front: amber, rear: red or amber)		
ECE	ECE 53 (red)	ECE 53 (amber, flash rate : 90±30 times per minute)		

32 Lighting installation (motorcycles)

AUSTRALIA	ADR 19/01	Lighting installation 1/4
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycle, Motor tricycle, Moped (2 wheels & 3 wheels)	
B : Structure requirement B-a : General specification	*For all light-signalling devices the reference axis of the lamp when fitted to the vehicle shall be parallel to the bearing plane; in addition, it shall be perpendicular to the median longitudinal plane of the vehicle in the case of side reflex reflectors and parallel to that plane in the case of all other light-signalling devices. *In the absence of specific instructions lamps constituting a pair and having the same function shall be mounted symmetrically in relation to the median longitudinal plane, be symmetrical to one another in relation to the median longitudinal plane, satisfy the same colorimetric requirements, and have identical nominal photometric characteristics.	
B-b : Headlamp	*Number : 1 or 2 lamps *Position : In the geometric center in the longitudinal median plane of the vehicle and at the front of the vehicle In all cases the edge of the illuminating surface of an independent driving lamp shall be not more than 100 mm away from the edge of the illuminating surface of the passing lamp. *May be “reciprocally incorporated” with the passing lamp, the front position lamp, and the front fog lamp. *May be “grouped” with other front lamps but not be “combined” with any others.	
B-c : Direction-indicator lamp	*Number : two front indicators and two rear indicators *Position in width : For front indicators ; *There shall be a minimum distance of 300 mm between illuminating surfaces. *They shall be situated outside of longitudinal vertical planes tangential to the outer edges of the illuminating surface of the headlamps.	

B-d : Stop lamp	*There shall be a minimum distance of at least 100 mm between the illuminating surfaces of indicators and headlamps close to one another. For rear indicators, the clearance between the inner edges of the illuminating surfaces shall be at least 240 mm. *position in height : Not less than 350 mm nor more than 1200 mm above the ground *position in length : The forward distance between the center reference of the rear indicators and the transverse plane which constitutes the rearmost limit of the vehicle's over-all length shall not exceed 300 mm. *May be "grouped" with one or more lamps but not be "combined" or "reciprocally incorporated" with any other lamps. *Number : One lamp. *Position : In width : The center of reference shall be in the median longitudinal plane of the vehicle. In height : Not less than 350 mm nor more than 1200 mm above the ground. In length : At the rear of the vehicle. *May be "grouped" with other lamps but not be "combined" with any other lamps. *May be "reciprocally incorporated" with the rear position lamp.	
B-e : Front position lamp	*Number : One independent lamp, or one reciprocally incorporated with a passing lamp. *Position In width : The center of reference shall be in the median longitudinal plane of the vehicle. The point on the illuminating surface which is farthest from the vehicle's median long-tudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle In height : Not less than 350 mm nor more than 1200 mm above the ground. In length : At the front of the vehicle. *May be "Grouped" or "reciprocally incorporated" with any other front lamp.	
B-f : Rear position lamp	*Number : One lamp	

AUSTRALIA		Lighting installation 3/4
	*Position In width : The center of reference shall be in the median longitudinal plane of the vehicle. The point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle The clearance between the inner edge of the illuminating surface shall not be less than 400 mm. In height : Not less than 350 mm nor more than 1200 mm above the ground. In length : At the rear of the vehicle.	Lighting installation 4/4
B-g : Rear reflex reflector	*Number : One reflector *Position In width : The center of reference shall be in the median longitudinal plane of the vehicle. The point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The inner edge of the reflectors shall not be less than 400 mm apart. In height : Not less than 350 mm nor more than 900 mm above the ground. *may be "grouped" with any other lamps.	

AUSTRALIA		
C :Performance requirement C-a : General specification	*No red lamp shall be visible towards the front and no white lamp shall be visible towards the rear.	
C-b : Headlamp	*Geometric visibility : Shall be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5°with the axis of reference of the headlamp.	
C-c : Direction-indicator lamp	*Geometric visibility ; Vertical angle : 15 above and below the horizontal. *The light flashing frequency shall be 90±30 times per minute. *The flashing of the indicators on the same side of the vehicle shall occur synchronously and in phase.	
C-d : Stop lamp	*Geometric visibility ; Horizontal angle : 45° to left and right Vertical angle : 15° above and below the horizontal.	
C-e : Front position lamp C-f : Rear position lamp	*Geometric visibility ; Horizontal angle : 80° to left and right Vertical angle : 15° above and below the horizontal.	
C-g : Rear reflex reflector	*Geometric visibility ; Horizontal angle : 30° to left and right Vertical angle : 15° above and below the horizontal.	
D : Label marking requirement	None	

Lighting installation (motorcycles)

CANADA	CMVSS 108	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycles	
B : Structure requirement B-a : Headlamps	*On the front, on the vertical centerline except that, if two are used they shall be symmetrically disposed about the vertical centerline. *Height above road surface : not less than 560 mm (22 inches) nor more than 1370 mm (54 inches)	
B-b : Taillamps B-c : Stoplamps	*On the rear - on the vertical centerline except that, if two are used, they shall be symmetrically disposed about the vertical centerline. *Height above road surface : not less than 380 mm, nor more than 1830 mm.	
B-d : License plate lamps	*At rear license plate.	
B-e : Reflex reflectors	*On the rear - 1 red on the vertical centerline except that, if two are used on the rear, they shall be symmetrically disposed about the vertical centerline. *On each side - 1 red as far to the rear as practicable, and 1 yellow as far to the front as practicable. *Height above road surface : not less than 380 mm, nor more than 1530 mm.	
B-f : Turn signal lamps	*At or near the front - 1 yellow on each side of the vertical centerline at the same height, and having a minimum horizontal separation distance of 400 mm. Minimum edge to edge separation distance between lamp and headlamp is 100 mm. *At or near the rear -1 red or yellow on each side of the vertical centerline at the same height and having a minimum horizontal separation distance of 230 mm. *Height above road surface : not less than 380 mm, nor more than 2110 mm.	
C : Performance requirement	None	
D: Label marking requirement	None	

Lighting installation (motorcycles)

HONG KONG, Road Traffic Regulations NO. 97, 104		
ITEM	CONTENT	Illustration / Supplement
A : Application	Construction and Maintenance of Vehicles	
B : Structure requirement	*A motor vehicle which has 2 or 3 wheels shall carry (a) one headlamp in the vertical plane passing through the longitudinal axis of the vehicle (b) a matched pair of headlamps, both headlamps in the pair being wired to a device the operation of which at the will of the driver can cause to be emitted from them at the same time either main beams or dipped beams.	
C : Performance requirement	*The rating of the filament or at least one of the filaments of any hesdlamp shall not be less than 18 watts in the case of a main beam or dipped beam emitted by a headlamp carried by a motorcycle.	
D : Label marking requirement	None	

32 Lighting installation (motorcycles)

INDONESIA,	Government Regulation No.44/1993, 41 to 51	Lighting installation 1/2
ITEM	CONTENT	Illustration / Supplement
A : Application	All vehicles including a motorcycle	
B : Structure requirement B-a : For motorcycle B-b : For side car	* A motorcycle with or without a side car must be equipped with lights and light reflectors encompassing : a) the main light for near sight, the maximum number of the lights is two; b) the main light for far sight if the speed exceeds 40 km/h on a flat road, the maximum number the lights is two; c) a pair of direction-indicating lights at the front and back parts of the motorcycle, the lights shall be fixed parallelly on the right and left sides; d) one front-position light, the maximum number of the lights is two ; e) one rear-position light; f) one brake light; g) one light to illuminate the vehicle number plate at the back part; h) a red light reflector which is not in the form of triangle. If the motorcycle is equipped with two main lights or two front-position lights as referred to in sub-article a), b) and d), the lights must be fixed side by side with the shortest distance possible. * A side car connected to a two-wheel motorcycle must be equipped with: a) a white or light-yellow front-position light at the front part; b) a red rear-position light at the back part; c) one red light reflector not in the form of a triangle; d) deep yellow direction-indicating lights fixed on the left side the front and back parts of the motorcycle. Both position lights of the side car as referred to in sub-article a) and b) must	

INDONESIA C : Performance requirement C-a : Main light C-b : Direction-indicating light C-c : Position light C-d : Brake light C-e : Number plate light	* The main light for near sight shall be white or light yellow in colour and can illuminate the road in the evening in bright weather at least 40 m ahead of the motorcycle. * The main light for far sight shall be white or light yellow in colour and can illuminate the road in the evening in bright weather at least 100 m ahead of the motorcycle. * The direction-indicating light shall have deep yellow blingking light and shall be visible during the day and in the evening by other road users. * The front-position light shall be white or light yellow in colour, and must be visible in the evening in bright weather from a distance of at least 100 m and shall not dazzle other road users. * The rear-position light shall be red in colour visible in the evening in bright weather from a distance of at least 300 m and shall not dazzle other road users. * The brake light shall be red in colour and shall have the strength of the light greater than that of the rear- position light fixed at the part of the motorcycle.	Lighting installation 2/2
D : Label marking requirement	None	

32 Lighting installation (motorcycles)

JAPAN	Safety Regulations for Road Vehicles, Article 32 to 41-3	Lighting installation 1/3
ITEM	CONTENT	Illustration / Supplement
A : Application	Two-wheeled motor vehicles	
B : Structure requirement B-a : Headlamps	*Motor vehicles shall be provided a headlamp on each side at the front of the motor vehicle. However, two-wheeled motor vehicles may be provided only one headlamp at the front. *Headlamps shall be so constructed that the intensity may be dimmed or the direction of the headlamp may be dipped to avoid hindering other traffic. *The headlamps shall be mounted at the height of 1.2 m or less above the ground on the same level and symmetrically to the longitudinal axis of the motor vehicle. *The outermost edge of the illuminating surface of a headlamp shall be within 400 mm of the extreme outer part of the vehicle.	
B-b : Number plate lamps	*The number plate lamp shall be wired so that it may not be put out at the driver's seat. *It must be turned on whenever the headlamps are turned on.	
B-c : Tail lamp	*For a two-wheeled motor vehicle only one tail lamp is required. *Tail lamps shall be located at a height of 2 m or less above the ground.	
B-d : Rear reflex reflectors	*Motor vehicle shall be provided with rear reflex reflectors on the rear plying with the following requirements: *The reflecting surface shall not be triangular. *Rear reflex reflectors shall be mounted at a height of 1.5 m or less above the ground. *For a two-wheeled motor vehicle, a reflector may be mounted on the center at the rear.	
B-e : Stop lamps	*For a two-wheeled motor vehicle, only one stop lamp on the rear is required. *It shall be so wired that it may be turned on only when the brake system is operated. *The stop lamp in combination with a tail lamp shall be so wired that its luminous intensity may increase 5 times or more stronger than that of the tail lamp only when the brake system is operated.	

JAPAN		Lighting installation 2/3
B-f : Direction indicator lamps	*The stop lamp shall be mounted at a height of 2 m or less above the ground. *It shall be so mounted that the illuminating surface thereof may be visible from a point at any height of 2.5 m or less above the ground at a distance of 10 m to the rear. *Motor vehicle shall be provided with direction indicator lamps, with at least one each side, at the right and left sides of the vehicle. These are to be mounted so that they may be visible from a distance of 30 m to the front and the rear along the longitudinal axis of the vehicle. *Direction indicator lamps shall be mounted symmetrically to the longitudinal axis of the vehicle. *The distance between the two respective indicator lamps shall be less than 250 mm for the front, 150 mm for the rear. In the case of two-wheeled motor vehicle has two or more heaslamps or tail lamps, the direction indicator lamps for the front shall be mounted on the outer position of the outer-most headlamps, or that for the rear on the outermost tail lamps. *Direction indicator lamps shall be mounted at a height of 2.3 m or less above the ground. *Direction indicator lamps mounted on each side of a motor vehicle may be wired so that they flash in time with the hazard warning lamps.	
C : Performance requirement C-a : Headlamps	*The headlamps of a motor vehicle shall have, when all headlamps are lit at the same time, such intensity that the driver may discern any obstacle on the roads at a distance of 100 m to the front at night. *The dimmed or dipped beam shall have, when all of them are lit at the same time, such an intensity that the driver may discern any obstacle on the road at a distance of 40 m to the front at night.	

JAPAN		Lighting installation 3/3
C-b : Number plate lamps	*The color of the headlamp light shall be white or light-yellow, and the color of all head-lamps of a motor vehicle shall be same.	
C-c : Tail lamps	*This light shall render the figure clearly visible from a distance of 20 m to the rear. *The color of the light : white	
C-d : Rear reflex reflectors	*The illuminating light of a tail lamp shall be clearly visible at night from a distance of 300 m from the rear of the vehicle. *The color of the light of the tail lamp shall be red.	
C-e : Stop lamps	*The reflecting light of a rear reflex reflector shall be clearly visible at night from a distance of 150 m from the rear of the vehicle when illuminated by headlamp beams. *Rear reflex reflectors shall reflect red light.	
C-f : Direction indicator lamps	*The illuminating light of a stop lamp shall be clearly visible in daytime at a distance of 100 m from the rear of the vehicle. *The color of the light of a stop lamp shall be red. *The illuminating surface of the lamp shall have a projected area of not less than 7 cm2. *Direction indicator lamps shall, when in operation, be visible in day time from a distance of 100 m to the intented direction. * Direction indicator lamps shall, when in operation, flash at rate between 60 cycles and 120 cycles per minute. *The color of the light of a direction indicator lamp shall be amber.	
D : Label marking requirement	None	

32 Lighting installation (motorcycles)

KOREA	The Regulations of the Motor Vehicle Safety Standards (Art. 75,79,81,82)	Lighting installation 1/2
ITEM	CONTENT	Illustration / Supplement
A : Application	For the structures and equipment of motor vehicles and two-wheeled motorcycles	
B : Structure requirement B-a : Headlamp	*Each two-wheeled motorcycle shall have equipped with not more than two head-lamps on the front. The aiming direction of a driving beam shall be the same as the line of travel of the motorcycle, and the main photometric axis of a driving beam shall aim downward. *The center of the lamp shall be not less than 50 cm but not more than 120 cm above the ground in the unloaded state.	
B-b : Turn signal lamp	* Each two-wheeled motorcycle shall have equipped with the turn signal lamps. *on each side of the front and rear of the motorcycle *symmetric about the center line of the motorcycle *the spacing of the front lamp shall be not less than 25 cm the spacing of the rear lamp shall not less than 15 cm not less the 50 percent of the width *the center of the lamp shall be mounted not less than 35 cm above the ground in the unloaded state	
B-c : Other lamps	*No two-wheeled motorcycle shall be equipped *with red lamps, reflex reflector or flashers on the front which may be confused as turn signal lamps *with lamps or flashers on the rear which may be confused as the stop lamp or turn signal lamps respectively *Each two-wheeled motorcycle shall be equipped with the illuminating device which may enable the driver to identify the controls and displays in the night.	

KOREA		Lighting installation 2/2
C : Performance requirement C-a : Headlamp	*The colour of the light : white or yellow *The luminous intensity per one lamp : *for the driving beam : not less than 5,000 cd but not more than 150,000 cd *for the low beam : not less than 1,000 cd but not more than 12,500 cd *The sum of the maximum luminous intensities of all headlamps shall not exceed 225,000 cd.	
C-b : Turn signal lamp	*The turn signal lamp shall flash or diminish its intensity at the constant rate of not less than 60 cycles but not more than 120 cycles per minute. *The colour of the light : yellow or amber *The luminous intensity per one lamp : not less than 30 cd but not more than 750 cd	
D : Label marking requirement	None	
E : Others	*The lamp of a two-wheeled motorcycle may be used for two or more purposes. *The Minister of Construction and Transportation may order additional lamps to be installed.	

32 Lighting installation (motorcycles)

NEW ZEALAND Traffic Regulations Part VII Vehicles standards regulation part II		
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycles	
B : Structure requirement B-a: Headlamps	*At least 1 and not more than 2 headlamps	
B-b: Rearward-facing side lamps	*At least 1 lamp, shall be mounted not higher than 1.5m above the ground	
B-c: Stop lamps	*At least 1 lamp, shall be mounted not higher than 1.5m above the ground	
B-d: Registration-plate illumination lamp and rear reflectors	*Shall be fitted with at least one lamp the white light from which shall illuminate the figures and letters of the rear registration plate *1 or more approved red reflectors, shall be equipped at a height from the ground not exceeding 1.5m	
B-e: Direction-indicator lamps	*Approved (flashing) direction - indicator lamps, capable of signaling the direction of the intention of the driver to turn to the right or to the left *Not less than 2 at the front and not less than 2 at the rear of the vehicle at a height, in each case, from the ground not exceeding 1.5m	
C : Performance requirement C-a: Headlamps	*Display beams of light of sufficient power, when the lamp are in the dipped position, to enable substantial dark objects and the nature of the road surface at a distance of at least 50m directly in front of the vehicle to be clearly visible during hours of darkness under normal driving conditions to a driver of normal vision	

NEW ZEALAND Road Traffic Law No. 69		
ITEM	CONTENT	Illustration / Supplement
C-b: Rearward-facing side lamps	*When lit, display a red light, clearly visible in clear weather, during hours of darkness, at a distance of 200m, through an angle of at least 15 degrees above and below a horizontal plane passing through the lamp and through angles of at least 45 degrees inboard and 80 degrees outboard of vertical plane passing through the lamp parallel to the longitudinal axis of the vehicle.	
C-c: Stop lamps	*Display a red light to the rear of the vehicle clearly visible in normal sunlight at a distance of 100m through a vertical angle of at least 15 degrees above and 15 degrees below a horizontal plane passing through the lamp, and through a horizontal angle of at least 45 degrees to each side of a longitudinal vertical plane passing through the lamp.	
C-d: Registration-plate illumination lamp and rear reflectors	*Shall be fitted with at least one lamp the white light from which shall illuminate the figures and letters of the rear registration plate. The figures and letters shall be clearly visible during the hours of darkness under normal conditions at a distance of 20m.	
C-e :Direction-indicator lamps	*If case of forward-facing lamps, display lights white or amber in colour, in case of rearward-facing lamps, display light red or amber in colour. *When lit, be visible through an angle of at least 15 degrees above and below a horizontal plane passing through the lamp and through a horizontal angle of at	
D : Label marking requirement	None	

32 Lighting installation (motorcycles)

PHILIPPINES	ADMINISTRATIVE ORDER AO-91-005 (S17-AO)	
ITEM	CONTENT	Illustration / Supplement
A : Application	The electrical system of all motor vehicles	
B : Structure requirement	*The electrical wiring located inside the compartment or the place for a gas container for liquified petroleum gas with a partition wall such as the boot shall be covered with an insulator and fixed to the body. *The electrical terminal switch and other electric system which are likely to spark and located inside the vehicle compartment shall be suitably covered.	
C : Performance requirement	None	
D : Label marking requirement	None	

32 Lighting installation (motorcycles)

THAILAND	Ministerial Regulations No.22	Lighting installation 1/2
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycle	
B : Structure requirement	*Not more than 2 headlamps fitted in the middle at the front of the motorcycle and at least 50 cm. above the roadsurface but not more than 1.20m. In case of having 2 headlamps, they shall be fitted at the same level and away from the middle line at the front of motorcycle to both sides at equal distance. *2 indicator lights of blinking type and of amber light fitted at the front and of red or amber light fitted at the rear on both the left and the right sides. The lights shall be fitted at the same level and at least 35 cm. above the road surface but not more than 1.20 m. All lights on the same side shall blink simultaneously when the vehicle is signalling to make a turn. *Not more than 2 red tail lights and/or 2 red stop lights in the middle at the rear of the motor-cycle and at the same level. They shall be at least 35 cm. above the road surface but not more than 1.20 m. If stop lights are housed in the same unit as tail light, they shall be brighter than the tail light and shall give out light only when the brake is used. *Not more than 2 license plate lamps fitted on top or at the bottom or at the side of license plate. *Not more than 2 dimming lamps fitted in the middle at the front of motorcycle. In case of 2 lamps, they shall be at the same level and at least 35 cm. above the road surface but not more than 1.20 m. Dimming lamp shall out light specifically when the tail light gives out light as well.	

THAILAND		Lighting installation 2/2
C : Performance requirement	*The colour of the light *high-beam headlamp : white or amber, low-beam headlamp : same colour of light of high-beam headlamps in case of having 2 lamps, they shall give out the same colour of light *indicator light : amber for the front, red or amber for the rear but the same colour of light shall be given out on both the left and right sides. *tail light : red *stop light : red *license plate lamp : white *dimming lamp : white or amber, in case of having 2 lamps, they shall give out the same colour of light. *License plate lamps shall be bright enough to enable the reading of the plate at a distance of not less than 20 m, from the rear of the motorcycle.	
D: Label marking requirement	None	

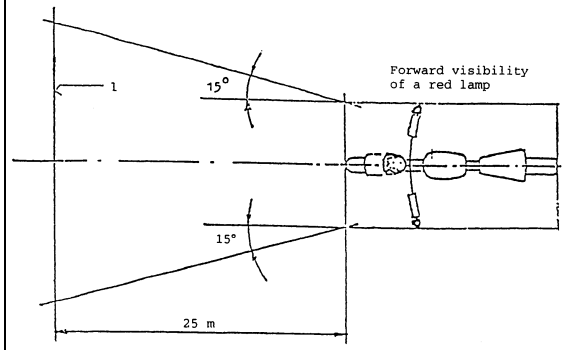
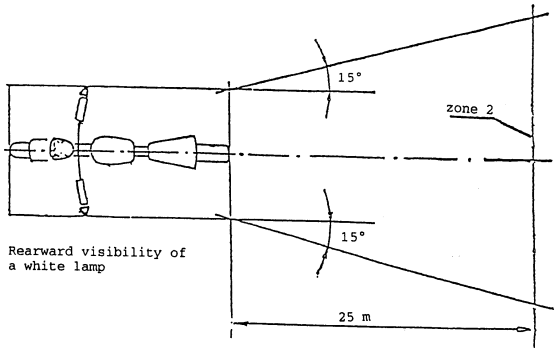
32 Lighting installation (motorcycles)

U S A	FMVSS 108	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycles	
B : Structure requirement B-a : Headlamps	*On the front, on the vertical centerline, except that if two are used they shall be symmetrically disposed about the vertical centerline. *Height above road surface : not less than 22 inches (55.9 cm) nor more than 54 inches (137.2 cm)	
B-b : Taillamps B-c : Stoplamps	*On the rear - on the vertical centerline, except that if two are used they shall be symmetrically disposed about the vertical centerline. *Height above road surface : not less than 15 inches, nor more than 72 inches.	
B-d : License plate lamps	*At rear license plate.	
B-e : Reflex reflectors	* On the rear - 1 red on the vertical centerline except that, if two are used on the rear, they shall be symmetrically disposed about the vertical centerline. *On each side - 1 red as far to the rear as practicable, and 1 amber as far to the front as practicable. *Height above road surface : not less than 15 inches, nor more than 60 inches.	
B-f : Turn signal lamps	*At or near the front - 1 amber on each side of the vertical centerline at the same height, and having a minimum horizontal separation distance of 16 inches. Minimum edge to edge separation distance between lamp and headlamp is 4 inches. *At or near the rear - 1 red or amber on each side of the vertical centerline at the same height and having a minimum horizontal separation distance of 9 inches. Minimum edge to edge separation distance between lamp and tail or stop lamp is 4 inches. *Height above road surface : not less than 15 inches, nor more than 83 inches.	
C : Performance requirement	None	
D : Label marking requirement	None	

32 Lighting installation (motorcycles)

ECE, Regulation No.53,	The Regulation of Lighting and Light-signalling Devices	ECE R.53 - 1/3
ITEM	CONTENT	Illustration / Supplement
A : Application	This regulation applies to the approval of two-wheeled power-driven vehicles without side-car, having a maximum design speed exceeding 50 km/h and/or a cylinder capacity exceeding 50 cc.	
B : Structure requirement B-a : General specification	*The illuminating lamps shall be so installed that correct adjustment of their orientation can be carried out. *For all light-signalling devices the reference axis of the lamp when fitted to the vehicle shall be parallel to the bearing plane of the vehicle on the road. In addition, it shall be perpendicular to the median longitudinal plane of the vehicle in the case of side reflex reflectors and parallel to the plane in the case of all other light-signalling devices. A tolerance of ±3° shall be allowed in each direction. *In the absence of specific instructions lamps constituting a pair and having the same function shall ; be mounted symmetrically in relation to the median longitudinal plane ; be symmetrical to one another in relation to the median longitudinal plane. *The electrical connections shall be such that the front position lamp, the rear position lamp and the rear-registration-plate illuminating device cannot be switched on or off otherwise than simultaneously. *The electrical connection shall be such that the driving lamp, the passing lamp and the fog lamp cannot be switched on unless the lamps referred to above requirement are likewise switched on. This requirement need not, however, be satisfied in the case of the driving lamp and passing lamp where their luminous warnings consist in switching on the passing intermittently, at short intervals, or in switching on the driving lamp intermittently, or in switching on the passing lamp and driving lamp alternately at short intervals.	

B-b :Driving lamp/Passing lamp	*Number : one *Position : *Driving lamp: above or below the passing lamp in dependently not more than 100 mm away from the edge of the illuminating surface of the passing lamp, or reciprocally incorporated with the passing lamp. *Passing lamp : not less than 500 mm nor more than 1,200 mm above the ground in height at the front of the vehicle. *May be grouped or reciprocally incorporated but not be combined with other front lamps.
B-c : Direction-indicating lamp	*Number: two front indicators ,two rear indicators *Position : *in width:: the space between the inner edges shall be not less than 560 mm, *in height : not less than 350 mm nor more than 1,200 mm above the ground.
B-d : Stop lamp B-e : Rear position lamp	*Number : one *Position : not less than 350 mm nor more than 1,200 mm above the ground at the rear and in the median longitudinal plane of the vehicle
B-f : Rear-registration-plate illuminating device	*Number : one *Position : such that the device illuminates the space reserved for the registration plate. *May be grouped or combined but not be reciprocally incorporated with other rear lamps.
B-g : Rear reflex reflector	*Number : one * Position : not less than 350 mm nor more than 900 mm above the ground, the center of reference shall be in the median longitudinal plane of the vehicle

ECE, Regulation No.53		ECE R.53 - 3/3
C : Performance requirement	* In the absence of specific instructions lamps constituting a pair and having the same function shall ; satisfy the same colorimetric requirements; and have identical nominal photometric characteristics. *No red lamp shall be visible towards the front and no white lamp shall be visible towards the rear. (See Figure 1 & 2) Red lamp must not be directly visible to an observer moving in zone of a transverse plane situated 25 m forward of the foremost point of the vehicle. White lamp must not be directly visible to an observer moving in zone of a transverse plane situated 25 m rearward of the rearmost point of the vehicle. *Every tell-tale lamp shall be readily visible to a driver in the normal driving position.	Forward visibility of Red light  Rearward visibility of White light 
C-a : Colours of the lights	*Driving lamp/passing lamp : white or selective yellow, *Direction-indicator lamp : amber *Stop lamp, Rear position lamp, Rear reflex reflector : red *Rear-registration-plate illuminating device : white	
C-b : Direction-indicator lamp	*The light flashing frequency : 90±30 times per minute *The flashing on the same side may occur synchronously or alternately.	
D : Label marking requirement	*There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation an international approval mark consisting of; *a circle surrounding the letter “E” followed by the distinguishing number of the country which has granted approval; *the number of this Regulation followed by the letter “R”, a dash, and the approval number to the right of the circle prescribed in above paragraph. *The approval mark shall be clearly legible and be indelible. *The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.	

ITEM 96-33

Wheel guards (mudguards) (trucks)

APEC Regulation Analysis Findings
Item No. 96-33: Wheel Guards [Mudguards (Trucks)]

1. Only Australia and New Zealand have detailed regulation.

2. A comparison of specific requirements for wheel guards is as follows.

(1) Scope: Australia, Brunei Darussalam, Hong Kong, Korea and Singapore apply their wheel guard regulations to all trucks.

(2) Construction: Brunei Darussalam and Korea require that wing- or mudflap-type wheel guards be installed. Australia, Hong Kong, Singapore and New Zealand specify in detail the areas to be covered by wheel guards.

ITEM 96-33 Wheel Guards (Mud Guards)

A: Application Trucks

Economy members	Application	Structural Requirement
Australia	All the motor trucks.	Wheel guards shall provide continuous protection between a point in area A and a point in area B in Figure 2. Mudflap (if fitted) need not be less than 230 mm from the ground for other than off-road vehicles, or 300mm in the case of vehicles designed for off-road operation.
Brunei	All the motor trucks.	Wings or other similar fittings shall be provided
Canada		
Chili		
China		
Hong Kong	All the motor trucks.	Mudguards or other similar fittings extending to cover the full width of each wheel and tyre shall be fitted.
Indonesia		
Japan		
Korea	All the motor trucks.	Mud flaps behind the wheels shall be equipped.
Malaysia		
Mexico		
New Zealand	All the motor trucks except any vehicles in an unfinished condition, incapable of a speed in excess of 30 kilometers an hour and any trailer being towed by such a vehicle and any straddle trucks or fork-lift truck:	Each wheel shall be provided with a mudguard. For twin tyres on the wheels of the rear axle, the vertical height if the lowest point of the rear of the mudguard or of any flap attached thereto, measured from the plane upon which the wheel rests with the vehicle in an unladen condition shall be not more than one-third of the horizontal distance measured from the wheel center to that point.

Economy members	Application	Structural Requirement
Philippines		
Papua new guinea	All the motor trucks except semi trailer tractor, straddle truck, fork lift truck, agricultural tractor or mobile machine.	Mudguard over each wheel on the front and rearmost axle shall be fitted. For vehicle of carriage of nine or more passengers, the lowest dege of the mudfuard is not more than one quarter of the horizontal distance between the lowest edge of the mudfuard and a vertical plane passing through the center of the wheels on the rear axle/
Singapore	All the motor trucks except motor tractor, government trailer, living van, watercart and timber trailer,	Wings or other similar fittings shall be provided
Taiwan		
U.S.A.		
ECE		

Wheel guards ((mudguards) trucks)

Australia ADR No.42		
Item	Content	Illustration/Supplement
Application	All the motor trucks This regulation shall not apply to any vehicle the construction or use of which is such that, in the opinion of the 'Administrator' it is unnecessary or impracticable to provide a wheel guard(s).	
Structural requirement	1)The wheel guards on the rearmost wheels on vehicles shall provide continuous protection between a point in area A and a point in area B in Figure 2,and shall be provided for the 'Overall Tyre Width' of all tyres. In the case of steerable wheels, the requirements of Clause 1) shall only apply when the wheels are in the straight-ahead position. 2)Wheel guards may consist of either permanent body structure or part structure and other components, including mudflaps, provided the specified protection is retained during vehicle operation. 3)Where 2 or more 'Axles' form an ' Axle Group,' separate wheel guards may be provided for each rear wheel or a single wheelguard may be provided which provides continuous protection from area A of the foremost wheel to area B of the rearmost wheel in Figure2. 4)Notwithstanding the requirements specified above the wheel guard including a mudflap (if fitted) need not be less than 230 mm from the ground for other than off-road vehicles, or 300 mm in the case of vehicles designed for off-road operation.	

Wheel guards ((mudguards) trucks)

Brunei Road Traffic Regulations 23		
Item	Content	Illustration/Supplement
Application	All the motor trucks. This regulation shall not apply to tractors or to trailers or any other vehicle used by or on behalf of the Government or any local authority road repairs or as a living van, water cart or trailer used only for, or used in connection with, the carriage of timber ,or trailer drawn by a vehicle the maximum speed of which is restricted to twenty miles per hour or less.	
Structural requirement	1)Every motor truck shall be provided with wings or other similar fittings.	

Wheel guards ((mudguards) trucks)

Hong Kong Road Traffic Regulations No.35		
Item	Content	Illustration/Supplement
Application	All the motor trucks.	
Structural requirement	1)Every motor truck shall be equipped with mudguards or other similar fittings extending to cover the full width of each wheel and tyre and extending sufficiently around the circumference of each wheel and tyre.	

Wheel guards ((mudguards) trucks)

Korea Korean Motor Vehicle Safety Standards Article 12		
Item	Content	Illustration/Supplement
Application	All the motor trucks.	
Structural requirement	1)Every motor truck shall be equipped with mud flaps behind the wheels.	

Wheel guards ((mudguards) trucks)

New Zealand Traffic Regulations 76		
Item	Content	Illustration/Supplement
Application	All the motor trucks This regulation shall not apply to 1)any vehicle in an unfinished condition used under the authority of trade prates issued pursuant to section 22 of the Act: 2)Any vehicle incapable of a speed in excess of 30 kilometres an hour and any trailer being towed by such a vehicle: 3)Any straddletruck or fork-lift truck: 4)To the extent of the exemption, any vehicle for the time being exempted in writing from all or part of the requirements of this regulation by the [Director]...or[the Director][or a commissioned officer of police], subject to such conditions as are imposed by the person granting the exemption. The exemption shall at all times be carried on the vehicle: 5)Any trailer towed by a vehicle exempt under paragraph(4) of this subclause and complying with the conditions of that exemption.	
Structural requirement	1)Every motor truck shall be provided with a mudguard over each road wheel: Provided that in the case of any vehicle designed for industrial purposes the construction of which makes it impracticable to fit full mudguard protection as it is practicably possible to fit shall be fitted. 2)On every motor vehicle to which this regulation applies, which is fitted with twin tyres on the wheels of the rear axle, the mudguards over those wheels shall meet the following requirement in addition to the requirement specified in Clause 1), namely:	

	The vertical height of the lowest point of the rear of the mudguard or of any flap attached thereto, measured from the plane upon which the wheel rests with the vehicle in an unladen condition, shall be not more than one-third of the horizontal distance measured from the wheel centre to that point.	

Wheel guards ((mudguards) trucks)

Papua New Guinea Motor Traffic Regulation R125D		
Item	Content	Illustration/Supplement
Application	All the motor trucks This regulation shall not apply to 1)A motor vehicle used solely or principally to tow a semi trailer or a pole trailer; or 2)A pole trailer that is not used solely or principally for road work; or 3)A straddle truck, fork lift truck, agricultural tractor or mobile machine; or 4)An unladen vehicle in an unfinished condition and used under the authority of a trader's plate; or 5)Any other motor vehicle in respect of which the body is so constructed that the body performs the functions of a mudguard.	
Structural requirement	1)every motor truck shall be provided with a mudguard over each wheel on the front and rearmost axle.)Where a motor truck or a motor car is constructed to be used principally for the carriage of nine or more passengers, the mudguard fitted to the rear axle of that motor truck or that motor car shall be so fitted that at all times while the vehicle is standing on a horizontal surface the height of the lowest edge of the mudguard above the surface on which the vehicle stands is not more than one quarter of the horizontal distance between the lowest edge of the mudguard and a vertical plane passing through the centre of the wheels on the rear axle.	

Wheel guards ((mudguards) trucks)

Singapore Road Traffic Rules C46		
Item	Content	Illustration/Supplement
Application	All the motor trucks. This regulation shall not apply to 1)Motor tractor; 2)Trailer used by or on behalf of the Government in connection with the construction, maintenance or repair of roads; 3)Living van; 4)watercart; 5)Trailer used only for or, when empty, in connection with the carriage of round timber; and 6)Trailer drawn by a vehicle the maximum speed of which is restricted under any written law to 30 kilometres per hour or less.	
Structural requirement	1)Every motor vehicle or trailer when the trailer is being drawn on a road shall be equipped with wings or other similar fittings. 2)A wing or any other similar fitting with which a vehicle is equipped under paragraph (1) shall cover at least the upper half of a wheel or a mudflap shall be fitted to the wing or fitting to reach down over the wheel to a point at the same level as or below the centre of the wheel.	

Wheel guards ((mudguards) trucks)

Thailand (The ministerial regulationNo9)		
Item	Content	Illustration/Supplement
Application	Trucks	
Structural requirement	* Mudguards for every wheel of a size at least the width of the tyre. They may be made from metal or rubber or other kind of materials. There must be mudflag hang at the last rear wheel with not more than 25cm Above the ground.	

ITEM 96-34

Suspension (Trucks)

APEC Regulation Analysis Findings
Item No. 96-34: Suspension (Trucks)

1. As the strength of suspensions is not an item suitable for specification by a regulation, no member economy has a specific requirement.

2. A comparison of specific requirements for head restraint is as follows.

(1) Scope: Brunei Darussalam, Hong Kong, Korea and Singapore apply their truck suspension regulations to all trucks. Indonesia, Japan and Philippines apply theirs to trucks exceeding 2,000kg in GVW and 20km/h in maximum speed. Australia applies only axle grouping.

(2) Construction: Hong Kong, Indonesia, Japan, Korea, Malaysia and Singapore require that the suspension be sufficiently strong against applied loads. Korea and Chinese Taipei specify that no cracks be present in the suspension. Malaysia requires the assurance of suspension movement, while Brunei Darussalam demands that all of the wheels be always in contact with the ground.

Item No. 96-34 Suspension

A: Application Truck

Economy	Application	Structural Requirement
Australia	Axle group of all the motor vehicles with more than four wheels	Suspension system of sharing the load equally to axles.
Brunei	All the motor vehicles with more than four wheels except steerable wheel of less than quarter tons	All wheels should remain contact with the road surface under the most adverse condition.
Canada		
Chile		
China		
Hong Kong	All the motor vehicles	Sufficient system of suspension between each wheel and the frame
Indonesia	All the motor vehicles of more than 2,000kg and maximum speed of more than 20 km/h	To be able to bear weights, vibrations and shocks
Japan	All the motor vehicles except large-sized special motor vehicles, trailers of GVM less than 2 tonnes and motor vehicles of maximum speed less than 20 km/h.	Sufficient to absorb shocks from ground to ensure safe operation.
Korea	All the motor vehicles	Capable of absorbing impacts from the ground. Free from cracks, separations or damages
Malaysia		adequate to support to the weight of the vehicle and load carried. sufficient flexible movement.
Mexico		
New Zealand		

Economy	Application	Structural Requirement
Papua New guinea		
Philippines	All the motor vehicles except large size special motor vehicle and vehicles of GVW less than 2,000kg or maximum speed less than 20 km/h not to carry dangerous material	Buffer system of springs or padding against impact from the ground shall be fitted.
Singapore	Every vehicle	Be capable of withstanding the loads and stress under normal operation.
Chinese Taipei		Free from any crack. Have balanced strength
Thailand		
U..S. A.		
ECE		.

Suspension (trucks)

Australia ADR 43		
Item	Content	Illustration/Supplement
Application	Axles in axle group other than twin steer axle for all vehicles except and close coupled axle group of vehicles with GVM less than 4.5 tonnes and the running gears thereof have at least 120% nominal load capacity of GVM and close coupled axle group of vehicles with GVM less than 4.5 tonnes and the running gears thereof have nominal load capacity of GVM	
Structural requirement	To be equipped with suspension system which shares the load equally to the axles.	

Suspension (trucks)

Brunei Road Traffic Regulations 10, 11		
Item	Content	Illustration/Supplement
Application	All the motor vehicles with more than four wheels Except that steerable wheel the load of which is less than quarter tons	
Structural requirement	All wheel should remain contact with the road surface under the most adverse condition	

Item 96-34 Suspension (Trucks)

Suspension (trucks)

Hong Kong Road Traffic Regulations No. 15		
Item	Content	Illustration/Supplement
Application	All the motor vehicles	
Structural requirement	Sufficient system of suspension between each wheel and the frame	

Suspension (trucks)

Indonesia Government Regulation 44/1993-16		
Item	Content	Illustration/Supplement
Application	All the motor vehicles Except for vehicles of the weight being less than 2,000kg and maximum speed of less than 20 km/h	
Structural requirement	Suspension system of buffer which can bear weights, vibrations and shocks	

Suspension (trucks)

Japan Safety Regulations for Road Vehicles, Article 14		
Item	Content	Illustration/Supplement
Application	All the motor vehicles except large-sized special motor vehicles, trailers of GVM less than 2 tonnes and motor vehicles of maximum speed less than 20 km/h.	
Structural requirement	Suspension system of sufficient to absorb shocks from ground to ensure safe operation.	

Suspension (trucks)

Korea Korean Motor Vehicle Safety Standards, Article 16		
Item	Content	Illustration/Supplement
Application	All the motor vehicles	
Structural requirement	Suspension system of being capable of absorbing impacts from the ground The suspension system shall be free from cracks, separations or damages	

Suspension (trucks)

Malaysia MVR-13		
Item	Content	Illustration/Supplement
Application		
Structural requirement	Constructed with materials of adequate to support to the weight of the vehicle and load carried.	
	Provide sufficient flexible movement.	

Suspension (trucks)

Philippines Motor Vehicle Inspection System, Section 15-AO		
Item	Content	Illustration/Supplement
Application	All the motor vehicles Except large size special motor vehicle and vehicles of GVW less than 2,000kg or maximum speed less than 20 km/h not to carry dangerous material	
Structural requirement	buffer system of springs or padding against impact from the ground	

Suspension (trucks)

Singapore Road Traffic Rules C 48		
Item	Content	Illustration/Supplement
Application	Every vehicle	
Structural requirement	Be capable of withstanding the loads and stress likely to be met with in the normal operation	

Item 96-34 Suspension (Trucks)

Suspension (trucks)

Chinese Taipei Road Traffic Safety Standards Article 39 - 6		
Item	Content	Illustration/Supplement
Application		
Structural requirement	Free from any crack.	
	Have balanced strength.	

Suspension (trucks)

Thailand The ministerial regulation No.9		
Item	Content	Illustration/Supplement
Application	Trucks	
Structural requirement	Spring and shock absorbers, spring must be of size capable of safety carrying the weight and the shock of the fully loaded vehicle, and there is a shock absorber on every wheel, at least two for each axle and they must be capable of reducing shock. .	

ITEM 96-35

Driver controls

APEC Regulation Analysis Findings
Item No. 96-35: Driver Controls

1. Only six member economies (Hong Kong, Korea, Japan, Australia, Canada and U.S) adopt a driver controls regulation in the APEC region.

2. These member economies mainly specify control positions and identification symbols, as indicated below.

(1) Control position: Japan and Korea require that driver controls be installed within 500mm lateral to the steering wheel. Australia specifies the positions of driver controls in terms of angles from the driver's seated position. The U.S. and Canada apply FMVSS 101.

(2) Display of symbols for controls: Korea, Japan, Australia, Canada and U.S. require symbols to be displayed for the identification of driver controls.

(3) Regulations for driver controls can be divided into the following two groups:

* FMVSS group - U.S., Canada
* Japan group - Japan, Korea

ITEM No 96-35 Drivers Controls

A: Application : Passenger Car

Economy	Location of control devices	D : Identification
Australia	1) Group 1 Within 20deg from vertical plane through driver's seating point (L&R) 2)Group 2 L : 40 deg. R : 20 deg.	Visual indicator is necessary
Brunei		
Canada	Driver's controls are operable by Driver	Drivers controls are identifiable by driver
Chile		
China		
Hong Kong	1)General requirement (Easily reach & Quickly Operate) 2)Driver's seat requirement *380mm backrest ~Front edge of the seat etc.	
Indonesia		
Japan	Within 500mm from steering center (L&R)	1) ID is necessary 2) Shift pattern ID on Shift lever
Korea	Within 500mm from steering center (L&R)	1) ID is necessary 2) Tall-tale requirement
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
U. S. A	Driver's controls are operable by Driver	Drivers controls are identifiable by driver
ECE		

Regulation: 35 Drivers Control
Economy: Australia, ADR 42

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger car (MA) and motor tricycle (only LEP)	
B: Requirement	1) The display information Following 'Visual Indicators', if fitted, shall be located as specified in item 2); Group I (a)speedometer (b)Direction indicator "tell-tale" lamp or lamps (c)High beam indicator Group II (d)Tachometer (e)Odometer (f)Service brake failure indicator lamp (g)Parking brake indicator lamp (h)Stop lamp failure indicator (i)Oil temperature indicator (j)Pressure indicator (k)Water temperature indicator (l)Battery charge failure indicator (m)Fuel level indicator In cases where more than on 'Visual Indicator' are provided for any one of the functions covered by (h) to (m) above, and are not located as specified in item 2)(b) a common indicator which could be either visual or an audible signal may be used to draw attention to the need to refer to a group of indicators located elsewhere. In such case the common indicator, if visual, shall totally located within the area specified in item 2) (b). 2) Location of 'Visual Indictors' a)All 'Visual Indicators' specified as Grope I shall be totally located between 2 vertical planes inclined at 20° left and 20° right of the longitudinal axis of the vehicle and passing through the foremost points of the left and right '95th Percentile Eye Ellipse' respectively. Such indicators shall be totally located above a plane inclined downwards at 35° from the horizontal and including a horizontal transverse line through the foremost points of each of the '95th Percentile Eye Ellipses' and below a plane tangential to the bottom of the '95th Percentile Eye Ellipses' which includes a line at ground level transverse to the longitudinal axis of the vehicle 11 m forward of the rearmost eye ellipse point.	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	b)All 'Visual Indicators' specified as Grope II shall be totally located between 2 vertical planes inclined at 40° left and 25° right of the longitudinal axis of the vehicle and passing through the foremost points of the left and right '95th Percentile Eye Ellipse respectively. Such indicators shall be totally located above a plane inclined downwards at 35° from the horizontal and including a horizontal transverse line through the foremost points of each of the '95th Percentile Eye Ellipses' and below a plane tangential to the bottom of the '95th Percentile Eye Ellipses' which includes a line at ground level transverse to the longitudinal axis of the vehicle 11 m forward of the rearmost eye ellipse point. 3)The vehicle speed indicating element shall be of such color or contrast as to differentiate it from the viewed background. 4)All 'Visual Indicators' other than indicator lamps shall be provided with variable intensity when illuminated	

Regulation: 35 Drivers control
Economy: Canada, CMVSS No. 101

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger cars, multipurpose passenger vehicles, trucks, and buses.	
B: Requirement	(1)The following controls and components, where fitted on a vehicle, shall be fitted in such a manner that they are operable by the driver while the driver is seated in the driver's designated seating position with the driver's seat belt fastened around the driver in accordance with the manufacturer's instructions: (a) the accelerator; (b) the automatic vehicle speed system: (c) the choke, if manually operated; (d) the clutch pedal; (e) the driver's sun visor; (f) the engine start control; (g) the engine stop control; (h) the hand throttle; (i) the hazard warning switch; (j) the headlamp upper or lower beam switch; (k) the horn; (l) the ignition switch; (m) the illumination intensity control; (n) the master lighting switch; (o) the parking brake pedal or lever; (p) the rear 'window defog and defrost control; (q) the service brake pedal or lever; (r) the steering wheel; (s) the transmission shift control, except for the transfer case; (t) the turn signal control; (u) the windshield defog and defrost system control; (v) the windshield washing system control; (w) the windshield wiping system control; (x) the clearance lamps switch; and (y) the identification lamps switch.	Refer to attachment.

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	(2) Where fitted on a vehicle, the displays for the following functions and malfunctions shall be fitted in such a manner that they are identifiable by the driver while the driver is seated in the driver's designated seating position with the driver's seat belt fastened around the driver in accordance with the manufacturer's instructions: (a) air brake low pressure; (b) antilock system failure; (c) battery charging; (d) brake failure; (e) engine coolant temperature; (f) engine oil pressure; (g) fuel; (h) gear position; (i) hazard warning; (j) headlamp upper beam; (k) odometer; (l) seat belt; (m) speedometer; and (n) turn signal. (3) An identification that is recognizable by the driver in daylight, that is located on or adjacent to the relevant manual control and that appears to be upright when the control is in the off position shall be provided for (a) each function of or, where a quantitative range is used, the extreme positions of (i) the heating and air-conditioning system controls, and (ii) the automatic vehicle speed control; (b) the engine start control, if separate from the key-locking system; (c) the engine stop control, if separate from the key-locking system; (d) the hand throttle; (e) the identification lamp and clearance lamp switches, if separate from the master lighting switch: and (f) the choke, if manually operated. (4) Where color coding is used to identify the extreme positions of heating and air-conditioning system controls, the hot extreme shall be identified by the color red and the cold extreme shall be identified by the color blue.	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	(5) An identification, similar to the corresponding identification symbol in Table I to this section, that is recognizable by the driver in daylight, that is located on or adjacent to the relevant hand-operated control and that appears to be upright when the control is in the off position shall be provided for (a) the clearance lamps, identification lamps and side marker lamps switch, if separate from the master lighting switch; (b) the hazard warning system; (c) the headlamp upper and lower beams, except where operated by a control located on the left side of the steering column adjacent to the steering wheel; (d) the horn, except where activated by a lanyard; (e) the master lighting switch; (f) the rear window defog and defrost system; (g) the turn signal, except where its control is located left side of the steering column, adjacent to the steering wheel, in a plane essentially parallel to the steering wheel face plane; (h) the fan for the heating and ventilation systems; (i) the windshield defog and defrost system; (j) the windshield washing system, if manually operated; (k) the windshield wiping and washing system, if combined; and (l) the windshield wiping system. (6) Notwithstanding subsections (3) and (5), the requirement that the identification appear to be upright does not apply (a) to a horn control that is located on a steering wheel or to a control that adjusts by means of a rotary motion and does not have an off position; or (b) to an automatic vehicle speed control located on the steering wheel, or on the steering wheel hub or spokes, when the vehicle, aligned to the manufacturer's specifications, has the steering wheel positioned for the vehicle to travel in a direction other than straight forward. (7) The identification in respect of each of the controls for the systems referred to in paragraphs (3)(a), (c) and (e) and (5)(a) to (c) and (f) to (l), other than an identification symbol in respect of a foot control, of a hand control that is mounted on the steering column, on the floor, on the floor console or in the windshield header area, or of a control for an air -conditioning and heating system that does not direct air directly onto the windshield, shall (a) be illuminated whenever the headlamps are activated; and (b) when illuminated, emit light at one of at least two levels of intensity, one of which is so low as to be barely discernible to a driver whose eyes have adapted to dark ambient road conditions. (8) When the headlamps are being flashed or operated as daytime running lamps at a reduced light intensity, it is not necessary to illuminate the controls for the systems referred to in subsection (7).	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	(9) Subject to subsections (10) to (12), the following displays, where fitted on a vehicle with a GVWR of 4536 kg (10,000 pounds) or less, shall be accompanied by an identification similar to the identification for that display shown in Table II to this section, in a position that appears to be upright, on or adjacent to the display it identifies: (a) the headlamp upper beam tell-tale; (b) the turn signal tell-tale; (c) the hazard warning tell-tale: (d) the seat belt tell-tale, if required by section 208 of this schedule; (e) the fuel level indicator or tell-tale; (f) the engine oil pressure indicator or tell-tale; (g) the engine coolant temperature indicator or tell-tale (h) the battery charging condition indicator or tell-tale; (i) the brake failure tell-tale, if required by section 1 05 or 1 21 of this schedule; (j) the automatic gear position indicator; (k) the speedometer; and (l) the odometer. (10) The indicators referred to in paragraphs (9)(e) to (h) and (j) to (l) shall (a) be illuminated whenever the headlamps are activated; and (b) when illuminated, emit light at one of at least two levels of intensity, one of which is so low as to be barely discernible to a driver whose eyes have adapted to dark ambient road conditions. (11)When the headlamps are being flashed or operated as daytime running lamps, it is not necessary for the indicators referred to in subsection (10) to be illuminated. (12) Where tell-tales are fitted with the corresponding indicators referred to in any of paragraphs (9)(e) to (h), the identification required by subsection (9) may be omitted from the tell-tale. (13) A tell-tale, while activated, (a) shall, where a color is specified for that tell-tale in Table II to this section, be of that color; (b) shall be of a color that contrasts with its background; (c) in the case of a tell-tale that identifies the headlamp upper beam, the turn signal, hazard warning, the seat belt or a brake failure, shall not be adjustable to a level that makes it invisible under any lighting condition; and (d) shall be identifiable by the driver under all lighting conditions.	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	(14) Except as provided in subsection (20), no tell-tale shall emit light except (a) while identifying a malfunction or vehicle condition that it is designed to identify; or (b) during a bulb check conducted when the engine is turned on. (15) Notwithstanding subsections (13) and (14) , if the headlamp upper beam tell-tale is illuminated when the upper beam headlamps are operated as daytime running lamps at reduced voltage, the headlamp upper beam tell-tale shall emit light of an intensity that is discernibly lower than the intensity of the light emitted when the upper beam headlamps are operated at regular voltage, except that the headlamp upper beam tell-tale may flash at full intensity in the event of a malfunction of the daytime running lamps. (16) Illumination that is provided in the driver's compartment of a vehicle and that is not subject to subsection (7), (10) or (13) shall (a) have a means of being turned off; (b) be manually or automatically adjustable to provide at least two levels of brightness; or (c) be of an intensity such that it is barely discernible to a driver whose eyes have adapted to dark ambient roadway conditions. (17) Speedometers shall be calibrated in kilometers per hour. (18) Odometers and trip record counters shall be calibrated in kilometers. (18.1) Notwithstanding subsection (18), the odometer and trip record counter may be calibrated in miles if a label is applied in the vicinity of the odometer stating that the vehicle odometer reads in miles. (19) In addition to the identification required by subsections (5) and (9), a manufacturer may use the symbols that are included in International Organization for Standardization (ISO) International Standard ISO 2575, entitled Road Vehicles - Symbols for controls, indicators and tell-tales, 4th edition, 1982. (20) A tell-tale or indicator listed in Table II to this section shall be activated (a) at the beginning of the vehicle's operating condition to which it relates; or (b) in the case of a seat belt tell-tale, as required by section 208 of this schedule.	

TABLE II
Identification of Displays

TABLEAU II
Identification des affichages

Control	Identification	Commande
Clearance lamps, identification lamps and side marker lamps	 1 3	Feux de gabarit, feux d'identification et feux de position latéraux
Master lighting switch	 1	Commutateur général d'éclairage
Headlamp upper and lower beams	 1 3	Feux de route et de croisement
Turn signals	 1 2	Clignotants
Hazard warning signal	 1	Signal d'avertissement
Windshield wiper		Essuie-glace de pare-brise
Windshield washer		Lave-glace de pare-brise
Windshield wiper and washer		Essuie-glace et lave-glace de pare-brise combinés
Heating and air conditioning fan	 2	Ventilateur du système de chauffage et de climatisation
Windscreen defogging and defrosting		Dégivrage et désembuage du pare-brise
Rear window defogging and defrosting		Dégivrage et désembuage de la lunette arrière
Horn		Avertisseur sonore

1. Framed areas of the symbol may be solid.
2. Outline may be used alone.
3. Symbol not required if function is combined with master lighting switch.

1. La partie encadrée du symbole peut-être pleine.
2. Il est permis d'utiliser seulement le contour.
3. Le symbole n'est pas nécessaire si la commande est couplée au commutateur général d'éclairage.

TABLE II
Identification of Displays

TABLEAU II
Identification des affichages

Indicator or Tell-Tale	Tell-Tale Colour	Identification	Couleur du témoin	Indicateur ou témoin
Headlamp upper beam	BLUE or GREEN [5]	 [1]	BLEU ou VERT [5]	Feux de route
Turn signals	GREEN	 [1] [2]	VERT	Clignotants
Hazard warning signal	RED [5]	 [1] [3]	ROUGE [5]	Signal d'avertissement
Seat belt	RED [5]	 [4]	ROUGE [5]	Ceinture de sécurité
Fuel level		 [4]		Niveau de carburant
Engine oil pressure		 [7]		Pression d'huile du moteur
Engine coolant temperature		 [7]		Température du liquide de refroidissement
Battery charging condition				Charge de la batterie
Brake failure	RED [5]	 [6]	ROUGE [5]	Défaillance des freins
Air brake low pressure	RED [5]	Type optional/ marque optionnelle	ROUGE [5]	Basse pression des freins à air comprimé
Antilock system failure	YELLOW	 [8]	JAUNE	Défaillance du dispositif antidérapant
Automatic gear position	Manufacturer's option/ choix du fabricant			Position du sélecteur de vitesses (boîte automatique)
Speedometer	km/h			Compteur de vitesse
Odometer	[9]			Odomètre

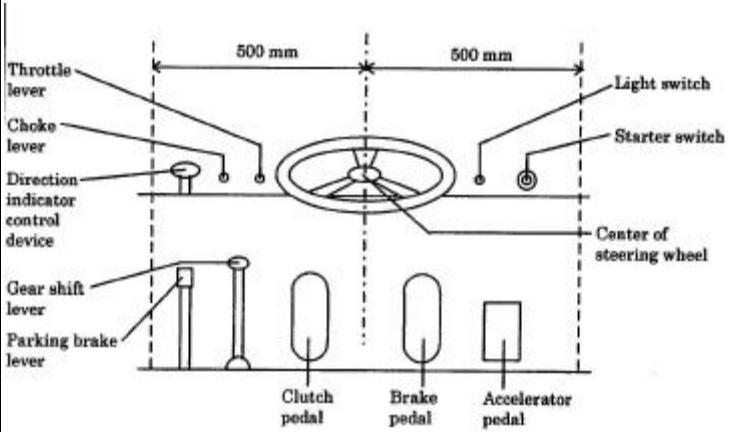
1. Framed areas of the symbol may be solid.
2. The left and right arrows may be separated if arrows operate independently flashing green lights.
3. Hazard warning signal not required when independently operated turn signal lights flash simultaneously as hazard warning lights.
4. Outline may be used alone.
5. Red may be red-orange. Blue may be blue-green.
6. If a single tell-tale is used to indicate more than one brake system condition, use the brake failure symbol.
7. Combination of the engine oil pressure symbol and the engine coolant temperature symbol in a single tell-tale is permitted.
8. A manufacturer shall use this symbol on vehicles manufactured on or after September 1, 1994, and may use this symbol or other identifications prior to this date.
9. The unit of measurement, if identified, is "km". Where electronic clusters are used and odometer units can be switched from "km" to "mi" or from "mi" to "km", the units must be identified.

1. Les parties encadrées du symbole peuvent être pleines.
2. Il est permis de dissocier les flèches si leur fonctionnement est indépendant (lumière verte clignotante.)
3. Un signal d'avertissement n'est pas nécessaire lorsque les clignotants servent également de feux d'avertissement.
4. Il est permis d'utiliser seulement le contour.
5. Il est permis d'utiliser le rouge-orange au lieu du rouge et le bleu-vert au lieu du bleu.
6. Si un seul témoin est employé pour indiquer plus d'une condition du système de freinage, employer le symbole de défaillance des freins.
7. Il est permis d'utiliser un même témoin à la fois pour le symbole de la pression d'huile du moteur et le symbole de la température du liquide de refroidissement.
8. Le fabricant doit utiliser ce symbole pour les véhicules fabriqués à partir du 1er septembre 1994 et peut utiliser ce symbole ou une autre forme d'identification avant cette date.
9. L'unité de mesure, si elle est indiquée, est indiquée par «km». Pour un combiné électronique pouvant passer de «km» en «mi» ou de «mi» en «km», l'unité de mesure doit être indiquée.

Regulation: 35 Drivers control
Economy: Hong Kong, Road Traffic Regulations No. 26

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger vehicle	
B: Requirement	(1) Every motor vehicle, other than a bus or light bus, shall be so designed and constructed that the driver --- (a) has adequate room and can easily reach and quickly operate the controls; (b) while controlling the vehicle can at all times have a full view of the road and traffic ahead of the vehicle. (2) The driver's seat of every motor vehicle, other than a bus or light bus, shall be secured to the body of the vehicle and shall measure at least 380 millimetres from the backrest to the front edge of the seat and 380 millimetres along the back, except that where the vehicle is fitted with a continuous seat for a passenger or passengers beside the driver the space available for passengers under regulation 27 shall be measured from a point 380 millimetres from that part of the seat nearest to the centre of the steering wheel. (3) The driver's seat of every motor vehicle, other than a bus or light bus, shall be capable of being adjusted in relation to the steering wheel of the vehicle so that it can be moved from 350 millimetres to at least 450 millimetres from the steering wheel measured from the nearest point on the periphery of the steering wheel to the nearest part of the back of the driver's seat. (4) Subject to paragraph (5), the driver's seat of every vehicle shall be so Placed as to permit the driver to give by hand the usual traffic signals on the right or off side of the vehicle. (5) The Commissioner may by permit in writing, subject to such terms and conditions and for such period as appears to him fit, authorize the use of a motor vehicle which does not comply with paragraph (4).	

Regulation: 35 Drivers control
Country: Japan, Safety Regulations of Road Vehicle, Article 10

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	All vehicles	
B: Requirement Article 10 (Control System)	CHAPTER II SAFETY REGULATIONS FOR MOTOR VEHICLES 1 . Each of the following control devices necessary for operating a motor vehicle shall be located 500mm or less to the left and right of the center of the steering wheel and be constructed so that the driver, in normal driving position, may easily operate them: (1) Control devices for engine and power train system, such as starter switches, accelerator ignition timing control, fuel injection timing control, clutch, transmission, etc; (2) Control device for brake system; and (3) Control devices for headlamps, horns, direction indicator lamps, windshield wipers, windshield washers and defrosters. 2. The control devices enumerated in Items (1) and (3) of the preceding Paragraph (except the starter switch, accelerator, clutch, transmission and direction indicator lamp) shall have identification thereon or nearby so as to be easily recognized by the driver in his seat. 3. Each gear or range of a transmission shift control device shall have identification thereon or nearby so as to be easily recognized by the driver in his seat. 4. Each direction of a direction indicator lamp control device shall have identification thereon or nearby so it can be easily recognized by the driver in his seat.	(Explanation) The example of the provision of paragraph 1 is illustrated as follows: 

Regulation: 35 Drivers control
Economy: Korea,The Regulations of The Motor Vehicle Safety Standards, Article 13

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger vehicle	
B: Requirement	(1)Each of the following controls and displays of a motor vehicle shall be located within 50 centimeters to the left and right of the steering column so that it can be easily operable and visible by the driver in the driver's seat restrained by a seat belt. 1. main engine starting and stopping devices, acceleration, other function of engine 2. control devices for service brake and clutch 3. control devices for transmission shift lever, windshield defrosting, headlamps, lighting switch, hazard warning signal lamp, turn signal lamps and horn 4. displays for speedometer, turn signal lamp, driving beam, fuel lever, engine coolant, oil pressure, brake failure lamp and electrical charge (2)Each motor vehicle shall be equipped at least two devices capable of returning the throttle to the idle position when the driver removes the opposing actuation force and the identification of the shift lever pattern shall be on the transmission shift lever (in case where it is difficult to put the identification of a shift lever pattern on the transmission shift lever, the device which the driver can identify easily.). (3)The automatic transmission shall meet each of the following items. 1. A neutral position shall be located between a forward drive and a rearward drive position. 2. If a transmission shift lever is mounted on the steering column, the movement from a neutral position to a forward drive position shall be clockwise. 3. A park position shall be located at the end, adjacent to the reverse position. 4.The engine shall be inoperative when the transmission shift lever is in a forward or reverse drive position. 5. In vehicles with two or more forward transmission gear ratios, the low forward drive position shall provide a greater degree of engine braking than the highest speed transmission ratio at vehicle speeds not more than 40 kilometers per hour.	

	(4)In case where hand-operated controls as specified in Appendix 1 are installed in a motor vehicle, identifying words or abbreviations or identifying symbols (hereafter referred to as the "identification") for controls shall be provided and meet the illumination standards. This requirement does not hazard warning signal lamp, a windshield wiper, a windshield washer which are located on the left or right side of the steering column. (5)In case where displays as specified in Appendix 2 are installed in a motor vehicle, the identification shall be provided and meet the color and illumination standards in Appendix 2. However, this requirement does not apply to the display (hereafter referred to as the "telltale") which shows the actuation of a device or a correct or defective functioning or condition, or a failure to function, provided that the telltale is used with other displays. (6)If a motor vehicle is equipped with an auxiliary engine starting and stopping devices 8 which can be operated remotely with radio waves), the engine shall not activated by the auxiliary engine starting and stopping device with a transmission shift lever in forward or reverse positions.	

Regulation: 35 Drivers control
Country: U.S.A. FMVSS 101

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger cars, multipurpose passenger vehicles, trucks, and buses.	
B: Requirement	(a) Except as provided in paragraph (b) of this section, each passenger car, multipurpose passenger vehicle, truck and bus manufactured with any control listed in S5.1 or in column 1 of Table 1, and each passenger car, multipurpose passenger vehicle and truck or bus less than 10,000 Pounds GVWR with any display listed in S5.1 or in column 1 of Table 2, shall meet the requirements of this standard for the location, identification, and illumination of such control or display. (b) For vehicles manufactured before September 1, 1987, a manufacturer may, at its option --- (1) Meet the requirements in this standard to use identifying words or abbreviation or identifying symbol for a control by using those specified in Table 1(a) instead of Table 1. If none are specified in Table 1(a), none need be used for the control. (2) Meet the requirements in this standard to use identifying words or abbreviation or identifying symbol for a display by using those specified in Table 2(a) instead of Table 2. If none are specified in Table 2(a), none need be used for the display.	Refer to attachment.
S5.1 Location.	Under the conditions of S6, each of the following controls that is furnished shall be operable by the driver and each of the following displays that is furnished shall be visible to the driver. Under the conditions of S6, telltales are considered visible when activated. HAND-OPERATED CONTROLS (a) Steering wheel. (b) Horn. (c) Ignition. (d) Headlamp. (e) Taillamp. (f) Turn signal. (g) Illumination intensity. (h) Windshield wiper. (i) Windshield washer. (j) Manual transmission shift lever, except transfer case. (k) Windshield defrosting and defogging system. (l) Rear window defrosting and defogging system. (m) Manual choke. (n) Driver's sun visor. (o) Automatic vehicle speed system. (p) Highbeam. (q) Hazard warning signal. (r) Clearance lamps. (s) Hand throttle. (t) Identification lamps.	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	FOOT-OPERATED CONTROLS (a) Service brake. (b) Accelerator. (c) Clutch. (d) Highbeam. (e) Windshield washer. (f) Windshield wiper. DISPLAYS (a) Speedometer. (b) Turn signal. (c) Gear position. (d) Brake failure warning. (e) Fuel. (f) Engine coolant temperature. (g) Oil. (h) Highbeam. (I) Electrical charge.	
S5.2 Identification.	S5.2.1 Vehicle controls shall be identified as follows: (a) Except as specified in S5.2.1(b), any hand-operated control listed in column 1 of Table 1 that has a symbol designated for it in column 3 of that table shall be identified by either the symbol designated in column 3 (or symbol substantially similar in form to that shown in column 3) or the word or abbreviation shown in column 2 of that table. Any such control for which no symbol is shown in Table 1 shall be identified by the word or abbreviation shown in column 2. Words or symbols in addition to the required symbol, word or abbreviation may be used at the manufacturer's discretion for the purpose of clarity. Any such control for which column 2 of Table 1 and/or column 3 of Table specifies "Mfr. Option" shall be identified by the manufacturer's choice of a symbol, word or abbreviation, as indicated by that specification in column 2 and/or column 3. The identification shall be placed on or adjacent to the control. The identification shall, under the conditions of S6, be visible to the driver and, except as provided in S5.2.1.1, S5.2.1.2, and S5.2.1.3, appear to the driver perceptually upright. (b) S5.2.1(a) does not apply to a turn signal control which is operated in a plane essentially parallel to the face plane of the steering wheel in its normal driving position and which is located on the left side of the steering column so that it is the control on that side of the column nearest to the steering wheel face plane. S5.2.1.1 The identification of the following need not appear to the driver perceptually upright: (a) A master lighting switch or headlamp and tail lamp control that adjusts control and display illumination by means of rotation, or any other rotating control that does not have an off position. (b) A horn control.	

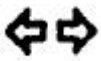
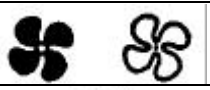
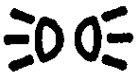
ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	S5.2.1.2 The identification of a rotating control other than one described by S5.2.1.1 shall appear to the driver perceptually upright when the control is in the off position. S5.2.1.3 The identification of an automatic vehicle speed control located on the steering wheel, including the steering wheel hub and spokes, need not appear to the driver perceptually upright except when the vehicle, aligned to the manufacturer's specifications, has its wheels positioned for the vehicle to travel in a straight forward direction. S5.2.2 Identification shall be provided for each function of any automatic vehicle speed system control and any heating and air conditioning system control, and for the extreme positions of any such control that regulates a function over a quantitative range. If this identification is not specified in Table 1 or 2, it shall be in word or symbol form unless color coding is used. If color coding is used to identify the extreme positions of a temperature control, the hot extreme shall be identified by the color red and the cold extreme by the color blue. *Example 1. A slide lever controls the temperature of the air in the vehicle heating system over a continuous range, from no heat to maximum heat. Since the control regulates a single function over a quantitative range, only the extreme positions require identification.* *Example 2. A switch has three positions, for heat, defrost, and air conditioning. Since each Position regulates a different function, each position must be identified.* S5.2.3 Any display located within the passenger compartment and listed in column 1 of Table 2 that has a symbol designated in column 4 of that table shall be identified by either the symbol designated in column 4 (or symbol substantially similar in form to that shown in column 4) or the word or abbreviation shown in column 3. Additional words or symbols may be used at the manufacturer's discretion for the purpose of clarity. Any telltales used in conjunction with a gauge need not be identified. The identification required or permitted by this section shall be placed on or adjacent to the display that it identifies. The identification of any display shall, under the conditions of S6, be visible to the driver and appear to the driver perceptually upright.	
S5.3 Illumination.	S5.3.1 Except for foot-operated controls or hand-operated controls mounted upon the floor, floor console, or steering column, or in the windshield header area, the identification required by S5.2.1 or S5.2.2 of any control listed in column 1 of Table 1 and accompanied by the word "yes" in the corresponding space in column 4 shall be capable of being illuminated whenever the headlights are activated. However, control identification for a heating and air-conditioning system need not be illuminated if the system does not direct air directly upon windshield. If a gauge is listed in column 1 of Table 2 and accompanied by the word "yes" in column 5, then the gauge and its identification required by S5.2.3 shall be illuminated whenever the ignition switch and/or the headlamps are activated. Controls, gauges, and their identifications need not be illuminated when the headlamps are being flashed. A telltale shall not emit light except when identifying the malfunction or vehicle condition for whose indication it is designed or during a bulb check upon vehicle starting.	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
	S5.3.2. Each telltale shall be of the color shown in column 2 of Table 2. The identification of each telltale shall be in a color that contrasts with the background. S5.3.3 (a) Means shall be provided for making controls, gauges, and the identification of those items visible to the driver under all driving conditions. (b) The means for providing the required visibility --- (1) Shall be adjustable, except as provided in S5.3.3(d), to provide at least two levels of brightness, one of which is barely discernible to a driver who has adapted to dark ambient roadway conditions. (2) May be operable manually or automatically, and (3) May have levels of brightness at which those items and their identification are not visible. (c) Effective September 1, 1989, if the level of brightness is adjusted by automatic means to a point where those items or their identification are not visible to the driver, a means shall be provided to enable the driver to restore visibility. (d) For a vehicle manufactured before September l, 1989, the requirements of S5.3.3(b)(1) shall not apply to any gauge during the actuation of a telltale which shares a common light source with the gauge. S5.3.4 (a) Means shall be provided that are capable of making telltales and their identification visible to the driver under all driving conditions. (b) The means for providing the required visibility may be adjustable manually or automatically, except that the telltales and identification for brakes, highbeams, turn signals, and safety belts may not be adjustable under any driving condition to a level that is invisible. S5.3.5 Any source of illumination within the passenger compartment which is forward of a transverse vertical plane 4.35 inch (110.6 mm) rearward of the manikin "H" Point with the driver's seat in its rearmost driving position, which is not used for the controls and displays regulated by this standard, which is not a telltale, and which is capable of being illuminated while the vehicle is in motion, shall have either (1) light intensity which is manually or automatically adjustable to provide at least two levels of brightness, (2) a single intensity that is barely discernible to a driver who has adapted to dark ambient roadway conditions, or (3) a means of being turned off This requirement does not apply to buses that are normally operated with the passenger compartment illuminated.	

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
S5.4	A common space may be used to display messages from any sources, subject to the following requirements: (a) The telltales for the brake, high beam, and turn signal, and the safety belt telltale required by S4.5.3.3 of Standard No. 208 may not be shown on the common space. (b) Except as provided in S5.4(e), the telltales listed in Table 2 shall be displayed at the initiation of any underlying condition. (c) When the underlying condition exists for actuation of two or more messages, the messages shall be either (1) Repeated automatically in sequence, or (2) Indicated by visible means and capable of being selected by the driver for viewing. (d) Messages may be cancelable automatically or by the driver. (e) The safety belt telltale must be displayed and visible during the time specified in S7.3 of Standard No. 208.	
S6. Conditions.	The driver is restrained by the crash protection equipment installed in accordance with the requirements of 571.208 of this part (Standard No. 208), adjusted in accordance with the manufacturer's instructions.	

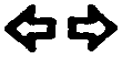
TABLE 1

Identification and Illumination of Controls

Column 1 Hand Operated Controls	Column 2 Identifying Words of Abbreviation	Column 3 Identifying Symbol	Column 4 Illumination
Master Lighting Switch	Lights		_____
Headlamps and Tail Lamps	(Mfr. Option) [2]	(Mfr. Option) [2]	_____
Horn	Horn		_____
Turn Signal	_____		_____
Hazard Warning Signal	Hazard		Yes
Windshield Wiping System	Wiper or Wipe		Yes
Windshield Washing System	Washer or Wash		Yes
Windshield Washing and Wiping Combined	Wash-Wipe or Washer-Wiper		Yes
Heating and or Air Conditioning Fan	Fan		Yes
Windshield Defrosting and Defogging System	Defrost, defog or Def.		Yes
Rear Window Defrosting and Defogging System	Rear Defrost, Rear Defog. Rear Def. or R-Def.		Yes
Identification, Side Marker and or Clearance Lamps	Marker, Lamps or MK Lps		Yes
Manual Choke	Choke	_____	_____
Engine Start	Engine Start [1]	_____	_____
Engine Stop	Engine Stop [1]	_____	Yes
Hand Throttle	Throttle	_____	_____
Automatic Vehicle Speed	(Mfr. Option)	_____	Yes
Heating and Air conditioning System	(Mfr. Option)	(Mfr. Option)	Yes

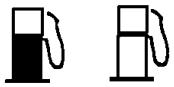
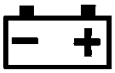
[1] Use when engine control is separated from the key locking system.
[2] Separate identification not required controlled by master lighting switch.
[3] The pair arrows is a single symbol. When the controls for left and right turn operate independently, however, the two arrows may be considered separate symbols and be spaced accordingly.
[4] Identification not required for vehicles with a GVWR greater than 10,000 Ibs., or for narrow ring-type controls.
[5] Framed areas may be filled.

TABLE I (a)
Identification and illumination of Controls

Column 1	Column 2	Column 3	Column 4
Hand Operated Controls	Identifying Words of Abbreviation	Identifying symbol	Illumination
Headlamps and Tail Lamps	Lights		____
Turn Signal	____		____
Hazard Warning Signal	Hazard		Yes
Clearance Lamps System	Clearance Lamps or Cl Lps		Yes
Windshield Wiping System	Wiper or Wipe		Yes
Windshield Washing System	Washer or Wash		____
Windshield Washing and Wiping Combined	Wash-Wipe or Washer-Wiper		Yes
Heating and/or Air Conditioning Fan	Fan		Yes
Windshield Defrosting and Defogging System	Defrost, defog or Def.		Yes
Rear Window Defrosting and Defogging System	Rear Defrost, Rear Defog. Rear Def, or R-Def.		Yes
Engine Start	Engine Start [1]	____	____
Engine Stop	Engine Stop [1]	____	Yes
Manual Choke	Choke	____	____
Hard Throttle	Throttle	____	____
Automatic Vehicle Speed	(Mfr. Option)	____	Yes
Identification Lamps	Identification Lamps or Id Lps	____	Yes
Heating and Air Conditioning System	(Mfr. Option)	____	Yes

[1] Use when engine control is separated from the key locking system.
[2] Use also when the clearance lamps, identification lamps, parking lamps and/or side marker lamps are controlled by the headlamp switch.
[3] Use also when the clearance lamps, identification lamps and/or side marker lamps are controlled by switches other than the headlamp switch.
[4] Framed areas may be filled.

TABLE 2
Identification and Illumination of Displays

Column 1 Display	Column 2 Telltale Color	Column 3 Identifying Words of Abbreviation	Column 4 Identifying Symbol	Column 5 Illumination
Turn Signal Telltale	Green	Also see FMVSS 108		
Hazard Warning Telltale		Also see FMVSS 108		____
Seat Belt Telltale	____ [7]	Fasten Belts or Fasten Seat Belts Also see FMVSS 208		____
Fuel Level Telltale		Fuel		____
Gauge	____			Yes
Oil Pressure Telltale		Oil		____
Gauge	____			Yes
Coolant Temperature Telltale		Temp		____
Gauge	____			Yes
Electrical Charge Telltale		Volts, Charge or Amp		____
Gauge	____			Yes
Highbeam Telltale	Blue or Green [4]	Also see FMVSS 108		____
Brake System [8]	Red [4]	Brake. Also FMVSS 105 &135	____	____
Malfunction in Anti-Lock or	Yellow	Antilock, Anti-lock, or ABS Also see FMVSS 105 & 135	____	____
Variable Brake Proportioning System [8]	Yellow	Brake Proportioning Also see FMVSS 135	____	____
Parking Brake Applied [8]	Red [4]	Park or Parking Brake Also see FMVSS I 05 & 135	____	____
Malfunction in AntiLock	Yellow	ABS, or Antilock; Trailer ABS, or Trailer Antilock. Also see FMVSS 121	____	____
Brake Air Pressure Position Telltale		Brake Air, Also see FMVSS 121	____	____
Speedometer	____	MPH [5]	____	Yes
Odometer	____	____ [3]	____	____
Automatic Gear Position	____	Also see FMVSS I 02	____	Yes

[1] The pair of arrows is a single symbol. When the indicator for left and right turn operate independent , however, the two arrows will be consldered separate symbols and may be spaced accordingly.

[2] Not required when arrows of turn signal tell-tales that otherwise operate independently flash simultaneously as hazard warning telltale.

[3] If the odometer indicates kilometers, then “KILOMETERS” of “km” shall appear, otherwise, no identification is required.

[4] Red can be red-orange. Blue can be blue-green.

[5] If the speedometer is graduated in miles per hour and in kilometers per hour, the identitying words or abbrevia -tions shall be “MPH and km/h” in any combination of upper or lower case letters.

[6] Framed areas may be filled.

[7] The color of the telltale required by S4.5.3.3 of Standard No. 208 is red; the color of the telltale required by S7.3 of Standard No. 208 Is not specified.

[8] In the case where a single telltale indieates more than one brake system condition, the word for Brake System shall be used.

TABLE 2 (a)
Identification and Iltumination of Internal Displays

Column 1	Column 2	Column 3	Column 4	Column 5
Display	Telltale Color	Identifying Words of Abbreviation	Identifying Symbol	Illumination
Turn Signal Tell-Tale	Green	Also see FMVSS 108		_____
Hazard Warning Tell-Tale	Red [4]	Also see FMVSS 108		_____
Seat Belt Tell-Tale	Red [4]	Fasten Belts or Fasten Seat Belts. Also see FMVSS 208.		_____
Fuel Level Tell-Tale	Yellow	Fuel		_____
Gauge	_____	Fuel		Yes
Oil Pressure Tell-Tale	Red [4]	Oil		_____
Gauge	_____	Oil		Yes
Coolant Temperature Tell-Tale	Red [4]	Temp		_____
Gauge	_____	Temp		Yes
Electrical Charge Tell-Tale	Red [4]	Volts, Charge or Amp		_____
Gauge	_____	Volts, Charge or Amp		Yes
Speedometer	_____	MPH [5]	_____	Yes
Odometer	_____	_____	_____	_____
Automatic Gear Position	_____	Also see FMVSS 102	_____	Yes
High Beam Tell-Tale	Blue [4] or Green	Also see FMVSS 108		_____
Brake Air Pressure Position Tell-Tale	Red [4]	Brake Air Also see FMVSS 121	_____	_____
Malfunction in Anti-Lock or	Yellow	Anti-Lock. Also see FMVSS 105-75	_____	_____
Brake System	Red [4]	Brake. Also see FMVSS 10~75	_____	_____

[1] The pair of arrows is a single symbol. When the indicator for left and right turn operate independently, however, the two arrows will be considered separate symbols and may be spaced accordingly.

[2] Not required when arrows of turn signal telltales that otherwise operate independently flash simultaneously as hazard warning tell-tale.

[3] If the odometer indicates kilometers, then 'KILOMETERS' of 'km' shall appear, otherwise, no identification is required.

[4] Red can be red-orange. Blue can be blue-green.

[5] Framed areas may be filled.

[6] If the speedometer is graduated in miles per hour and in kilometers per hour, the identifying words or abbreviations shall be 'MPH and km/h' in any combination of upper or lower case letters.

ITEM 96-36

Exhaust outlets
(Buses, Trucks)

APEC Regulation Analysis Findings
Item No. 36: Exhaust Outlets (Buses, Trucks)

1. The exhaust outlet positions of commercial vehicles vary, depending on whether the steering wheel is located on the right or left side of the vehicle. Except Australia and the U.S., however, member economies have similar requirements.

2. A comparison of specific requirements for the exhaust outlets of buses and trucks is as follows.

(1) Installation position: Only the U.S. and Australia specify installation dimensions and other detailed requirements. In addition to the regular position requirements, Australia applies a vertical exhaust requirement.

Many of the member economies which specify an exhaust outlet position require the outlet to be installed in the rear of the vehicle (Australia, Hong Kong, Indonesia), or the right side of the vehicle (Australia, Hong Kong, Singapore) in the case of vehicles having the steering wheel on the right side.

(2) Outlet direction: Many of the member economies which specify an exhaust outlet direction require the outlet to be directed rearward of the vehicle (Australia, Japan, Hong Kong, Indonesia, Papua New Guinea, Thailand), or rightward of the vehicle (Australia, Hong Kong, Indonesia) in the case of vehicles having the steering wheel on the right side. Australia requires the exhaust outlet to be directed upward if the outlet is situated at least 150mm above the carburetor, or downward if the height of the outlet is not more than 750mm from the ground.

(3) Damage by heat: Many member economies require that the exhaust outlet be so positioned that it will not set fire to the vehicle itself or to the loaded goods (Japan, U.S., Hong Kong, Indonesia, Korea, Malaysia, Singapore, Thailand). Australia sets forth a requirement for vertical exhausts to the effect of preventing injury to persons.

Item No.36 Exhaust Outlet

A : Application Bus & Truck

Country	B: Construction	B-b)-1 Position
Australia		ADR 42/02
Brunei		
Canada		
Chile		
China		
Hong Kong		Unique (off side or rear of the vehicle)
Indonesia		Unique (back of the vehicle)
Japan		SRRV31 (Not be inside)
Korea		
Malaysia		Unique (prevent so far as practicable any fumes from entering the vehicle) [public service vehicle only]
Mexico		
New Zealand		
Papua New Guinea		
Philippines		Unique (not towards the plate)
Singapore		Unique (on the offside or at the rear of the vehicle) [public service vehicle only]
Chinese Taipei		
Thailand		Unique (must not be placed at beneath of loaded deck)
United States		Unique (FMCSR 393. 83)
ECE		

Country	B-b)-2 Orifice Direction
Australia	ADR 42/02
Brunei	
Canada	
Chile	
China	Unique (The direction not be to the right of the vehicle)
Hong Kong	Unique (is not directed to near side of the vehicle)
Indonesia	Unique (should be directed upwards or backwards or to the right side)
Japan	SRRV31 (Opening shall not be directed rightwards or leftwards)
Korea	SRRV31 (Opening shall not be directed rightwards or leftwards)
Malaysia	Unique (straight and free of any attachment for the last 150mm) [public service vehicle only]
Mexico	Unique (Opening rearward, special structured vehicle may have upward or leftward)
New Zealand	
Papua New Guinea	Unique (shall not projected to the side of the vehicle)
Philippines	Unique (shall not be directed towards the passenger compartment)
Singapore	Unique (shall be on the offside or at the rear of the vehicle)
Chinese Taipei	
Thailand	Unique (End of exhaust pipe must be paralelled with road surface and straight to the rear)
United States	Unique (FMCSR393. 83)
ECE	

Country	B-b)-3 Heat Damage
Australia	ADR42/02 (Any exposed section of an exhaust system ---must be shielded to prevent)
Brunei	
Canada	
Chile	
China	
Hong Kong	Unique (It is not likely to cause a fire through proximity to any inflammable material)
Indonesia	
Japan	SRRV31 (shall be located so that it may set fire to motor vehicle itself or the loaded goods)
Korea	Unique (it shall not ignite the motor vehicle itself or the cargos or obstruct other function)
Malaysia	Unique (It is not likely to cause fire through proximity to any inflammable material on the vehicle [public service vehicles only]
Mexico	
New Zealand	
Papua New Guinea	
Philippines	Unique (it may not cause fire to the motor vehicle or the cargo or shall not obstruct the function)
Singapore	Unique (It is not likely to cause fire through proximity to any inflammable material on the vehicle) [public service vehicles only]
Chinese Taipei	
Thailand	Unique (insulator plate must be position of touching with flammable fire material)
United States	Unique (FMCSR 393. 83)
ECE	No flammable material shall be permitted within 10 cm of the exhaust pipe unless the material is effectively shielded

Country	B-b)-4 Others (shape)	C: Function
Australia		
Brunei		
Canada		
Chile		
China		
Hong Kong		
Indonesia		
Japan		
Korea		
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore	Unique (shall end in a straight section of at least 100 mm in length)	
Chinese Taipei		
Thailand		
United States		
ECE		

Country	D: Marking	E: Reference standards / Alternative regulation
Australia		
Brunei		
Canada		
Chile		
China		
Hong Kong		
Indonesia		
Japan		
Korea		
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States		
ECE		

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : AUSTRALIA ADR42			
Technical Requirement		Content	Illustration / supplement
Bus (42.11.2)			
Vertical exhaust system	1. Position	Behind the rearmost portion of the passenger compartment	
	2. Orifice direction	Vertically upwards or rearwards at any angle above the Horizontal	
Other than vertical exhaust system	1. Position	Rearwards or to the right of the vehicle Not extend beyond the perimeter of the vehicle when viewed in plan	
	2. Orifice direction	Not extend beyond the perimeter of the vehicle when viewed in plan.	
Truck (42.11.3)			
1. Position		The exhaust outlet must be behind the rearmost seating position and at least 40 mm beyond the furthermost outboard or rearmost joint of the floor pan which is not continuously welded or permanently sealed, and must not extend beyond the general perimeter of the vehicle when viewed in plan. The height of the outlet must be either greater than 150 mm (above) the maximum height of the cab or less than 750 mm above the ground.	
2. Orifice direction		The direction of the discharge must not be to the left of the vehicle and must be above the horizontal; for other exhausts, the derection of discharge must not be to the left of the vehicle and must be between the horizontal and 45 degrees downwards.	
3. Heat damage		Any exposed section of an exhaust system discharging above the cabin must be shielded to prevent accidental personal contact in areas where contact can occur during normal operating and servicing conditions.	
4. Vertical exhaust system requirement (42.11.4)		The orifice must be a horizontal cross-section of the exhaust pipe and must direct the exhaust gases vertically upwards; OR The orifice must be a horizontally cross-section of the exhaust pipe and must be fitted with a rain cap such that in plan view the hinge of the cap makes an angle of 90 degrees ±10 degrees with the longitudinal centerline of the vehicle, with the rain cap operating in a fore-and-aft direction ; OR	
4. Vertical exhaust system requirement (continued)		The orifice must be angled and oriented so that the principal flow of the exhaust gases is directed rearwards, within 0 degree and 45 degree the longitudinal centerline of the vehicle.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : CHINA GB 7258-87		
Technical Requirement	Content	Illustration / supplement
1. Position	NO REQUIREMENT	
2. Orifice Direction GB 7258-87 Article 9. 10	The direction of exhaust outlet must not be to the right of the vehicle.	
3. Heat damage	NO REQUIREMENT	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : HONG KONG Road Traffic Regulation No. 80		
Technical Requirement	Content	Illustration / supplement
1. Position	The outlet of the exhaust pipe of every bus and light bus shall be placed - (a) on the off side of the vehicle; or (b) at the rear of the vehicle, as near as is reasonably practicable to the off side of the vehicle.	
2. Orifice direction	On every goods vehicle and special purpose vehicle the exhaust pipe shall be so fitted as sheeled, and maintained that - the exhaust outlet is not directed to the near side of the vehicle.	
3. Heat damage	On every goods vehicle and special purpose vehicle the exhaust pipe shall be so fitted or shielded, and maintained that – (a) no inflammable material can be thrown upon it from any other part of the vehicle. (b) it is not likely to cause a fire through proximity to any inflammable material in the vehicle or being carried on the vehicle. The exhaust pipe pf every bus and light bus shall be so fitted or shielded, and maintained that - (a) no inflammable material can be thrown upon it from any other part of the vehicle; (b) it is not likely to cause a fire through proximity to any inflammable material on the vehicle.	
4. Others	The exhaust pipe of every bus and light bus shall be so fitted or shielded, and maintained that - so far as is reasonably practicable, fumes are preented from entering the vehicle from it.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : INDONESIA Government Regulation No. 44/1993-13		
Technical Requirement	Content	Illustration / supplement
1. Position & 2. Orifice direction	The exhaust gas and smoke form the exhaust system should be directed upwards or backwards or to the right side at the back with a cetain sloping angle formed with a line diving the vehicle in two equal parts in such a way that safety in ensured.	
3. Heat damage	Not applicable	
4. Other requirement	Designed and made from fairly strong material so that there shall not be any smoke and exhaust gas leakages in fulfillment of the requirement for the noise level threshold.	

Item No.36　Exhaust outlet (Buses & Trucks)

Economy : JAPAN　Safety Regulations for Road Vehicles　Article 31		
Technical Requirement	Content	Illustration / supplement
1.　Position	No exhaust pipe shall be inside the vehicle compartment.	
2.　Orifice direction	No exhaust pipe shall have its opening directed rightwards or leftwards. No exhaust pipe shall have its opening in a direction such that the registration number plate or vehicle number plate in Paragrapf 1 of Article 11 or Paragraph 1 or Article 73 (including the case applied mutatis mutadis in Paragraph 2 of Article 97-3) of the Act, respectively are fouled by the exhaust gas, etc. and mde illegible.	
3.　Heat damage	No exhaust pipe shall be located so that it may set fire to motor vehicle itself (including a trailer drawn thereby) or the loaded goods, and that it may obstruct the function of other system such as brake system or electrical system because of the interfererance with the exhaust pipe or exhaust gas, etc. emitted from the exhaust pipe.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : KOREA The Regulations of The Motor Vehicle Safety Standards Article 37		
Technical Requirement	Content	Illustration / supplement
1. Position	No regulation	
2. Orifice direction	The exhaust system of each motor vehicle shall have its opening rearward. However, the special structured vehicle approved by the Minister of Construction and Transportation may have its opening upward or leftward. If the opening direction of the exhaust system is within 30 degrees from the center line of a motor vehicle to the downward and rearward or to the left, the exhaust system shall be deemed to be in compliance with the regulations in Paragraph 1.	
3. Heat damage	The exhaust system of each motor vehicle shall not ignite the motor vehicle itself or the cargoes or obstruct other functions.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : MALAYSIA Motor Vehicles Rules 51, 130 & EQR-1995-15		
Technical Requirement	Content	Illustration / supplement
1. Position (MVR-130)	Exhaust pipe. The exhaust pipe and all apparatus connected therewith shall be maintained in such condition as to prevent so far as practicable any fumes from entering the vehicle.	Public service vehicles only
2. Orifice Direction (EQR-1995-15, MVR-51)	The exhaust pipe installed in every motor vehicle shall be straight and free of any attachment for the last 150 mm when the exhaust is finally discharged into the atmosphere. (EQR 1995-15) The outlet thereof shall be placed in such manner as may prevent fumes (so far as practicable) from entering the vehicle. (MVR-51)	Public service vehicles only
3. Heat Damage (MVR-51)	Exhaust pipe. The exhaust pipe shall be so fitted or shielded that no inflammable material can be thrown upon it from any other part of the vehicle and that it is not likely to cause a fire through proximity to any inflammable material on the vehicle.	Public service vehicles only

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : PNG Motor Vehicle Traffic Act- Chapter 243. Motor Traffic Regulation ; Reg. No. 125C Exhaust, Silencer etc		
Technical Requirement	Content	Illustration / supplement
1. Position 2. Orifice direction	No regulation The outlet of an exhaust system shall not project to the side of the motor vehicle in such a manner as is likely to cause danger or annoyance to any person.	
3. Heat damage	No regulation	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : PHILIPPINES Motor Vehicle Inspection System Section 13-AO		
Technical Requirement	Content	Illustration / supplement
1. Position	The exhaust pipe shall not have its opening towards the plate.	
2. Orifice direction	The exhaust pipe shall not be directed towards the passenger compartment.	
3. Heat damage	The exhaust pipe shall be so located that it may not cause fire to the motor vehicle itself or the cargo, or that it shall not obstruct the function of the other systems of the vehicle, such as the braking system or the electrical system.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : SINGAPORE Road Traffic Rules No.33		
Technical Requirement	Content	Illustration / supplement
1. Position	The outlet of the exhaust pipe shall be on the offside or at the rear of the vehicle. The outlet of the exhaust pipe shall be either at the rear or on the off-side and far enough to the rear, to prevent so far as practicable fumes from entering the vehicle.	Applicability : Public service vehicle only.
2. Orifice direction	No regulation	
3. Heat damage	The exhaust pipe of a vehicle shall be so fitted or shielded that no inflammable material can fall or be thrown upon the pipe from any other part of the vehicle and so that it is not likely to cause a fire through proximity to any inflammable material on the vehicle.	Applicability : Public service vehicle only.
4. Others (Shape)	The exhaust pipe of every vehicle shall end in a straight section of at least 100 millimeters in length.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : CHINESE TAIPEI Road Traffic Safety Standards Article 39 Section 3		
Technical Requirement	Content	Illustration / supplement
1. Position	No regulation	
2. Orifice direction	No regulation	
3. Heat damage	No regulation	
4. Others	The joint in the exhaust outlet should not have the phenomenon such as leakage of air, split, corrosion and cross split.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : THAILAND Regulation of Land Transport Department for Bus & Truck Section 2 Part 1 Item 15-(K)		
Technical Requirement	Content	Illustration / supplement
1. Position	For truck type 4, any parts of exhaust pipe must not be placed at beneath of loaded deck. For truck type 9, which use for trail the truck type 7 or type 8 - Exhaust pipe may be fixed in vertical and end of pipe not lower than the highest part of truck.	Type 4 : Dangerous loaded truck Type 7, 8 : Semi trailer Pole trailer Type 9 : Truck tractor
2. Orifice Direction	- End of exhaust pipe must be paralelled with road surface and straight to the rear. For the bus that has door at rear of body. - Road surface and turn out to the corner of rear right side.	
3. Heat damage	- With exhaust pipe insulator plate at the position of touching with flammable fire material.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : U.S.A Federal Motor Carrier Safety Regulation Subpart G Sec.393.83		
Technical Requirement	Content	Illustration / supplement
2. Orifice direction	1) No exhaust system shall discharge to the atmosphere at a location immediately below the fuel tank or the fuel tank filler pipe. 2) The exhaust system of a bus powered by a gasoline engine shall discharge to the atmosphere at or within 6 inches forward of the rearmost part of the bus. 3) The exhaust system of a bus using fuels other than gasoline shall discharge to the atmosphere either: (1) At or within 15 inches forward of the rearmost part of the vehicle; or (2) To the rear of all doors or windows designed to be open, except windows designed to be opened solely as emergency exits. 4) No part of the exhaust system shall leak or discharge at a point forward of or directly below the driver/sleeper compartment. The exhaust outlet may discharge above the cab/sleeper roofline.	
3. Heat damage	No part shall be located where its location would likely result in burning, charring, or damaging the electrical wiring, the fuel supply, or any combustible part of the motor vehicle.	

Item No.36 Exhaust outlet (Buses & Trucks)

Economy : ECE (ECE 36 & ECE 52)		
Technical Requirement	Content	Illustration / supplement
1. Position	No regulation	
2. Orifice direction	No regulation	
3. Heat damage	Materials No flammable material shall be permitted within 10 cm of the exhaust pipe unless the material is effectively shielded.	

ITEM 96-37

Windows and ventilation (Buses, Trucks)

APEC Regulation Analysis Findings
Item No. 96-37: Windows and Ventilation (Buses, Trucks)

1. Australia, Japan, U.S. and other member economies which have a ventilation regulation for commercial vehicles specify the necessary ventilation equipment but do not provide detailed requirements concerning ventilation performance. In this sense, their regulations can be regarded as similar. Australia requires that ventilation be furnished in addition to windows and doors.

Item No.96-37 Windows and Ventilation

A : Application Bus & Truck

Country	B: Construction	B-b)-1 Ventilation
Australia		ADR 42/02 (Must be provided with a means of ventilation other than window and doors)
Brunei		
Canada		
Chile		
China		
Hong Kong		Unique (Adequate ventilation shall be provided)
Indonesia		
Japan		SRRV 20 (Compartment of a motor vehicle shall be constructed to ensure adequate ventilation)
Korea		
Malaysia		Unique (Every vehicle shall have a system of ventilation incorporated in its structure)
Mexico		
New Zealand		Unique: PSV 16 & 36 (shall be effectively ventilated either by windows, by special design and)
Papua New Guinea		
Philippines		
Singapore		Unique (Adequate ventilation shall be provided)
Chinese Taipei		
Thailand		
United States		FMCSR 397(A sleeper berth must have means to provide adequate ventilation)
ECE		

Country	C: Function	D: Marking	E: Reference standards / Alternative regulation
Australia			
Brunei			
Canada			
Chile			
China			
Hong Kong			
Indonesia			
Japan			
Korea			
Malaysia			
Mexico			
New Zealand			
Papua New Guinia			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
United States			
ECE			

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : AUSTRALIA (42 / 02)		
Technical Requirement	Content	Illustration / supplement
1. Ventilation standards (42. 20)	At least half the number of windows must be capable of being opened or the vehicle must be provided with an alternative method of ventilation. Omnibus and N-group vehicles must be provided with a means of ventilation other than by means of windows and door openings. Except in the case of omnibuses equipped with flow-through ventilation or refrigerated air-conditioning, the provision of an inlet air vent and at least two rotary vents or a hatch in the roof towards the rear of the passenger compartment as mean of ventilation is deemed to meet the provision of this clause.	

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : HONG KONG Road Traffic Regulation, No. 75		
Technical Requirement	Content	Illustration / supplement
1. Ventilation standards	- Ventilation - Adequate ventilation shall be provided in every bus and light bus for the driver and passengers.	

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : JAPAN Safety Regulations for Road Vehicles, Article 29		
Technical Requirement	Content	Illustration / supplement
1. Ventilation standards	The drivers and passenger compartment of a motor vehicle shall be constructed to ensure adequate ventilation.	

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : MALAYSIA Motor Vehicle Rules, No. 74		
Technical Requirement	Content	Illustration / supplement
1. Ventilation Standards (MVR-74)	Ventilation Every vehicle shall have a system of ventilation incorporated in its structure, with inlets for fresh air and outlets for used air and smoke, of such capacity as will ensure that no discomfort is caused to any person carried in the vehicle, when all the doors and all the windows of the body are closed.	

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : NEW ZEALAND (PSV 16 & 36)		
Technical Requirement	Content	Illustration / supplement
1. Ventilation standards	Every passenger-service vehicle body shall be effectively ventilated, either by windows, by special design and construction of the walls and ceilings, or by the provision of approved ventilators therein, or by a combination of such methods. Adequate means of ventilation shall also be provided for the driver at the front of the body, and those means of ventilation shall be adjustable. 36.Windows ---(1) Windows shall be fitted along each side of the body and shall open to an extent that a minimum of 130 cm^2 of open area is provided for each seated passenger, or, in the case of school buses, 100 cm^2 of open area for each seated child. Any windows which open, and alongside which a passenger may be seated, shall be guarded to a distance of at least 610 mm above the seat cushion by slats on the inside, or by other approved means, so that a sphere 125 mm in diameter cannot within the said distance be passed through the opening: Provided that windows shall not be required to open where a forced draught ventilating system incorporating at least 2 power driven fans is incorporated and the total capacity of all the fans is such that they are together capable of completely changing the air in the vehicle each 2 minutes. (2) Where windows of a panoramic type are specified, the Secretary may call for such information and testing of the design of the roof and support pillars as will satisfy him of the adequacy of that design.	

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : SINGAPORE Road Traffic Rules No.C21,C87,C89		
Technical Requirement	Content	Illustration / supplement
1. Ventilation standards	Adequate ventilation shall be provided in a vehicle for passengers and the driver without the necessity for opening any main window or windscreen.	

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : Thailand The Ministerial regulation No.40		
Technical Requirement	Content	Illustration / supplement
1. Ventilation standards	* The side window of the vehicle has reasonable size and number. The window must be able to be opened and closed and can protect from both rain and sun. They shall made of durable materials. There should have bolt using for lock. If they made of transparent material, filter is necessary to be equipped with the same size as the windw. *Type of windows for passenger transport vehicles standard 1,2,4 and 6 can be either fixed or can be opened and closed. If they are fixed, and in case that the air-conditioned is out of order, there must be the efficient ventilation inside the vehicle's room. *Materials of the window for passenger transport vehicle standard 3 and small rural buses can be both canvas or other equivalent materials, however, they must be fastened with a vehicles.	

Item No.96-37 Windows & ventilation (Buses & Trucks)

Economy : U.S.A Federal Motor Carrier Safety Regulation Subpart G Sec. 393.76 (f)		
Technical Requirement	Content	Illustration / supplement
1. Ventilation standards	A sleeper berth must have louvers or other means of providing adequate ventilation. A sleeper berth must be reasonably tight against dust and rain.	

ITEM 96-38

Vehicle dimensions (Motorcycle)

APEC Regulation Analysis Findings
Item No. 96-38: Vehicle Dimensions (Motorcycles)

1. Member Economy Comparison

(1) Korea's motorcycle dimension regulation is the same as Japan's regulation for motor-driven cycle dimensions.

(2) Australia, Brunei Darussalam, Malaysia, New Zealand and Philippines adopt their unique motorcycle dimension requirements.

(3) Other member economies do not have dimension requirements for motorcycles.

2. Item Comparison (B-a, B-b, B-c)

(1) Only a small number of member economies adopt dimension requirements specially for motorcycles, and those who have such requirements do not have similar items.

3. Grouping

* Japan group - Japan, Korea

Item No. 96-38 Vehicle Dimension

A: Application Motorcycles

Member Economies	B: Structure requirement	B-a: Length	B-b: Width	B-c: Height	C: Performance requirement	D: Label	E: Reference, Alternative
Australia			Unique (LA and LC 1000mm) (LB, AD and LE 1850mm)				
Brunei	Unique	Unique (14 feet)	Unique(6 feet 6 inches)				
Canada							
Chile							
China							
Hong Kong							
Indonesia							
Japan (Small-sized) (Mini-sized) (Motor-driven)	SRRV 2, 59,	SRRV 2, 59, 12 m 2.5 m 2.5 m	SRRV 2, 59, 2.5 m 1.3 m 1.3 m	SRRV 2, 59, 3.8 m 2.0 m 2.0 m			
Korea	SRRV 59	SRRV 59 (2.5 m)	SRRV 59 (1.3 m)	SRRV 59 (2.0 m)			
Malaysia	Unique	Unique (30 feet)	Unique (7 feet 6 inches)				
Mexico							
New Zealand	Unique		Unique (1 m)				
Papua New Guinea							
Philippines	Unique	Unique (10 m)	Unique (2.5 m)	Unique (4 m)			
Singapore							
Chinese Taipei							
Thailand							
U.S.A							
ECE							93/93EEC (L:4m, W:2m, H:2.5m)

Item 96-38 Vehicle Dimensions (motorcycles)

AUSTRALIA	ADR 43	
ITEM	CONTENT	Illustration / Supplement
A : Application	Two wheel vehicle	
B : Structure requirement B-a : Length B-b : Width	*In the case of a two wheel vehicle (LA or LC), the maximum width shall notexceed 1,000 mm. *In the case of a three wheel vehicle (LB or LE) or a motor cycle with a side car(LD), the maximum width shall not exceed 1,850 mm	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

BRUNEI	Road Traffic Regulation (Article 6,8)	
ITEM	CONTENT	Illustration / Supplement
A : Application	This regulation shall apply to wheeled vehicles only.	
B : Structure requirement B-a : Length B-b : Width	 *The overall length of a vehicle not being a motor or trailer shall not exceed fourteen feet. *The overall width of a vehicle not being a motor or trailer shall not exceed six feet six inches.	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

HONG KONG	Road Traffic Regulations No. 6	
ITEM	CONTENT	Illustration / Supplement
A : Application	Construction and Maintenance of Vehicles	
B : Structure requirement	None	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

JAPAN	Safety Regulation for Road Vehicles, Article 2	
ITEM	CONTENT	Illustration / Supplement
A : Application	Two-wheeled motor vehicles	
B : Structure requirement	Dimension of motor vehicles Length Width Height Small-sized motor vehicles : 12 m 2.5 m 3.8 m (Two-wheeled motor vehicles) or less or less or less Mini-sized motor vehicles : 2.5 m 1.3 m 2.0 m (Two-wheeled motor vehicles) or less or less or less Motor-driven cycles : 2.5 m 1.3 m 2.0 m or less or less or less	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

KOREA	The Regulation of the Motor Vehicle Safety Standards (Art. 59)	
ITEM	CONTENT	Illustration / Supplement
A : Application	For the structures and equipment of motor vehicles and two-wheeled motorcycles	
B : Structure requirement	*The linear dimensions of each two-wheeled motorcycle without a side car shall not exceed 2.5 m in length 1.3 m in width 2 m in height in the unloaded state.	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

MALAYSIA	Motor Vehicles Rules, No.10, 11	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motor Vehicles and Trailers	
B : Structure requirement	Overall length : Not exceed 30 feet (in case of West Malaysia) Not exceed 24 feet (in case of Sabah) Overall width : Not exceed 7 feet 6 inches	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

MEXICO	NOM-EM-012-SCT-2-1994	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycles	
B : Structure requirement	None	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

NEW ZEALAND	Road Traffic Law (TR 48E)	
ITEM	CONTENT	Illustration / Supplement
A : Application	Mopeds and Motorcycles	
B : Structure requirement	*No person shall operate any cycle, mopeds, or motorcycles if the vehicle or its load or both exceed 1 m in width or extend more than 500 mm from the vehicle's center-line, or any part of the load extends more than 1 m ahead of the front wheel or more than 1 m behind the rear wheel.	
C : Performance requirement	None	
D : Label marking requirement	None	

PHILIPPINES	REPUBLIC ACTS No.4136 (SEC. 9)	
ITEM	CONTENT	Illustration / Supplement
A : Application	This ACT shall control the registration, operation of motor vehicle, the licensing.	
B : Structure requirement	No motor vehicle operating as a single unit shall exceed the following dimensions: Overall width : two and five-tenth meters Overall height : four meters Overall length : ten meters	
C : Performance requirement	None	
D : Label marking requirement	None	

Item 96-38 Vehicle Dimensions (motorcycles)

THAILAND	The Ministerial Regulation No.24	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycles	
B : Structure requirement	The width of motorcycle : not exceed 1.10m The length of motorcycle : not exceed 2.05m The width of motorcycle with side trailer : not exceed 1.10m The length of motorcycle with side trailer : not exceed 1.75m The distance between rear wheel of the motorcycle and the trailer's wheel must not exceed 1.50m.	
C : Performance requirement	None	
D : Label marking requirement	None	

ITEM 96-39

Vehicle dimension limits

APEC Regulation Analysis Findings
Item No. 96-39: Vehicle Dimension Limits

1. APEC member economies, except the U.S. and Canada, specify limits for the total length, width and height of the vehicle. The U.S. and Canada do not provide Federal dimension limits.

2. The dimension requirements regarding the length, width and height of the vehicle have practically been harmonized.

3. In addition, Indonesia apply a front and rear overhanging requirement. Australia, Papua New Guinea and Chinese Taipei adopt a rear overhanging requirement. Japan, Korea and Chinese Taipei specify limits for side mirrors and other external projections.

4. A comparison of specific requirements for vehicle dimension limits is as follows.

(1) Total length: All member economies specify the vehicle length limit in the 10-12m range, without a trailer. Brunei Darussalam's limit is shorter at 25 feet (6.2m). Many member economies additionally specify the length limit for the vehicle with a trailer, in the 18-20m range.

(2) Total width: All member economies set forth a width limit in the 2.4-2.5m range, and width is one of the most harmonized items. In Japan and its neighboring member economies, external projection limits are provided in the 10-25cm range for side mirrors, outward-opening windows, etc.

(3) Total height: Most member economies have their vehicle height limits, in the 3.8-4.3m range. Singapore's limit is slightly lower at 3.2m. Brunei Darussalam does not specify a height limit.

(4) Overhanging: Australia, New Zealand, Papua New Guinea, Indonesia and Chinese Taipei provide an overhanging limit, mostly about 50% of the wheelbase.

(5) Regulations for vehicle dimension limits can be divided into the following groups:

* Japan group (adding external projection limits) -
  Japan, Korea, Thailand
* Australia group (also providing overhanging limits) -
  Australia, New Zealand, Indonesia, Papua New Guinea
* Other (only the length, width and height specified) -
  Singapore, Philippines, Hong Kong, Brunei Darussalam

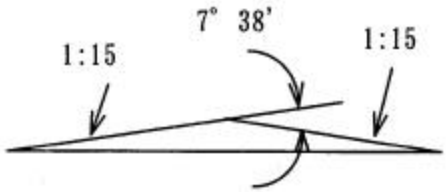
ITEM No 96-39 Vehicle Dimension Limit

A: Application : All Vehicle

Economy		Total length	Overall width	Height	Overhang
Australia	ADR 43	12.5m(Rigid vehicle) 14.2m(Semi trailer) -12.3m : rearward part of point of articulation -1.9m:forward projection of point of articulation 19m (non rigid vehicle)	2.5m	4.3m	Rear over hang: Different from vehicle categories: max. : 3.7m
Brunei	RTR 4, 7	24ft. (6.2m)	8 ft.(2.4m)		
Canada					
Chile					
China					
Hong Kong	RTR 6	Set out every category max. 16m	Set out every category Max. 2.5m	Set out every category Max. 4.6m	
Indonesia	GR 44/1993-115	12m 18m(trailer)	2.5m	4.2m or 170% of overall width	8 deg. : departure angle Fr/Rr overhang : 47.5% / 62.5% of W/B
Japan	SRRV 2	12m	2.5m Protrusion 250mm	3.8m Protrusion 300mm	
Korea	KMVSS 4	12m 13m (Truck) 16.7m (Trailer)	2.5m Protrusion 250mm(Passenger car) 300mm (others)	4m	
Malaysia					
Mexico					
New Zealand	TR48	11m 17m(Semi trailer) 19m(Trailer)	2.5m	4.25m	Rear overhang: lesser of 3.2m or 60% of wheelbase; or 3.7m or 60% of wheelbase if overall length ≥ 9.5m
Papua New Guinea	MTR 111-R117	11.3m	2.5m	4.3m	Rear overhang / Side over hang requirement
Philippines	MVIS S.9ra4136	10m - 14m	2.5m	4m	

Economy		Total length	Overall width	Height	Overhang
Singapore	RTR C6-C-8	10m 11m(agricultural vehicle)	2.5m	3.2m	
Chinese Taipei	RTSS 37	12.2m(passenger vehicle) 11m(Cargo) 20m(Full trailer) : 18m(Semi trailer)	2.5m Protrusion100mm - 150mm	3.8m	Rear overhang 50% of wheel base (Cargo) 60% of wheel base (Passenger)
Thailand					
U. S. A					
ECE					

Regulation: 39 Weight & Dimension
Economy: Australia, ADR 43

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger car(MA)	
B: Requirement	1) Total length Total length must not exceed 12.5 m. 2)Rear overhang Rear overhang must not exceed 60 percent of the distance from the centerline of the front 'Axle' to the line from which 'Rear Overhang' is measured, or 3.2 meters whichever is the lesser. 3)Height The height must not exceed 4.3 meters. 4)Ground clearance Ground clearance under the conditions of 'Maximum Loaded Mass' loading must not less than; a)for any point in the width of the vehicle which is within one meter fore and aft of any 'Axle', 100mm;. b)for mid-point between any 2 consecutive 'Axles', the dimension in millimeters obtained by multiplying the distance between those 2 'Axles' in meters by 33.33; and c)for other point, Ground clearance is such that if the wheels of one 'Axle' are on one plane and the plane which intersects the first so that the angle between them is 738' the point will pass over the apex transverse to the vehicle formed by that intersection, as shown in Fig. 1. 5)Overall width Overall width must not exceed 2,500 mm.	 1:15 gradient Fig. 1

Regulation: 39 Weight & Dimension
Economy: Brunei, Road Traffic Regulations, Section 4, 7

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	(1)The overall length of a motor vehicle shall not exceed twenty-four feet. (2)The overall width of a motor vehicle or trailer shall not exceed eight feet. (3)The weight unladen of a motor vehicle or trailer shall not exceed six tons.	

Regulation: 39 Weight & Dimension

Economy: Hong Kong, Road Traffic Regulations No. 6

<table>
<tr><th>ITEM</th><th>CONTENT</th><th>ILLUSTRATION / SUPPLEMENT</th></tr>
<tr><td>A: Application</td><td>Passenger Vehicle</td><td></td></tr>
<tr><td>B: Requirement</td><td>(1) Subject to paragraph (2), the dimensions of a vehicle of a class listed in column 1 of the First Schedule shall not exceed the overall dimensions specified in relation to that vehicle in column 2,3, and 4 of that schedule.
(2) The Commissioner may be permit in writing, subject to such terms and conditions as may be specified in the permit, authorize the use of a vehicle exceeding the dimensions specified in the First Schedule.

<table>
<tr><td>Column 1</td><td>Column 2</td><td>Column 3</td><td>Column 4</td></tr>
<tr><td>Vehicle</td><td>Length</td><td>Width</td><td>Height</td></tr>
<tr><td>Private car</td><td>6.3</td><td>2.3</td><td>2.0</td></tr>
<tr><td>Taxi</td><td>6.3</td><td>2.3</td><td>2.0</td></tr>
<tr><td>Invalid Carriage</td><td>6.3</td><td>2.3</td><td>2.0</td></tr>
<tr><td>Light Bus</td><td>7.0</td><td>2.3</td><td>3.0</td></tr>
<tr><td>Bus</td><td></td><td></td><td></td></tr>
<tr><td>single decked</td><td>12.0</td><td>2.5</td><td>3.5</td></tr>
<tr><td>Double decked</td><td>12.0</td><td>2.5</td><td>4.6</td></tr>
<tr><td>Articulated</td><td>15.0</td><td>2.5</td><td>3.5</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Light Goods Vehicle</td><td>10.0</td><td>2.5</td><td>3.5</td></tr>
<tr><td>Medium Goods Vehicle</td><td>11.0</td><td>2.5</td><td>4.6</td></tr>
<tr><td>Heavy Goods Vehicle</td><td></td><td></td><td></td></tr>
<tr><td>Rigid</td><td>11.0</td><td>2.5</td><td>4.6</td></tr>
<tr><td>Articulated</td><td>16.0</td><td>2.5</td><td>4.6</td></tr>
<tr><td>Special purpose vehicle</td><td>12.0</td><td>2.5</td><td>4.6</td></tr>
<tr><td>Tricycle</td><td>---</td><td>1.1</td><td>---</td></tr>
<tr><td>Trailer</td><td>13.5</td><td>2.5</td><td>4.6</td></tr>
<tr><td>Pedestrian-controlled Vehicle</td><td>4.3</td><td>1.6</td><td>---</td></tr>
</table>
First Schedule (mm)</td><td></td></tr>
</table>

Regulation: 39 Weight & Dimension

Economy: Indonesia, Government Regulations No. 44/1993-115

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	(1)The main size of a motorized vehicle with or without cargone is as follows. a. maximum width is 2,500 mm; b. maximum height 4,200 mm and not more than 1.7 times the width of the vehicle; c. the maximum length of a single motorized vehicle is 12,000 mm, while a combination of a motorized vehicle and a trailer car or a linked car shall not exceed 18,000 mm; d. the length of the part of a vehicle without any cargoes which stretches backward from the rearmost axle is at most 62.50% of the axle distance, while the part which stretches forward from the frontmost axle is at most 47.50% of the axle distance; e. the going angle of the bottom rear of the vehicle is at least 8 degrees measured from the road surface. (2)The height of a double decker may exceed the maximum height as referred to in sub-article. (1) letter b. (2) The length of a linked bus shall not exceed than 18,000 mm. (3)If a motorized vehicle with or without any cargoes has a total height of more than 3,500 mm, it must be fitted with a warning sign regarding the height of the vehicle being driven. (4)The warning sing as referred to in sub-article (4) is in the form of writing easily visible to the driver in the driver's room.	

Regulation: 39 Dimension

Economy: Japan, Safety Regulations for Road Vehicles, Article 2

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	All vehicles	
B: Requirement Article 2 (Length, Width and Height)	CHAPTER II SAFETY REGULATIONS FOR MOTOR VEHICLES 1 . No motor vehicle shall exceed a length (in the case of a semi-trailer, the horizontal distance between the center of the coupling pin and the rear end of the semi-trailer concerned) of 12m, a width of 2.5m and a height of 3.8m in the state specified below: (1) Unloaded state; (2) Any ladder of an escalating motor vehicle, or turret of an overhead wire repair motor vehicle or those which can be housed while the vehicle is being driven, shall be housed; (3) Any folding awnings or cranes of a work motor vehicles or those which may be used in various states shall be closed or housed; and (4) Any outside rearview mirrors in Paragraph 3 of Article 44 or flexible antennas shall be removed. 2. Any outward-opening windows, ventilators, rearview mirrors or mirrors in Paragraph 3 of Article 44 shall not, in the respective states specified below protrude 250mm or more outwards from the outermost part of the motor vehicle, and 300mm or more upwards from the highest part of the motor vehicle. However, in the case of rearview mirrors attached to a tractor drawing a trailer with a larger width than that of the tractor, protrusion of 250mm from the outermost part of the trailer may be allowed: (1) As respects outward-opening windows or ventilators, the state where they are opened; (2) As respects rearview mirrors or mirrors described in Paragraph 3 of Article 44, the state in which they are described.	

Regulation: 39 Weight & Dimension

Economy: Korea, The Regulations of The Motor Vehicle Safety Standards, Article 4

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	(1)The length, width and height of a motor vehicle shall not exceed the standards below. 1.length a) Passenger vehicles and busses : 12 meters b) Truck and special purpose vehicles : 13meters (in the case of a tractor-trailer, 16.7 meters) 2.Width : 2.5 meters (Any of rearview mirrors, ventilators and out-opening windows shall not protrude 25 centimeters more than the outermost part of a passenger vehicle, 30 centimeters more than those of other vehicles except passenger vehicles. However, if a drawn vehicle is wider than a drawing vehicle, the rearview mirror of the drawing vehicle shall not protrude 10 centimeters more than the outermost part of the drawn vehicle.) 3.Hight : 4 meters (2)The length, width and height, as specified in Paragraph 1, of a motor vehicle shall be measured under the following conditions. 1. in the unloaded state 2. aligned straight on a horizontal plane 3. Rearview mirrors, antennas, outward-opening windows, flashes of emergency vehicles and ventilators, or other protruding apparatus are removed or closed.	

Regulation: 39 Vehicle Dimension Limit
Economy: New Zealand

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	All Vehicle	
B: Requirement	(1)No person shall operate any vehicle- (a) If the vehicle or its load or both exceed 2.5 m width or extend more than 1.25 m from the longitudinal center-line of the vehicle; or (b)If the vehicle is a rigid vehicle or a full trailer or a simple trailer or a semi-trailer and its forward distance exceed 8.5 m; or (c)If the vehicle or its load extends forward from the front edge of the driver's seat by more than 3 m ; or (d)If the vehicle or its load extends backward from the vehicle's rear axis by more than 4 m ; or (e)If the vehicle is a rigid vehicle or a bus and exceeds 3500 kg gross weight, and its rear overhang exceeds 3.7 m or exceeds 60 % of the wheelbase; or (f)If the vehicle is a rigid vehicle (other than a trailer) or a bus and exceeds 3500 kg gross weight is of under 9.5 m overall length, and its rear overhang exceeds 3.2 m or exceeds 60 % of the wheelbase; or (g)If the vehicle or its load or both rise to a height exceeding 4.25 m from the ground or are likely to damage any construction or wires lawfully over any roadway used by the vehicle; or (h)If the vehicle has a trailing unit attached to it or is part of a combination of vehicles and or the distance from the towing vehicle's point of attachment to the first trailing unit to the rear of the trailing unit or the rear of the vehicle combination or the rear of the load exceeds 14.5 m; or (i)If the vehicle is an A train and the distance from the semi-trailer's rear axis to its point of attachment to the full trailer's draw bar exceeds 30 % of the semi-trailer's forward distance; or (j)If the vehicle by itself or in combination with other vehicles has an overall length exceeding,- 1)In the case of a single, non-articulated vehicle (not being a bus or a semi-trailer), 11 m; or 2)In the case of an articulated vehicle, other than an A train or a B train, 17 m; or	

	3)In the case of a non-articulated vehicle that has a trailer attached to it (not being a semi-trailer), 19m; or 4)In the case of an A train or a B train, 20 m; or (k)If the vehicle is being operated in combination with other vehicles and the space between any 2 vehicles in the combination exceeds 4 m; or (l)If the vehicle or any other vehicle used in combination with it was first registered on or after the 1st day of January 1971 and the vehicle or combination of vehicles is incapable a 360 degree turn without projection outside the circumference of a circle of 25 m diameter; or (m)If the vehicle is not a bus and is not stationary, and is a vehicle exceeding 3500 kg gross weight, and the ground clearance at any point along the vehicle does not exceed 10 % of the distance from that point to the nearest axle, and does not exceed 100 mm; or (n)If the vehicle by itself or in combination with other vehicles has a gross weight exceeding 3500 kg, unless, in the case of rigid vehicle, it is supported by either a single axle or twin seer set towards the front of the vehicle connecting all wheels for that part of the vehicle to the steering system, and 1 axle set towards the rear of the vehicle; or (o)If the vehicle has any steering axles, unless that axle is, or those axles are, in the front axle set; or (p)If the vehicle is used in combination with other vehicles and the combination exceeds 3900 kg gross weight, and - 1)Any of the axle (excluding those in the foremost set in the combination or those in the front set of a full trailer) can steer; or 2)The combination (not being a B train) contains 2 or more trailers or is an A train or is an articulated vehicle; or 3)The towing vehicle is a rigid vehicle (other than a rigid vehicle that has a twin steer set) towing a full trailer and has a wheelbase under 4.25 m; or 4)The gross weight of all the axles of the trailer or trailers does not exceed twice the gross weight of all	

	the axles of the towing vehicle; or 5)The towing vehicle does not contain 2 motor driven axles in a tandem set; or (q)If the vehicle exceeds 3500 kg gross weight and its axle set (excluding any twin steer sets) are not load sharing; or (r)If the vehicle is an A train, unless the towing vehicle contains 2 motor driven axles in a tandem set; or (s)If the vehicle is an articulated vehicle exceeding 3700 kg gross weight and the semi-trailer has steering axle; or (t)If the vehicle is an articulated vehicle, and the point of attachment of the semi-trailer is located more than 300 mm behind the rearmost axle of the towing vehicle; or (u)If the vehicle has a retractable axle; or (v)If the vehicle is towing a full trailer and the gross of both exceeds 42000 kg, unless the vehicle has a twin steer set. (2)Paragraph (a) of substance (1) of this regulation shall not apply to any agricultural trailer or agricultural machine that- (a)Does not exceed 3.7 m in width; and (b)Does not carry a load exceeding 3.7 m in width; and (c)Is not operated during the hours of darkness; and (e)Carries a flag of the type specified in regulation 50 of these regulation, at the extreme right-hand edge of the vehicle, to indicate excess dimensions. (3)For the purpose of paragraph (a) of subclause (1) this regulation, the following shall be deemed not to form part of the vehicle or its load: (a)Side maker lights and direction indicators: (b)Collapsible mirrors that project not more than 240 mm more than the width of the vehicle or its trailer:	

	(c)Ropes, lashings, straps, chains and related connectors or tensioning devices that extend not more than 25 mm out either side of the vehicle and are neither permanently fixed nor rigidly fixed. (4)Paragraph(b) of subclause (1) of this regulation shall apply to buses. (5)Paragraph(k) of subclause (1) of this regulation shall not apply to any set of 2 vehicles that are designed or being used to support a common load. (6)For the purposes of paragraph(m) of subclause (1) of this regulation, the vehicle shall be deemed not to include the wheels, tyres, flexible mudflaps, or devices designed to discharge static electricity.	

Regulation: 39 Weight & Dimension
Economy: Papua New Guinea, Motor Traffic Regulation R.111-R.117

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	(1) MAXIMUM LENGTH OF VEHICLES. The maximum length of a motor vehicle or combination shall not exceed - (a) in the case of a rigid vehicle, other than a semi-trailer, 11.3m of which the forward length shall not exceed 8.3m; and (b) in the case of an articulated vehicle, 17m of which - (i) the maximum length of a semi-trailer shall not exceed 12.5m; and (ii) the forward length of a semi-trailer shall not exceed 8.5m, and (c) in the case of a motor vehicle and trailer, not being an articulated vehicle, 18m of which the space between the motor vehicle and trailer shall not exceed 4m. (2) MAXIMUM WIDTH OF VEHICLES The maximum width of a motor vehicle together with any load or equipment thereon shall not - (a) exceed 2.5m; or (b) extend more than 1.25m beyond the longitudinal centre line of that vehicle. (3) SIDE OVERHANG No part of a motor vehicle or its load shall extend sideways more that 300 mm from the longitudinal centre line of the outermost tyre. (4) HEIGHT The maximum height of a motor vehicle together with any load or equipment thereon shall not exceed 4.3m. (5) FORWARD PROJECTION No part of a motor vehicle (other than a uck-mounted mobile crane) shall extend more than 3m forward from the front edge of the driver's seat. (6)REAR OVERHANG 1) No part of a motor vehicle shall overhang the rear axis by more than - (a) 60% of the wheel base; or (b) 3.2m, which ever is the lesser. 2) For the purposes of Subsection (1) the wheel base of a motor vehicle is - (a) in the case of a motor vehicle, other than an articulated vehicle, the distance from the centre line of the front axle to the rear axis of that vehicle; and (b) in the case of an articulated vehicle, the distance from the rear axis of the towing unit to the rear axis of the semi-trailer.	

Regulation: 39 Weight & Dimension

Economy: Papua New Guinea, Motor Traffic Regulation R.111-R.117

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	(7) PROJECTING LOADS 1) No load shall project more than 1.5m beyond the rear, or the front, of a motor vehicle unless - (a) between the hours of sunrise and sunset that is affixed to the projecting end of the load a clean, red flag at least 400mm long and 300mm wide; and (b) between the hours of sunset and sunrise there is carried on the end of the load - (i) projecting rearward, a bright red light; and (ii) projecting forward, a white marker light. 2) No load shall project more than 3m beyond the rear, or the front. of a vehicle unless the written consent of an inspector of motor traffic is first obtained.	

Regulation: 39 Weight & Dimension

Economy: Philippines, Motor Vehicle Inspection System, Section 9 ra 4136

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	(1)SEC. 9. Permissible weights and dimensions of vehicles in highways traffic. (a)The maximum gross weight and measurement of motor vehicles, unladen or with load, permissible on public highways shall be as specified hereunder, subject to such regulations as the Commissioner with the approval of the Secretary of Public Works and Communications, may promulgate, from time to time, as the conditions of the public highway may warrant and the needs of the service may require. Permissible maximum weights; 1. Per most heavily loaded wheel --- three thousand six hundred kilograms (3,600 kg) ; 2. Per most heavily loaded axle ----- eight thousand kilograms (8,000 kg) ; 3. Per most heavily loaded axle group (the two axles of the group being at least one meter (1 m) and less than two meters (2 m) apart) ------ fourteen thousand five hundred (14,500 kg) kilograms. - An axle weight shall be the total weight transmitted to the road by all the wheels the centers of which can be included between the parallel transverse vertical planes one meter (1 m) apart extending across the full width of the vehicles. - No provincial, city or municipal authority shall enact or enforce any ordinance or resolution regulating or prescribing the maximum gross weight of any motor vehicle. (b)No motor vehicle operating as a single unit shall exceed the following dimensions: Overall width -------- two and five-tenths meters (2.5 m) Overall height ------- four meters (4 m) Overall length: Freight vehicles with two axle -------- ten meters (10 m) Passengers vehicles with two axle --- eleven meters (11 m) Vehicles with three or more axles ---- fourteen meters (14 m) (c)No motor vehicle and/or trailer combination shall exceed eighteen meters (18 m) in overall projected length, including any load carried on such vehicle and trailer. (d)No articulated vehicle shall be allowed to draw or pull a trailer and no vehicle already drawing trailer shall draw another.	

Regulation: 39 Weight & Dimension
Economy: Singapore, Road Traffic Rules, No.6-No.8

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	Overall length (1) The overall length of a motor vehicle, other than an articulated vehicle shall not exceed 10 metres. (2) The overall length of an articulated vehicle shall not exceed 11 metres. (3) The Registrar may, subject to such terms and conditions as he maybe impose, authorize the use of a vehicle whose over all length exceeds the limit prescribed by this rule for that vehicle. Overall width. (1) The overall width of a motor vehicle or trailer shall not exceed 2.5 metres. (2) The Registrar may, subject to such terms and conditions as he may impose, permit the use of light locomotive or heavy locomotive the overall width of which exceeds 2.5 metres. Overall height (1) The overall height of a motor vehicle measured from the surface on which the vehicle rests shall not exceed 3.2 metres. (2) The Registrar may, subject to such terms and conditions as he maybe impose permit the use of a motor vehicle the overall height of which exceeds 3.2 metres.	

Regulation: 39 Weight & Dimension

Economy: Chinese Taipei, Road Traffic Safety Standard, Article 37

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	1. Dimension a) overall length 1) Passenger car shall not exceed 12.2 m. 2) Cargo car shall not exceed 11m. 3) Combination of vehicle and full-trailer shall not exceed 20m. 4) Combination of vehicle and semi-trailer shall not exceed 18m. b) overall width Vehicle shall not exceed 2.5m. The distance between the outer edge of rearmost wheels and vehicle inside; -- in the case of large vehicle, shall not exceed 15cm. -- in the case of small vehicle, shall not exceed 10cm. c) overall height Vehicle shall not exceed 3.80m. Small car shall not exceed 1.5 times of overall width and not exceed 2.5m. d) rear overhang 1) Rear overhang of passenger car shall not exceed 60% of wheel base. 2) Rear overhang of cargo shall not exceed 50% of wheel base.	

Regulation: 39 Weight & Dimension
Economy: Thailand, The ministerial regulation No.14

ITEM	CONTENT	ILLUSTRATION / SUPPLEMENT
A: Application	Passenger Vehicle	
B: Requirement	The wide of passenger car (not more than 7 passengers) must not exceed 2.50m and its length must not exceed 12m.	

ITEM 96-40

Vehicle dimension limits (Buses)

APEC Regulation Analysis Findings
Item No. 96-40: Vehicle Dimension Limits (Buses)

1. Member economies set forth similar limits for the length, width and height of the bus. The U.S. does not provide Federal dimension limits.

2. A comparison of specific requirements for bus dimension limits is as follows.

(1) Total length: In the case of single-unit buses, many member economies provide a length limit not exceeding 12m. (People's Republic of China, Hong Kong, Indonesia, Japan, U.S.)
In the case of coupled buses, many member economies specify a length limit not exceeding 18m. (Australia, People's Republic of China, Indonesia, U.S.)

(2) Total width: Many member economies set their bus width limit of not more than 2.5m. (Australia, People's Republic of China, Hong Kong, Indonesia, Japan, Korea, New Zealand, Mexico, Philippines, Singapore, Chinese Taipei, Thailand)

(3) Total height: The bus height limits are as follows:

4.3m or less (Australia, Papua New Guinea)
4.25m or less (New Zealand)
4.2m or less (Indonesia, Singapore)
4.15m or less (Mexico)
4.0m or less (People's Republic of China, Korea, Philippines, Chinese Taipei)
3.8m or less (Japan)

(4) Rear overhanging: Many member economies specify a rear overhanging limit of not more than 60% of the wheelbase. (Australia, Hong Kong, New Zealand, Papua New Guinea, Singapore, Chinese Taipei, Thailand)

(5) Protrusion of mirrors, etc. from the total length, width and height: The largest number of member economies (i.e., People's Republic of China, Japan and Korea) provide -
Projection from total length & width.≤ 250mm
Projection from total height ≤300mm.

(6) Minimum ground clearance: Australia, Japan, Malaysia and New Zealand provide their unique minimum ground clearance limits.

(7) Minimum turning radius: Many member economies specify the minimum turning radius of 12m as measured by the locus of the center of the front outer tire. (People's Republic of China, Indonesia, Japan, Korea)

Item No.96-40 Vehicle Dimension Limits

A : Application Bus

Country	B: Construction	B-b)-1 Overall Length
Australia		ADR 43/03 (Bus; ≤ 12.5m)
Brunei		Unique (motor vehicle ≤ 24 feet)
Canada		
Chile		Unique (Medium bus: 9m, Large bus: 11m)
China		Unique (Bus: ≤ 12m)
Hong Kong		Unique (Bus: ≤ 12m)
Indonesia		Unique (Bus: ≤ 12m)
Japan		SRRV 2 (Bus: ≤ 12m)
Korea		Unique (Bus: ≤ 12m)
Malaysia		Unique (≤ 30 feet for west Malaysia, ≤ 24 feet for Sabah and Sarawak)
Mexico		Unique (Bus: ≤ 12.5m or 13.71m or 14m, Specified by the number of axletyre and road type)
New Zealand		Unique (Bus: ≤ 12.6m)
Papua New Guinea		Unique (Bus: Rigid ≤ 11.3m)
Philippines		Unique (Passengers vehicles: ≤ 11m)
Singapore		Unique (≤ 10m)
Chinese Taipei		Unique (Passengers vehicles: ≤ 11m)
Thailand		Unique (Bus: ≤ 12.2m)
United States		
ECE		

Country	B-b)-2: Overall Width
Australia	ADR 43/03 (≤ 2500 mm including any equipment)
Brunei	Unique (motor vehicles ≤ 8 feet)
Canada	
Chile	Unique (≤ 2.6m)
China	Unique (≤ 2.5m)
Hong Kong	Unique (≤ 2.5m)
Indonesia	Unique (≤ 2.5m)
Japan	SRRV 2 (≤ 2.5m)
Korea	Unique (≤ 2.5m)
Malaysia	Unique (≤ 7 feet 6 inches)
Mexico	Unique (Bus: ≤ 2.5m or 2.6m, Specified by the number of axle, tyre and road type)
New Zealand	Unique (≤ 2.5m)
Papua New Guinea	Unique (Bus: ≤ 2.5m with any load or equipment, shall not extend more than 1.25m than 1.25m beyond the lingitudinal centerline of the vehicle)
Philippines	Unique (≤ 2.5m)
Singapore	Unique (≤ 2.5m)
Chinese Taipei	Unique (≤ 2.5m)
Thailand	Unique (≤ 2.5m)
United States	
ECE	

Country	B-b)-3: Overall Height
Australia	ADR 43/03 (4.3m except for a Livestock Trailer)
Brunei	
Canada	
Chile	
China	Unique (≤ 4.0m)
Hong Kong	Unique (Single-decked: ≤ 3.5m, Double Decked: ≤ 4.6m, Articulated: ≤ 3.5m)
Indonesia	Unique (≤ 4.2m)
Japan	SRRV 2 (≤ 3.8m)
Korea	Unique (≤ 4.0m)
Malaysia	Unique (Single-decked ≤ 10 feet 6 inches, Double-decked ≤ 15 feet)
Mexico	Unique (≤ 4.15m)
New Zealand	Unique (≤ 4.25m)
Papua New Guinea	Unique (≤ 4.3m)
Philippines	Unique (≤ 4.0m)
Singapore	Unique (≤ 3.2m)
Chinese Taipei	Unique (≤ 4.0m)
Thailand	Unique (Bus: ≤ 3.0m, Double deck bus: ≤ 4.8m)
United States	
ECE	

Country	B-b)-4: Overhang
Australia	ADR 43/03 (Rear overhang ≤ 60% of the distance from the centerline of the front axle to the line from which rear overhang is measured, or 3.7m whichever lesser)
Brunei	
Canada	
Chile	Unique (Rear overhang ≤ 65% of wheelbase)
China	Unique (Rear overhang ≤ 65% of wheelbase and ≤ 3.5m)
Hong Kong	Unique (Rear overhang ≤ 60% of wheelbase)
Indonesia	Unique (Rear overhang ≤ 62.5% of wheelbase)
Japan	SRRV 18 (Rear overhang ≤ 50% of the distance between foremost and rearmost axles)
Korea	Unique (Rear overhang ≤ 2/3 of wheelbase)
Malaysia	Unique (Rear Overhang ≤ 50% of the distance between centre(s) of the front wheel(s) and the plane from which the overhang is measured)
Mexico	
New Zealand	Unique (Rear overhang ≤ 3.7m or 60% of wheelbase: or ≤ 3.7m or 60% of wheelbase if overall length ≥ 9.5m provided rear overhang must be restricted so that at least 25% of the total weight is on the front axle.)
Papua New Guinea	Unique (Rear overhang (a) ≤ 60% of wheel base (b) Max 3.2m)
Philippines	
Singapore	Unique (Rear overhang ≤ 60 % of the distance between centre(s) of the front wheel and the plane from which the overhang is measured, Side overhang ≤ 150mm beyond the outer face of the outer tyre)
Chinese Taipei	Unique (with in 60% of wheel base)
Thailand	Unique (with in 60% 2/3 of wheel base, door has rear body bus: 50%)
United States	
ECE	

Country	B-b)-5: External protrusions of the vehicle
Australia	ADR 43/03 (Refer to the requirement of overall width)
Brunei	
Canada	
Chile	
China	Unique (Ventilators or rearview mirrors shall not protrude 250mm or more outwards, 300mm or more upwards)
Hong Kong	
Indonesia	
Japan	SRRV 18 (Opening windows, ventilaters or rearview mirrors shall not protrude 250mm or more outwards, 300mm or more upwards)
Korea	Unique (Any of rearview mirrors, Ventilators and outward-opening windows shall not protrude 25 cm more than the outermost part of a passenger vehicle, 30cm more than shose of other vehicles except passenger vehicles)
Malaysia	
Mexico	
New Zealand	Unique (side marker lights, direction indicators, and collapsible mirrors ≤ 240mm)
Papua New Guinea	Unique
Philippines	
Singapore	Unique (steps, mascot, part or accessory of vehicle)
Chinese Taipei	
Thailand	Unique (Outside shape must not has some parts extend or sharply may cause dangerous)
United States	
ECE	

Country	B-b)-6: Ground Clearance
Australia	ADR 43/03 (any point in the width of the vehicle which is within one meter fore and after of any axle, 100mm)
Brunei	
Canada	
Chile	
China	
Hong Kong	
Indonesia	
Japan	SRRV 3 (Any part shall have clearance above the ground to ensure safe operation)
Korea	Unique (ground clearance:12 m)
Malaysia	Unique (vehicle with seating capacity of more than 16 passengers ; 10 inches, other vehicles ; 7 inches)
Mexico	
New Zealand	Unique (any point along the bus does not exceed 6 % of the distance from that point to the nearest axle, and does not exceed 100mm)
Papua New Guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	
ECE	

Country	B-b)-7: Turning radius	C: Function
Australia	ADR 43/03 (inner radius of 5.3m and outer radius of 12.5 meters)	
Brunei		
Canada		
Chile		
China	Unique (minimum turning diameter ≤ 24m)	
Hong Kong	Unique	
Indonesia	Unique (minimum turning radius ≤ 12m)	
Japan	SRRV 6 (minimum turning radius ≤ 12m)	
Korea	Unique (minimum turning radius ≤ 12m)	
Malaysia	Unique (minimum turning diameter ≤ 66 feet)	
Mexico		
New Zealand	Unique (minimum turning diameter ≤ 25m)	
Papua New Guinea		
Philippines		
Singapore	Unique (minimum turning diameter ≤ 19m)	
Chinese Taipei		
Thailand		
United States		
ECE		

Country	D: Marking	E: Reference standards / Alternative regulation
Australia		
Brunei		
Canada		
Chile		
China		
Hong Kong		
Indonesia		
Japan		
Korea		
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States		
ECE		

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : AUSTRALIA (ADR 43/03)		
Technical Requirement	Content	Illustration / supplement
1. Overall length	The total length of any vehicle, other than a semi-trailer must not exceed 12.5 meters. The total length of an Articulated Omnibus must not exceed 18 meters.	Including any equipment.
2. Overall width	The overall width of any motor vehicle (other than an L-group vehicle) or trailer must not exceed 2,500 mm.	
3. Overall height	The height of any vehicle, except for a 'Livestock Trailer' must not exceed 4.3 meters.	
4. Overhang	NO REGULATION	
5. External Protrusion of the vehicle	NO REGULARION	
6. Ground clearance	The 'Ground Clearance' of a (the) vehicle other than L-group vehicle, mesured from a horizontal road surface to any point on the underside of the vehicle except the tires, wheels and wheel hubs must, under the conditions of 'Maximum Loaded Test Mass' loading as specified in the relevant braking Rule, be not less than: * for any point in the width of the vehicle which is within one meter fore and aft of any 'Axle', 100mm ; * for the mid-point between any 2 consecutive 'Axles', the dimension in millimeters obtained by multiplying the distance between those 2 'Axles' in metres by 33.33 ; and * for any other point, 'Ground Clearance' is such that if the wheels of one 'Axle' are on another plane which intersects the first so that the angle between them is 7 degree 38 minutes the point will pass over the apex tranverse to the vehicle formed by that intersection. (as show in Figure 1)	
7. Turning radius	The minimum turning radius should be 12.5 m.	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : BRUNEI(6,8)		
Technical Requirement	Content	Illustration / supplement
1. Overall length	The overall length of a motor vehicle shall not exceed twenty-four feet. ; or The overall length of a vehicle not being a motor vehicle or trailer shall not exceed fourteen feet.	
2. Overall width	The overall width of a motor vehicle or trailer shall not exceed eight feet. ; or The overall width of a vehicle not being a motor vehicle or trailer shall not exceed six feet six inches.	
3. Overall height	No regulation	
4. Overhang	No regulation	
5. External protrusions of the vehicle	No regulation	
6. Ground clearance	No regulation	
7. Turning radius	No regulation	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : CHILE No.122-3		
Technical Requirement	Content	Illustration / supplement
1. Overall Length	Medium-sized Bus : 9.00 m Large-sized Bus : 11.0 m	* 10t ≤ GVW < 14t * Seating capacity including driver < 26 * GVW ≥ 14t * Seating capacity including driver< 26
2. Overhang	Max 2.60 m The ratio of the overall width and the distance between the outer surface of tyres on the rear axle should not exceed 115 %	
3. Overall Height	NO REGULATION	
4. Overhang	The rear overhang should not exceed 65 % of the wheelbase.	
5. External protrusions of the vehicle	NO REGULATION	
6. Ground clearance	NO REGULATION	
7. Turning radius	NO REGULATION	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : CHINA(GB 1589)		
Technical Requirement	Content	Illustration / supplement
1. Overall Length GB 1589-89 Article 4.1	Bus : 12 m	
2. Overall width GB 1589-89 Article 4.2	2.5 m	
3. Overall height GB 1589-89 Article 4.3	4 m	
4. Overhang GB 7258 - 87 Article 1.3	Rear overhang ≤ 65 % of wheelbase and ≤ 3.5 m	
5. External protrusions of the vehicle GB 1589-89 Article 4.4 & 4.5	Ventilators or rearview mirrors shall not protrude 250 mm or more outwards from the outwards from the outermost part of the motor vehicle, and 300 mm or more upwards from the highest part of the motor vehicle.	
6. Ground Clearance	NO REGULATION	
7. Turning radius GB 7258-87 Article 3.8	The minimum turning diameter shall not exceed 24 meters when measured along the center time of the outermost front wheel.	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : HONG KONG(Article 6)

Technical Requirement (6)	Content	Illustration / supplement
1. Overall length 2. Overall Width 3. Overall Height	a. Subject to paragraph (2), the dimension of a class listed in column 1 of the First Schedule shall not exceed the overall dimensions specified in relation to that vehicle in column 2,3 and 4 of that schedule. b. The comissioner may by permit in writing, subject to such terms and conditions as may be specified in the permit, authorize the use of a vehicle exceeding the dimensions specified in the First Schedule.	

FIRST SCHEDULE [reg. 6]

OVERALL DIMENSIONS OF VEHICLES

Column 1 Vehicle	Column 2 Overall Length (m)	Column 3 Overall Width (m)	Column 4 Overall Height (m)
Light Bus	7.0	2.3	3.0
Bus			
Single-decked	12.0	2.5	3.5
Double-decked	12.0	2.5	4.6
Articulated	15.0	2.5	3.5

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : HONG KONG		
Technical Requirement	Content	Illustration / supplement
4. Overhang (8) (56)	Subject to paragraph (2), (3) and (4), the overhang of a motor vehicle shall not exceed 60 per cent of the distance between the plane perpendicular to the longitudinal axis of the vehicle which passes through the centre or centres of the front wheel or wheels and the foremost vertical plane from which the overhang is to be measured. (Side overhang) No part of the bus or light bus, other than a direction indicator or a driving mirror, shall project laterally beyond the outer face of the outer type of the rearmost wheel on the same side of the vehicle as the projection in the case of	
5. External protrusion of the vehicle	NO REGULATION	
6. Ground clearance	NO REGULATION	
7. Turning radius	1. Every vehicle shall be so constructed as to be capable of turning in either direction within a circle which has a diameter not exceeding - a. 24.5 meters, in the case of a vehicle with an overall length of more than 10 meters ; and b. 26 meters, in the case of a vehicle with an overall length of more than 10 meters. 2. For the motor purpose of this regulation, the diameter of the turning circle of a vehicle shall be determined by reference to the circle traced by the extreme projection points included in the overall length and over-all width of the vehicle.	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : INDONESIA(44/1993-115)		
Technical Requirement	Content	Illustration / supplement
1. Overall length	Max. 12.0 m (Single vehicle) Max. 18.0 m (Articulated vehicle)	
2. Overall width	Max. 2.5 m	
3. Overall Height	Max. 4.2 m	
4. Overhang	Max. 62.5 % x wheel base (Rear over hang) Max. 47.5 % x wheel base (Front over hang)	
5. External protrusions of the vehicle	Not applicable	
6. Ground clearance	Not applicable	
7. Turning radius	Max. 12.0 m	
8. Approach and departure angle	Min. 8 degree (Departure angle) Not applicable (Approach angle)	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : JAPAN (SRRV Article 2)		
Technical Requirement	Content	Illustration / supplement
1. Overall length 2. Overall Width 3. Overall Height	No motor vehicle shall exceed a length of 12m, a width of 2.5m and a a height of 3.8 m.	Measurement conditions; 1). Unloaded state; 2). Any ladder of an escalating motor vehicle or those which can be housed while the vehicle is being driven, shall be housed; 3). Any folding awnings or cranes of a work motor vehicles or those which may be used in various states shall be closed or housed; and 4). Any outside rearview mirrors in Pragraph 3 of Article 44 or flexible antennas shall be removed.
4. Overhang	(Rear overhang) The horizontal distance between the center of the rearmost axle and the rearmost part of the body shall not exceed 1/2 (2/3, in the case of the motor vehicle which is constructed so that it may not carry a load protruding out of the rearmost part of the body; or 11/20, in the case of small-sized motor vehicles except those corresponding with the former) of the distance between foremost and rearmost axles.	
5. External protrusions of the vehicle	Any outward-opening windows, ventilaters, rearview mirrors or mirrors in Pragraph 3 of Article 44 shall not, in the respective states specified below protrude 250mm or more outwards from the outermost part of the motor vehicle, and 300mm or more upwards from the highest part of the motor vehicle. However, in the case of rearview mirrors attached to a tractor drawing a trailer with a larger width than that of that of the tractor, protrusion of 250mm from the outermost part of the trailer may be allowed. 1. As respects outward- opening windows or ventilaters, the the state they are opened; 2. As respect s rearview mirrors or mirrors described in	
6. Ground clearance	Any part other than the ground-contact section of a motor vehicle shall have clearance above the ground to ensure safe operation.	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : KOREA(Article 4)		
Technical Requirement	Content	Illustration / supplement
1. Overall length	The length of a motor vehicle shall not exceed 12 meters.	The length, width and height, as specified in paragraph 1, of a motor vehicle shall be measured under the following conditions. 1. in the unloaded state 2. aligned straight on a horizontal plane 3. rearview mirrors, antennas, outward - opening windows, flashes of emergency ehicles and ventilators, or other protruding appatatus are removed or closed.
2. Overall width	The width of a motor vehicle shall not exceed 2.5 meters.	
3. Overall height	The height of a motor vehicle shall not exceed 4 meters.	
4. Overhang	Rear overhang shall not exceed 2/3 of wheel base (refer to Article 19)	
5. External protrusions of the vehicle	Any of reaview mirrors, ventilators and outward-opening windows shall not protrude 25 centimeters more than the outermost part of a passenger vehicle, 30 centimeters more than shose of other vehicles except passenger vehicles.	
6. Ground clearance	Any part of a motor vehicle in the unloaded state shall have a minimum of 12 centimeter clearance above the ground for safe operation.	
7. Turning radius	The minimum turning radius of vehicles shall not exceed 12 meters when measured along the center line of the outermost front wheel.	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : MALAYSIA(MUR-10,11,29,36,39,40)		
Technical Requirement	Content	Illustration / supplement
1. Overall Length (MVR-10)	Overall length of motor vehicles and trailers (1)(a) In the case of West Malaysia the overall length of a motor vehicle or of an articulated motor vehicle shall not exceed 30 feet : Provided that the Director General may, subject to such terms and conditions as appear to him fit, authorise the use of a vehicle exceeding 30 feet in overall length but not exceeding 40 feet in overall length. (b) In the case of Sabah and Sarawak the overall length of a motor vehicle or of an articulated motor vehicle shall not exceed 24 feet : Provided that the Director General may, subject to such terms and conditions as appear to him fit, authorise the use of a vehicle exceeding 24 feet in overall length but not exceeding 33 feet in overall length.	"Overall length" means the length of a vehicle measured between parallel planes passing through the extreme projecting points of the vehicle exclusive of- (a) any starting handle; (b) any hood when down ; (c) any ladder forming part of a turntable fire-escape fixed to a vehicle; (d) any telescopic fog lamp when extended; (e) any post office letter box the length of which measured parallel to the longitudinal axis of the vehicle does not exceed 12 inches; and (f) any ladder which does not project more than six inches beyond the body of the vehicle. (MVR-2)
2. Overall Width (MVR-11)	Overall width of motor vehicles. (1) The overall width of a motor vehicle shall not exceed seven feet six inches : Provided that the Director General may, subject to such terms and conditions as appear to him fit, authorise the use of a vehicle the overall width of which exceeds seven feet six inches but does not exceed eight feet. (2) No part of a vehicle other than a driving mirror or a direction indicator (when in use) may extend more than six inches beyond the outer face of the outer tyre of the rearmost wheel of the vehicle.	"Overall width" means the width measured between parallel planes passing through the extreme projecting points of the vehicle exclusive of the driving mirror, pass lights which do not increase the overall width by more than six inches and of any direciton indicator and of so much of the distortion of any tyre as is caused by the weight of the vehicle. (MVR-2)
3. Overall height (MVR-36)	Overall height of vehicles No single-decked vehicle shall exceed 10 feet 6 inches in height and no double-decked vehicle shall exceed 15 feet in height.	
4. Overhang (MVR-29)	Overhang The overhang of the motor vehicle shall not exceed 50 per cent of the distance between the plane perpendicular to the longitudianl axis of the vehicle passes through the centre or centres of the front wheel or wheels and the foremost vertical plane from which the overhang is to be measured as defined in rule 2: Provided that it shall be accepted as sufficient compliance with this rule -	" Overhang" means the distance measured horizontally and parallel to the longitudinal axis of the vehicle between two vertical planes at right angles to such axis passing through the two points specified in pragraph (i) and (ii) of this definition respectively, namely- (i) the rearmost point of the vehicle exclusive of- (a) any hood when down,

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : MALAYSIA		
Technical Requirement	Content	Illustration / supplement
4. Overhang (continued) (MVR-29)	1). in the case of a vehicle that does not exceed 20 feet in overall length and 60 cwts in unladen weight, if the measurement of the overhang does not exceed 56 per cent of the distance from which, as defined in rule2, such overhang is to be measured.	(b) any post office letter box, the length of which measured parallel to the longitudinal axis of the vehicle does not exceed 12 inches, (c) any ladder forming part of a turntable fire-escape fixed to a vehicle, (d) any luggage carrier fitted to a motor car constructed solely for the carriage of passengers and their effects and adopted to carry not more than six passengers exclusive of the driver, and (e) any ladder which does not project more than six inches beyond the body of the vehicle; (ii) (a)in the case of a motor vehicle having only two axles one of which is not a steering axle, through the centre point of that axle, (b) in the case of a motor vehicle having only three axles where the front axle is the only steering axle, through a point four inches in rear of the centre of a straight line joining the centre points of the rear and middle axles, and (c) in any other case through a point situated on the longitudinal axis of the vehicle and such that a line drawn from it at right angles to that axis will pass through the centre of the minimum turning circle of the vehicle. (MVR-2)
5. External protrusions of the vehicle	NO REGULATION	
6. Ground clearance (MVR-40)	(1) Save as provided for in rule 41 of these Rules no part of a fully laden vehicle standing on level ground shall, in front of or within the limits hereinafter specified, be nearer the ground than 10 inches in the case of a vehicle having seating capacity for more than 16 passengers or 7 inches in the case of any other vehicle. (2) The limits shall extend - (i) in length rearwards from the foremost part of the vehicle excluding the starting handle and the body work for a distance : (a) in the case of four-wheeled vehicle of 14 feet 6 inches or, if the rear axle is less than 14 feet 6 inches behind such foremost part, up to but not including such axle, and	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : MALAYSIA		
Technical Requirement	Content	Illustration / supplement
6. Ground clearance (continued) (MVR-40)	(b) in the case of a vehicle having more than four wheels of 13 feet or if the foremost driving axle is less than 13 feet behind such foremost part, up to but not including such driving axle; (ii) in width for a distance on either side of the centre line of the vehicle of not less than one-third of the distance between the centre lines of the tracks of the front wheels.	
7. Turning radius (MVR-39)	Turing circle. Every vehicle shall be so constructed as to be capable of turning in either direction in a circle not exceeding in diameter 66 feet. For the purpose of this rule such diameter shall be determined by reference to the extreme outer edge of the wheel track at ground level : Provided that the Director General may subject to such terms and conditions as appear to him meet authorise the use of a vehicle with a turning circle of over 66 feet but not exceeding 70 feet.	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : MEXICO(NOM-EM-012-SCT-2-1994)		
Technical Requirement	Content	Illustration / supplement
1. Overall Length	Specified by the number of axle, tyre and road type. Bus : 12.50 m, 13.71 m, 14.00 m	Refer to table 1C
2. Overall Width	Specified by the number of axle, tyre and road type. Bus : 2.50 m, 2.60 m	ditto
3. Overall Height	Bus : 4.15 m (all)	ditto
4. Overhang	NO REGULATION	
5. Exhaust Protrusions of the Vehicle	NO REGULATION	
6. Ground Clearance	NO REGULATION	
7. Turning Radius	NO REGULATION	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : NEW ZEALAND (TR 48 - Fact sheet 13 (Feb. 1995) Maximum Permitted Vehicle Dimentions)		
Technical Requirement	Content	Illustration / supplement
1. Overall length 2. Overall width 3. Overall Height 4. Overhang 5. External protrusions of the vehicle 6. Ground clearance 7. Turning radius 8. Approach and departure angle	Ristriction affecting buses - (1) No person shall operate any bus - a) If the forward distance exceed 8.3 m plus any distance by which the overrall exceeds 11.4 m; or b) If the bus is a non-articulated bus and has an overrall length exceeding 12.6 m; or c) If the bus is an articulated bus; or d) If the ground clearance at any point along the bus does not exceed 6 % of the distance from that point to nearest axle, and does not exceed 100 mm. (2) For the purpose of paragraph (d) of subclause (21) of this regulation, the bus shall be deemed not to include the wheels, tyres, flexible mudflaps, or devices designed to discharge static electricity. "Forward length" - a) In relation to a motor vehicle other than a trailing unit, means the distance from the rear axis to the foremost part of the vehicle or its load, whichever is the greater: b) In relation to the trailing unit the front axle of which is steered by the towbar, means the greater of the following distances: (i) From the front axle of the trailing unit to the point of attachment of the tow-bar to the towing vehicle: (ii) From the rear axis of the trailing unit to the front axle: c) In relation to any other trailing unit, the distance from rear axis of the trailing unit to the point of attachment to the towing vehicle:	There are no bus regulations for bus.

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : PNG : Motor Vehicle Traffic Act- Chapter 243. Motor Traffic Regulation ; Red. No. 111-117 Vehicle dimension limits - Passenger cars		
Technical Requirement	Content	Illustration / supplement
1. Overall Length	A rigid vehicle ; 11.3m	11.3m of which the forward length shall not exceed 8.3m
	An articulated vehicle ; 17m	17m of which ; (i) Max length of a semi-trailer shall not exceed 12.5m (ii) the forward length of a semitrailer shall not exceed 8.5m
2. Overall Width	* With any load or equipment ; 2.5m *Shall not extend more than 1.25m beyond the longitudinal centerline of the vehicle.	
3. Overall height	4.3m	
4. Overhang	Rear overhang ; (a) 60% of wheel base (b) Max 3.2m	
5. External protrusions of the vehicle	(1) 1.5m beyond the rear or the front of the vehicle (a) Hours from sunrise to sunset, with a clean reg flag at least 400mm long and 300mm wide. (b) Hours from sunset to sunrise with ; (i) a light red light at projecting rearward. (ii) a white marker light at projecting frontward. (2) 3m beyond the rear or front of the vehicle provided that the written consent of an inspector of motor traffic has been obtained.	
6. Ground clearance	NO REGULATION	
7. Turning radius	NO REGULATION	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : PHILIPPINES(S.9 RA 4136)		
Technical Requirement	Content	Illustration / supplement
1. Overall length	(Single unit) Passengers vehicles with two axles - Max. 11 m Vehicles with three or more axles - Max. 14 m (Articulated vehicles) Including any load carried on single vehicle and trailer. - 18 m	
2. Overall width	Max. 2.5 m	
3. Overall Height	Max. 4.0 m	
4. Overhang	No regulation	
5. External protrusions of the vehicle	No regulation	
6. Ground clearance	No regulation	
7. Turning radius	No regulation	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : SINGAPORE(C6,C7,C8,C44,C56,C60,C62,C75 and C128)		
Technical Requirement	Content	Illustration / supplement
1. Overall length (C6)	a. The overall length of a motor vehicle, other than an articulated vehicle, shall not exceed 10 metres. b. The registrar may , subject to such terms and conditions as he may impose, authorize the use of a vehicle whose overall length exceeds the limit prescribed by this rule for that vehicle. (Measurement conditions) " Overall length " means the length of a vehicle measured between vertical planes at right angles to the longtidinal axis of the vehicle and passing through the extreme projecting points thereof excluding any - (a) driving mirror ; (b) starting handle ; (c) hood when down ; (d) expanding or extensible contrivance forming part of a turntable fire-escape fixed to a vehicle ; (e) telescopic fog lamp when extended ; (f) post-office letter-box the length of which measured parallel to the longitudinal axis of the vehicle does not exceed 300 millimeters; and (g) laddar which does not project more than 150millimeters beyond the body of the vehicle; In ascertaining the extreme projecting points of a vehicle account shall be taken of any device or any receptable on or attached to the vehicle which increases the carrying capacity of the vehicle unless (i) it is a tailboard which is let down while the vehicle is stationary in order to facilitate its loading or unloading; (ii) it is a tailboard which is let down in order to facilitate the carriage of, but which is not essential for the support of, loads which are in themselves so long as to extend at least as far as the tailboards when in the upright position; or (iii) it is a receptacle which is constructed or adapted for the purpose of being lifted on or off vehicles with goods or burden contained therein and is from time to time used for that purpose in the ordinary course of business;	notice: atriculated vehicle = tractor + semitrailer

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : SINGAPORE		
Technical Requirement	Content	Illustration / supplement
2. Overall width [C7 (1)]	The overall width of motor vehicle or trailer shall not exceed 2.5 meters. (measurement conditions) " Overall width " means the width of a vehicle measured between vertical planes parallel to the longitudinal axis of the vehicle and passing through the extreme projecting points thereof excluding (a) any driving mirror ; (b) any pass lights which do not increase the overall width by more than 150 millimetres ; (c) any direction indicator ; and (d) so much of the distortion of any tyre as is caused by the weight of the vehicle ; In ascertaining the extreme projecting points of a vehicle account shall be taken of any device or any receptacle on or attached to the vehicle which increases the carrying capacity of the vehicle unless (i) it is a sideboard which is let down while the vehicle is stationary in order to facilitate its loading or unloading ; or (iii) it is a receptacle which is constructed or adopted for the purpose of being lifted on or off vehicles with goods or burden contained therein and is from time to time used for that purpose in the ordinary course of business ;	
3. Overall height [C8, C56]	(a) The overall height of motor vehicle measured from the surface on which the vehicle rests shall not exceed 3.2 metres. (b) The Registrar may, subject to such terms and conditions as he may impose permit the use of a motor vehicle the overall height of which exceeds 3.2 metres. (c) Subject to Paragraph (d), no public service vehicle shall exceed 3.2 metres in height. (d) The Registrar may, subject to such terms and conditions as he may impose, permit the use of a double-decked vehicle which is more than 3.2 metres but less than 4.6 metres in height.	

Economy : SINGAPORE		
Technical Requirement	Content	Illustration / supplement
4. Overhang [C44(1)(2), C62]	(Rear overhang) Subject to Paragraph (2) & (3), the overhang of a motor vehicle shall not exceed 60 % of the distance between the plane perpendicular to the longitudinal axis of the vehicle which passes through the centre or centres of the front wheel or wheels and the foremost vertical plane from which the overhang is to be measured as defined in rule 2. The Registrar may permit the overhang of a public service vehicle to be more than 60 % but less than 65 % of the distance referred to in paragraph (1). (Side overhang) No part of a vehicle included within the overall width thereof shall project laterally more than 150 millimeteres beyond the outer face of the outer tyre on the rearmost wheel on the same side of the vehicle. Definition of overhang (Fr. Rr. only) " Overhang " means the distance measured horizontally and parallel to the longitudinal axis of the vehicle between two vertical planes at right angles to that axis passing through the two points specified respectively in paragraph (a) & (b) of this definition, namely (a) the rearmost point of the vehicle exclusive of any (i) hoof when down ; (ii) post-office letter-box, the length of which measured parallel to the longitudinal axis of the vehicle does not exceed 300 millimetres ; (iii) expanding or extensible contrivance forming part of turntable fireescape fixed to a vehicle ; (iv) in the case of motor-car constructed solely for the carriage of passengers and their effects and adopted to carry not more than 6 passengers, exclusive of the driver, any luggage carrier fitted to the vehicle ; and (v) laddar which does not project more than 150 millimetres beyond the body of the vehicle ; and (b) (i) in the case of the motor vehicle having only two axles one of which is not a steering axle, the centre point of that axle ;	

Economy : SINGAPORE		
Technical Requirement	Content	Illustration / supplement
4. Overhang (Continued)	(ii) in the case of the motor vehicle having 3 axles of which the front axle is the only steering axle, a point 100 milli-metres to the rear of the centre of straight line joining the centre points of the middle and rear axles ; and (iii) in any other case, a point so situated on the longitudinal axis of the vehicle that a line drawn from the point at right angles to that axis will pass through the centre of the minimum turning circle of the vehicle ;	
5. External protrusions of the vehicle [C75(2), C128]	(a) Every fixed step of the vehicle shall not project laterally beyond the body of the vehicle unless it is so protected by the front wings of the vehicle or otherwise is such that it is not liable to injure any pedestrian. (b) No mascot shall be carried by a motor vehicle in any position where it is likely to strike any person with whom the vehicle may collide unless the mascot is not liable to cause injury to such person by person of any projection thereon. (c) No part or accessory of a vehicle shall project beyond the body of the vehicle in such a manner or position as to cause or be likely to cause danger to any person on a road.	
6. Ground clearance	No regulation	
7. Turning radius [C60]	(a) Every vehicle shall be so constructed as to be capable of turning in either direction in a circle which does not exceed in diameter 19 metres. (b) The Registrar may, subject to such terms and conditions as he may impose, permit the use of a vehicle so constructed as to be capable of turning in either direction in a circle which exceeds in diameter 19 metres but not 22 meters. Measurement condition For the purpose of this rule, a circle referred to in paragraph (a) or (b) shall be traced at ground level by the extreme outer edge of the wheel track.	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : CHINESE TAIPEI(Article 37)		
Technical Requirement	Content	Illustration / supplement
1. Overall length	Heavy duty bus : within 12.2 meters	
2. Overall width	Overall width should not be more than 2.5 meters. However, distance from outside of rear wheel to inside of vehicle compartment is not more than 15 centimeters as for heavy-duty vehicles.	
3. Overall height	Two-stored bus : 4.4 meters (in the city area only) The other heavy-duty vehicles : not more than 3.8 meters	
4. Overhang	Bus : within 60 % of wheelbase	
5. External protrusions of the vehicle	No regulation	
6. Ground clearance	No regulation	
7. Turning radius	No regulation	

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : THAILAND(No.9 LTA)		
Technical Requirement	Content	Illustration / supplement
1. Overall Length	Length Bus Standard 1, 2(A), 2(B), 3(A), 3(B), 4 and 7 - Not over 12.0 m. - Measure from front bumper to rear of bus. Bus standard 2(C), 2(D), 2(E), 3(C), 3(D), 3(E), 3(F), 5 and small bus. - Not over 10.0 m. - Measure from front bumper of front part (exclusive trailer arm) to rear of bus. Note: Revised follow Regulation of Communication Ministry No. 31 B.E. 2532(1989) Bus standard 6 - Not over 18.0 m. - Measure from front bumper to rear bumper	More than 30 seats bus and double deck bus and specific business passenger bus not more than 29 seats medium size bus - Semi-trailer bus
2. Overall width	Width - Not over 2.50 m - Outside of body to rim of tire not over 15 cm	
3. Overall height	Height Bus standard 1, 2(A), 2(B), 3(A), 3(B), 5 and 6 - Not over 3.0 m - Measure from ground to max. height of bus. Bus standard 2(C), 2(D), 2(E), 3(C), 3(D), 3(F) and small bus - Not over 3.0 m - Measure from ground to max. height of bus. Bus standards 4 and 7 - Not over 4.80 m. - Measure from ground to max. height of bus. Height of transportation bus and small bus are followed LTD. announcement or passed the acceptance from LTD.	-more than 30 seats bus - medium size bus - double deck bus and specific business passenger bus.

Item No.96-40 Vehicle Dimension Limits (Bus)

Economy : THAILAND		
Technical Requirement	Content	Illustration / supplement
4. Overhang	Front overhang - Not over 1/2 of wheel base and not over 1/2 of front wheel base for bus standard 6. Wheelbase is distance from center of front axle to center of rear axle or center between rear double axle. Wheelbase of bus standard 6 is distance from center of front axle (front bus) to center of rear axle or center between rear double axle (front bus) and distance from center of rear axle or center between rear double axle (front bus) to center of rear axle or center between rear double axle. Rear overhang - Not over 2/3 of wheelbase. - Measure from rear of bus (excluded rear bumper) to center of rear axle or center between rear double axle. Bus that has door at rear of body and bus standard 6 rear overhang is : - Not over 1/2 of wheelbase or not over 1/2 of rear wheelbase. Bus standard 5, 6 and 7 (specific business passenger bus) rear overhang may over from item 13. If necessary but must be passed the acceptance from LTD.	- Standard 6 --- semi trailer bus Standard 5 --- trailer bus
5. External protrusions of the vehicle	Outside shape must not has some parts extend or sharply may cause dangerous.	
6. Ground Clearance	NO REGULATION	
7. Turning radius	NO REGULATION	

ITEM 96-41

Steering

APEC Regulation Analysis Findings
Item No. 96-41: Steering

1. Few member economies have regulations for steering. Furthermore, any concrete requirements are not specified in those regulations, except ECE 79.

Item No.96-41 : Steering

A: Application: Passenger car

Member Economies	B Structure Performance	B-a Structure of Parts	B-b Structure of Parts Installed to Vehicle	B-b-1) Contact to Other Parts	B-b-2) Difference Between Left and Right	B-b-3) Driving Position
Australia		ADR 42				
Brunei						
Canada						
Chile						
China						
Hong Kong				ECE 79		
Indonesia						
Japan				SRRV 11 No contact parts	SRRV 11 No difference	
Korea				SRRV 11		
Malaysia						
Mexico						
New Zealand						SRRV 11
Papua New Guinea						SRRV 11
Philippines						
Singapore						
Chinese Taipei					SRRV 11	SRRV 11
Thailand						
U.S.A.						
ECE				ECE 79 No contact parts		

Item No.96-41 : Steering

Member Economies	B-b-4) Steering Wheel Free Play	B-b-5) Synchronization	C Performance Requirement	C-a Performance of Parts	C-b Performance of Parts Installed to Vehicle	C-b-1) Mechanical Safe Driving
Australia						
Brunei						
Canada						
Chile						
China						
Hong Kong						Unique(No overlock)
Indonesia						
Japan						SRRV 11 Side Slip≤5mm/1m
Korea	12.5% of dia. of S/W					SRRV 11
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines	Max 45°					
Singapore						
Chinese Taipei						
Thailand						
U.S.A.						
ECE		ECE 79 There must be time and travel syncronization				ECE 79

Item No.96-41 : Steering

Member Economies	C-b-2) Steering force	C-b-3) ASE	D Label Marking	D-a Label Marking Its Own	D-b Label Marking Vehicle	E Reference Standard
Australia						
Brunei						
Canada						
Chile						
China						
Hong Kong						
Indonesia						
Japan	SRRV 11 Wheel Load ≤4700kg					
Korea	Max.effort:25kg					
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
U.S.A.						
EC	ECE79 Max.effort:15daN					

41 Steering

Economy/Regulation : Australia /ADR 42

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	The centerline of the steering control must not be located to the left of the centerline of the vehicle. Any component of the steering system of a motor vehicle which is essential for effective steering of the vehicle must be designed to transmit energy by mechanical means only.	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	None	
2) Difference between left and right	None	
3) Driving position	None	
4) Steering wheel free play	None	
Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	None	
2) Steering force	None	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation : Hong Kong/23

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	The wheels shall not in any circumstances foul any part of the vehicle.	
2) Difference between left and right	None	
3) Driving position	None	
4) Steering wheel free play	None	
Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	No overlock shall be possible.	
2) Steering force	None	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation : Indonesia /44/1993-17

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	None	
2) Difference between left and right	None	
3) Driving position	None	
4) Steering wheel free play	None	
Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	None	
2) Steering force	Steering device must be movable by normal force. If the auxiliary force does not work the vehicle must remain to be drivable with normal force.	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation : Japan/SRRV11(1/2)

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	No part of the steering system shall make contact with any other parts. The cloths may not be caught by the steering control system.	
2) Difference between left and right	There shall be no great difference of the steering ratio between the left and right. There shall be no considerable difference of the steering force between the left and right.	
3) Driving position	None	
4) Steering wheel free play	None	
5) Synchronization	None	
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	The steering system shall be secure to ensure safe operation. Slide slippage of the steering tires should not exceeds 5mm per 1m.	

41 Steering

Economy/Regulation : Japan/ (2/2)

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
2) Steering force	The steering system shall be constructed so that it may be operated easily and securely by the driver. The sum of wheel loads of the steering tire of the vehicles without power steering should be less than 4700kg.	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

S:Safety regulations
T:Type approval testing standards
I:Inspection procedure

41 Steering

Economy/Regulation : Korea /14

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	Steering control system shall not be in contact with the body and frame or their parts. No part of the steering control shall catch the driver's cloths.	
2) Difference between left and right	There shall be no considerable difference between left and right with regard to the steering torque and the steering wheel ratio.	
3) Driving position	None	
4) Steering wheel free play	Not more than 12.5% of the diameter of the steering wheel.	
5) Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	Steering control shall have no crack or damage and shall be operating normally. When the vehicle travels 1m, the side slip of the steered wheel shall not be more than 5mm.	
2) Steering force	When each motor vehicle in the loaded state is turned around a 12m radius circle, the steering force shall be not more than 25kg.	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation : Malaysia/MVR-44

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a : Structure of Parts	None	
B-b : Structure of Parts Installed to Vehicle		
1)General	a) The ball and socket joints of steering connections when such are used shall not be pendant	
	b) Any dust-excluding covers fitted to any joints or connections of the steering mechanism shall be capable of being easily removed to facilitate inspection	
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E: Reference Standards	None	

41 Steering

Economy/Regulation : New Zealand / TR70

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	None	
2) Difference between left and right	None	
3) Driving position	Right hand drive	
4) Steering wheel free play	None	
Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	No person shall operate a motor vehicle unless the steering gear and associated mechanizm are in a safe and efficient working condition.	
2) Steering force	None	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation : Papua New Guinea/R125F

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	None	
2) Difference between left and right	None	
3) Driving position	Right hand drive	
4) Steering wheel free play	None	
Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	A person shall not operate a motor vehicle unless the steering mechanism is in a safe and efficient working condition.	
2) Steering force	None	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation : Philippines/S. 10-A0, PNS1259-RHD

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	The steering wheel or any part thereof shall not come in contact with any part of the motor vehicle when steered.	
2) Difference between left and right	The ratio of turning angle to the left or right shall be of no considerable difference to the steering angle of the tire.	
3) Driving position	None	
4) Steering wheel free play	Not more than 45 degree.	
Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1) For safe driving	All parts of the steering wheel shall be secured in order that safety and efficient operation of the vessel are ensured.	
2) Steering force	The steering wheel shall be so made that it may be easily handled.	
3) Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation :Chinese Taipei/39-7

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	All	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1) Contact to other parts	None	
2) Difference between left and right	There shall be no difference of the steering ratio between the left and right.	
3) Driving position	Right hand drive	
4) Steering wheel free play	None	
Synchronization		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1)For safe driving	None	
2)Steering force	None	
3)Auxiliary Steering Equipment(ASE)	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

41 Steering

Economy/Regulation : ECE79/ (1/2)

ITEM	CONTENTS	ILLUSTRATION/SUPPLEMENT
A : Application	M,N,O	
B : Structure Performance	None	
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed to Vehicle		
1)Contact to other parts	The maximum steering angle shall not be limited by any part of the steering transmission.	
2)Difference between left and right	None	
3)Driving position	None	
4)Steering wheel free play	None	
5)Synchronization	There must be time and travel synchronization between the steering control	
and the steered wheel except ASE.		
C : Performance Requirement	None	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle		
1)For safe driving	It must be possible to drive straight at maximum design speed without	
unusual steering correction.		
	It must be possible to leave a curve with a 50m radius of 50m at a tangent without unusual vibration at 40km/h (50km/h).	
	When the vehicle is driven in a circle with its steered wheels at half lock and at least 10km/h, the turning circle must remain the same or become larger if the steering control is released.	
Some safety requirements when the trailer is towed.		

41 Steering

Economy/Regulation : ECE79/ (2/2)

ITEM CONTENTS ILLUSTRATION/SUPPLEMENT

2)Steering force When the vehicle is driven from traight ahead into a speral at 10km/h, the steering effort shall be as follows:

Vehicle Category	Intact			With a failure		
	Maximum effort (daN)	Time (s)	Turning radius (m)	Maximum effort (daN)	Time (s)	Turning radius (m)
M1	15	4	12	30	4	20
M2	15	4	12	30	4	20
M3	20	4	12	45	6	20
N1	20	4	12	30	4	20
N2	25	4	12	40	4	20
N3	20	4	12 (or full lock if 12 is not attainable)	45	6	20

3)Auxiliary Steering Equipment(ASE) The vehicle with ASE can be driven into a circle with a transverse acceleration of 5m/s2 and at 80km/h without any abnormal behavior when ASE fails.

D : Label Marking Requirement None

D-a: Label Marking Its Own Requirement None

D-b: Label Marking Requirement of Its Installed to Vehicle None

E : Reference Standards None

ITEM 96-42

Side guards and Rear guards (Under-run prevention)

APEC Regulation Analysis Findings
Item No. 96-42: Sideguards and Rearguards (under-run prevention)

Rearguards

1. Most of economies which have regulations for rearguards have ones that are equivalent to ECE Regulation.

2. Position:
   Hong Kong, Japan and Singapore have requirements that are equivalent to ECE Regulation, and other economies have their own requirements.

3. Shape:
   People's Republic of China, Hong Kong, Japan, Korea and Singapore have requirements that are equivalent to ECE Regulation. The United States has its own requirement.

4. Performance Requirement:
   Japan and Philippines have requirements that are equivalent to ECE Regulation. Korea and the United States have their own requirements.

Sideguards

1. Few member economies have regulations for sideguards.

2. Position:
   Hong Kong and Singapore have requirements for sideguards that are equivalent to ECE Regulation..
   People's Republic of China and Korea have ones that are equivalent to Japanese regulation.

3. Performance Requirement : It is specified only in ECE Regulation.

Item No.96-42: Rear Guard

A:Application: Truck, Trailer

Member Economies	B Structure Performance	B-a Structure of Parts	B-b Structure of Parts Installed to Vehicle	B-b-1) Location of Device	B-b-2) Shape of Device
Australia				ADR 42 600 mm to Grand 600 mm to Rear End 300mm to Side End	
Brunei					
Canada					
Chile					
China				Height ; 500mm,60% of Vehicle Width	ECE 58
Hong Kong				ECE 58	ECE 58
Indonesia					
Japan				SRRV 18-2	SRRV 18-2
Korea				Height ; 600mm,60% of Vehicle Width	ECE 58
Malaysia					
Mexico					
New Zealand					
Papua New Guinea					
Philippines					
Singapore				ECE 58	ECE 58
Chinese Taipei					
Thailand					
U.S.A.				560mm to Ground 305mm to Rear End 100mm to Side End	Section Height ; 100mm
ECE				ECE 58 Height ; 550mm 100mm to Side End	ECE 58 Section Height ; 100mm

Item No.96-42: Rear Guard

Member Economies	C Performance	C-a Performance of Parts	C-b Performance of Parts Installed to Vehicle	D Label	E Reference Standard
Australia					
Brunei					
Canada					
Chile					
China					
Hong Kong					
Indonesia					
Japan		SRRV 18-2			
Korea		600mm (Max) to rear end after test			
Malaysia					
Mexico					
New Zealand					
Papua New Guinea					
Philippines		ECE 58			
Singapore					
Chinese Taipei					
Thailand					
U.S.A.		125mm deflection			
ECE		ECE 58 400mm (Max) to rear end after test			

Item No.96-42: Side Guard

A: Application Truck, Trailer

Member Economies	B Structure Performance	B-a Structure of Parts	B-b Structure of Parts Installed to Vehicle	B-b-1) Location of Device	B-b-2) Shape of Device	C Performance
Australia						
Brunei						
Canada						
Chile						
China				SRRV 18		
Hong Kong				ECE 73	ECE 73	
Indonesia						
Japan				SRRV 18-2 450 mm or less to the ground 400 mm or less to front wheel 400 mm or less to rear wheel		
Korea				SRRV 18		
Malaysia						
Mexico						
New Zealand						
Papua New Guinea						
Philippines						
Singapore				ECE 73		
Chinese Taipei						
Thailand						
U.S.A.						
ECE				ECE 73 120mm to Vehicle Width 300mm to rear end 550mm to the ground	ECE 73 R≥2.5mm	ECE 73 Withstanding a static force of IKN

Item No.96-42: Side Guard

Member Economies	C-a Performance of Parts	C-b Performance of Parts Installed to Vehicle	D Label	E Reference Standard
Australia				
Brunei				
Canada				
Chile				
China				
Hong Kong				
Indonesia				
Japan				
Korea				
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei				
Thailand				
U.S.A.				
ECE				

42. REAR UNDERRUN PROTECTION

Economy/Regulation AUSTRALIA/ ADR42 (1/2)

Item	Contents	Illustration/Supplement
A : Application	Semi-trailer	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)LOCATION OF DEVICE (REAR BUMPER)	-With the vehicle unladen, the lower edge of the bumper (device) bar across its width shall not be more than 600 mm from the ground.	
	-The bumper (device) contact surface is located not more than 600 mm forward of the rear of the vehicle and is painted white.	
	-The bumper (device) ends extend to within 300 mm of each side of the vehicle, unless the rearmost point of tires is within 600 mm of rear end of the vehicle, in which case tires shall be considered as meeting the Contents over their width.	

42. REAR UNDERRUN PROTECTION

Economy/Regulation AUSTRALIA/ ADR42 (2/2)

Item	Contents	Illustration/Supplement
C: Performance Requirement		
	1)PERFORMANCE, STRUCTURE -The member which is, or directly supports, the bumper(device) contact surface is of material having no less strength than steel tubing of 100 mm outside diameter and 8 mm wall thickness -The structure supporting the member can transmit no less force than that member can sustain, and provides a continuous force path to vehicle members of a strength consistent with the forces to be sustained.	
C-a: Performance of Parts		
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. SIDE GUARDS

Economy /Regulation HONG KONG / CAP374 40A (1/3)

Item	Contents	Illustration/Supplement
A : Application	-Good vehicles with GVM > 5.5t and wheel base > 3m -Trailer with GVM > 2t and wheel base > 3m -Semi-trailer with GVM> 2t and the distance first axle and the center of king pin > 4.5 m.	
B : Structure Performance		
1)GENERAL	-The device shall be of such robust construction as to effectively prevent pedestrian etc. from being trapped between the axles in the event of a collision.	
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)SHAPE OF DEVICE	-The surface of the device shall be smooth. essentially rigid and either flat or horizontally corrugated.	
2)LOCATION OF THE DEVICE	-The lower edge of the device shall be no more than 550 mm above the ground. -In case that the floor of the vehicle extend laterally outside the tangential plane, the height of the upper edge of the device shall not be more than 350 mm below the underside of the floor or the structure of the vehicle where it is cut by the tangential plane. -If no part of the structure of the vehicle is cut within 1.85 mm of the ground by the tangential plane & upper surface of the load carrying structure of the vehicle is less than 1.5 m from the ground, the highest edge shall not be less than the height of upper surface of the load carrying structure of the vehicle.	

42. SIDE GUARDS

Economy /Regulation HONG KONG/ CAP374 40A (2/3)

Item	Contents	Illustration/Supplement
2)LOCATION OF THE DEVICE	-In other cases, the highest edge shall not less than 1.5 m from the ground. -The distance between the rearmost edge of the device and tire nearest to it shall not exceed 300 mm. -In case of semi-trailer, (without landing legs) the distance between the rearmost edge of device and the point at right angles to the center of the king-pin shall not exceed 3 m. -In case of semi-trailer, (with landing legs) unless the center of the landing leg is less than 2.75 m from the king-pin, then the front edge of the device shall not be over 250 mm from the center of the leg. -Except semi-trailer, the front edge of the device shall not be more than 300 mm from the nearest front tire, in case of trailer 500 mm from it. -The device shall not more than 30 mm inboard from the tangential plane and shall not add to vehicle width.	
3)SHAPE OF DEVICE	-All external edges of the device shall be rounded at a radius of at least 2.5 mm. -The device shall extend downwards at least 100 mm from its highest edge, 100 mm upwards from its lowest edge and 100 mm rearwards and inwards from its front edge and shall not have a vertical gap more than 300 mm nor a vertical surface less 100 mm.	

Item	Contents	Illustration/Supplement
C : Performance Requirement		None
C-a: Performance of Parts		None
C-b: Performance of Parts Installed to Vehicle		None
D : Label Marking Requirement		None
D-a: Label Marking Its Own Requirement		None
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. REAR UNDERRUN PROTECTION

Economy /Regulation HONG KONG / CAP.374 40B (1/2)

Item	Contents	Illustration/Supplement
A : Application	Goods vehicle (GVM > 5.5t), Trailer (GVM> 2t), Semi-trailer (GVM> 2t)	
B: Structure Performance		
1)GENERAL	-Each device shall be of such robust construction as to effectively prevent a motor vehicle from underrunning the motor vehicle in front in the event of rear-end collision.	
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)LOCATION OF DEVICE	-The lower edge of the device shall not be more than 550 mm above the ground.	
	-The outer edge of the device shall not be extended beyond the outer faces of the rear axle measured at the outermost points of the wheels, excluding the bulging of tires close to the ground, or more than 100 mm inboard from either outer face of the rear axle, and more than 300 mm inboard from either of the rear axle in case of a vehicle fitted with demountable body; and in case where there is more than one rear axle, the width to be considered is that of the widest rear axle.	

42. REAR UNDERRUN PROTECTION

Economy /Regulation HONG KONG / CAP.374 40B (2/2)

Item	Contents	Illustration/Supplement
2.DEVICE (STRUCTURE)	The device shall consist of a cross-member and linking components connected to the chassis side member or to whatever replaces the chassis side members. The section height of the close member shall not be less than 100 mm.	

C : Performance Requirement	None
C-a: Performance of Parts	None
C-b: Performance of Parts Installed to Vehicle	None
D : Label Marking Requirement	None
D-a: Label Marking Its Own Requirement	None
D-b: Label Marking Requirement of Its Installed to Vehicle	None
E : Reference Standards	None

42. SIDE GUARDS

Economy /Regulation JAPAN / ART 18-2 (1/2)

Item	Contents	Illustration/Supplement
A : Application	-Ordinary-seized motor vehicle used for goods transportation or ordinary-sized motor vehicle with GVM of 8t or more except motor vehicles with 11 person or more passenger capacity or similar shape vehicles.	
B : Structure Performance		
1)GENERAL	-It shall be secure and have a shape of sheet or a shape which can effectively prevent pedestrian etc. from being caught under the rear wheels of the motor vehicle.	
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)LOCATION OF DEVICE	-The height of its lower edge shall be 450 mm or less and the height of its upper edge shall be 650 mm or more above the ground in unladen state. -The distance between the front end of the flat section and the front wheel shall be 400 mm or less. -The distance between the rear end of the flat section and the rear wheel shall be 400 mm or less. -In case of semi-trailer, the device must be mounted so that the front end of flat section is located forward of auxiliary leg. -The flat section of the device shall be located outside of the straight line connecting the centers of road contact section of outermost front wheel and outermost of rear wheel.	

42. SIDE GUARDS

Economy /Regulation JAPAN / ART 18-2 (2/2)

Item	Contents	Illustration/Supplement
C : Performance Requirement		None
C-a: Performance of Parts		None
C-b: Performance of Parts Installed to Vehicle		None
D : Label Marking Requirement		None
D-a: Label Marking Its Own Requirement		None
D-b: Label Marking Requirement of Its Installed to Vehicle		None
E : Reference Standards	None	

42. REAR UNDERRUN PROTECTION

Economy/Regulation JAPAN /ART 18-2 (1/2)

Item	Contents	Illustration/Supplement
A : Application	Ordinary-sized vehicle used for the transport of goods except motor vehicles (GVM ≥ 8t or Max. loading capacity ≥ 5t and tractors)	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1) LOCATION OF DEVICE	-The width of the device is not less than 60 % of the width of the vehicle. -The height of the lower edge of the device is not more than 700 mm in unloaded state. -The distance between the flat section of the device and the rear end of the other part of the motor vehicle at a height of 1500 mm or less above the ground is 600 mm or less.	
2)SHAPE OF DEVICE	The device shall be secure, and it shall be a sheet or have a shape which can effectively prevent the front part of a colliding motor vehicle from running under the rear part of motor vehicle during a rear-end collision.	
C : Performance Requirement		None
C-a: Performance of Parts		None
C-b: Performance of Parts Installed to Vehicle		None
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. REAR UNDERRUN PROTECTION

Economy/Regulation JAPAN /ART 18-2 (2/2)

Item	Contents	Illustration/Supplement
A : Application	Ordinary-sized vehicle used for the transport of goods with GVM of 8t or more or with Max. loading capacity of 5t or more (except tractors)	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)SHAPE OF DEVICE	-The height of the device (Cross section of flat section) is 100 mm or more	
2)LOCATION OF DEVICE	-The outermost edge of the flat section of the device is located 100 mm to 200 mm inward from the outermost edge of the wheel of the rear axle. -The height of the lower edge of the device is 550 mm or less above the ground in the unloaded state.	
C : Performance Requirement	Same as ECE58.	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. SIDE GUARDS

Economy /Regulation KOREA / KMVSS 19

Item	Contents	Illustration/Supplement
A : Application	-Truck, special purpose vehicle and tractor-trailer with GVM of 8 t or more or max. loading capacity of 5 t or more.	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)LOCATION OF DEVICE	-The height of its lower edge shall be 500 mm or less and the height of its upper edge shall be 700 mm or more above the ground in unladen state. -The distance between its front edge and the front wheel shall be less 400 mm or more. -The distance between its rear edge and the rear wheel shall be less 400 mm or more.	
C : Performance Requirement		None
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. REAR UNDERRUN PROTECTION

Economy / Regulation KOREA / KMVSS 96

Item	Contents	Illustration/Supplement
A : Application	Truck and special purpose vehicle and tractor-trailer with its GVM ≥ 8t or Max. loading capacity ≥ 5t	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)LOCATION OF DEVICE	-The width of the device is not less than 60 % of the width of the vehicle but less than 100% of the width of a motor vehicle. -The height of the lower edge of the device is not more than 600 mm in unloaded state. -The device shall be symmetric about the center line of a motor vehicle.	
2)SHAPE OF DEVICE	-The min. vertical height of the device shall not be less than 100 mm.	
C: Performance Requirement	(Except tractor-trailer) When the load as specified in Appendix 13 is applied, the distance between the device and rearmost part of the body not more than 1500 mm above the ground shall not be more than 600 mm.	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. SIDE GUARDS

Economy /Regulation SINGAPORE / CHAPT276 C48B

Item	Contents	Illustration/Supplement
A : Application	-Motor vehicle with GVM of more than 3.5 t.	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)DEVICE AND INSTALLATION	-Same as 89/297/EEC (=ECE73)	
C : Performance Requirement		None
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. REAR UNDERRUN PROTECTION

Economy /Regulation SINGAPORE / CHAPT.276

Item	Contents	Illustration/Supplement
A : Application	Motor vehicle (GVM ≥ 3.5t)	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
C: Performance Requirement		
1)LOCATION, STRUCTURE PERFORMANCE	Same as 79/490/EEC (=ECE58)	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. REAR UNDERRUN PROTECTION

Economy /Regulation USA /FMVSS223/224 (1/2)

Effective date: January 26, 1998

Item	Contents	Illustration/Supplement
A : Application	Trailer and semi-trailer with GVWR of 4536kg or more.	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)LOCATION OF DEVICE	-The device must fulfill the Contents of FMVSS223. -The width of the device: The outermost surfaces of the horizontal member of the device shall extend outboard to within 100 mm of the longitudinal vertical planes that are tangent to side extremities of the vehicle, but shall not extend outboard of those planes. -The height of the device: The vertical distance between the bottom edge of the horizontal member of the device and the ground shall not exceed 560 mm at any point across the full width of the member. The device with rounded corners may curve upward within 255 mm of the longitudinal vertical planes that are tangent to the side extremities of the vehicle. -Rear face of the device At any height 560 mm or more above the ground, the rearmost surface of the horizontal member of the device shall be located as close as practical to a transverse vertical plane tangent to the rear extremity of the vehicle, but no more than 305 mm forward of the plane.	

42. REAR UNDERRUN PROTECTION

Economy /Regulation USA / FMVSS223/224 (2/2)

Effective date: January 26, 1998

Item	Contents	Illustration/Supplement
	The horizontal member may extend rearward of the plane, and the device with rounded corners may curve forward within 225 mm of the longitudinal vertical planes that are tangent to the side extremities of the vehicle.	
2)SHAPE OF DEVICE	-Height of the device The horizontal member of the device shall have a cross sectional vertical height of at least 100 mm at any point across the device width.	
C: Performance Requirement	-Strength of the device: The device must resist the force levels specified in S5.2.1. (a) to (c) without deflecting by more than 125 mm. -Applied force: (a) P1 : 50,000 N , (b) P2 : 50,000 N (c) P3 : 100,000 N -Energy absorption: The device (other than a hydraulic device) shall absorb by plastic deformation within the first 125 mm of deflection at least 5,650 J of energy at each test location P3. -Labeling: The device shall be permanently labeled with the information specified in S5.3 (a) to (c).	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed to Vehicle	None	
D: Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

42. SIDE GUARDS

Economy/Regulation EUROPE / ECE 73 (1/3)

Item	Contents	Illustration/Supplement
A : Application	N2, N3, O3, O4	
B : Structure Performance		
B-a: Structure of Parts		
B-b: Structure of Parts Installed to Vehicle		
1)LOCATION OF DEVICE	-The location of the device:	
(GENERAL)	-The device shall not increase the overall width of the vehicle and the main part of its outer surface shall not be more than 120 mm inboard from the outermost plane of the vehicle. -Its forward end may be turned inwards on some vehicles in accordance with para.7.4.3. & 7.4.4. Its rearward end shall not be more than 30 mm inboard from outermost edge of the rear tires.	
2)SHAPE OF DEVICE	-Outer surface of the device -Outer surface must be smooth. Adjacent parts may however overlap provided that overlapping edge faces rearwards or downwards, or a gap of not more than 25 mm measured longitudinally may be left, provided that rearward part does not protrude outboard of forward part. Protrusion of domed head of bolts or rivets must not more than 10 mm. External edges and corners shall be rounded with a radius not less than 2.5 mm. -Component	

42. SIDE GUARDS

Economy/Regulation EUROPE / ECE 73 (2/3)

Item	Contents	Illustration/Supplement
2)SHAPE OF DEVICE	The device may consist of a continuous flat surface, horizontal rails or the combination of them. In case of rails, they shall not be more than 300 mm apart and not less than 50 mm height for N2, O3 (100 mm height for N3, O4).	
3)FORWARD EDGE OF DEVICE	-The position of the forward edge of the device shall not be 300 mm for motor vehicles (500 mm for drawber trailers) to the rear of the vertical plane perpendicular to the longitudinal plane of the vehicle and tangential to the outer surface of the tire on the wheel immediately forward of the device. -In case of semi-trailer, its position shall be not more than 250 mm to the rear of transverse median plane of support legs, if it is fitted. -If the forward edge lies in an otherwise open space, the edge shall consist of a continuous vertical Economy extending the whole height of the device. And the outer and forward surface shall measure at least 50 mm rearwards & 100 mm inwards for N2,O3 (100 mm rearwards & 100 mm inwards for N3 & O4). -If the cab is located within 300 mm described in para.7.4.1.1, the forward edge of the device and the cab panel shall not have a gap not more than 100 mm, if necessary, it shall be turned in through an angle not exceeding 45%.	

42. SIDE GUARDS

Economy/Regulation EUROPE / ECE 73 (3/3)

Item	Contents	Illustration/Supplement
4)REARWARD EDGE OF DEVICE	-The rearward edge of the device shall not be more than 300 mm forward of the vertical plane perpendicular to the longitudinal plane of the vehicle and tangential to the outer surface of the tire on the wheel immediately to the rear.	
5)LOWER EDGE OF DEVICE	-The lower edge of the device shall at no point be more than 550 mm above the ground.	
6)UPPER EDGE OF DEVICE	-The upper edge of the device shall not be more than 350 mm below that part of the structure of the vehicle , cut or contacted by vertical plane tangential to outer surface of the tires.	
C : Performance Requirement		
1)STRENGTH	-It shall be capable of withstanding a horizontal static force of 1kN applied perpendicularly to any part of its external surface by the center of a ram the face of which is circular and flat, with a diameter of 220 mm+10 mm and if deflection of is not more than 30 mm (rearmost 250 mm part),150mm (rest).	
C-a: Performance of Parts		None
C-b: Performance of Parts Installed to Vehicle		None
D : Label Marking Requirement		None
D-a: Label Marking Its Own Requirement		None
D-b: Label Marking Requirement of Its Installed to Vehicle		None
E : Reference Standards		None

42. REAR UNDERRUN PROTECTION

Economy /Regulation EUROPE / ECE58 (1/2)

Item	Contents	Illustration/Supplement
A : Application	N2 ,N3 ,O3 ,O4	
B : Structure Performance		
B-a: Structure of Parts		
1) SHAPE OF DEVICE	-The section height of the device : not less than 100 mm -The lateral extremities of the device are rounded on the outside and have a radius of curvature of not less than 2.5 mm.	
B-b: Structure of Parts Installed to Vehicle		
1) POSITION OF DEVICE	-The device may be so designed to have several positions at the rear of the vehicle. In this event, there must be a guaranteed method of securing it in the service position so that any unintentional change of position is precluded. The force applied by the operator to very the position of the device must not exceed 40 daN.	
2) LOCATION OF THE DEVICE (HEIGHT OF THE DEVICE etc.)	-Vehicle condition: unladen condition (REQUIREMENT) The height of the underside of the device ≤ 550 mm [Over its entire width]	

42. REAR UNDERRUN PROTECTION

Economy / Regulation EUROPE / ECE58 (2/2)

Item	Contents	Illustration/Supplement
2) LOCATION OF DEVICE (WIDTH etc.)	-The width of the device must not exceed the width of the rear axle (outermost point of wheel excluding bulging of the tires close to the ground) and it must not be more than 100 mm shorter on either side.	
C :Performance Requirement		
C-a: Performance of Parts	-During and after applying the forces described in Annex 5, -The horizontal distance between the rear of the device and the rear extremity of the vehicle does not exceed 400 mm at any of points where the test forces are applied. (Points where test forces are applied) A: Horizontal applied force: 100kN or GVM/2 (lesser) B: Horizontal applied force: 25kN or GVM/8 (lesser)	
C-b: Performance of Parts Installed to Vehicle	None	
D : Label Marking Requirement	None	
D-a: Label Marking Its Own Requirement	None	
D-b: Label Marking Requirement of Its Installed to Vehicle	None	
E : Reference Standards	None	

ITEM 96-43

Towing connections

APEC Regulation Analysis Findings
Item No. 96-43: Towing Connections

1. Member economies adopt different requirements for towing connections.

2. A comparison of specific requirements for head restraint is as follows.

(1) Japan, Korea and New Zealand provide an abstract requirement that a trailer be "securely connected."

(2) Australia have detailed requirements for couplings, towers, drawers and safety chains.

(3) Canada sets forth detailed requirements for connection dollies and connection dolly hitches.

(4) New Zealand has detailed requirements for heavy motor vehicle towing connections including fifth wheel assemblies.

Item No. : 96-43 Towing connections

A : Application : Passenger Vehicles

Name of Economy	B-a: Structure of Parts	C-a: Performance of Parts
Australia	ADR 62 (Coupling - locking & location)	ADR 62 (Coupling) (Towbar, Drawbar, Safety Chain)
Brunei		
Canada	MVSR 903 (C-dolly spec.)	MVSR 903 & 904 (C-dolly) (C-dolly hitch)
Chile		
China		
Hong Kong		
Indonesia		
Japan	SRRV 19 (general requirements)	SRRV 19 (general requirements)
Korea	MVSS 20 (general requirements)	MVSS 20 (general requirements)
Malaysia		
Mexico		
New Zealand		TR 83 (general requirements)
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
U.S.A		
ECE		

43 Towing Connections

Australia (Regulation Name : AUSTRALIAN DESIGN RULE) ADR 62/00 : MECHANICAL CONNECTIONS BETWEEN VEHICLES		
Items	Summary	Figure and additional explanations
A: Application	1) This national standard applied to the design and construction of vehicles as set out on the separated sheet. 2) Mechanical connection devices for, and fitted to, all vehicles specified on the separated sheet are to be designed and constructed to comply with the relevant requirements of this national standard. 3) Four requirements are classified. (a) Coupling Requirements (b) Towbar Requirements (c) Drawbar Requirements (d) Safety Chain(s)	
(a) Coupling Requirements		
A: Application	None	
B: Structure Requirement B-a: Structure of Parts	1) Locking Mechanisms (1) "Coupling" must be a positive locking type with provision for a second independent device. (2) It may have provision for automatic coupling and the locking must be readily verifiable by visual examination.	
B-b: Structure of Parts Installed in body	1) Location (1) Only trailers designed for use in "Road Train" and "B-Double" combinations may be fitted with a rear mounted tow "Coupling." (2) NC category vehicles •The "Tow Coupling Overhang" must not exceed 2.7 m. (Not applied to the vehicles which were manufactured before July 1 in 1992.)	

Items	Summary	Figure and additional explanations
	(3) Height of towing pivot ~1 Vehicles fitted with 50mm pin type "Couplings" or 127 mm "Ball Couplings" • The height of the towing attachment and the "Drawbar" pivot determined in the unladen condition must be either 875 ± 75 mm or 600 ± 50 mm. ~2 MA and MB group vehicles fitted with a 50 mm "Ball Coupling" • The height to center of the ball determined in the laden condition must be between 350 and 420 mm. (4) Mounting of "Fifth Wheel" and "Fifth Wheel" kingpins ~1 Unless otherwise "Approved", "Fifth Wheel" assemblies must be mounted in conformity with the requirements of: • Australian Standard 1771-1987 Australian Standard 2174-1978 ~2 "Fifth Wheel" kingpins must be attached to the "Semi-Trailer" skid plate in conformity with the requirements of Australian Standard 2175-1990.	
C: Performance Requirements C-a: Performance of Parts and	1) Marking and Strength Unless otherwise "Approved' all "Couplings" must conform with the marking and strength requirements as specified below: (1) "Fifth Wheel" assemblies •Australian Standard 1773-1990 (2) "Fifth Wheel" kingpins •Australian Standard 2175-1990 (3) Pin type "Couplings" •Australian Standard 2213-1984 (4) 50mm"Ball Couplings" •Australian Standard D18-1968, or ISO 3853 and ISO 1103	

Items	Summary	Figure and additional explanations
	(5) 127mm"Ball Couplings" • "Ball Couplings" of nominal diameter of 127 mm shall when installed in the design configuration withstand the following forces without incurring any residual deformation that would interfere or degrade the function of the assembly, nor shall there be any breaks, cracks or separation of component. ~1 Longitudinal tension and compression 1.6 x "D-value"; and ~2 Vertical tension and compression 0.5 x "D-value"; or ~3 A dynamic oscillating force of ±0.6 x "D-value" in the longitudinal direction and ±0.2 x "D-value " in the vertical direction applied concurrently for 2 million cycles. The frequency of the longitudinal and vertical forces must differ by approximately 5 % and not exceed 10 Hz, but must be chosen not to coincide with the natural frequency of the system. ~4 Marking 127 mm "Ball Couplings" must be marked in lettering not less than 6 mm in height with the manufacturer's name or trademark and the rated "D-value" so as to be readily when coupled. (6) Hook "Couplings" • Hook "Couplings" suitable for use with a 76.2 mm internal diameter x 41.27 mm stock towing eye must comply with the dimensions shown in Figure 1. Hook "Couplings" must when installed in the design configuration withstand the following forces without incurring loss of attachment, distortion or failure which would affect the safe towing of a trailer. ~ 1 Longitudinal tension and compression 1.6 x "D-value"; and ~ 2 A dynamic oscillating force of ±0.6 x "D-value" for 2 million cycles. The frequency during testing not to exceed 10 Hz, but must be chosen not to coincide with the natural frequency of the system.	

Items	Summary	Figure and additional explanations
E: Reference Standards	~3 Marking Hook "Couplings" and towing eyes must be marked with the manufacturer's name or trademark and the rated "D-value". The installer of all "Couplings" fitted to ME, NC, TC, and TD category vehicles must be identified by means of a plate. The information provided must contain the installer's name and address in the English language in block letters and numerals which must not be less than 2.5 mm in height. None	
(b) Towbar Requirements		
A: Application	The requirements of this Section do not apply to connection devices mounted at the front of a motor vehicle or devices not intended for towing trailers.	
B: Structure Requirement B-a:Performance of Parts B-b:Performance of Parts Installed in body	 None None	

Items	Summary	Figure and additional explanations
C: Performance Requirement C-a: Performance of Parts C-b: Performance of Parts Installed in body and D: Label Marking Requirement	None 1) Strength Requirements The vehicle structure including the "Towbar" must either: be able to withstand the following forces applied at the intended "Coupling" centreline without any residual deformation that would interfere with or degrade the function of the assembly, nor must there be any brakes, cracks, or separation of components: (1) In the case of ME, NB and NC category vehicles • Longitudinal tension and compression 1.6 x "Coupling" "D-value" required for use with the "Aggregate Trailer Mass" on the "Towbar" • A dynamic oscillating force of ±0.6 x "Coupling" "D-value" required for use with the "Aggregate Trailer Mass" marked on the "Towbar" for 2 million cycles. The frequency not to exceed 10 Hz but must be chosen not to coincide with the natural frequency of the system. (2) In the case of L group, MA,MB,MC,MD and NA category vehicles • Longitudinal tension and compression 1.5 x the "Towbar's" rated capacity • Transverse thrust 0.5 x the "Towbar's" rated capacity • Vertical tension and compression 0.5 x the "Towbar's" rated capacity	

Items	Summary	Figure and additional explanations
	2) Safety Chain Attachments The "Towbar" must be fitted with safety chain attachments to withstand the loads imposed. Vehicles having a towing capacity (i.e. the "Aggregate Trailer Mass" for which the towing vehicle is designed.) of 2.5 tones or more must be fitted with 2 safety chain attachments mounted one on either side of, and adjacent to, the tow "Coupling". (1) To establish the strength of the attachments provided on the "Towbar " for the safety chain(s), each attachment including the safety chain(s) must withstand the following forces without any residual deformation that must interfere with or degrade the function of the assembly, nor shall there be any breaks, cracks, or separation of components. • Longitudinal tension - the "Towbar's" rated capacity • Vertical load - 0.5 x the "Towbar's" rated capacity 3) Marking (1) Except where the "Towbar" is an integral part of the vehicle the "Towbar" must clearly and permanently display the following information: • The "Towbar" manufacturer's name or trademark. • The "make and model" shown on the "Compliance Plate" fitted to the vehicle for which it is designed or the manufacture's part number. • Its maximum rated capacity expressed in kilograms in numerals not less than 2.5 mm high. The maximum rated capacity must be the "Aggregate Trailer Mass" for which the "Towbar" is designed and must not exceed the motor vehicle manufacture's recommendation. (2) Where the information required above 3)-(1) is not visible when the "Towbar" is fitted to the vehicle a plate must be affixed to the vehicle adjacent to the "Towbar" showing the maximum rated capacity of the "Towbar"	
E: Reference Standards	None	

Items	Summary	Figure and additional explanations
(c) Drawbar Requirements		
A : Application	None	
B:Structure Requirement B-a:Structure of Parts B-b:Performance of Parts Installed in body	None None	
C: Performance Requirement C-a:Performance of Parts C-b: Performance of Parts Installed in body	None 1)The "Drawbar" must withstand the following forces applied at the centreline of the intended "Coupling" without incurring loss of attachment or any distortion or failure which will affect the safe drawing of the towed trailers: • Longitudinal tension and compression 1.5 x the "Aggregate Trailer Mass" • Transverse thrust 0.5 x the "Aggregate Trailer Mass" • Vertical tension and compression -for rigid "Drawbar" trailers 0.5 x the "Aggregate Trailer Mass" 2)The "Drawbar" must be securely attached to a substantial portion of the towed trailer. 3) When a safety chain(s) is fitted, each attachment must be of sufficient strength to withstand the forces imposed. (1)To establish the strength of the attachments provided on the "Drawbar" the attachments including the safety chain(s) must withstand the following forces without failure: • Longitudinal tension - the "Aggregate Trailer Mass". • Vertical load - 0.5 x the "Aggregate Trailer Mass".	

Items	Summary	Figure and additional explanations
D: Label Marking Requirement	None	
E: Reference Standards	None	
(d) Safety Chain(s)		
A: Application	None	
B: Structure Requirement B-a: Structure of Parts B-b: Structure of Parts Installed in body	None None None	
C: Performance Requirement C-a: Performance of Parts C-b: Performance of Parts Installed in body	None 1) There must be affixed to a substantial portion on every trailer which is not fitted with an "Emergency Brake System" in accordance with the Australian Design Rule 38/... "Trailer Brake Systems",and on every rigid "Drawbar" "Pig Trailer" except a "Converter Dolly", a safety chain(s) which will hold in the tow trailer in the event of the failure or accidental detachment of the "Coupling". 2) A rigid "Drawbar" "Pig Trailer" which has a "Aggregate Trailer Mass" of 2.5 tones or more must be fitted with 2 safety chains for connection to the towing vehicle. 3) Safety chains must be permanently attached to the trailer. Shackles are not permitted. The point(s) of attachment to the trailer must be as near as practicable to the "Coupling" and where 2 points are required they must be mounted one on either side of the "Drawbar".	

Items	Summary	Figure and additional explanations
	4) The specification for the safety chain: (1) For a trailer of less than 2.5 tones "Aggregate Trailer Mass" must comply with the provisions of Australian Standard 1872-1976 "Safety Chains for Trailers and Caravans". Where attachment is by welding, the weld must extend around 50 % of the circumference of the link and the adjoining link must have free movement.	
	(2) For a trailer of 2.5 tones or more "Aggregate Trailer Mass"must be made from 800 Mpa breaking stress and conform to the mechanical properties of Grade T chain as specified in Australian Standard 2321-1979 "Short Link Chain for Lifting Purposes(non calibrated)" and must be of a size corresponding with the "Aggregate Trailer Mass"of the trailer shown in Table 1. Attachment must not involve welding or deformation.	
D: Label Marking Requirement	None	
E: Reference Standards	None	

43 Towing Connections

Canada (Regulation Name: Motor Vehicle Safety Standards) (establishment: 23 / March /1993) 903 : C-dolly Specifications & 904 : C-dolly Hitch Requirements		
Items	Summary	Figure and additional explanations
MVSR 903	C-dolly Specifications	
A: Application	None	
B: Structure Requirement		
B-a: Structure of Parts 1) C-dolly : GAWR	1) Every C-dolly shall have a GAWR of 9 100kg.	
2) distance between the center of the coupling and one of the axle	2) The longitudinal distance on a C-dolly, measured on the longitudinal centre-line from a point aligned with the center of the coupling to a point aligned with the center of the axle, shall no greater than 2 m.	
3)pressure gauge , manual valve , label	3) Every pressure gauge referred to in subsection B-b-2) and every manual valve and switch, if any, that forms part of a system referred to in that subsection, and every label referred to in subsection D-b-1), shall be protected from adverse weather conditions.	
4) C-dolly :flat surface	4) Every C-dolly shall have a flat surface that is horizontal when the C-dolly is not loaded and when the center of the coupling on the C-dolly is held at the mounting height in accordance with the manufacturer's design.	

Items	Summary	Figure and additional explanations
5) C-dolly; Size of flat surface	5) The flat surface referred to in paragraph B-a-4) shall be (a) at least 30 cm in length, measured longitudinally; (b) at least 5 cm in width, measured laterally; (c) accessible from both sides of the C-dolly; and (d) within 50 cm of the coupling of the C-dolly.	
B-b: Structure of Parts Installed in body 1) C-dolly; Requirement of equipment	1) Every C-dolly shall be equipped with (a) an automotive-type or a turntable type self-steering mechanism; (b) A means to return the wheels to within one degree of the straight-ahead position whenever any steering force applied to the wheels is removed: (c) a device that automatically locks the steering mechanism in the straight-head position in the event of a failure of the means referred to in paragraph (b): (d) a device (1) that includes a switch by means of which the driver can, while seated in the normal driving position in the cab of the truck towing the C-dolly, lock the steering mechanism in the straight-ahead position, or unlock it, (2) that locks the steering mechanism in the straight -ahead position in the event that the control for the device fails or power supply to the device terminates, and (3) that includes, in both official languages, the information specified in subparagraph D-b-2)(a) and (b) on the switch referred in subparagraph(a) or on a label affixed near that switch.	

Items	Summary	Figure and additional explanations
2) C-dolly; hydraulic or pneumatic system	2) Where a C-dolly is equipped with a pressurized hydraulic or pneumatic system that provides the means referred to paragraph B-b-1) (b), the system shall (a) be independent of the brake system of the C-dolly; (b) be fitted with a pressure gauge that indicates (1) the minimum pressure required to meet the requirements B-b-1)(b) and C-a-4)(c) and (d), and (2) the amount of pressure in the system; and (c) not permit any adjustment of the steering force	
3) C-dolly; lock of steering mechanism according to speed	3) Where a C-dolly is equipped with a device that is intended to lock the steering mechanism automatically according to the speed of the C-dolly, that device shall (a) lock the steering mechanism in the straight-ahead position when the C-dolly is travelling at a speed of 60 km/h and keep the steering mechanism locked when the C-dolly is travelling at a speed greater than 60 km/h; and (b) unlock the steering mechanism when the C-dolly is travelling at a speed of 50 km/h and keep the steering mechanism unlocked when the C-dolly is travelling at a speed less than 50 km/h.	

Items	Summary	Figure and additional explanations
C: Performance Requirement		
C-a: Performance of Parts 1) coupling on a C-dolly : single component static load requirement	1) Where the coupling on a C-dolly consists of a single component, that coupling shall have (a) a static load rating of (1) 800 kN in the longitudinal direction (2) 80 kN in the lateral direction; and (b) a static moment rating of 76.2 kN.m about the longitudinal axis of the C-dolly.	
2) coupling on a C-dolly : mounting height , load static load requirement	2) Where the coupling on a C-dolly consists of two metal eyes, the two eyes shall (a) be separated laterally by a distance of 762mm,± 2mm (b) be equidistant from the longitudinal centre-line of the C-dolly. (c) have a mounting height of 900mm, ±10mm, when the C-dolly is not loaded; and (d) each have a static load rating of (1) 400 kN in the longitudinal direction, (2) 100 kN in the vertical direction, and (3) 40 kN in the lateral direction.	
3) C-dolly; torsion test and its requirement	3) Every C-dolly that is subjected to a torsion test conducted in accordance with the Motor Vehicle Safety Test Methods, Section 903-C-dolly (October 1, 1992), published by the department of Transport, shall have a torsional stiffness of at least 3 000N.m/ degree with respect to the longitudinal direction, and shall be capable of sustaining a torque of at least 45 000N.m in either direction without incurring a residual deformation that exceeds 0.5 degree.	

Items	Summary	Figure and additional explanations
4) C-dolly ; test items and test requirement	4) where a C-dolly is tested in accordance with the Motor Vehicle safety Test Methods, Section 903-C-dolly (October 1,1992) published by the Department of Transport. (a) the axis of rotation of a turntable-type steering mechanism shall not divide from the vertical by more than 0.5 degree; (b) the kingpin axes of an automotive-type steering mechanism shall not deviate from the vertical by more than 0.5 degree. (c) the steering mechanism shall keep the wheels within one degree of the straight-ahead position when the steering mechanism is subjected to (1) a lateral force of 22 320 N that is applied to a point located 50 mm behind the center of the tire contact patch, or (2) a longitudinal force of 8 930 N that is applied through the center of one of the tires in the case of a C-dolly that is equipped with one tire on each side, and through the center of one of the dual tires and wheel assemblies in the case of a C-dolly that is equipped with two tires on each side; and (d) the steering mechanism shall not permit the wheels to move beyond one degree from the straight-ahead position unless the steering mechanism is subjected to a force exceeding the force referred to in sub-paragraph (c)(1) or (2).	
C-b:Performance of Parts Installed in body	N/R	

Items	Summary	Figure and additional explanations
D: Label Marking Requirement D-a: Structure Requirement D-b: Its Installed in Body 1) C-dolly:labeling of minimum pressure 2) C-dolly l; its flat surface and its Labeling	None 1) Every C-dolly referred to in subsection B-b-2) shall bear a label, in both official languages, that states the minimum pressure referred to in paragraph B-b-2)(b). 2) Every C-dolly shall bear a label, in both official languages, that states (a) that the steering mechanism should be locked when the C-dolly is travelling at a speed of 60 km/h or more on any slippery or unpaved road, and that the steering mechanism should unlocked when the C-dolly is travelling at a speed of 50 km/h or less, and (b) that the C-dolly shall not be attached to a straight truck.	
E: Reference Standards	N/R	

Items	Summary	Figure and additional explanations
MVSR 904 A: Application 1) a coupling to connect the trailer	C-dolly Hitch Requirements 1) Every trailer that is designed to tow a C-dolly shall be equipped with a coupling to connect the trailer to the C-dolly.	
B: Structure Requirement	N/R	
C: Performance Requirement C-a: Structure Requirement 1) coupling on a C-dolly : single component static load requirement 2) coupling on a C-dolly: two separate hitches static load requirement	1) Where a coupling referred to in subsection (1) consists of a single component, the coupling shall have (a) a static load rating of (1) 800 kN in the longitudinal direction (2) 80 kN in the lateral direction; and (b) a static moment rating of 76.2 kN.m about the longitudinal axis of the C-dolly. 2) Where a coupling referred to in subsection A-1) consists of two separate hitches, the hitches shall (a) be separated laterally by a distance of 762mm, ± 2mm (b) be equidistant from the longitudinal centre-line of the trailer. (c) have a mounting height of 900mm, ±10mm, when the trailer is not loaded; and (d) each have a static load rating of (1) 400 kN in the longitudinal direction, (2) 100 kN in the vertical direction, and (3) 40 kN in the lateral direction.	
C-b: Structure of Parts Installed in body, D: Label Marking Requirement, E: Reference Standards-------N/R		

43 Towing Connections

Japan (Regulation Name: STANDARDS FOR CONSTRUCTION AND DEVICES OF MOTOR VEHICLES) (establishment: 1951•7) Article 19 (Coupling devices)		
Items	Summary	Figure and additional explanations
A : Application	None	
B : Structure Requirement B-a: Structure of Parts B-b: Structure of Parts Installed in Body	None Coupling devices between a tractor and a trailer shall comply with the following requirement 1) The coupling device shall be constructed so that it may securely connect a tractor with a trailer.	
C : Performance Requirement C-a: Performance of Parts C-b: Performance of Parts Installed in body	None Coupling devices between a tractor and a trailer shall comply with the following requirement 1) The coupling device shall be secure so that it may fully withstand vehicle operation. 2) The coupling device of a tractor or a trailer shall be provided with a suitable safety device to prevent accidental separation by vibration, shocks, etc. while running.	
D: Label Marking Requirement	None	
E: Reference Standards	None	

43 Towing Connections

Korea (Regulation name: THE REGULATIONS OF THE MOTOR VEHICLE SAFETY STANDARDS)(1995.12.30 NO.44 AMENDMENT)
Article 20 Coupling Device Towing Device

Items	Summary	Figure and additional explanations
A: Application	Each motor vehicle shall be equipped with coupling or towing devices that meet each of the following items.	
B: Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in body	1) The coupling device shall be constructed so that it may firmly engaged. 2) The coupling device shall be constructed so that it may not disengage due to vibrations and impacts.	
C: Performance of Parts		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	(1) (Tractor-trailer) The coupling device of a tractor-trailer shall withstand more than the gross vehicle weight of the trailer. (2) (Motor vehicle) A motor vehicle (excluding drawn vehicles) shall be equipped with a coupling or towing device on the front (and rear of a passenger vehicle) which can withstand not less than one half of the curb weight of that motor vehicle when towed in the longitudinal direction of that motor vehicle.	

Items	Summary	Figure and additional explanations
Reference Standards	(3) (A drawn vehicle with inertia brake systems as specified in Article 15 Paragraph 5 : The inertia brake systems of a drawn vehicle shall be constructed so that they shall not be operable if a drawing vehicle is moving reversely.) This vehicle shall be equipped with auxiliary coupling devices, such as chains, which can withstand twice of the gross vehicle weight of that drawn vehicle, in addition to the coupling device as specified in Item C-(1), so that the separation of a drawing vehicle and a drawn vehicle and a drawn vehicle can be prevented while in motion.	
D: Label Marking Requirement	None	
E: Reference Standards	None	

43 Towing Connections

New Zealand (Regulation Name: TRAFFIC REGULATIONS) TR 83 COUPLINGS, Heavy Motor Vehicle Regulation 16A(1)(c) and (d)		
Items	Summary	Figure and additional explanations
A: Application	Except in the case of a trailer forming part of an articulated vehicle, no person shall operate any motor vehicle which is being used to tow a trailer or trailers unless-	
B: Structure of Parts Installed in body	None	
C: Performance Requirement C-a:Performance of Parts C-b:Performance of Parts Installed in body	None (1) Every trailer with a gross wt. not exceeding 2000 kg Every trailer with a gross weight not exceeding 2000 kg is safely and securely attached to the vehicle in front of it by an adequate coupling and also by a securely attached chain or cable coupling, each being in itself of sufficient strength to hold the trailer secure under all conditions of road use. (2) Every trailer with a gross wt. exceeding 2000 kg Every trailer with a gross weight exceeding 2000 kg is safely and securely attached to the vehicle in front of it by an adequate coupling and is fitted with brakes in efficient working order which under all conditions of use will immediately and automatically operate to stop and hold the trailer on its becoming disconnected from the vehicle to which it is attached.	

Items	Summary	Figure and additional explanations
	(*) Provided that nothing in paragraph (1) of this regulation requiring a trailer to be attached to the towing vehicle by an additional chain or cable coupling shall apply with respect to any trailer that is designed principally or exclusively as part of the armament of any of Her Majesty's Forces, or as a trailer pump for fire-fighting purposes.	
D: Label Marking Requirements	None	
E: Reference Standards	NZS 5446:1987, NZS 5450:1989, NZS 5451:1989	

ITEM 96-44

Brakes (trailers)

APEC regulation analysis findings
Item No.44 : Brakes (Trailers)

1. A comparison of specific requirement for trailer brakes is as follows.

(1) Trailer braking system (B-a) : Simply a “braking system” is required by Brunei Durussalam, Hong kong, Malaysia and Chinese Taipei. Service brakes, emergency brakes and parking brakes (all of pneumatic braking) are required by the U.S. and Canada. Service brakes, emergency brakes and parking brakes are demanded by Australia. Service brakes and parking brakes are require by Indonesia and Korea. Only service brakes are specified by the Philippines. Any two of mutually independent service brakes, emergency brakes and parking brakes are require by New Zealand. Other member economies do not provide requirements for trailer brakes.

(2) The number of wheels to be braked (B-b-1) : Australia, Hong Kong, Indonesia, Korea and U.S. requre all the wheels of the trailer to be braked. Brunei Darussalam requires that at least 4 trailers wheels be braked. New Zealand specify that service brakes be applied to all the wheels, and emergency brkes to at least half of the wheels. Malaysia demands braking on half of the trailer wheels. The Philippines requires at least half of the wheels to be braked, provided that the rear wheels are always braked. Singapore requires that at least half of the wheels be braked during running, and at least 2 wheels when at halt.

(3) Overrun protection (B-b-2) : Indonesia, Japan, Papua New guinea and Singapore require that the braking system automatically function whenever it is necessary to protect overrun. Australia requires that, in the event of a trailer overrun, both service brakes and secondary brakes automatically operate and also the emergency brakes activate for 15 minutes.

(4) Effect of service brakes (C-b-1) : Austraria and Korea provide specific requirements for the effect of service brakes. Indonesia requires that both tractor and trailer be stopped simultaneously. The U.S. specifies that Table III (Braking Force and Chamber Pressure) be satisfied.

(5) Emergency brake system (C-b-2) : Australia, Canada and U.S. Provide specific requirements.

(6) Effect of parking brakes (C-b-3) : Australia, Canada, Indonesia, Korea, New Zealand and U.S. have specific requirements for the effect of parking brakes.

(7) Brake operation time (C-b-4) : Canada and U.S. adopt specific requirements.

(8) Brake release time (C-b-5) : Canada and the U.S. have specific requirement, while Korea adopts its unique requirements for brake release time.

(9) Stopping distance (C-b-6) : Korea, New Zealand, Papua new guinea, Philippines, and U.S. provide their unique stopping distances against various running speeds.

(10) Holding on slopes (C-b-7) : Australia, Hong Kong, Indonesia, Japan, Korea, New Zealand and Philippines adopt their unique requirements for the trailer's holding performance on slopes.

(11) Labeling and marking (D) : Only Australia seat forth a labeling requirement by accepting ECE 13-05 as an alternative.

ITEM No. 96-44 : Brakes (trailers)

A. Application: Trailers

Member Economies	B-b-1) Required brake systems	B-b-2) Minimum number of wheels to which brakes are applied
Australia	ADR 38 (Service, emergency, and parking brakes)	Common (All wheels, by service brakes)
Brunei	Common (Braking system)	Unique (At least four wheels)
Canada	FMVSS 121 (Air service, emergency and parking brakes.)	
Chile		
China		
Hong Kong	Common (Efficient braking system)	Common (All wheels)
Indonesia	Unique (Service & parking brakes)	Common (All wheels)
Japan		
Korea	Unique (Service & parking brakes)	Common (All wheels)
Malaysia	Common (Efficient braking system)	Unique (Half the number of wheels)
Mexico		
New Zealand	Unique (At least 2 independent braking systems to provide service-, emergency-, & parking-brake functions)	Unique (Service brake acts on every wheel; Emergency & parking brakes act on half)
Papua New Guinea		
Philippines	Unique (Service brakes)	Unique (At least half, but always all rear wheels)
Singapore	Common (Efficient braking system)	Unique (At least half when drawn; at least two when stopped)
Chinese Taipei	Common (Brakes in good condition)	
Thailand		
United States	FMVSS 121 (Air service, emergency, parking brakes and ABS)	Common (All wheels)
ECE		

Member Economies	B-b-3) ABS malfunction	B-b-4) Overrun protection
Australia		ADR 38 (Service and secondary brakes automatically apply; emergency brakes apply for 15 min.)
Brunei		
Canada		
Chile		
China		
Hong Kong		
Indonesia		Common (Main brake automatically operates)
Japan		Common (Service brakes automatically operate)
Korea		
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		Common (Brakes automatically operate)
Philippines		
Singapore		Common (Brakes automatically operate)
Chinese Taipei		
Thailand		
United States	FMVSS 121(Electrical circuit for signaling, External indicator)	
ECE		

Member Economies	C-b-1) Service Brake Effectiveness	C-b-2) Emergency Brake System
Australia	ADR 38 (Within bounds of Figure 1.and Established Retardation Coefficient(ERC)≥0.65. Service brake fade:≥60% of value obtained from service brake effectiveness test, and ≥ 80% of lower bound of Figure 1.)	ADR 38 (ERC ≥ 0.18 for a period not less than 15 min..)
Brunei		
Canada		Unique (Same requirements as parking brakes and apply when supply-line is at atmospheric pressure)
Chile		
China		
Hong Kong		
Indonesia	Unique (Stops trailer & towing vehicle at same time)	
Japan		
Korea	Unique (Braking force on each axle ≥ 50 of GVW (if max. speed≥80 km/h & GVW>1.2x curb weight); ≥40% (if max speed<80 km/h & GVW<1.5x curb wt))	
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States	FMVSS 121 (Meet brake retardation force of Table)	FMVSS 121 (Same requirements as parking brakes)
ECE		

Member Economies	C-b-3) Parking Brake Effectiveness	C-b-4) Brake Actuation Time
Australia	ADR 38 (Hold trailer on 18% gradient, 5 minutes, facing either direction. Operating force ≤ 685 N foot-operated (≤590 N hand-operated))	ADR 38 (Service brake actuation time≤0.35 s; ≤0.50 s if able to draw air-braked vehicle)
Brunei		
Canada	Unique (Hold trailer on 20% gradient, with single leak in system)	FMVSS 121 (Service brake application time≤ 0.60 s; ≤ 0.50 s if able to draw air-braked vehicle)
Chile		
China		
Hong Kong		
Indonesia	Unique (Holds trailer on flat or sloped road)	
Japan		
Korea	Unique (Hold unloaded trailer on 11.5° gradient, or braking force ≥ 20% curb wt. Operating force≤70 kg foot-operated (≤50 kg hand-operated))	
Malaysia		
Mexico		
New Zealand	Unique (Hold fully laden vehicle on slope of 1 in 5)	
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States	FMVSS 121 ((Static retardation force/GAWR) ≥ 0.28, or hold vehicle on 20% grade at GVWR and UVW + 500 lbs.)	FMVSS 121 (Air pressure must reach 60 psi within 0.50 s (0.60 if not able to tow air-braked vehicle))
ECE		

Member Economies	C-b-5) Brake Release Time	C-b-6) Stopping Distance
Australia	ADR 38 (Service brake release time≤0.65 s; ≤0.55 s if able to draw air-braked vehicle)	
Brunei		
Canada	FMVSS 121 (Service brake release time ≤ 1.2 s; ≤ 1.0 s if able to draw air-braked vehicle)	
Chile		
China		
Hong Kong		
Indonesia		
Japan		
Korea	Unique (Brake force ≤ 20% of axle weight within 3 s)	Unique (≤ 50 m for vehicle with max. speed ≥80 km/h; and ≤ 14 m with max. speed 35-80 km/h. Max operating force ≤ 90 kg, foot-operated (≤ 30 kg, hand-operated)
Malaysia		
Mexico		
New Zealand		Unique (Combination of fully loaded vehicle and trailer must stop in 7m from 30km/h)
Papua New Guinea		Unique (≤ 7 m from 30 km/h)
Philippines		Unique (≤ 22 m for vehicle with max. speed ≥80 km/h; and ≤ 14 m for vehicle with max. speed 35-80 km/h)
Singapore		
Chinese Taipei		
Thailand		
United States	FMVSS 121 (Air pressure must fall to 5 psi within 1.0 s (1.20 s for non-towing trailers))	
ECE		

Member Economies	C-b-7) Holding on Gradient	
Australia	ADR 38 (18% grade, for 5 minutes, trailer facing either direction, with foot-operated pedal force ≤ 685 N (hand-operated ≤ 590 N))	
Brunei		
Canada	FMVSS 121	
Chile		
China		
Hong Kong	Unique (At least 1 in 6.25 gradient)	
Indonesia	Unique (Flat or sloped road)	
Japan	SRRV 12 (Gradient of 1/5, unloaded, foot-operated force of ≤ 90 kg (hand-operated ≤ 50 kg))	
Korea	Unique (11.5° grade or brake force ≥ 20% curb wt)	
Malaysia		
Mexico		
New Zealand	Unique (Gradient of 1 in 5)	
Papua New Guinea		
Philippines	SRRV 12	
Singapore		
Chinese Taipei		
Thailand		
United States	FMVSS 121 (20% grade, with at GVWR and UVW + 500 lbs (with & without leakage failure))	
ECE		

Member Economies	D) Label / Markings	E) Reference Standards/ Alternative Standards
Australia	ADR 38 (If alternatively certifying to ECE 13/05, trailer control line connectors must bear label, "Ensure Load Proportioning Brake System on Trailer is HELD in LOADED POSITION if Tow Vehicle NOT Fitted with Load Proportioning".	• All brake components must meet one or more recognized (inter)national, or association standard (SAA, SAE, BS, JIS, DIN, ISO and ECE)) • Compliance with ECE 13/05 satisfies this rule, if Variable Proportioning Brakes held in LTM position and labeled as specified
Brunei		
Canada		
Chile		
China		
Hong Kong		
Indonesia		
Japan		
Korea		
Malaysia		
Mexico		
New Zealand		• Traffic Regulations 1976 (except stopping distance)
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States		
ECE		

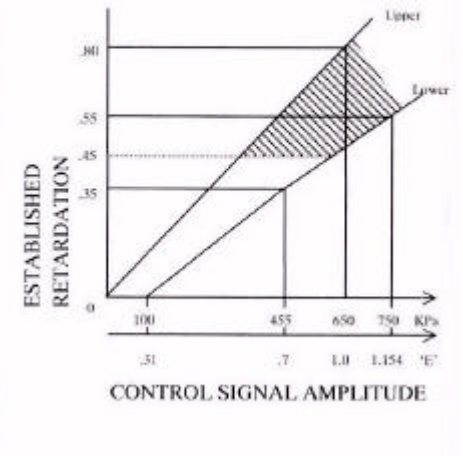
AUSTRALIA

Australian Design rule - ADR 38/02 (trailer brake systems)		
ITEM	**CONTENTS**	**Illustration/supplement**
A: Application	Trailers	
B: Structure requirements **B-a:Structure of parts** **B-b:Structure of parts installed in vehicle**	None 1.1 Brake system for trailers up to 4.5 tonnes ATM 1.1.1 Every trailer, except those with over-run brakes, shall be equipped with an efficient brake system which shall be designed so that the braking force can be progressively increased and decreased by means of the control signal from the towing vehicle and, for trailers with an aggregate trailer mass of >2 tons, operates on all wheels. 1.1.2 The brake system on trailers with a gross trailer mass <2 tons may be actuated for both service brake system and secondary brake system upon the over-run of the trailer. 1.1.3 Every trailer with a gross trailer mass > 2 tons and every semi-trailer shall have an emergency brake system which will cause immediate automatic application of its brakes for at least 15 minutes in the event of the trailer or semi-trailer becoming disconnected from the drawing vehicle. 1.1.4 Trailers with an aggregate trailer mass of <4.5 tons are not required to comply with other Sections of this rule.	

(B-b:Structure of parts installed in vehicle)	1.2 Brake system for trailers over 4.5 tonnes ATM 1.2.1 A service brake system shall be fitted to all trailer wheels and designed so that the braking force can be progressively increased and decreased by means of the control signal from the towing vehicle. 1.2.2 The trailer brake system shall be capable of being actuated from the towing vehicles by a connection between the trailer and towing vehicle and compkyting with emergency brake system requirements after any one failure in a trailers brake device. 1.2.3 A parking brake system shall be fitted. 1.2.4 The trailer brake system must restrain the trailer automatically, in the event of a trailer break-away and comply with emergency brake system standards. 1.2.5 A brake system which utilises stored energy to actuate the service brake system shall be designed so that when the supply line energy level is reduced at a rate of at least 0.15E/sec(100kPa/sec) the following conditions are met: (a) the brake system shall not start to automatically apply the brakes at a supply line energy level of more than 0.65 E (420kPa) AND, (b) the brake system shall start to automatically apply the brakes at a supply line energy level of not less than: (i) 0.31 E (200kPa) where the maximum braking effectiveness of the brakes is dependent on stored fluid energy OR, (ii) 0.24 E(155kPa) where it is not dependent on stored fluid energy, AND (c) with the supply line energy level at 0.0 E the braking effectiveness shall be at least that specified for the emergency brake system. 1.2.6 The brake system shall be designed so that no single failure in a brake device in the service brake system, except of a supply line or control line, shall cause the brakes to apply on more than one axle.	

(B-b:Structure of parts installed in vehicle)	1.2.7 Manual devices for the isolation of faulty devices or brake circuits may be included in the brake system but automatic device of the type that normally remain passive and whose function cannot readily be checked during normal operation of the trailer are not permitted. 1.2.8 Where a trailer is fitted with an auxiliary park brake release device, enabling stored energy actuation or release of any part of the brake system to be cut out, the device must be such that the brake system is restored to normal no later than on the resumption of the supply of stored energy to the trailer from the towing vehicle. 1.2.9 All components and devices in the brake system shall meet or exceed at least one appropriate and recognised international, national or association standard, where such standards exist. “Recognised” can mean SAA, SAE, BS, JIS, DIN, ISO and ECE standards 1.2.10 Brake line couplings shall not be interchangable and shall be polarrised. 1.2.10.1 Couplings shall be complyed with the requirement AS D8-1971, “Hose Couplings for use with vacuum and air-pressure braking systems on prime-movers, trailers and semi-trailers” where applicable or alternatively Duomatic or compatible couplings may be used. Couplings shall be configured as follows:vacuum systems, supply line, female connector; compressed air systems, supply line, male connector; or palm type with inboard interference lug: or duomatic male connector, Part No. 452 804 0010 or equivalent. 1.2.11 Each air reservoir in a compressed air brake system shall be fitted with a manual condensate drain valve at the lowest point. An automatic condensate valve may be fitted provided it also drains the lowest point. The manual drain valve may be incorporated in the automatic valve.	

(B-b:Structure of parts installed in vehicle)	1.2.12 Each brake system shall incorporate devices which compensate for increased movement from wear. Such devices shall themselves contain provision for securing them throughout their working range. 1.2.13 Each brake system shall produce a resultant braking force acting along the longitudinal center line of the vehicle. 1.2.14 Where the supply line supplies energy to devices other than brake power unit the design shall be such that all the brake power unit are preferentially charged to an energy level of not less than 0.69 'E' (450 kpa). 1.2.15 The first call on the stored energy shall be that of the brake system. Any other demand for stored energy shall be disconnected automatically if the stored energy level falls below 0.69 'E' (450 kPa). 1.2.16 Where separate methods of actuation are provided for any functions of the brake system, the actuation of one function shall not cause the operation of another. 1.2.17 Stored energy devices shall be safeguarded to prevent depletion of the stored fluid energy through failure of any part of the supplying system. 1.2.18 In the case of a compressed air brake system, a pressure test connection complying with clause 4 of ISO Standard 3583-1984 shall be fitted at either the inlet to, or in the body of, the brake chamber with the slowest reaction time in each axle group 1.2.19 Emergency brake system that employ stored fluid energy to hold them in the release position shall be provided with an auxiliary release mechanism that is not dependent on fluid energy provided by the tow vehicle.	

C: Performance requirements **C-a:Performance of parts** **C-b:Performance of parts installed in vehicle**	1.1 Service brake system 1.1.1 The combined total energy capacity of energy storage devices incorporated into the service brake system shall be not less than 8 times the combined maximum energy capacity of the service brakes actuating devices. For compressed air systems, the ratio of air reservoir volume to actuator volume means the ratio of energy capacity. 1.1.2 The elapsed time, as specified in clause 2.7 for brake actuation time response, shall not exceed: (a) 0.35 s for any brake actuator of any axle group on the trailer, and (b) 0.25 s for any trailer or dolly rear service coupling for towed trailers. 1.1.3 The elapsed time, as specified in clause 2.7 for brake release time, shall not exceed: 1.1.3.1 0.65 seconds for the brake actuator on any trailer, and 1.1.3.2 0.55 seconds for any trailer, dolly, rear service coupling for towed trailers. 1.1.4 Each unique trailer service brake system shall: 1.1.4.1 have established retardation coefficients between the upper and lower boundaries of Figure 1; and 1.1.4.2 reach an ERC of no less than 0.45. 1.1.5 Each unique trailer service brake system shall meet the requirements of clause 2.4.1. 1.1.6 Where a trailer is fitted with a variable proportioning brake system, it shall : 1.1.6.1 meet the requirements of clause 1.1.5 with the variable proportioning brake system par device(s) set in the 'GTM' position; and 1.1.6.2 be able to hold any variable proportioning brake system device(s) in the 'GTM' position; and 1.1.7 Where the service brake system incorporates ABS the requirements of APPENDIX 1 must be met.	FIGURE 1 TRAILAR SERVICE BRAKE 

(C-b: Performance of parts installed in vehicle)	1.2 Emergency brake systems 1.2.1 Each unique trailer emergency brake system shall have an ERC of not less than 0.18 and be able to sustain a brake force required to obtain an ERC of 0.18 for a period not less than 15 minutes. 1.2.2 The emergency brake system may utilise parts of the service brake system if any one failure in the service brake system does not prevent the emergency brake system from achieving its performance requirement. 1.2.3 In the case of semi-trailers, when disconnected from the prime-mover, the failure of any structure designed to support the front of the trailer shall not reduce the effectiveness of the emergency brake system to less than half that required by clause 1.2.1. 1.3 Parking brake system 1.3.1 The parking brake system shall be independent of the service brake system except that the brakes and any mechanical system attached directly therero may be common. 1.3.2 The parking brake system shall be able to be applied by a single control and shall be able to be held in position by mechanical means. It shall not be possible to release the parking brake unless a means of immediately reapplying it is available. 1.3.3 The parking brake shall operate when the supply line energy level drops below 0.24 ‘E’ (155 kpa). The provisions of clause 1.3.2 do not apply to the auxiliary release mechanism required by clause 1.2.19 of Section B-b but the other provisions of clause 1.2.19 of Section B-b must apply. 1.3.4 Additional parking brake facilities are permitted provided that the requirements of clause 1.3.2 and 1.3.3 are met. 1.3.5 Each unique trailer parking brake system shall be capable of holding the trailer stationary on an 18 % gradient in either direction, according to clause 2.6 (parking brake effectiveness).	

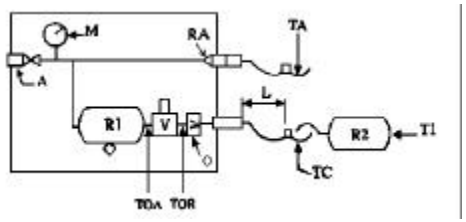
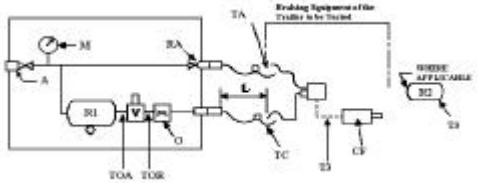
(C-b:Performance of parts installed in vehicle)	2. PERFORMANCE TEST REQUIREMENTS 2.1 General performance road test conditions 2.1.1 The ambient temperature shall be between 0 and 40°C. 2.1.2 All road tests shall be conducted with tyres of manufacturer specified size and inflation. 2.1.3 Braking tests shall be carried out on approximately level surfaces. 2.1.4 The wind speed difference between two tests shall not exceed 15km/h. 2.1.5 The towing vehicle shall be a type normally used to tow the trailer and shall have enough power to attain the initial speed required. 2.1.6 All road tests must be conducted with the axle groups loaded to GTM and energy storage devices charged to nominal minimum energy level. 2.1.7 The test surface shall be either concrete or bitumen pavement. 2.1.8 No towing vehicle braking system or other means shall contribute to braking effort, and the towing vehicle engine shall be declutched or neutral engaged. 2.1.9 The brakes may be burnished before conducting any effectiveness tests according to the brake manufacturers recommended procedures. 2.1.10 The brake system shall be adjusted in accordance with the brake manufacturers recommendations before tests are conducted. 2.1.11 The performance requirements shall be met with no deviation of the vehicle from its course greater than 300 millimetres. 2.1.12 No part of the brake system must exceed 100°C immediately prior to the commencement of a brake test sequence.	

(C-b:Performance of parts installed in vehicle)	2.2 Service brake effectiveness test conditions 2.2.1 The initial speed at the point where trailer braking commences shall be: (1) for trailers having an aggregate trailer mass up to 45 tons and not being restricted by design speed limitations, 58 to 64km/h. (2) for trailers having an aggregate trailer mass greater than 45 tons, or special trailers having a design speed less than 58km/h, not less than the manufacturers nominated design speed. 2.2.2 The trailer shall braked to a stop from initial speed starting with a control signal of 0.2 E and in increasing increments of not greater than 0.2 E for subsequent stops until an ERC of not less than 0.45 is achieved. 2.2.3 In the case of a compressed air brake system the control signal, applied to the control line at the front of the trailer, shall reach 65 % of the final value in less than 0.4 s. 2.2.4 Either stopping distance or time may be used to calculate the ERC according to the equations in clause 2.2.5 2.2.5 The service brake system ERC shall be determined according to the following as required: $$ERC = \frac{0.00394\ V^2}{S - 0.278 T_R V} \times \frac{\text{Total Combination Mass}}{\text{Gross Trailer Mass}}$$ $$ERC = \frac{0.0283\ V}{T - T_R} \times \frac{\text{Total Combination Mass}}{\text{Gross Trailer Mass}}$$ where: V is the initial speed (km/h) S is the Stopping Distance (m) T is the Stopping Time (s) T_R is the response time measured from the time the control leaves the Initial brake control location until the energy level at the least favoured actuator reaches 65 percent of final value (s) Total Combination mass (tons) Total trailer axle Load (tons)	

(C-b:Performance of parts installed in vehicle)	2.2.6 The computed ERCs determined from clause 2.2.5 shall comply with clause 1.1.4 (service brake effectiveness). 2.2.7 No trailer wheels shall remain locked, except below 15 km/h, during completion of the braking tests required by the sections of clause 2.2. 2.3 Dog trailer friction utilisation 2.3.1 In the case of dog trailers at least one front axle shall skid before at least one rear axle at an ERC greater than: (a) 0.3 in the case of two axle dog trailers; (b) 0.15 in the case of dog trailers with three or more axles. 2.3.2 The test shall be conducted generally in accordance with clause 2.2 with the control signal and surface type selected to demonstrate the requirement of clause 2.3.1 above, but the initial speed requirement of clause 2.2 does not apply.	

(C-b:Performance of parts installed in vehicle)	2.4 Service brake fade effectiveness test 2.4.1 The service brake system shall, on the next application after not less than 20 successive applications, each not more than 70 seconds after the preceding one and with the total of 20 applications completed within 20 minutes, of the trailer brakes from an initial speed of 60 km/h to a final speed as calculated by clause 13.2, achieve a calculated ERC, when tested in accordance with part 2.2, at a nominated control signal level, of not less than 60 percent of the value obtained at that control signal level nor less than 80 percent of the value specified by the lower boundary of Figure 1 at that control signal level. The nominated control signal level chosen shall not be less than that necessary to produce a calculated ERC of 0.45 under the service brake test conditions described in part 2.2 without prior fade conditioning stops. 2.4.2 The final speed to which the trailer has to be successively braked as part of the brake fade conditioning procedure shall be determined from the equation $$V_1^2 - V_2^2 = 2{,}700 \times \frac{\text{Gross Trailer Mass}}{\text{Total Combination Mass}}$$ where: V_1 is the initial speed (km/h) V_2 is the final speed (km/h) Masses and Loads (tons) 2.4.2.3 The 100°C temperature requirement of clause 2.1.12 shall not apply to the test required by clause 2.4.1.	

(C-b:Performance of parts installed in vehicle)	2.5 Emergency brake system effectiveness test 2.5.1 The ERC, as determined by clause 2.2.5 with shall be determined by a test to the requirements of part 2.2 except where clause 2.5.3 applies, and except that: (a) The control signal source shall be left in the "off" position with no control signal being provided to the trailer control line; and (b) The energy level in the supply line shall be reduced to zero. 2.5.3 Where the actuation of the emergency brake system depends on one or more sources of stored energy that are common to the service brake system, for the purposes of testing for compliance with the requirements of clause 2.5.1, the trailer energy storage devices shall be charged to an energy level no greater than 0.05 E above the supply level determined for clause 1.2.5 of Section B-b, or the energy storage device level if higher, at which the emergency brake system commences to activate the brakes. 2.6 Parking brake effectiveness test 2.6.1 The parking brake system shall be able to meet the requirements of clause 1.3.5 (18 percent gradient) for a 5-minute period in each direction with the force required to actuate the parking brake not exceeding 685 N in the case of a foot operated brake (or 590 N for a hand operated brake). 2.6.1.1 The necessary longitudinal force will be considered to have been applied if the sum of the force applied to the trailer towing point and the force due to the effect of gravity on the laden trailer mass, in the direction parallel to the test surface and trailer longitudinal axis, is greater than 0.18 times the aggregate trailer mass. 2.6.1.2 Where the test involves a force depending on the slope of the test surface, the slope shall not be less than 10 %. 2.6.1.3 When the test involves the action of slope on the trailer or combination mass, and the towing vehicle remains connected, 1.5 % of the towing vehicle mass shall be subtracted from the other forces parallel to the test plane, to allow for rolling friction. 2.6.1.4 The test slope shall be specified in terms of unit vertical per unit horizontal distance expressed as a percentage. 2.6.2 The parking brake system shall meet the requirements of clause 2.5.1 (emergency brake system performance) when the the foundation brakes geometry is such that reversal of the required braking torque will not reduce the ability of the parking brake system to generate the required braking torque.	

(C-b:Performance of parts installed in vehicle)	2.7 Time Response Measurement 2.7.1 Except where hydraulic brakes are used, each unique trailer brake system shall be shown to meet the requirements of clause 1.1.2 (actuation time) and clause 1.1.3 (release time) by testing in accordance with clause 2.7.3 or on the basis of calculation according to clause 3.5 (time response calculation). 2.7.2 A variant of a unique trailer brake system will be considered to be identical in regard to time response, when the only variation from the unique brake system is one or more of the following: (a) Plumbing or energy transmission line lengths and number of fittings are reduced but other characteristics including diameter, material, type of connecting fittings and the characteristic transmission loss per unit length are not changed. (b) Entire subsections of the brake system have been removed, as would be the case in converting a modular 3-axle system to a modular 3-axle system, such that the effect if any is to slightly increase the energy flow rate to and from the remaining brake sub-systems. (c) The energy required to actuate the substitute brake actuators to their maximum design level is less. 2.7.3 Where a trailer brake system is required to be tested for compliance with clauses 1.1.2 and 1.1.3 in the case of compressed air brake system, the test rig described in Figure 2 shall be calibrated in accordance with clause 2.7.4.2 and connected as described in Figure 3. 2.7.4 The test rig described in Figure 2 must be calibrated by adjustment of the orifice (O) such that; 2.7.4.1 upon application of the brake control valve (V) with the storage reservoir (R1) charged to 1.0 E (650 kPa), the time between the initial pressure drop measured between the storage reservoir and the control valve (V), and the pressure at the end of the calibrating vessel (R2) increasing to 0.65 E (420 kPa), is between 0.18 and 0.22 seconds. 2.7.4.2 the pressure in the calibrating vessel (R2) having stabilised, upon release of the brake control valve (V) must be such that the time between the initial pressure drop in the calibrating vessel (R2) and the pressure in the calibrating vessel (R2) reaching 0.05 E (35.0 kPa) is between 0.4 and 0.5 seconds.	**USE OF TRAILER COMPRESSED AIR BRAKE TEST RIG**  Figure 2 CALIBRATION OF TEST RIG  Figurer 3 TESTING THE TRAILER NOMENCLATURE FOR FIGURE 2 AND 3 A = supply connection with single check valve and regulator set at 650 kpa CF = trailer brake actuator L = Cupling hose, 13mm nominal bore and 2.5 metres long M = pressure gauge O = Orifice (see calibration note) R1 = Reservoir of not less than 30,000ml R2 = Calibrating vessel of 800±5ml RA = Shut off valve TA = Coupling head-supply (emergency) TC = Coupling head-control (service) TOA = Transducer point for timing inlet to brake actuation time TOR = Transducer point for timing inlet to brake release time T1 = Transducer point for calibration at end of R2 reservoir T3 = Transducer point for testing trailer V = brake control valve

(C-b:Performance of parts installed in vehicle)	2.7.5 Where one setting of the orifice (O) does not meet both of these conditions simultaneously, two different settings meeting the appropriate condition can be used in the tests prescribed in clauses 2.7.8 and 2.7.9 2.7.6 Where a rear service coupling for towed trailers is provided, time responses shall be measured with an 800-millilitre vessel attached to the rear service coupling as in Figure 3. 2.7.7 The test rig and the trailer energy storage devices shall be charged to 1.0 E (650 kPa) prior to the test being conducted and no additional energy shall be added to the storage vessel (R1) or the trailer supply line during the test. 2.7.8 The brake actuation time is from when the pressure level, measured between the storage reservoir and control valve, initially drops to when the pressure in the least favoured brake actuator reaches 0.65 E (420 kPa). 2.7.9 With an initial service brake application level of 1.0 E (650 kPa), the brake release time shall be taken from when the pressure level, measured between the control valve and orifice, initially drops, to the greater of when the pressure in the least favoured brake actuator reaches 0.05 E (35.0 kPa) or when the friction materials cease to contact each other. 2.7.10 The brake control valve must be of a configuration such that; 2.7.10.1 it permits energy to flow from the storage reservoir to the orifice (O) when in the “ON” position and from the orifice to waste when in the “OFF” position; and, 2.7.10.2 it must not allow additional energy to flow into the test rig control line by way of its own control signal ; and 2.7.10.3 it must be designed so that the manner of its operation has no effect on the output response of the test rig; and 2.7.10.4 it may be arranged to provide a modulated test rig output signal for other brake development purposes which will be rendered inoperative for the purpose of measuring trailer brake system response in accordance with clause 2.7.3.	

(C-b:Performance of parts installed in vehicle)	3. PERFORMANCE CALCULATION REQUIREMENTS 3.1 Service brake effectiveness calculation 3.1.1 In the case of an axle group fitted with a brake reactive suspension the distribution of braking effort amongst the axles in an axle group must be in the range of skid limit values determined for the suspension in accordance with clause 22.4. 3.1.2 In the case of dog trailers at least one front axle shall have a higher friction utilisation than that of at least one rear axle at decelerations greater than: (a) 0.3g in the case of 2-axle dog trailers. (b) 0.15g in the case of dog trailers with 3 or more axles. 3.1.2.1 In the case of 2-axle dog trailers the friction utilization factors may be calculated according to $\text{Friction Utilization Factor} = \frac{\text{Tangential Force at Wheel}}{\text{Dynamic Load at Wheel}}$ so: $F_1 = \frac{T_1}{P_1 + \frac{zhP}{L}}$ $F_2 = \frac{T_2}{P_2 - \frac{zhP}{L}}$ and: T1 Tangential Force at front wheel (N) T2 Tangential Force at rear wheel (N) F1 Friction utilisation factor for front wheel F2 Friction utilisation factor for rear wheel. P1 front axle static load P2 rear axle static load P total static axle Load h height of trailer and load centre of mass L wheel base z deceleration, as a proportion of acceleration due to gravity 3.1.2.2 No friction utilisation factor (F) shall exceed 0.7 at z=0.45.(a friction utilisation factor of greater than 0.7 is taken as to mean that wheel lock would have occurred in the physical test otherwise required by part 2.2.	

(C-b:Performance of parts installed in vehicle)	3.1.3 The ERCof the trailer shall be calculated using the formula in clause 3.1.3.2 at levels of input control signal starting no higher than 0.2 'Eand increasing in increments of not more than 0.2 'E' until an ERC of not less than 0.45 is achieved. 3.1.3.1 All calculated ERC values shall lie between the upper and lower bounds of Figure 1. 3.1.3.2. The 'Established Retardation Coefficient' must be calculated by $$ERC = \frac{\text{total brake force at e}}{\text{Gross Trailer Mass}} = \frac{e(\frac{C_1\ T_1}{R_1} + \frac{C_2\ T_2}{R_2} + \text{etc})}{(P_1 + P_2 + \text{etc})}$$ where: e is value of E C is the ratio of output signal level to control signal strength for the control system for the axle concerned T is the brakes output torque per unit input signal to the brakes actuator from output of the control system for the axle concerned R is the rolling radius of the tyre on the wheel P is the static load on the axle concerned 1,2, etc are subscripts referring to the concerned axle 3.2 Service brake fade calculation The service brake system shall be considered to have sufficient brake fade resistance to meet the requirements of this rule if the gross axle load rating of each foundation brake rated according to the fade test in clause 3.6.2.5 is greater than the gross trailer mass multiplied by the percentage of total brake torque provided by that foundation brake for at least one control signal level necessary to produce a calculated ERC of not less than 0.45 under the service brake test conditions described in part 2.2 without prior fade conditioning stops.	

(C-b:Performance of parts installed in vehicle)	3.3 Emergency brake system Calculation. The ERC for the emergency brake system shall be determined by computing the total braking force (kN) at the wheels to which emergency brakes are fitted and dividing by [9.81× gross trailer mass (tonnes)]. 3.3.1 The braking force at each axle shall be calculated according to $F = \frac{A \times T}{R}$ where: F is the tangential force at the braked wheels on the axle concerned A is the input to the emergency brakes actuator (in E) T is the ratio of output torque to input signal to 1.0 'E' for the emergency brake system R is the rolling radius of the tyre fitted to the wheel 3.3.1.1 Where the actuating force is dependent on the stroke, as in the case of spring brakes, the value of A used in the equation above must be that corresponding to the brakes actuator stroke achieved by the emergency brake system. This can be determined by plotting on a graph of control signal versus stroke as detailed in clauses 3.3.1.2 and 3.3.1.3: 3.3.1.2 The input to the emergency brakes actuator in units of 'E' from the data provided for the control system at various strokes; and 3.3.1.3 The foundation brake stroke achieved at various control system inputs. 3.3.2. The ratio of brake force to static axle load at each axle must not exceed that specified in the data for the suspension as approved under clause 3.6.3.	

(C-b:Performance of parts installed in vehicle)	3.4 Parking brake calculation 3.4.1 The gradient, expressed as a percentage, on which the parking brake system can hold the trailer shall be determined by computing the total braking force at the wheels (N) to which the parking brake system is fitted and dividing by [98.1× aggregate trailer mass (tonnes)] 3.4.2 The braking force at each axle must be calculated according to $F = \frac{A \times T}{R}$ where: F is the tangential force at the braked wheels on the axle concerned A is the input to the park brake actuator in units of 'E' T is the brakes output torque per 1.0 'E' for the park brake system R is the rolling radius of the tyre fitted to the wheel. 3.4.3 The provisions of clause 3.3.1.1, 3.3.1.2 & 3.3.1.3.shall apply. 3.4.4 When emergency brake system performance date is used to demonstrate compliance of the parking brake system, the geometry of the brakes shall be such that brake effectiveness will be not less in the reverse direction. 3.5 Time Response 3.5.1 The time response of a service brake system may be taken as complying with the this rule if the service brake system is installed in a manner identical to that describing the approved control system used, except as allowed in clause 3.5.2 3.5.2 Actuator volumes at full foundation brake stroke and line lengths may be reduced (for actuation response test), and actuator volumes at the point when the foundation brake friction materials cease to contact each other may be increased (for release response test) from those specified in the approved control system documentation, but other devices, fittings and dimensions may not be changed.	

(C-b:Performance of parts installed in vehicle)	3.6 Specification of brake system components Sub-assemblies of brake system components may be approved by the Administrator as part of the brake system approval process where information has been supplied in accordance with the requirements. 3.6.1 Control system 3.6.1.1 The control system shall be characterised by determining the control system ratio at ≤5 points in the range of control sgnal inputs at 0.2 E to 1.0 E. These points must be equally spaced except where the relationship within that range is non-linear, in which case the points must include each critical point 3.6.1.2 The input signal strength shall be the final value of the applied signal and shall be applied to the control system such that it rises from 0 to 65 % of the final value in ≤0.22 second. In the case of air brake systems, the input control signal strength (kPa) will be measured at the trailer control line coupling. 3.6.1.3 The output signal strength shall be the final value of the signal generated for control of the brakes actuator and which shall be reached in ≤2s. The output signal strength (kPa) will be measured in the actuator attached to each output having a fundamentally different relation to the input. For air brake systems, a control signal path having additional pressure limiters, relay valves or other active devices will be considered as being different. 3.6.1.4 Time response shall be measured in accordance with clause 2.7 (time response measurement). Where the control system is not installed on an actual trailer, it shall be installed in an essentially identical manner, in the laboratory, with all bends, fittings and worst case line lengths and representative actuator volumes installed. For the application test, clause 2.7.8, actuator displacement shall be the largest volume for which the control system is designed and may be represented by an equivalent fixed volume. 3.6.1.5 The release test, clause 2.7.9, must commence at an actuator displacement corresponding to the largest volume for which the control system is designed. Alternatively the actuators may be replaced by an equivalent fixed volume. The pressure 0.65 seconds after release must be 0.05 ‘E’ (35.0 kPa) or less. 3.6.1.5 All relevant test conditions pertaining to clause 2.1 (road test general conditions) shall be complied with. 3.6.1.6 The relationship between brake actuator volume and stroke must be measured and plotted from zero to full actuator stroke.	

(C-b:Performance of parts installed in vehicle)	3.6.1.6.1 Where more than one actuator type is used, a plot for each actuator must be supplied. If several plots are shown on one graph, each plot must be identified and clearly related to the actuator details. 3.6.1.6.2 If the relationship between stroke and volume is not linear, all critical points must be measured and plotted. 3.6.1.6.3 The value of the maximum brake actuator design stroke and volume must be stated. 3.6.2 Foundation brakes 3.6.2.1 The effectiveness of the foundation brakes shall be characterised by comparing the control signal provided to the brakes actuator against the output brake torque of the brakes device at ≤ 5 points approximately equally spaced over the range 0.2 E to 1.0 E. Where a test was not conducted at 1.0 'E' , the torque from a test conducted at 0.8 'E' or greater may be increased pro-rata to derive output torque at 1.0 'E' . Parameters relevant to the specification of the brakes actuator including its stroke at each energy level of the signal provided to the brakesactuator, shall be recorded. In the case of S-Cam air systems this will include the actuator size, slack adjuster length and any other special feature. 3.6.2.2 Measurements shall be taken in accordance with the relevant conditions for the road test in clause 2.1 and 2.2. 3.6.2.3 The brakes shall be burnished before conducting any effectiveness tests according to the brake manufacturers recommended procedures. 3.6.2.4 Specification of effectiveness for foundation brakes shall be on the basis of axle performance with 2 brake assemblies rather than wheel performance.	

(C-b:Performance of parts installed in vehicle)	3.6.2.5 The foundation brake must, on the next application after not less than 20 successive applications, each not more than 70 seconds after the preceding one and with the total of 20 applications completed within 20 minutes, of the trailer brakes' from an initial speed of 60 km/h to a final speed as calculated by clause 3.6.2.5.1, achieve a calculated brake torque, when tested in accordance with part 2.2, at a nominated energy level of the signal provided to the brakes actuator, of not less than 60 percent of the brake torque achieved at that Actuator Supply Energy level when tested in accordance with clause 3.6.2.1. The chosen, nominated energy level of the signal provided to the brakes actuator, must not be less than that necessary to produce a calculated ERC of 0.45 under the service brake test conditions described in part 2.2 when laden to the 'GALR' without prior fade conditioning stops. 3.6.2.5.1 The final speed to to which the trailer has to be successively braked as part of the brake fade conditioning procedure must be determined from the equation $V_1^2 - V_2^2 = 2{,}700 \times \frac{\text{Gross Axle Load Rating}}{\text{Total Combination Mass}}$ where: V1 is the initial speed in km/h V2 is the final speed in km/h Masses and Loads in tonnes 3.6.2.5.2 The temperature (100°C) requirement of clause 2.1.3 does not apply to the test required by clause 2.4.1 3.6.3 Suspension behaviour, brake reactive suspensions only. 3.6.3.1 Suspension systems for other than hinged drawbar pig trailers 3.6.3.1.1 The suspension must be installed according to the manufacturers instructions to a representative trailer, be fitted with axles, wheels and tyres of a size appropriate to the mass rating of the suspension, and be fitted with identical pre-calibrated brakes at each axle. 3.6.3.1.1.1 Pre-calibrated in this case means that the relationship between the input actuation energy level and the output torque for the brakes on each axle has been measured.	

(C-b:Performance of parts installed in vehicle)	3.6.3.1.2 To determine the service brake system skid limit a service brake effectiveness test must be conducted applying the brakes on all axles of the trailer and using the General Test Conditions of part 2.1 and generally in accordance with the particular conditions of part 2.2 with not less than 50% of the suspension systems rated axle group load used in place of gross trailer mass. Clause 2.2.2 need not be complied with. 3.6.3.1.3 The test result shall be reported as the value of the indicated retardation force for each axle divided by the greatest of the axle retardation forces. For S-Cam air brake systems, the overall effect of changing actuator and slack adjuster sizes can be simulated by individually adjusting the air pressure to each axle. 3.6.3.1.4 To determine the emergency brake system skid limit a test repeating that prescribed in clause 3.6.3.1.2 must be conducted, but using brakes on those trailer axles deemed to be fitted with an emergency brake system and without having to meet 0.45 'ERC'. The skid limit value must be specified as the dimensionless ratio D $\text{Where } D = \frac{\text{Indicated retardation force (N)}}{9.81 \times \text{Static Axle Load}}$ Where D is the maximum value achievable without wheel lock. 3.6.3.1.5 The parking Brake System skid limit may either be determined by the test in clause 3.6.3.1.4 or by a test based on part 2.6. The skid limit value must be specified as the dimensionless ratio D. $\text{Where } D = \frac{\text{Indicated retardation force (N)}}{9.81 \times \text{Static Axle Load}}$ Where D is the maximum value achievable without wheel lock. 3.6.3.2 Suspension systems for hinged drawbar pig trailers . 3.6.3.2.1 The suspension must be installed according to the manufacturers instructions to a representative trailer, be fitted with axles, wheels and tyres of a size appropriate to the mass rating of the suspension, and be fitted with identical re-calibrated brakes at each axle. 3.6.3.2.1.1 re-calibrated in this case means that the relationship between the input actuation energy level and the output torque for the brakes on each axle has been measured.	

(C-b:Performance of parts installed in vehicle)	3.6.3.2.2 The trailer must be laden such that the axle group load equals the suspension systems rated axle group load and that the centre of gravity of the trailer is at the same height as for a typical trailer laden to the rated axle group . 3.6.3.2.3 To determine the service brake system skid limita service brake effectiveness test conditions test must be conducted applying the brakes on all axles on both the trailer and the towing vehicle such that the computed retardation of the trailer is within 0.05 m/sec^2 of that of the towing vehicle. 3.6.3.2.4 The computed retardation must be derived from tests of each vehicle braked alone comparing the control signalat the truck to trailer coupling with the retardation achieved. 3.6.3.2.5 The test must be conducted using the general test conditions of part 2.1 and the generally in accordance with the particular conditions of part 2.2. Clause 2.2.2 need not be complied with. 3.6.3.2.6 The test result must be reported as the value of the indicated retardation force for each axle divided by the greatest of the axle retardation forces at which an 'ERC' of 0.45, calculated with Total combination Mass held equal to gross trailer bass, can be achieved without wheel lock. 3.6.3.2.6.1 In the case of s-camair brake systems the overall effect of changing actuator and slack adjuster sizes can be simulated by individually adjusting the air pressure to each axle. 3.6.3.2.7 To determine the emergency brake system skid limita test repeating that prescribed in clause 3.6.3.2.3 must be conducted, but using brakes on those axles deemed to be fitted with an emergency brake systemand without having to meet 0.45 'ERC'. The skid Limit value must be specified as the dimensionless ratio D Where $D = \frac{\text{Indicated retardation force (N)}}{9.81 \times \text{Static Axle Load}}$ Where D is the maximum value achievable without wheel lock.	

(C-b:Performance of parts installed in vehicle)	3.6.3.2.8 The parking brake system skid limit may either be determined by the test in clause 3.6.3.2.7 or by a test based on part 2.6. The skid limit value must be specified as the dimensionless ratio D. Where $D = \frac{\text{Indicated retardation force (N)}}{9.81 \times \text{Static Axle Load}}$ Where D is the maximum value achievable without wheel lock.	
D:Label marking requirements	1.1. Where a trailer is fitted with a variable proportioning brake system it shall adjacent to the trailercontrol line connectors have the notice: "Ensure Load Proportioning Brake System on trailer is HELD in LOADED POSITION if Tow Vehicle NOT Fitted with Load Proportioning or if it can not be determined that the towing vehicle has Load Proportioning Brake System.". A diagram clearly indicating how the load proportioning device is adjusted and where it is located must be located adjacent to this notice.	
E:Referenced standards	ECE Regulation No. 13/05 "Braking" SAA, SAE, BS, JIS, DIN Braking Standards AS D8-1971, "Hose couplings for use with vacuum- and air-pressure braking systems on prime movers, trailers, and semi-trailers." SAE J866-a, "Friction identification system for brake linings and brake blocks for motor vehicles," (Sept. 1966) DAE J 840c, "Test procedures for brake shoe and lining adhesives and bonds," (May 1971) SAE J998, "Minimum requirements for motor vehicle brake linings," (Jan. 1968)	

BRUNEI DARUSSALAM

Road Traffic Regulations No. 13 Brakes (Trailers)		
ITEM	CONTENTS	Illustration/supplement
A: Application	Trailers	
B: Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle	 None Every trailer exceeding two hundredweights in weight unladen shall have an efficient braking system which is capable of being applied when it is being drawn: •to at least four wheels, for trailers having four or less wheels, or •to at least four wheels, for trailers having more than four wheels In the case of all trailers the braking system shall be constructed that it is not rendered ineffective by the non-rotation of the engine of the drawing vehicle.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	None None	
D:Label marking requirements	None	
E:Referenced standards	None	

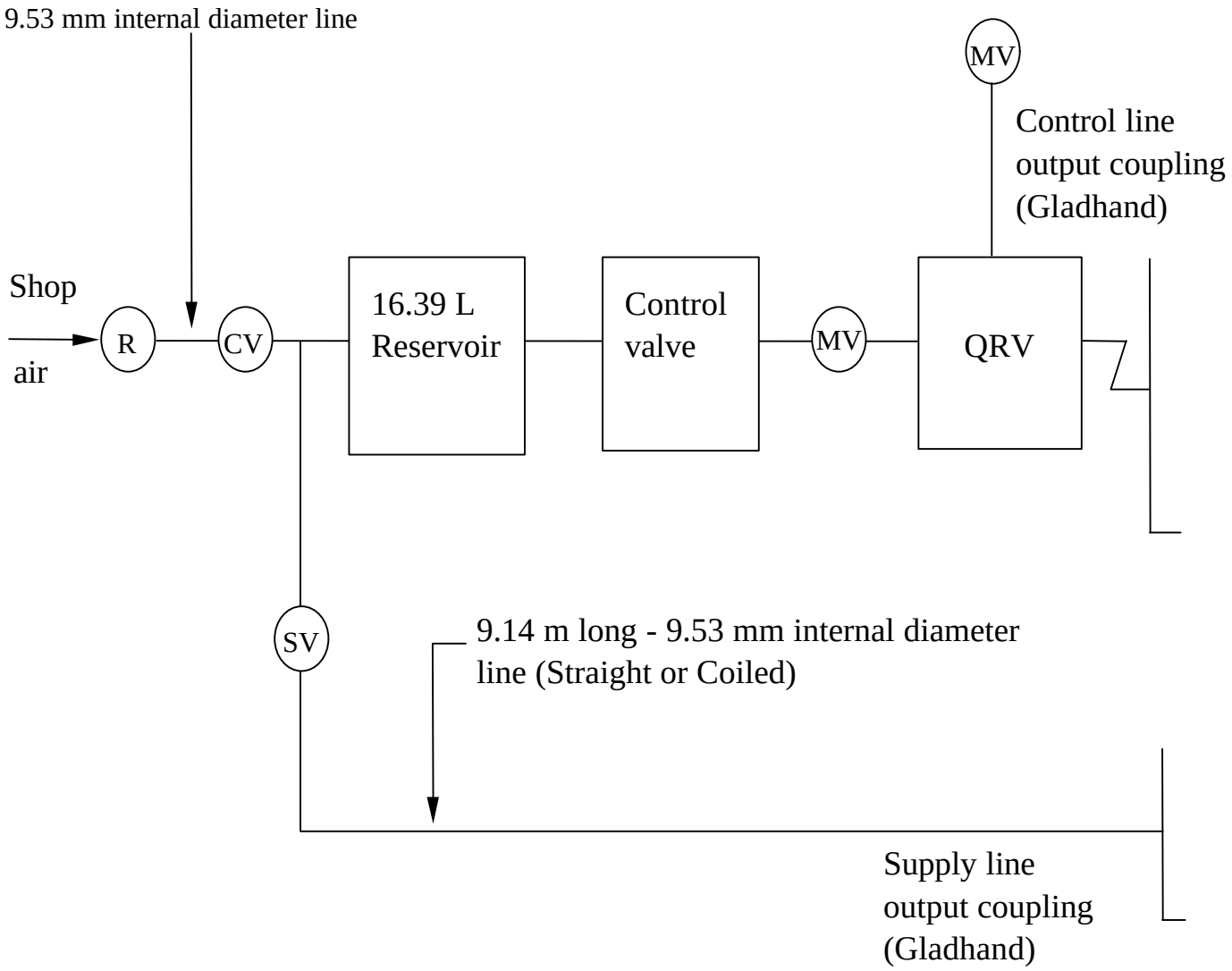
CANADA

CMVSS 121 - Air Brake System		
ITEM	**CONTENTS**	**Illustration/Supplement**
A:Application	Trailers except: • Trailers with overall width > 2.6 m, with two short track axles; • Trailers w/ UVW ≥ 95% of its GVWR; • Trailers w/ GVW >54431kg and GAW>13154kg	
B:Structure requirements **B-a:Structure of parts** **B-b:Structure of parts installed in vehicle**	None • All trailers must have service brake system that acts on each wheel, & have a parking brake system. • All trailers must have an emergency brake system & service brake reservoirs with one or more manually-operable condensate drain valves and check valves against pressure loss.	
C:Performance requirements **C-a:Performance of Parts** **C-b:Performance of Parts installed in vehicle**	None Service brake reservoirs must: Receive air from towing vehicle; Withstand 3447.35 kPa for 10 min; Have combined air volume ≥ 8×the volume of all service brake chambers. Parking Brakes and Emergency Brakes must: Three seconds after air supply line is vented, brakes must hold the vehicle on a cement road with 20% grade, when the vehicle is loaded to its GVWR, and at UVW+226.8 kg. (Must also comply, with a single leak in a brake system component by maintaining parking brake application mechanically.) Service Brake Application time: ≤ 0.60 s or, if designed to draw air-braked vehicle, ≤ 0.50 s in service brake chambers Service Brake Release time: 1.2 s in service chamber or, if designed to draw air-braked vehicle, 1 s in brake chamber & test reservoir ABS system electrical failure must not increase brake application or release time.	

<table>
<tr><td rowspan="4">(C-b:Performance of Parts installed in vehicle)</td><td>Service brakes: Inertia dynamo test requirements
• Set the sum of retardation forces so that, for the service brake chamber pressure in column I, the expression (sum of retardation forces) / (sum of GAWRs) is are equal or greater than the value in column II.
<table><tr><th></th><th>Column I</th><th>Column II</th></tr><tr><th>Item</th><th>Service brake chamber air pressure (kPa)</th><th>(Sum of retardation forces) /(Sum of GAWRs)</th></tr><tr><td>1</td><td>137.9</td><td>0.05</td></tr><tr><td>2</td><td>206.8</td><td>0.12</td></tr><tr><td>3</td><td>275.8</td><td>0.18</td></tr><tr><td>4</td><td>344.7</td><td>0.25</td></tr><tr><td>5</td><td>413.7</td><td>0.31</td></tr><tr><td>6</td><td>482.6</td><td>0.37</td></tr><tr><td>7</td><td>551.6</td><td>0.41</td></tr></table>• Determine retardation forces of service brakes, for each pressure in column I, using an inertia dynamometer:
Decelerate from 80.47 km/h to 0 km/h with the service brake on dynamo-meter. Measure the average torque exerted by service brake and divide by the manufacturer-specified static loaded tire radius.</td><td></td></tr>
<tr><td>Service Brake Inertia Dynamometer Test
• Make 10 consecutive decelerations from 80.47 km/h to 24.15 km/h at 72-second intervals, and at an average deceleration rate of 2.74 m/s2, and for one minute after tenth deceleration, decelerate from 32.2 km/h until brake drum or discs stop rotating, at an average deceleration of 4.27 m/s2.
• Two minutes after the above test, make 20 additional consecutive stops from 48.28 km/h at 1-minute intervals at an average rate of 3.66 m/s2.</td><td></td></tr>
<tr><td>Brake Burnish
Burnish brakes before brake application, release, and inertia dynamometer tests.</td><td></td></tr>
<tr><td>Emergency brake systems:
Must meet same requirements as for parking brake systems, and must apply the brake whenever air pressure in supply line is at atmospheric pressure.</td><td></td></tr>
<tr><td>D:Label marking requirement</td><td>None</td><td></td></tr>
<tr><td>E:Reference standards</td><td>None</td><td></td></tr>
</table>

Figure 1

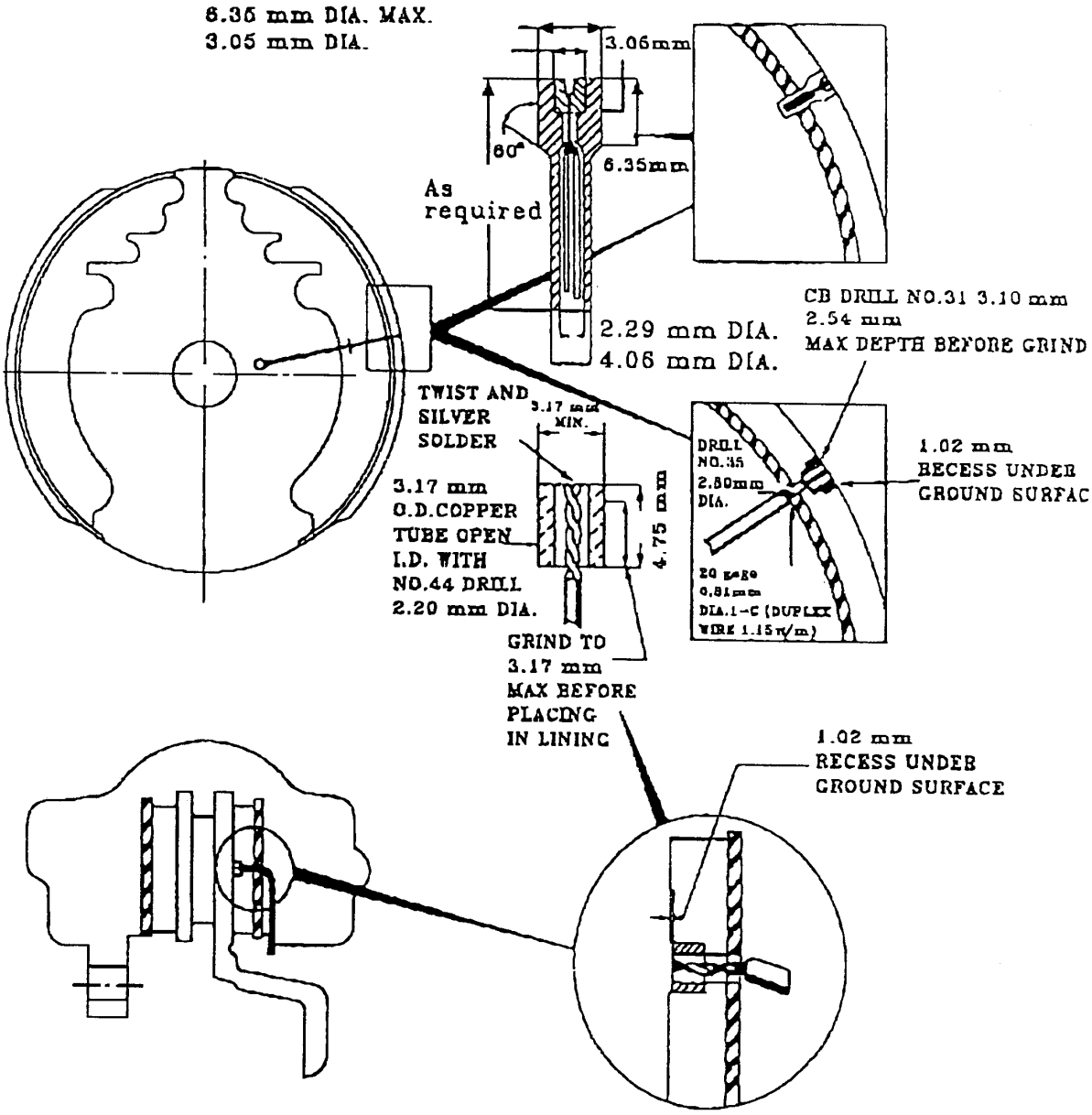
Test Rig for Drawn Vehicles



SV - Shut-off valve
R - Regulator (set at 889.5 kPa for application tests and 855.0 kPa for release tests)
CV - Check valve
MV - Metering valve (variable or fixed)
QRV - Quick release valve

Figure 2

Typical Plug-type Thermocouple Installations



HONG KONG

Road Traffic Regulations Section 83 - Brakes		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers	
B:Structure Requirements B-a:Structure of parts	None	
B-b:Structure of parts installed in vehicle	Trailers must have efficient braking system	
C:Performance Requirements C-a:Performance of Parts	Braking system of trailers, when towed, must be able to be applied to all wheels by applying brakes of towing vehicle. (Does not apply to trailers with GVW < 2 tons, if the brakes automatically operate on the overrun of the trailer.)	
C-b:Performance of Parts installed in Vehicle	Braking system of trailers must be constructed so that: • Brakes can be applied to a least 2 wheels of trailer, and be released by person standing on the ground, by means of an operation fitted to the trailer; • Braking force can be maintained at all times by direct mechanical action only; • Braking force is capable of holding the trailer on a gradient of at least 1 in 6.25, by direct mechanical action; • Braking system is not rendered ineffective by the non-rotation of the engine of towing vehicle.	
D:Label marking requirements	None	
E:Referenced Standards	None	

INDONESIA

Government Regulation No. 44/1993 Paragraph 9 Articles 18, 19, 23, 24, 25 Braking System		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers.	
B:Structure requirement B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None Trailer cars must have suitable braking instruments.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None Every trailer car must have a brake which can perform a dual function: •Main brake enables the driver to stop a trailer at the same time as the pulling motorized vehicle; •Parking brake can maintain the position of trailer when stopped on a flat or sloped road. The main brake of a trailer must automatically stop the trailers if the linking device separates from the pulling vehicle. (Does not apply to trailer cars whose wheel axle is < 1 meter with allowed weight < 1,500 kg & trailers designed for maximum speed <20km/h.) The main brake of trailers must be "spread" and "almost simultaneous in a good way on each wheel on each axle of the series of vehicles."	
D:Label marking requirement	None	
E:Referenced Standards	None	

JAPAN

Safety Regulations for Road Vehicles - Article 12 (Brake System), Article 13 (Brake System of a Tractor and a Trailer)		
ITEM	CONTENTS	Illustration/supplement
A:Application	Trailers.	
B:Structure requirements B-a:Structure of parts	None	
B-b:Structure of parts installed in vehicle	<u>Article 12</u> 1.When tractor and trailer are coupled the brake system shall not interfere with the steering performance. 2.The brake fluid of the service brake system shall not impair the function of the service brake system due to corrosion of the brake piping or formation of bubbles due to heat from the engine or other sources. 3.The service brake system operated or assisted by pneumatic or vacuum pressure shall have adequate capacity of accumulating pressure for braking and, shall be provided with warning device for the driver, when the pressure or vacuum in the brake system drops and threatens not to generate the effective braking performance. This provision shall not apply to a brake system that, even if the pressure thereof is reduced to null, may be operated in compliance with the requirements. 4.The brake system shall be secured so that it may fully withstand the operation and shall be fixed so as not to be damaged by vibration, impact, contact, etc. 5.The service brake system shall be constructed so it may interlock with the service brake system of a coupled tractor. 6.The service brake system of a trailer in the following items may be of overrun brake type (i. e. automatically applied upon overrun of trailer). •Trailer with a gross vehicle weight of 750kg or less. •Trailer drawn by a tractor with a maximum speed of < 20km/h, and •Trailer with a gross vehicle weight < 2tons, which is drawn by a large-sized special motor vehicle and with a maximum speed < 35km/h	

(B-b:Structure of parts installed in vehicle)	Article 13 •Brake system of trailer shall comply with the requirements of paragraphs 1, 2, and 3 of Article 12, B-b when coupled. •Trailers described in Paragraph 6 of Article 12, B-b (except the first paragraph, whose gross vehicle weight exceeds half of the tractor's vehicle weight plus 55 kg) may not be provided with a service brake system, if the tractor's service brake system complies with Paragraph 1 of Article 12, B-b and Paragraph 1 of Article 12, C-b when coupled.	
C:Performance requirements C-a:Performance of parts	None	
C-b:Performance of parts installed in vehicle	Article 12 1.One line of the brake system shall be constructed so that it may be controlled by device provided at the trailer and also shall hold the trailer in the unloaded state by mechanical means on a dry paved road with a gradient of 1/5. The operator's application force shall be not more than 90kg for a foot-operated type, or 50kg for a hand-operated type. 2.ABS fitted to the service brake systems of drawn systems of trailers with a gross vehicle weight > 10 tons shall comply with "Technical Standard for ABS (Chigi 182, 1990)" Aeticle 13 •The brake system of tractor and trailer shall comply with Paragraph 1 of Article 12, C-b, when coupled. •Brake system of tractor and trailer (except trailer brake systems in paragraph 6 of Article 12, B-b), shall stop each vehicle in the case of breakaway while running. •The service brake system of a tractor and a trailer shall comply with "Technical Standard for Lag in Braking Coupled Motor Vehicles (Jisha 92, 1975)".	

D:Label marking requirements	None	

E:Referenced standards	•Technical Standard for Anti-Lock Brake System (Chigi 182, 1990) •Technical Standard for Lag in Braking Coupled Motor Vehicles (Jisha 92, 1975)	

KOREA

The Motor Vehicle Safety Standards Article 15 - Brake Systems		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers	
B:Structure Requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	None •All vehicles must have a service brake system, and a parking brake system. •Each motor vehicle shall have a warning device indicating a service brake system malfunction when the brake fluid level (or air pressure for air brake systems) drops below the recommended safe level.	
C:Performance Requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	None •The service and parking brake system shall be operable independently. Service brake shall work on all wheels simultaneously. •Service brake performance shall meet the Appendix 3 requirements when the motor vehicle is stopped suddenly on a level, dry, paved road. •Service brake system braking capability and pedal force shall meet the Appendix 4 requirements. •The parking brake system braking capability shall meet the Appendix 5 requirements. •The service brake system of a drawn vehicle shall be coupled and operated simultaneously with that of the drawing vehicle.	
D:Label requirements	None	
E:Referenced standards	None	

Appendix 3: Stopping Distance and Operating Force of Service Brake System

Category	Motor vehicle with max. speed of 80 km/h or more	Motor vehicle with max. speed of 35 ~ 80 km/h	Motor vehicle with max. speed of < 35 km/h
1. Initial Braking Speed (km/h)	50	35	Max. speed of test vehicle
2. Stopping Distance (m)	22 or less	14 or less	5 or less
3. Operating Force (kg)	Foot-operated: 90 or less		
	Hand-operated: 30 or less		
4. Vehicle Test Condition	With one occupant in the unloaded state		

Appendix 4: Braking Capability and Operating Force of Service Brake System

Category	Requirement
1. Vehicle Test Condition	With one occupant in the unloaded state.
2. Braking Capability	a) Motor vehicle with a max. speed of 80 km/h or more and a GVW or more than 1.2 times the curb weight, the sum of braking force of each axle: 50% of GVW or more. b) Motor vehicles with max. speed of less than 80 km/h and a GVW of less than 1.5 times the curb weight, the sum of braking force of each axle: 40% of GVW or more c) Other vehicles: (1) Sum of brake force of each axle: 50% of GVW or more (2) Braking force of each axle: 50% of axle weight or more (for rear axle, 20% of rear axle weight)
3. Difference of Braking Force between Left and Right Wheels	8% of that axle or less.
4. Recovery of Braking Force	Braking force must decrease to 20% of that axle weight or less within 3 s after brake pedal is released.

Appendix 5: Braking Capability and Operating Force of Parking Brake System

Category	Requirement	
1. Vehicle Test Condition	With one occupant in the unloaded state	
2. Operating Force	Passenger Vehicle	Foot-operated: 60 kg or less
		Hand-operated: 40 kg or less
	Other than passenger vehicle	Foot-operated: 70 kg or less
		Hand-operated: 50 kg or less
3. Braking Capability	Hold the vehicle stationary on a 11.5 degree grade, or Braking force must be at least 20% of curb weight	

MALAYSIA

Motor Vehicles (Construction and Use) Rules, 1959 - Section 16 Brakes (trailers)		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None Every trailer or semi-trailer > 2 cwt. (unladen weight) built after 1/1/49 shall have an efficient braking system, meeting the performance requirements below.	Note: 1 cwt (UK) = 50.80 kg; cwt = "hundredweight"
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None Brakes shall be capable of being applied to at least half the number of trailer wheels. Brakes must be operable even if the drawing vehicle's engine is not rotating. If drawing vehicle does not use hydraulic, electric, compressed-air, or vacuum-type brakes, then the trailer brakes must be operable independently from the vehicle's brakes. This provision shall not apply to trailers or semi-trailers ≤ 1 ton (unladen) if trailer brakes automatically apply upon overrun of the trailer and are capable of being applied to two wheels when the trailer is not being drawn.	Note: 1 ton (UK) = 1016.05 kg
D:Label marking requirements	None	
E:Referenced standards	None	

NEW ZEALAND

Traffic Regulations 1976 -Reg 68 (Brake tubing and brake hose, and Brakes)		
ITEM	CONTENTS	Illustration/supplement
A:Application	Trailers >2000 kg (laden weight)	
B:Structure requirements B-a:Structure of parts	Brake tubing and hose •The hose or flexible tubing forming part of the compressed air or vacuum brake lines shall be of a make or kind approved by the Secretary for that purpose.	
B-b:Structure of parts installed in vehicle	Brakes •Must be equipped with 2 independent service brakes operating on different wheels. •Every brake which simultaneously applies braking pressure on 2 wheels/drums with common axis shall be adjusted so the braking effect is about equal on each wheel. •Every brake shall be capable of easy adjustment.	
C:Performance requirements C-a:Performance of parts	None	
C-b:Performance of parts installed in vehicle	Brakes •Service brake must be able to stop the vehicle ≤7 m from 30 km/h on a dry, level road. •Parking brake must be able to stop the vehicle ≤18 m from 30 km/h or be able to hold the vehicle at rest on a grade of 1 in 5. •Trailers >2,000 kg must not be operated unless equipped with compliant service brakes •Every trailer > 2,000 kg, shall be equipped with a parking brake which, when applied on a loaded trailer alone, is capable of meeting the requirements for parking brakes.	
D:Label marking requirements	None	
E:Referenced standard	•ECE 13, EEC 71/320, 74/132, and 75/524; •ADR 31, 33, 35, and 38; and •Japan Articles 12, and 13.	

NEW ZEALAND

Transport Vehicle Standards Regulation 13 (VSR 13), Passenger Service Vehicle Construction Regulations 6 & 7 (PSVR 6&7)		
ITEM	CONTENTS	Illustration/supplement
A: Application	Trailers > 2000 kg.	
B: Structure requirements B-a: Structure of parts	1. VSR reg.13 • Hose or other flexible tubing forming part of the compressed air, hydraulic oil, or vacuum brake lines shall comply with the appropriate vehicle safety standard or be of a make or kind approved by the Director for that purpose.	
B-b: Structure of parts installed in vehicle	1. VSR reg.13 • Every motor vehicle shall be equipped with at least 2 independent braking systems which shall provide the functions of: (a) A service brake; and (b) An emergency brake; and (c) A parking brake. • The service brake on every motor vehicle shall act on every road wheel. • The emergency brake - (a) Shall act on at least half of the road wheels of that vehicle; and (b) Shall act directly on those wheels without the interposition of any reduction or differential gearing; and (c) May be combined with the parking brake function. • The parking brake on every motor vehicle shall act on at least half of the wheels of that vehicle, and shall be capable of holding that vehicle at rest, when fully laden, on a slope of 1 in 5. • Every brake that simultaneously applies brakes on 2 wheels with a common axis, or to more than that one axle on a vehicle or combination of vehicles with more than one axle, shall be such that the braking effect is commensurate with the load applied to each wheel (except for anti-lock brake systems).	

(B-b: Structure of parts installed in vehicle)	2. GSVR reg.1 • Every vehicle shall be fitted with brakes which comply with the requirements of the Traffic Regulations 1976 but the stopping ability of the footbrake shall be equivalent to 25 ft from a speed of 20 mph for a four-wheel braking system or to 35 ft from a speed of 20 mph for a two-wheel braking system. • Brake Systems Utilising Compressed Air-Every combination of heavy motor vehicles utilising compressed air for application of the vehicle's brakes shall be equipped with air compressors, and with air receivers, and with gauges which meet the following requirements: • System Instrumentation- Gauges-The receivers from which the service-brake system draws its supply of energy shall be fitted with a calibrated gauge to indicate the pressure. In brake systems which are split, each such receiver shall be fitted with a calibrated gauge to indicate the pressure:	

C. Performance requirements C-a. Performance of parts C-b. Performance of parts installed in vehicle	None • System Capacity- (i) Reservoir Capacity-With the air pressure in the braking system at its maximum specified operational setting and with the engine stopped, the reserve of stored energy of the braking system shall be such as to provide a minimum of 5 full service-brake applications with full release of the brakes after each before the low-pressure warning operates, and 2 subsequently. Where a combination is equipped with an emergency or a breakaway valve on the trailer and a tractor protection valve on the towing vehicle, the requirement for 5 full service-brake applications shall be reduced to 3 before the emergency valve operates. A full service-brake application is considered to be made when all the brake actuators are operated to apply their associated brakes: (ii) Compressor Capacity-At maximum governed speed, or where the engine is not governed at a speed determined by the Vehicle Inspector, the compressor shall be capable of raising the pressure in the braking system to the point at which the compressor unloads, in the following times: (A) In not more than 3 minutes, from when the pressure at which the low-pressure warning ceases to operate or the emergency braking operates; and (B) In not more the 1 1/2 minutes, from the pressure to which the brake system falls from the maximum specified operating pressure as a result of fully applying and releasing the service brakes 5 or 3 times in accordance with:	
D:Label marking requirements	None	
E:Referenced standards	•Japan Traffic Regulations 1976, Reg. 68.	

PAPUA NEW GUINEA

Motor Traffic Regulations No. 125A - Brakes		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers	
B:Structure requirements B-a:Structure of parts	None	
B-b:Structure of parts installed in vehicle	None	
C:Performance requirements C-a:Performance of parts	For vehicles using compressed air or vacuum to apply brakes, the hose or flexible tubing of the brake lines shall be designed for that use. An air receiver shall have: • a gauge that is visible to normally-seated driver, and • an audible low-pressure warning device.	
C-b:Performance of parts installed in vehicle	Service brake must be capable of stopping vehicle within 7 meters from a speed of 30 km (without engine braking) ...**(*)** A trailer with compressed air brakes shall have separate air receivers and break-away hoses and valves which automatically apply the trailer brakes upon trailer disengagement.	
D:Label marking requirements	None	
E:Referenced standards	None	

(*) Note: This summary is incomplete due to missing text in the regulation.

PHILIPPINES

Administrative Order No. AO-91-005 Section 11 - Brakes

ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers	
B:Structure requirement B-a:Structure of parts B-b:Structure of parts installed in vehicle	None A trailer must have a braking system such that: • Brakes will withstand operation; • Service brakes operate in connection with service brakes of a coupled tractor.	
C:Performance requirements C-a:Performance of parts C-b:Performance of Parts installed in Vehicle	None The sum of the braking forces of the right & left wheels shall be ≥ 50% of the axle weight; the difference of braking forces shall be ≤10% of the axle weight. The service brakes shall have the following stopping distance, under application force of ≤ 90 kg (foot-operated) or ≤ 30 kg (hand-operated): *Max. Speed of MV (km/h)* — *Initial Speed (km/h)* — *Stopping Distance (m)* ≥80 — 50 — 22 or less ≥35 ~ < 80 — 35 — 14 or less ≥20 ~ < 35 — 20 — 5 or less < 20 — max. speed — 5 or less One line of the system shall hold an unloaded trailer on a 1/5 gradient under application force of ≤ 90 kg (foot-operated) or ≤50 kg (hand-operated). Braking system must not interfere w/ steering performance. Service brakes shall work on at least half the wheels; always all rear wheels.	

(C-b:Performance of Parts installed in Vehicle)	If brake piping serving one wheel is damaged, brakes still must apply to 2 or more wheels. The brake system shall hold, by mechanical means, an unloaded motor vehicle, (tractors must also hold a coupled unloaded trailer), on a gradient of 1/5 under application force of ≤ 90 kg (foot-operated) or 50 kg (hand-operated).	
D:Label marking requirements	None	
E:Referenced standards	None	

SINGAPORE

Road Traffic Rules Section 53 - Brakes		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers which exceed 100 kg unladen, except trailers which do not exceed one metric ton unladen as long as the brakes automatically operate on overrun of trailer.	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None Every trailer must have an "efficient braking system."	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None The braking system of a trailer must be capable of being applied to at least half the wheels of the trailer when it is being drawn, and: • can be applied by driver of the drawing vehicle, by applying the brakes of the drawing vehicle; and • capable of being set to prevent at least two of the wheels from revolving when the trailer is not being drawn. The braking system shall not be rendered ineffective by the non-rotation of the engine of the drawing vehicle.	
D:Label marking requirements	None	
E:Referenced standards	None	

CHINESE TAIPEI

Road Traffic Safety Regulations No.39 - 21 Brakes (Trailers)		
ITEM	CONTENTS	Illustration/supplement
A:Application	Trailers	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None Trailers must obey general vehicle inspection standards. Trailers must be inspected that •the efficiency of brakes and balance rate are in good condition	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None None	
D:Label marking requirements	None	
E:Referenced standards	None	

Thailand

The ministerial regulation No.9		
ITEM	CONTENTS	Illustration/supplement
A:Application	Trailers	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None A brake system that can be applied by the brake system of the tow vehicle, and there must be an emergency brake which is capable of automatically stopping the animal or goods transport vehicle type 6,7,and 8 in case the trailer comes adrift from the tow vehicle.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None None	
D:Label marking requirements	None	
E:Referenced standards	None	

UNITED STATES OF AMERICA

FMVSS 121- Air Brake		
ITEM	**CONTENTS**	**Illustration/Supplement**
A:Application	Trailers except: • Trailers with width >102.36 in. with two short track axles; • Trailer with UVW≥120,000 lbs. and whose body is heavy hauler trailer; • Trailer that has UVW ≥95% of its GVWR;	
B:Structure requirements **B-a:Structure of parts**	None	
B-b:Structure of parts installed in vehicle	• Reservoirs - One or more reservoirs to which air is delivered from towing vehicle. Must withstand internal hydrostatic pressure of 500 psi for 10 min, & have manually-operable condensate drain valve & check valves. • Brake distribution and automatic adjustment - service brake system must act on all wheels and have brake adjuster. • Antilock brake system - Each trailer shall be equipped with ABS for at least one axle for semitrailers and ABS for at least one front & one rear axle for fulltrailers. • Antilock malfunction signal - Electrical circuit for signaling malfunction in trailer ABS. Capability to transmit malfunction signal from ABS of additional trailers and means to connect ABS malfunction circuit at front and rear of trailer, if able to tow. If not able to tow, must have means for connection of ABS malfunction circuit at front of trailer. Electrical power for ABS obtained from separate electrical power circuits. The signal shall remain present as long as the malfunction exists. Each message about the existence of such a malfunction shall be stored in the ABS whenever power is no longer supplied to the system, and the malfunction signal shall be automatically reactivated whenever power is again supplied to the trailer ABS. In addition to the above requirements, trailers made after 2/28/01, if designed to tow another air-braked vehicle, , shall be capable transmitting a malfunction signal from the ABS of additional trailers it tows to the vehicle towing it	

(B-b:Structure of parts installed in vehicle)	• Antilock malfunction indicator - If made before 3/1/09, also must have external antilock malfunction indicator lamp* of trailers ABS. * The color of lamp shall be yellow. The letter "ABS" shall be indicated parmanently on or by the lamp. The lamp shall be mounted on a structure on the left side of the trailer, no closer than 150 mm, and no farther than 600 mm from the red rear side marker lamp. • Antilock System Power - Trailers: - For trailers equipped with ABS that requires electrical power, the power shall be obtained from the towing vehicle through one or more electrical circuits. The ABS shall automatically receive power from the stop lamp circuit, if the primary circuit or circuits are not functioning. Trailers equipped to tow air-braked vehicles shall have one or more circuits to provide continuous power to the ABS system on the vehicle it tows. • Parking Brake System: Each trailer shall have a parking brake system. • Emergency Brake System Each trailer shall have a emergency brake system.	

C:Performance Requirements **C-a:Performance of parts**	None	
C-b:Performance of parts installed in vehicle	**Service Brake Systems**: Trailer Service Brake Systems shall meet Brake Actuation Time , Brake Release Time and Control Signal Pressure Differential requirements: • Brake Actuation Time: Air pressure in each brake chamber shall reach 60 psi within 0.50 s (trailers); 0.60 s (trailers not designed to tow air-braked vehicles). For vehicles designed to tow air-braked vehicles, pressure in 50-cubic-inch test reservoir must reach 60 psi not later than the time fastest brake chamber reaches 60 psi or less than 0.50 s. • Brake Release Time.: Air pressure in each chamber shall fall to 5 psi ≤1.00 s (trailers); 1.20 s (non-towing trailers). For vehicles that to tow air-braked vehicles, pressure in the test reservoir shall fall to 5 psi within 1.10 s; or 1.00 s (other trailers). • Control Signal Pressure Differential: For a trailer designed to tow air-braked vehicles, the pressure differential between the control line input coupling and test reservoir shall not exceed (1) 1 psi at 5 psi < input pressure ≤ 20 psi (2) 2 psi at 20 psi < input pressure ≤ 40 psi (3) 5 % at 40 psi < input pressure under the following conditions (1) When the pressure at the input coupling is steady, increasing or de-creasing; (2) When air is applied to or released from the control line input coupling using the trailer test rig (3) With a fixed orifice consisting of a 0.0180 inch diameter hole in a 0.032 inch thick disc installed in the control line between the trailer test rig coupling and the vehicle's control line input coupling; and (4) Operating the trailer test rig in the same manner and under the same conditions as it is operated during testing to measure brake actuation and release times, except for the installation of the orifice in the control line to restrictair flow rate.	Make stops from 60 mph & 20 mph on surface with skid #81 and from 20 mph on wet surface with skid #30, when loaded to GVWR, & UVW plus 500 lbs.

(C-b:Performance of parts installed in vehicle)

Service brake system - Inertia Dynamometer Tests. When tested before road testing, each brake assembly shall meet Brake Retardation Force, Brake Power, and Brake Recovery in sequence.

- Brake Retardation Force: The sum of retardation forces of service brakes on each towed vehicle shall be such that the quotient sum of the brake retardation forces/sum of GAWR relative to brake chamber air pressure, shall be not less than Column 1 of Table. To determine Retardation Force, measure average torque of brake from the time specified air pressure is reached until brake stops, and divide by static loaded tire manufacturer-specified static loaded tire radius. Repeat 6times, increasing air pressure by 10 psi each time.
- Brake Power: Each brake must make 10 consecutive decelerations(9 f/s^2) from 50 mph to 15 mph at 72-s intervals, and decelerate(14 f/s^2) to a stop from 20 mph, 1 minute after the 10th deceleration. Then brake to 15 mph. Accelerate to 50 mph and apply brake for at 72 s after start of first braking. Repeat 10 times. Service line air pressure shall not exceed 100 psi.
- Brake Recovery: Starting 2 min. after Brake Power test, brakes shall be capable of making 20 stops from 30 mph at an average deceleration rate 12 f/s^2 , at 1-minute intervals.

Parking Brake System: Trailer parking brake system shall meet Static Retardation Force or Grade Holding, Application and Holding, Release Performance, and Accumulation of Actuation Energy requirements:

- **Static Retardation Force**: During static drawbar pull the static retardation force produced by brake application shall be, the quotient (static retardation force)/(GAWR) >= 0.28 for any axle.
- **Grade Holding**: With all parking brakes applied, vehicle must remain stationary facing uphill and facing down-hill on dry cement with 20% grade, at GVWR and at UVW plus 500 lbs.
- **Application and Holding**: There must be a mechanical means to hold the parking brake application to meet minimum performance of Grade Holding or Static Retardation Force test with and without a leakage-type failure. No later than from time of front supply line venting, mechanical means must be actuated.

TABLE – BRAKE RETARDATION FORCE

Brake retardation force, GAWR–Col.1	Brake chamber pressure, psi–Col.2
0.05	20
0.12	30
0.18	40
0.25	50
0.31	60
0.37	70
0.41	80

(C-b:Performance of parts installed in vehicle)	• **Release Performance**: After brake actuation, no reduction in brake retardation force shall result from a release of brake control unless capable of being reapplied to meet Static Retardation Force & Grade Holding. Must meet requirement with & without engine on, and with & without leakage-type failure. • **Accumulation of Actuation Energy**: Parking brake system must comply with Static Retardation Force & Grade Holding, with any leakage-type failure in other brake system. **Trailer Pneumatic System Failure Performance**: Each trailer shall meet Emergency Braking Capability, Supply Line Pressure Retention, and Automatic Application of Parking Brakes: • **Emergency Braking Capability**: Every trailer shall have a parking brake system conforming to Parking Brake System requirements and that applies with the force specified in Static Retardation Forces or Grade Holding when air pressure in supply line is at atmospheric pressure. • **Supply Line Pressure Retention**: Pressure in supply line shall not fall below 70 psi due to any single leakage-type failure in service brake system. • **Automatic Application of Parking Brakes**: With any subsequent singleleakage-type failure in any other brake system, whenever the air pressure in the supply line is >=70 psi, the parking brakes shall not provide any brake retardation as a result of complete or partial automatic application of the parking brakes. <u>Automatic Application of Air-Applied, Mechanically Held Parking Brakes</u>: With any single leakage type failure in the service brake system, parking brakes shall not provide any brake retardation as a result of complete or partial automatic application of the parking brakes .	
D:Label marking requirements	None	
E:Referenced standards	None	

Effective on 3/1/97, compliance to FMVSS 121 for air-braked trailers is required as of 3/1/98:

Required Equipment	Trailers made after 2/28/98 must have: o Electrical circuit for signaling malfunction in trailer ABS. o Capability to transmit malfunction signal from ABS of additional trailers and means to connect ABS malfunction circuit at front and rear of trailer, if able to tow. If not able to tow, must have means for connection of ABS malfunction circuit at front of trailer. o Electrical power for ABS obtained from separate electrical power circuits. o If made before 3/1/06, also must have lamp indicating malfunction of trailer's ABS. o Semitrailers must have ABS for at least one axle. o Full trailers must have ABS for at least one front & one rear axle. Trailers made after 2/28/98, if designed to tow another air-braked vehicle, must have: o Electrical circuit capable of signaling a malfunction in the trailer's ABS, and have the means for connection of this circuit to the towing vehicle. o Capability of transmitting a malfunction signal from the ABS of towed trailers by means of its ABS malfunction signal circuit. o After 2/28/01, trailers with ABS must have Electrical circuit capable of signaling malfunction in trailer's ABS, and ability to transmit a malfunction signal from the ABS of additional trailers it tows, to the vehicle towing it o Trailers made after 2/18/98 but before 3/1/09, must have external indicator lamp that is activated upon malfunction that affects the transmission of control signals in the trailer's ABS, and as a check function.	
	Antilock System Power - Trailers: Trailers made after 2/28/98, equipped with ABS that requires electrical power: o Power shall be obtained from the towing vehicle through electrical circuits. Trailers equipped to tow air-braked vehicles shall have one or more circuits to provide continuous power to the ABS system on the vehicle it tows.	
Performance Standards	Vehicle: Manufactured: Service Brake Requirements: Trailer Brake Actuation Time -- Brake Release Time Control signal pressure	

TABLE I—STOPPING SEQUENCE

1. Burnish.

2. Control trailer service brake stops at 60 mph (for truck-tractors tested with a control trailer in accordance with S6.1.10.)

3. Control trailer emergency brake stops at 60 mph (for truck-tractors tested with a control trailer in accordance with S6.1.10.7.)

4. Stops with vehicle at gross vehicle weight rating:

(a) 20 mph service brake stops on skid number of 81.

(b) 60 mph service brake stops on skid number of 81.

(c) 20 mph service brake stops on skid number of 30.

(d) 20 mph emergency brake stops on skid number of 81

(e) 60 mph emergency brake stops on skid number of 81.

5. Parking brake test with vehicle loaded to GVWR.

6. Stops with vehicle at unloaded weight plus 500 lbs.

(a) 20 mph service brake stops on skid number of 81.

(b) 60 mph service brake stops on skid number of 81.

(c) 20 mph service brake stops on skid number of 30.

(d) 20 mph emergency brake stops on skid number of 81

(e) 60 mph emergency brake stops on skid number of 81.

7. Parking brake test with vehicle at unloaded weight plus 500 lb.s.

8. Final inspection of service brake system for condition of adjustment.

TABLE II—STOPPING DISTANCE IN FEET

Vehicle speed in miles per hour	Service brake		Emergency brake, skid No. 81	
	Skid No. 81(1)	Skid No. 30(2)	(3)	(4)
20	35	60	83	85
25	53	.....	123	131
30	75	.....	170	186
35	101	.....	225	250
40	131	.....	288	325
45	165	.....	358	409
50	203	.....	435	504
55	246	.....	520	608
60	293	.....	613	720

TABLE III–BRAKE RETARDATION FORCE

Brake retardation force, GAWR–Col.1	Brake chamber pressure, psi–Col.2
0.05	20
0.12	30
0.18	40
0.25	50
0.31	60
0.37	70
0.41	80

TABLE I—STOPPING SEQUENCE

1. Burnish.

2. Stops with vehicle at gross vehicle weight rating:

(a) 60 mph service brake stops on a peak friction coeffcient surface of 0.9, for a truck tractor with a loaded unbraked control trailer, or for a single-unit vehicle.

(b) 30 mph service brake stops on a peak friction coeffcient surface of 0.5, for a truck tractor with a loaded unbraked control trailer.

(c) 60 mph emergency brake stops on a peak friction coefficient surface of 0.9, for a single-unit vehicle. Truck tractors are not required to be tested in the loaded condition.

3. Parking brake test with vehicle loaded to GVWR.

4. Stops with vehicle at unloaded weight plus up to 500 lbs.

(a) 60 mph service brake stops on peak friction coeffcient surface of 0.9, for a truck tractor or for a single-unit vehicle.

(b) 30 mph service brake stops on peak friction coefficient surface of 0.5, for a truck tractor.

(c) 60 mph emergency brake stops on a peak friction coefficient surface of 0.9, for a truck tractor or for a single-unit vehicle.

5. Parking brake test with vehicle at unloaded weight plus up to 500 lbs.

6. Final inspection of service brake system for condition of adjustment.

TABLE II—STOPPING DISTANCE
[IN FEET]

Vehicle speed in miles per hour	Service brake				Emergency brake	
	PFC 0.9. (1)	PFC 0.9. (2)	PFC 0.9. (3)	PFC 0.9. (4)	PFC 0.9. (5)	PFC 0.9. (6)
20	32	35	38	40	83	85
25	49	54	59	62	123	131
30	70	78	84	89	170	186
35	96	106	114	121	225	250
40	125	138	149	158	288	325
45	158	175	189	200	358	409
50	195	216	233	247	435	504
55	236	261	281	299	520	608
60	280	310	335	355	613	720

Note: (1) Loaded and unloaded buses; (2) Loaded single unit trucks; (3) Unloaded truck tractors and single unit trucks; (4) Loaded truck tractors tested with an unbraked control trailer; (5) All vehicles except truck tractors; (6) Un loaded truck tractors.

Table I.-Stopping Sequence

1. Burnish.

2. Stops on a peak friction coefficient surface of 0.5: (a) With the vehicle at gross vehicle weight rating (GVWR), stop the vehicle from 30 mph using the service brake, for a truck tractor with a loaded unbraked control trailer. (b) With the vehicle at unloaded weight plus up to 500 lbs., stop the vehicle from 30 mph using the service brake, for a truck tractor.

3. Manual adjustment of the service brakes allowed for truck tractors, within the limits recommended by the vehicle manufacturer.

4. Other stops with vehicle at GVWR:

(a) 60 mph service brake stops on a peak friction coefficient surface of 0.9, for a truck tractor with a loaded unbraked control trailer, or for a single-unit vehicle.

(b) 60 mph emergency brake stops on a peak friction coefficient of 0.9, for a singleunit vehicle. Truck tractors are not required to be tested in the loaded condition.

5. Parking brake test with the vehicle loaded to GVWR.

6. Manual adjustment of the service brakes allowed for truck tractors and single-unit vehicles, within the limits recommended by the vehicle manufacturer.

7. Other stops with the vehicle at unloaded weight plus up to 500 lbs.

(a) 60 mph service brake stops on a peak friction coeffcient surface of 0.9, for a truck tractor or for a single-unit vehicle.

(b) 60 mph emergency brake stops on a peak friction coefficient of 0.9, for a truck tractor or for a single-unit vehicle.

8. Parking brake test with the vehicle at unloaded weight plus up to 500 lbs.

9. Final inspection of service brake system for condition of adjustment.

ITEM 96-45

Side marker lamps (Trailers)

APEC Regulation Analysis Findings
Item No. 96-45: Side Marker Lamps (Trailers)

1. Regarding the side marker lamps of trailers, Canada and the U.S. subscribe to an FMVSS regulation. The relevant regulations of Korea and Australia are seemed to be similar.

2. New Zealand requires ECE, ADR, Japanese, FMVSS as alternatives.

3. Other member economies provide few specific requirements, although they specify these side marker lamps.

4. A comparison of specific requirements for the side marker lamps of trailers is as follows.

(1) Light distribution (C-a-1): A specific light distribution value is established by the U.S., Canada, ECE, Australia and Korea. The U.S. and Canada subscribe to the FMVSS regulation, while the other member economies specify various light distribution values. These economy members are similar in that they require higher luminous intensity for vehicles having a greater body width.

(2) Color of light (C-a-2): Australia, Canada, Japan, New Zealand, Thailand, U.S. and ECE specify amber for the front side marker lamps and red for the rear lamps. (Japan specifies amber for the rear lamps as well.) All member economies but Papua New Guinea (which requires white rear side marker lamps) accept red rear lamps. Korea and Hong Kong, however, do not distinguish between the front and rear side marker lamps.

(3) Luminous area (C-a-3): Only Hong Kong and Japan have specifications for the luminous areas of side marker lamps.

(4) Bulb power (C-a-4): ECE provides requirements for bulb power. Hong Kong specifies a bulb power of 7W or more, while Papua New Guinea specifies 7W or less. Consequently, 7W will be satisfactory to both Hong Kong and Papua New Guinea, but not to ECE. Japan specifies a bulb power of 3W or more.

(5) Visibility (C-b-1): The small number of member economies which specify visibility define it in terms of a conspicuous range. New Zealand, however, specifies a conspicuous distance in addition to range. Australia, Canada and U.S. have similar conspicuous ranges.

ITEM No.96-45: Side Marker Lamp

A: Application Trailers

Economy	A. Application	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b Position	C-b-1 Visibility	C-b-2 Connection	D Marking	E Reference Standard Alternative Regulation
Australia	All vehicles	ADR 45/01 Passenger car: Min.: 0.25 cd Max.: 15 cd Others: Min.: 0.3 cd Max.: 12 cd	Front: Amber Rear: Red			Durability of vibration	Both side for vehicle (ADR13/00)	Passenger car: 45 deg. L to 45 deg. R 10 deg. U to 10 deg.D Others: 5 to 85 deg. outboard 10 deg. U to 10 deg.D	Same time lighted position lamp etc.		
Brunei											
Canada	Motor vehicles	FMVSS 108 (SAE J592e) Amber: Min.: 0.25 cd Red: Min.: 0.62 cd Max.: 15 cd	Front: Amber Center: Amber Rear: Red			FMVSS 108 (SAE J575 Dec 88) Vibration Test Moisture Test Dust Test Corrosion Test	Both side for vehicle	45 deg. L to 45 deg R 10 deg. U to 10 deg.D	Same time lighted position lamp etc.		
Korea	Motor vehicles	Width more 200 cm Min.: 0.62 (H-V) Max.: 125 cd (H or above) 250 cd (below H)	White, Yellow or Amber								
China											
Hong Kong	Motor vehicles		White or Red	Not less than 25mm in diameter or equivalent	7W or more	Clean and efficient condition					
Indonesia											
Japan		SRRV 35-2	Front: Amber Center: Amber Rear: Amber or Red	10 sq. cm. or more	3 W or more		Both side for vehicle (ex. length 9m or more vehicle is mandatory Center position)		Same time lighted position lamp etc.		
Malaysia											
Mexico											
New Zealand	Width front 2.0m or more rear 1.5m or more		Front: White or Amber Rear: Red					Visible from a distance of 200m at night 45 deg. inboard to 80 deg. outboard 15 deg above to 15 deg. below			
Papua New Guinea	Motor truck trailer or semi-trailer		Front: White Rear: Red		Less than 7W						
Philippines											
Singapore	Trailers										FMVSS
Chinese Taipei	Trailers										
Thailand	Motor Cars		Front: Amber Rear: Amber or Red						Same time lighted position lamp etc.		
USA	Motor vehicles	FMVSS 108 (SAE J592e) Amber: Min.: 0.25 cd Red: Min.: 0.62 cd Max.: 15 cd	Front: Amber Center: Amber Rear: Red			FMVSS 108 (SAE J575e) Vibration Test Moisture Test Dust Test Corrosion Test	Both side for vehicle	45 deg. L to 45 deg R 10 deg. U to 10 deg.D	Same time lighted position lamp etc. (ECE 48-01)		
ECE	ECE 48-01	ECE No. 91 SM1: Min.: 4.0 cd Max.: 25 cd SM2: Min.: 0.6 cd Max.: 25 cd	Front: Amber Rear: Amber or Red (ECE 48-01)		ECE No. 37 or Non- replaceable bulb	Durability of vibration	Both side for vehicle (ECE 48-01)	SM1: 45 deg. L to 45 deg. R 15 deg. U to 15 deg. D SM2: 30 deg. L to 30 deg. R 10 deg. U to 10 deg. D Max.: 25 cd ECE 48-01	Same time lighted position lamp etc.	Approval mark	

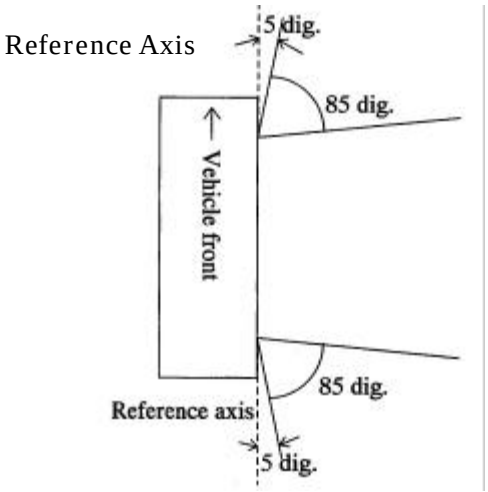
Economy : Australia

Title of Standard : 3rd Australia Design Rule 45/01

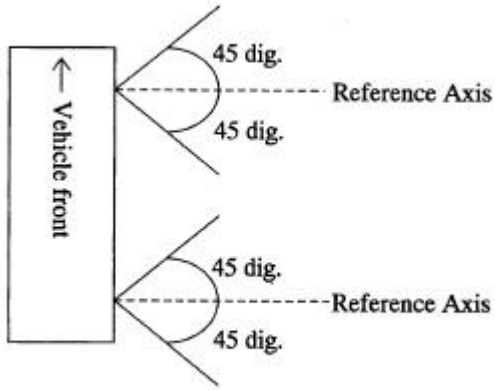
A. Application : All vehicle

C-a-1 : Photometry :

Vehicle type		Others car	Passenger car
Minimum intensity (within the specified angular field)		0.3cd	0.25cd
Maximum intensity (Over-all)		12cd	15cd
Angle field	Horizontal	5 to 85deg.	±45deg.
	Vertical	±10deg.	±10deg.



Others car



Passenger car

Horizontal angle field

C-a-2 : Color :
Front side marker : Amber
Rear side marker : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical :

The devices must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1 : Visibility :

Passenger car

Horizontal : 45deg. forward and 45deg. backward form reference center

Vertical : 10deg. above and 10deg. below form reference center

Others car

Horizontal : 5deg. outward and 85deg. outward form vertical plane

Vertical : 10deg. above and 10deg. below form reference center

C-b-2 : Electrical Connection :

N/R

(or same time lighted front position, side marker, endout-line marker and License plate lamp. 3rd ADR 13/00 Appendix A)

Economy : Canada

Title of Standard : CMVSS No.108 and TSD No.108

A. Application : Motor Vehicles

C-a-1 : Photometry : SAE J592e Table 1

C-a-2 : Color :

Front Side : Amber
Rear Side : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test
Moisture Test
Dust Test
Corrosion Test

C-b-1 : Visibility : see C-a-1

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the headlamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Economy : Hong Kong

Title of Standard : Road Traffic (Safety Equipment) Regulations 109

A. Application : Motor Vehicles

C-a-1 : Photometry : N/R

C-a-2 : Color : White or Red

C-a-3 : Luminous Area : Not less than 25mm in diameter or equivalent

C-a-4 : Bulb Wattage : Not more than 7W

C-a-5 : Mechanical : Clean and efficient condition

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Japan

Title of Standard : Safety Regulations for Road Vehicles Article 35-2
Motor Vehicle Inspection Procedures 4-25-2

A. Application :

Front, Center and Rear : Motor Vehicles with a length of 9m or more
Front and Rear : Motor Vehicles with a length of less than 9m but 6m or more
Rear : Trailers with a length of less than 6m and pole trailers

C-a-1 : Photometry :

The light of a side marker lamp shall be clearly visible at night at a distance of 150m from the side of the vehicle

C-a-2 : Color :

Front and Center : Amber
Rear : Amber or red

C-a-3 : Luminous Area :

Size of the indicating surface is 10 square centimeter or more.

C-a-4 : Bulb Wattage :

Light source is 3 watts or more.

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :

Side marker lamps shall be wired so that it may not be put out at the driver's seat. It must be turned on whenever the headlamps, auxiliary headlamps or clearance lamps are turned on.

Economy : Korea

Title of Standard : The Regulations of the Motor Vehicle Safety Standards 49, 106

A. Application : Motor Vehicle

C-a-1 : Photometry :

1. Maximum luminous intensity

a) On and above the H line : not more than 125 candela

b) Below the H line : not more than 250 candela

2. Minimum luminous intensity at each test point.

a) Minimum luminous intensity at each test point in the case of a motor vehicle with a width of more than 200 centimeters. (candela)

Test Point (degree)	Minimum Luminous Intensity
45L-10U, H, 10D	0.62
V-10U, H, 10D	0.62
45R-10U, H, 10D	0.62

Note : If the measured value at each test point in the table above is not less than 60 percent of the minimum luminous intensity and the measured value at each test point in the table below meets the requirements of the sum of the minimum luminous intensity, it shall be deemed to be in compliance with the requirements of the minimum luminous intensity.

Test Point (degree)	Sum of Minimum Luminous Intensity
45L-10U, H, 10D	1.86
V-10U, H, 10D	1.86
45R-10U, H, 10D	1.86

b) Minimum luminous intensity at each test point in the case of a motor vehicle with a width of 200 centimeters or less(candela)

Test Point (degree)		Minimum Luminous Intensity (candela)
10U, 10D	5L, 5R	0.8
5U, 5D	20L, 20R	0.4
	10L, 10R	0.8
	V	2.8
H	10L, 10R	1.4
	5L, 5R	3.6
	V	4.0

Note : If the measured value at each test point in the table below meets the requirements of the sum of the minimum luminous intensity, it shall be deemed to be in compliance with the requirements of the minimum luminous intensity.

Test Point (degree)		Luminous Intensity (candela)
20L-5U,5D	5L-10U, 10D	2.4
10L-5U, H, 5D		3.0
H-5L, V, 5R	V-5U, 5D	16.8
10R-5U, H, 5D		3.0
20R-5U,5D	5R-10U, 10D	2.4

C-a-2 : Color : White, Yellow or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : New Zealand

Title of Standard : Traffic Regulation 59

A. Application :
Width: front 2.0m or more
rear 1.5m or more

C-a-1 : Photometry : N/R

C-a-2 : Color : White or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility :
Visible from a distance of 200m at night,
Vertical : 15 dig. above and below form reference center
Horizontal : 45 dig. inboard and 80 dig. outboard from reference center

C-b-2 : Electrical Connection : N/R

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulations No. 97

A. Application :
exceed 7.5m length motor truck trailer or semi-trailer

C-a-1 : Photometry : N/R

C-a-2 : Color :
Front side marker : White
Rear side marker : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : Shall not exceed 7W

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Philippines

Title of Standard : S.8-a-A0

A. Application : N/A

C-a-1 : Photometry : N/A

C-a-2 : Color : N/A

C-a-3 : Luminous Area : N/A

C-a-4 : Bulb Wattage : N/A

C-a-5 : Mechanical : N/A

C-b-1 : Visibility : N/A

C-b-2 : Electrical Connection : N/A

Economy : Singapore

Title of Standard : Motor Vehicle Construction and Use Rules L3, L20

A. Application : Trailers

C-a-1 : Photometry :

C-a-2 : Color :

C-a-3 : Luminous Area :

C-a-4 : Bulb Wattage :

C-a-5 : Mechanical :

C-b-1 : Visibility :

C-b-2 : Electrical Connection :

Economy : Chinese Taipei

Title of Standard : Road Traffic Safety Standards 39-12-7

A. Application : Trailers

C-a-1 : Photometry :

C-a-2 : Color :

C-a-3 : Luminous Area :

C-a-4 : Bulb Wattage :

C-a-5 : Mechanical :

C-b-1 : Visibility :

C-b-2 : Electrical Connection :

Economy : Thailand

Title of Standard : Ministerial Regulations No. 22 Article 3 (1) (b)

A. Application : Motor car (may be)

C-a-1 : Photometry : N/R

C-a-2 : Color :
Front side marker : Amber
Rear side marker : Amber or Red
Both side shall be same color

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :
Device shall give out light only when the tail lights give out light as well
(same time lighted of tail light)

Economy : U.S.A.

Title of Standard : FMVSS No.108

A. Application : Motor Vehicles

C-a-1 : Photometry :

SAE J592e Table 1 unit : cd

Test Points		Red	Amber
10U	45L	0.25	0.62
	V	0.25	0.62
	45R	0.25	0.62
H	45L	0.25	0.62
	V	0.25	0.62
	45R	0.25	0.62
10D	45L	0.25	0.62
	V	0.25	0.62
	45R	0.25	0.62

Note : In the case of red side marker lamps, maximum luminous intensity shall not exceed 15cd

C-a-2 : Color :

Front and Center : Amber

Rear : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test

Moisture Test

Dust Test

Corrosion Test

C-b-1 : Visibility : see C-a-1

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the headlamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Economy : ECE

Title of Standard : ECE Uniform Regulation No. 91

A. Application : N/R

C-a-1 : Photometry :

Category		SM1	SM2
Minimum intensity	Reference enter (H-V)	4.0cd	0.6cd
	Within the specified angular field, other than above	0.6cd	0.6cd
Maximum intensity (Over-all)		25cd	25cd
Angle field	Horizontal	±45dig.	±30dig.
	Vertical	±10dig.	±10dig.

Table of standard light distribution for category SM1

45dig.	40dig.	30dig.	20dig.	10dig.	5dig.	V	5dig.	10dig.	20dig.	30dig.	40dig.	45dig.

Table of standard light distribution for category SM2

30dig.	20dig.	10dig.	5dig.	V	5dig.	10dig.	20dig.	30dig.

For SM1 and SM2 category of side-marker lamps it may be sufficient to check only five points selected by test authority.

C-a-2 : Color :

Front side marker : Amber

Rear side marker : Amber or Red*

* : If rear side marker lamp is grouped or combined or reciprocally incorporated with the rear position lamp, rear endout-line marker lamp, rear fog lamp, stop lamp, or is grouped with or has part of the light emitting surface in common with the rear retro-reflector.

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage :

Replaceable light sources : See ECE Reg. No. 37-03

Non-replaceable light sources : N/R

C-a-5 : Mechanical :

The devices must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1 : Visibility :

Category SM1

Horizontal : 45dig. forward and 45dig. backward form reference center

Vertical : 15dig. above and 15dig. below form reference center

Category SM2

Horizontal : 30dig. forward and 30dig. backward form reference center

Vertical : 15dig. above and 15dig. below form reference center

Above area maximum intensity shall be not more than 25cd

C-b-2 : Electrical Connection :

N/R

(or same time lighted front position, side marker, endout-line marker and License plate lamp. ECE No. 48-01 S5.11)

ITEM 96-46

Brake tubing and brake hose (Trailers)

APEC Regulation Analysis Findings
Item No. 96-46: Brake Tubing and Brake Hose (Trailers)

1. A comparison of specific requirements for the brake tubing and hose of trailers is as follows.

(1) Dimensions and brake hose assembly fitting (B-a-1): Australia requires that tubing and hoses conform with established standards. New Zealand requires only those hoses and tubing to comply with recognized standards approved by the relevant minister of its government. Canada and the U.S. provide structural and dimension requirements for hydraulic brake hoses, pneumatic brake hoses and rubber hoses.

(2) Durability test for hydraulic brake hose assemblies (C-a- 1): Canada and the U.S. specify a number of tests for these assemblies. Other member economies do not require such tests.

(3) Durability test for pneumatic brake hose assemblies (C-a- 2): Canada and the U.S. specify a number of tests for these assemblies. Other member economies do not require such tests.

(4) Durability test for vacuum brake hose assemblies (C-a-3): Canada and the U.S. specify a number of tests for these assemblies. Other member economies do not require such tests.

(5) Labeling and marking (D): Canada and the U.S. specify many marking requirements. Other member economies do not require such requirements.

ITEM No.96-46 : Brake Tubing and Brake Hose (Trailers)

A. Application: Trailers

Member Economy	B-a-1) Dimensions and Brake Hose Assembly Fittings
Australia	ADR 42 (Air-brake tubing; air- and vacuum-brake hose; flexible and hydraulic power hose must conform to SAA, SAE, BS, JIS, ISO or ECE Standards)
Brunei	
Canada	FMVSS 106
Chile	
China	
Hong Kong	
Indonesia	
Japan	
Korea	
Malaysia	
Mexico	
New Zealand	Unique (Make or kind of hose or tubing must be approved by Secretary)
Papua New Guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	FMVSS 106 (Hydraulic-brake hose: Permanently-attached end fittings required. Air-brake hose: Permanently-attached or reusable end fittings required. Rubber hose with reusable end fittings: Table III dimensions)
ECE	

Member Economies	C-a-1) Hydraulic-Brake Hose Assembly Durability Tests
Australia	
Brunei	
Canada	FMVSS 106
Chile	
China	
Hong Kong	
Indonesia	
Japan	
Korea	
Malaysia	
Mexico	
New Zealand	
Papua New Guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	FMVSS 106 (Capable of compliance with all tests, but need only demonstrate Constriction (≥ 64% diameter) and one other test: • Expansion & Burst Strength (meet Table 1 values, and 2000 psi); • Whip Resistance (35-hr); • Tensile Strength (325-lb.); • Water Absorption & Burst Strength (70-hr; 2-min @ 4000 psi); • Water Absorp. & Tensile Strength (70-hr; 325-lb); • Low-Temp. Resistance (70-hr @ -40°F); • Water Absorption & Whip Resistance (70-hr immersion; 35-hr flex); • Brake Fluid Compatibility , Constriction, & Burst Strength (70-hr exposure; ≥64% diameter; 2-min 4000 psi); • Ozone Resistance (70-hr); • End-Fitting Corrosion Resistance (24-hr).)
ECE	

Member Economies	C-a-2) Air-brake Hose Assembly Durability Tests
Australia	
Brunei	
Canada	FMVSS 106
Chile	
China	
Hong Kong	
Indonesia	
Japan	
Korea	
Malaysia	
Mexico	
New Zealand	
Papua New Guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	FMVSS 106 (Capable of compliance with all tests, but need only demonstrate Constriction (≥66% diameter) and 1 other test: • High-Temp. Resistance (70 hrs, 212°F); • Low-Temp. resistance (70 hrs, -40°F, meet Table IV); • Oil Resistance (70-hr); • Ozone Resistance (70-hr); • Length Change (200 psi); • Adhesion (8 lb/in); • Air Pressure (5-min, 200 psi); • Burst Strength (800 psi); • Tensile Strength (50, 150, or 325 lb); • Water Absorption & Tensile Strength (70-hr immersion; 50, 150, or 325 lb); • Zinc Chloride Resistance (200-hr); • End-Fitting Corrosion Resistance (24-hr).)
ECE	

Member Economies	C-a-3) Vacuum-Brake Hose Assembly Durability Tests
Australia	
Brunei	
Canada	FMVSS 106
Chile	
China	
Hong Kong	
Indonesia	
Japan	
Korea	
Malaysia	
Mexico	
New Zealand	
Papua New Guinea	
Philippines	
Singapore	
Chinese Taipei	
Thailand	
United States	FMVSS 106 (Capable of compliance with all tests, but need only demonstrate Constriction (≥75% diameter) and 1 other test: • High-Temp. Resistance (70-hr, 212°F); • Low-Temp. Resistance (70 hrs, -40°F, meet Table IV); • Ozone Resistance ((70-hr); • Burst Strength (350 psi); • Vacuum (26-in Hg., 5 min, ≤1/16 inch shrink); • Bend (meet Table V); • Swell (inside diameter ≥ 75%; 26 in. Hg, 10 min); • Adhesion (8 lb/in) • Deformation (60 s, 5 applications per Table VI, return to 90% diameter); • End Fitting Corrosion Resistance (24-hr).)
ECE	

Member Economies	D) Label / Marking	E) Reference Standards / Alternative Standards
Australia		• SAA, SAE, BS, JIS, ISO or ECE Standards for air-, vacuum-, or hydraulic-brake tubing & hose
Brunei		
Canada	FMVSS 106	
Chile		
China		
Hong Kong		
Indonesia		
Japan		
Korea		
Malaysia		
Mexico		
New Zealand	Unique (Marking required)	• Approved standards for air, vacuum tubing & hoses
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States	FMVSS 106 (Hydraulic-Brake Hose: One end labeled with manufacturer designation. Vacuum-Brake Hose: ≤ 6-in intervals, mark with DOT, manufacturer, date, diameters, type.)	
ECE		

Item 96-46 Brake Tubing and Brake Hose (Trailers)

AUSTRALIA

AUSTRALIAN DESIGN RULE - 42/02 (GENERAL SAFETY REQUIREMENTS)		
ITEM	**CONTENTS**	**Illustration/supplement**
A:Application	Trailers	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	 None None	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	 None Brake Tubing and Brake Hoses Air or vacuum brake tubing and air and vacuum brake hose, flexible and hydraulic power hose between the Brake Power Unit 31/00 or Brake Power Unit 35/00 and the master cylinder or its equivalent must conform toSAA, SAE, BS, JIS, ISO or ECE Standards specified for air brake tubing or hose, or vacuum brake tubing or hose, or hydraulic power tubing or hose, and be so fitted to the vehicle as to prevent chafing, kinking or other mechanical damage.	
D:Label marking requirements	None	
E:Referenced standards	•SAA, SAE, BS, JIS, ISO or ECE Brake Tubing & Hose Standards	

Item 96-46 Brake Tubing and Brake Hose (Trailers)

CANADA

CMVSS 106 - Brake Hoses		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers	
B:Structure of Parts B-a:Structure of parts	• Hydraulic brake hose (HBH) assemblies must have permanently-attached end fittings • Air brake hose (ABH) assemblies must have permanently-attached or reusable brake hose end fittings. • ABHs of natural or synthetic rubber with reusable end fittings must conform to Table II dimensions.	See Table II
B-b:Structure of parts installed in vehicle	None	
C:Performance Requirements C-a:Performance of parts	See Table V for cross references to performance reqs. of CMVSS 106 & test procedures of Motor Vehicle Safety Test Methods, §106. See Tables I, III, IV, V.	
C-b:Performance of parts installed in vehicle	None	

D:Label marking requirement	Hydraulic Brake Hoses (HBH): • Two identifiable stripes ≥1.6 mm on opposite sides along longitudinal axis • If NOT part of assembly or installed in vehicle, label HBH with: Mnfr name; manufacture date; inside diameter; and "HR" or "HL" for high/low expansion Air Brake Hoses (AB): • If NOT part of assembly or installed in vehicle, label ABH with: Mnfr name; manufacture date; inside or outside diameter; letter "A"; and for reusable rubber hoses, "AI" or "AII" for dimensional type • For non-permanently attached ABH end fittings, label with: mnfr name; inside or outside diameter; letter "A" (& for reusable end fittings, "AI" or "AII" for type) • ABH w/permanently-attached fittings must be labeled for mnfr name Vacuum brake hose (VBH): • If not part of assembly or installed in vehicle, label with: mnfr name; manufacture date; inside or outside diameter; and "VL" for light duty or "HL" for heavy duty hosing • If end fittings not attached, label fitting with mnfr name; inside or outside diameter; and "VL" or "HL" for light or heavy duty systems • VBH assemblies with attached end fittings must be labeled for mnfr name	
E:Referenced standards	• Motor Vehicle Safety Test Methods, section 106, "Brake Hoses" • SAE Standard J844, "Nonmetallic Air Brake System Tubing," June 1990	

Table V. Brake Hose Tests & Performance Requirements

HYDRAULIC BRAKE HOSE

Must meet requirement Constriction requirement, plus requirements of one of the numbered groups:

TEST	PERFORMANCE REQUIREMENT
Constriction	Inside diameter shall not constrict to less than 64% of nominal outside diameter
(1) Ozone Resistance	Must not show cracks (under magnification) after 70-hr ozone exposure at 40°C
Water Absorption & Whip Resistance	After 70-hr immersion in water, must not rupture for 35 hrs on flexing machine
(2) End Fitting Corrosion Resistance	After 24-hr exposure to salt spray, must not show base metal corrosion
Expansion & Burst Strength	Max. expansion, at 6895 kPa and 10,342 kPa must not exceed values in Table I; and shall not rupture at 27,579 kPa for 2 minutes; and not rupture at pressure below 34,474 kPa.
Whip Resistance	No rupture for 35 hrs on flexing machine
Tensile Strength	Withstand 1446 N pull without separation from end fittings
Water Absorption & Burst Strength	After 70-hr immersion in water, must withstand 27,579 kPa for 2 min, and not rupture below 34,474 kPa
Water Absorption & Tensile Strength	After 70-hr immersion in water, must withstand 1446 N without separation from end fittings
Low Temperature Resistance & Flexibility	After 70 hours at -40°C, must not show visible cracks when bent around specified cylinder
(3) Brake Fluid Compatibility, Constriction, & Burst Strength	After 70 hrs at 93.3°C filled with SAE Compatibility Fluid, must have Inside diameter _ 64% of nominal outside diameter, must withstand 27,579 kPa for 2 min, and must not rupture below 34,474 kPa. (Except for mineral- or water-based brake fluid systems)

Table V. Brake Hose Tests & Performance Requirements (continued)

AIR BRAKE HOSE

Must meet Constriction requirement, (and coiled nylon tubing, if applicable) plus requirements of one of the numbered groups:)

TEST	PERFORMANCE REQUIREMENTS
Constriction	Inside diameter shall not constrict to less than 75% of inside diameter for Heavy duty use or 70% for light duty use
Coiled Nylon Tubing *(if applicable)*	May be used when towing if: Meets Type B nylon tubing requirements of SAE Standard J844; Has straight segment at each end • †50.8 mm & is encased in spring guard with ≥50.8 mm of closed coils extending ≥38 mm into coiled segment of tubing
(1) High Temperature Resistance	No external/internal cracks, charring, or disintegration when straightened after being bent over cylinder (radius per Table III) for 70 hours at 100°C
Low Temperature Resistance	No cracks on outer cover, after being bent over cylinder (radius per Table III) for 70 hours at -40°C
Oil Resistance	After 70-hr immersion in ASTM No. 3 oil at 100°C, volume of inner tube & cover must not increase > 100%
Ozone Resistance	Must not show cracks (under magnification) after 70-hr ozone exposure at 40°C
Length Change	Must not contract in length > 7% nor elongate > 5% at 1379 kPa (except coiled nylon tube)
Adhesion	Must withstand tensile force of 1401 N/m before separation (except hose reinforced by wire)
Zinc Chloride Resistance	After 200-hr in 50% zinc chloride aqueous solution, must not show cracks on outer cover under magnification
(2) End Fitting Corrosion Resistance	After 24-hr exposure to salt spray, must not show base metal corrosion
(3) Air Pressure	Must contain 1379 kPa for 5 minutes without loss of > 34.5 kPa
Burst Strength	Must not rupture at 5516 kPa
Tensile Strength	Hose must not separate from fitting under a pull of 222 N (internal diameter ≤ 6.35 mm) or 667 N (internal diameter > 6.35 mm). For use between frame & axle or towed & towing vehicle: Hose must not separate from end fitting under a pull of 1112 N (internal diameter ≤6.35 mm) or 1446 N (internal diameter > 6.35 mm).
Water Absorption & Tensile Strength	For use between frame & axle, or towed & towing vehicle: After 70-hr immersion in water, must not separate from fittings under a pull of 1112 N (internal diameter ≤6.35 mm) and 1446 N (internal diameter > 6.35 mm)

Table V. Brake Hose Tests & Performance Requirements (continued)

VACUUM BRAKE HOSE

Must meet requirement Constriction requirement, plus requirements of one of the numbered groups:

TEST	PERFORMANCE REQUIREMENTS
Constriction	Inside diameter shall not constrict to less than 75% of inside diameter for Heavy duty use or 70% for light duty use
(1) High Temperature Resistance	No cracks or disintegration after being bent over cylinder (radius per Table IV) for 70 hours at 100°C
Low Temperature Resistance	No cracks on outer cover, after being bent over cylinder (radius per Table IV) for 70 hours at -40°C
Ozone Resistance	Must not show cracks (under magnification) after 70-hr ozone exposure at 40°C
Burst Strength	Must not rupture at 2413 kPa
Vacuum	Outside diameter must not collapse > 1.6 mm at internal vacuum of 88 kPa for 5 min.
Bend	Outside diameter at mid-point of tube must not collapse more than value in Table IV when bent until ends touch
Swell	After exposure to ASTM Reference Fuel A, inner diameter must not reduce to less than 75% (for heavy duty use) or less than 70% (for light duty use) and not show leakage at 88 kPa for 10 min.
Adhesion	Must withstand 1401 N/m before separation (except wire-reinforced hose)
Deformation	After exposure to ASTM Reference Fuel A, must return to 90% of outside diameter (wire reinforced hose to 85%) within 60 seconds after 5 applications of force. For heavy duty hoses, the first of five applications of force shall be ≤311 N and fifth ≤178 N. For light duty hoses, the first force shall be ≤222 N, and the fifth ≤89 N.
(2) End Fitting Corrosion Resistance	After 24-hr exposure to salt spray, must not show base metal corrosion

Item 96-46 Brake Tubing and Brake Hose (Trailers)

MAXIMUM EXPANEXPANSION OF FREE LENGTH BRAKE HOSE, ml/m (ml/ft.)

	Test Procedure							
	8 8896 kPa (1,000 pai)				10 342 kPa (1,500 pai)			
Hydraulic Brake Hose Inside Diameter	Regular Expansion Hose		Low Expansion Hose		Regular Expansion Hose		Low Expansion Hose	
3.18 mm (1/8 in) or less	2.17	(0.66)	1.08	(0.33)	2.59	(0.79)	1.38	(0.42)
4.76 mm (3/16 in)	2.82	(0.86)	1.80	(0.55)	3.35	(1.02)	2.36	(0.72)
6.35 mm (1/4 in) or more	3.41	(1.04)	2.69	(0.82)	4.27	(1.30)	3.84	(1.17)

TABLE II

AIR BRAKE HOSE DIMENSIONS FOR RUSABLE ASSEMBLES

Size, mm (Inches)	Inside Diameter Tolerance, mm (Inches)	Type I Outside Diameter, mm (Inches)		Type II Outside Diameter, mm (Inches)	
		Minimum	Maximum	Minimum	Maximum
4.76 (3/16)	+0.66 (0.026) -0.00 (0.000)	11.99 (0.472)	12.95 (0.510)	12.70 (0.500)	13.69 (0.539)
6.35 (1/4)	+0.79 (0.031) -0.00 (0.000)	13.59 (0.536)	14.55 (0.573)	14.27 (0.562)	15.29 (0.602)
7.94 (5/16)	+0.79 (0.031) -0.00 (0.000)	15.19 (0.598)	16.15 (0.636)	16.58 (0.656)	17.65 (0.695)
9.53 (3/8)	0.58 (0.023)	18.26 (0.719)	19.84 (0.781)	18.28 (0.719)	19.84 (0.789)
10.32 (13/32)	+0.79 (0.31) -0.00 (0.000)	18.14 (0.714)	19.30 (0.760)	18.85 (0.742)	20.04 (0.789)
12.7 (1/2)	+0.99 (0.039) -0.00 (0.000)	20.52 (0.808)	21.69 (0.854)	22.81 (0.898)	24.00 (0.945)
15.88 (5/8)	+1.07 (0.042) -0.00 (0.000)	23.70 (0.933)	24.87 (0.979)	26.77 (1.054)	27.97 (1.101)
12.7 (1/2) special	0.79 (0.031)	21.44 (0.844)	23.01 (0.906)	21.44 (0.844)	23.01 (0.906)

TALBE III

AIR BRAKE HOSE DIAMETERS AND TEST CYLINDER RADIUS

Hose, Nominal diameter in mm (inches)	3.18 (1/8)	4.76 (3/16)	6.35 (1/4)	7.94 (5/16)	9.53 (3/8)	10.32 (13/32)	11.11 (7.16)	12.7 (1/2)	15.88 (5/8)
Radius of test cylinder in mm (inches)	38.10 (1 ½)	50.8 (2)	63.5 (2 ½)	76.2 (3)	88.9 (3 ½)	88.9 (3 ½)	101.6 (4)	101.6 (4)	114.30 (4 ½)

TABLE IV

VACUUM BRAKE HOSE TEST REQUIREMENTS

Hose-Inside diameter, mm (inches)		High temperature resistance Hose length, mm (inches)		Radius of cylinder, mm (inches)		Low temperature resistance Hose length, mm (inches)		Radius diameter, mm (inches)		Bend(dimension D) mm (Inches)		Maximum collapse of outside diameter, mm (inches)		Deformation collapsed inside diameter dimension mm (inches)	
5.56	(7/32)	203.2	(8)	38.10	(1 1/2)	444.5	(17 1/2)	76.2	(3)	177.8	(7)	4.37	(11/64)	1.19	(3/64)
6.35	(1/4)	228.6	(9)	38.10	(1 1/2)	444.5	(17 1/2)	76.2	(3)	203.2	(8)	2.38	(3/32)	1.59	(1/16)
7.14	(9/32)	228.6	(9)	44.45	(1 3/4)	482.6	(19)	88.9	(3 1/2)	228.6	(9)	4.76	(3/16)	1.59	(1/16)
8.73	(11/32)	228.6	(9)	44.45	(1 3/4)	482.6	(19)	88.9	(3 1/2)	279.4	(11)	5.16	(13/64)	1.98	(5/64)
9.53	(3/8)	254.0	(10)	44.45	(1 3/4)	482.6	(19)	88.9	(3 1/2)	304.8	(12)	3.97	(5/32)	2.38	(3/32)
11.11	(7/16)	279.4	(11)	50.80	(2)	520.7	(20 1/2)	101.6	(4)	355.6	(14)	6.75	(17/64)	1.98	(5/64)
11.91	(15/32)	279.4	(11)	50.80	(2)	520.7	(20 1/2)	101.6	(4)	355.6	(14)	6.75	(17/64)	1.98	(5/64)
12.7	(1/2)	279.4	(11)	50.80	(2)	520.7	(20 1/2)	101.6	(4)	406.4	(16)	5.58	(7/32)	3.18	(1/8)
15.88	(5/8)	304.8	(12)	57.15	(2 1/4)	558.8	(22)	114.3	(4 1/2)	558.8	(22)	5.58	(7/32)	3.97	(5/32)
19.05	(3/4)	355.8	(14)	63.50	(2 1/2)	609.6	(24)	127.0	(5)	711.2	(28)	5.58	(7/32)	4.76	(3/16)
25.4	(1.0)	406.4	(16)	82.55	(3 1/4)	725.9	(28 1/2)	166.1	(6 1/2)	914.4	(36)	7.14	(9/32)	6.35	(1/4)

Item 96-46 Brake Tubing and Brake Hose (Trailers)

NEW ZEALAND

Traffic Regulations 1976 -Reg 68 (Brake tubing and brake hose, and Brakes)		
ITEM	CONTENTS	Illustration/supplement
A:Application	Trailers >2000 kg (laden weight)	
B:Structure requirements B-a:Structure of parts	Brake tubing and hose •The hose or flexible tubing forming part of the compressed air or vacuum brake lines shall be of a make or kind approved by the Secretary for that purpose.	
B-b:Structure of parts installed in vehicle	Brakes •Must be equipped with 2 independent service brakes operating on different wheels. •Every brake which simultaneously applies braking pressure on 2 wheels/drums with common axis shall be adjusted so the braking effect is about equal on each wheel. •Every brake shall be capable of easy adjustment.	
C:Performance requirements C-a:Performance of parts	None	
C-b:Performance of parts installed in vehicle	Brakes •Service brake must be able to stop the vehicle ≤ 7 m from 30 km/h on a dry, level road. •Parking brake must be able to stop the vehicle ≤18 m from 30 km/h or be able to hold the vehicle at rest on a grade of 1 in 5. •Trailers >2,000 kg must not be operated unless equipped with compliant service brakes •Every trailer > 2,000 kg, shall be equipped with a parking brake which, when applied on a loaded trailer alone, is capable of meeting the requirements for parking brakes.	
D:Label marking requirements	None	
E:Referenced standard	•ECE 13, EEC 71/320, 74/132, and 75/524; •ADR 31, 33, 35, and 38; and •Japan Articles 12, and 13.	

Item 96-46 Brake Tubing and Brake Hose (Trailers)

UNITED STATES OF AMERICA

FMVSS 106 - Brake Hoses		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Trailers	
B:Structure requirement B-a:Structure of parts	• Hydraulic brake hose assembly must have permanently attached end fittings. • Air brake hose assembly must have permanently-attached or reusable end fittings. Rubber hose used with reusable end fittings must meet Table III.	
B-b:Structure of parts installed in vehicle	None	
C:Performance requirements C-a:Performance of parts	Hydraulic brake hose assemblies must be able to meet any requirement below, but each assembly need not meet further requirements after meeting the constriction test and any one other requirement. • Constriction - Inside diameter of assembly shall be ≥ 64% of nominal inside diameter. • Expansion & Burst Strength - Maximum expansion of assembly at 1,000 and 1,500 psi must not exceed Table 1 values; then must withstand 2,000 psi water pressure for 2 min. and not rupture at less than 5,000 psi. • Whip Resistance - Assembly must not rupture for 35 hr. on flexing machine. • Tensile Strength - Assembly must withstand 325 lb.-pull without separation. • Water Absorption & Burst Strength - After 70-hr in water, must withstand 4,000-psi pressure for 2 min., and not rupture below 5,000 psi. • Water Absorption & Tensile Strength - After 70-hr in water, must withstand 325 lb.-pull without separation. • Water Absorption & Whip Resistance - After 70-hr in water, must not rupture for 35 hours on flexing machine. • Low-Temp.Resistance - After 70-hr at -40°F, must not crack when bent around cylinder. • Brake Fluid Compatibility, Constriction, & Burst Strength - After 70-hr at 200°F in SAE RM-66-04 Compatibility Fluid, must meet Constriction test, withstand 4,000 psi pressure for 2 min., and not rupture below 5,000 psi.	

(C-a:Performance of parts)	• Ozone Resistance - After 70-hr ozone exposure at 104°F, must not show cracks (under 7-power magnification). • End-Fitting Corrosion Resistance - After 24-hr exposure to salt spray, end fitting must not show base metal corrosion. Air brake hose assemblies must be able to meet any requirement below, but each assembly need not meet further requirements after meeting the constriction test and any one other requirement. • Constriction - Inside diameter of hose must be ≥ 66% of nominal inside diameter. • High-Temperature resistance - After 70 hours bent over cylinder of radius specified in Table IV at 212°F, hose must not show cracks. • Low-Temp. Resistance - After 70-hr at -40°F, must not crack when bent around cylinder of radius specified in Table IV. • Oil Resistance - After 70-hr in ASTM No. 3 oil at 212°F, volume of inner tube & cover must not increase >100%. • Ozone Resistance - After 70-hr ozone exposure at 104°F, hose must not show cracks (7-power magnification). • Length Change - At 200 psi, hose must not elongate >5% nor contract >7%. • Adhesion - Except wire-reinforced hose, hose must withstand tensile force of 8 lbs. per inch of length before separation. • Air Pressure - Assembly must contain 200-psi air pressure for 5 min., without loss of >5 psi. • Burst Strength - Must not rupture at 800 psi hydrostatic pressure. • Tensile Strength - Assemblies must withstand 50 lb.-pull (nom. int. diam. of <1/4 in.), 150 lbs. (3/8 in., 1/2 in.), or 325 lbs. (>1/2 in), except assembly for use between frame & axle, or towed & towing vehicle, must not separate under 250-lb pull (≤1/4 in.), or 325-lb. pull (>1/4 in.). • Water Absorption & Tensile Strength - After 70-hr in water, must withstand 50-lb pull (nominal diameter <1/4 in.), 150 lbs (3/8 in., 1/2 in.), or 325 lbs (>1/2 in.), except assembly designed for use between frame & axle, or towed & towing vehicle, must withstand 250-lb. pull (< 1/4 in) or 325 lbs (>1/4 in).	

(C-a:Performance of parts)	• Zinc Chloride Resistance - After 200 hr in 50% zinc chloride aqueous solution, outer hose cover must not show cracks (at 7-power magnification). • End Fitting Corrosion Resistance - After 24-hr in salt spray, end fitting must not show base metal corrosion. Vacuum brake hose assembly must be able to meet any requirement below, but need not meet further tests after meeting constriction and any one other test: • Constriction - Inside diameter must be ≥75% of nominal inside diameter for heavy duty hose, or ≥70% for light duty hose. • High-Temp. Resistance - After 70 hours bent over radius specified in Table V at 212°F, must not show cracks. • Low-Temp. Resistance - After 70-hr at -40°F, must not crack when bent around cylinder of radius specified in Table V. • Ozone Resistance - After 70-hr ozone exposure, must not show cracks. • Burst Strength - Must not rupture under 350 psi hydrostatic pressure. • Vacuum - Outside diameter shall not collapse > 1/16 in. under internal vacuum of 26 in. of Hg for 5 min. • Bend - Outside hose diam., at middle when ends touch, must be < Table V. • Swell - After exposure to Ref Fuel A, inside diameter must be ≥75% of nominal inside heavy-duty (70% light-dutY). Must show no leakage or separation in vacuum of 26 in. Hg for 10 min. • Adhesion - withstand 8-lb tensile force per in. of length before separation. • Deformation - Hose shall return to 90% of outside diam. (86% for wire-reinforced) within 60 s. after 5 applications of increasing force to the diameter specified in Table VI. • End Fitting Corrosion Resistance - After 24-hr exposure to salt spray, end fitting must not show base metal corrosion.	
C-b:Performance of parts installed in vehicle	None	

D:Label marking requirement	• At least one end fitting of a hydraulic brake hose assembly shall be labeled with manufacturer designation (1/16-in. high). • Each vacuum brake hose must be labeled at < 6-in. intervals (1/8-in. high) with DOT symbol; manufacturer designation; manufacture date; nominal inside diameter (in. or mm) or outside diameter of plastic tubing (in. or mm) with "OD"; and "VL" or "VH" for light-duty or heavy-duty hose.	
E:Referenced standards	• SAE Standard J1703 January 1995, "Motor Vehicle Brake Fluid, Appx. B • 1964 ASTM, Designation E4, Verification of Testing Machines • ASTM B117-64, "Salt Spray (Fog) Testing"	

TABLE I -- MAXIMUM EXPANSION OF FREE LENGTH BRAKE HOSE, CC/FT.

Hydraulic brake hose, inside diameter	Test Pressure			
	1,000 psi		1,500 psi	
	Regular expan-sion hose	Low expan-sion hose	Regular expan-sion hose	Low expan-sion hose
1/8 inch or 3 mm or less	0.66	0.33	0.79	0.42
3/16 inch or 4 to 5 mm	.86	.55	1.02	.72
1/4 inch or 6 mm or more	1.04	.82	1.30	1.17

TABLE III -- AIR BRAKE HOSE DIMENSIONS FOR REUSABLE ASSEMBLIES

Size, inches	Inside diameter tolerance inches	Type I outside diameter, inches		Type II outside diameter, inches	
		Mini-mum	Maxi-mum	Mini-mum	Maxi-mum
3/16	+0.026 - 0.000	0.472	0.510	0.500	0.539
1/4	+0.031 - 0.000	0.535	0.573	0.562	0.602
5/16	+0.031 - 0.000	0.598	0.636	0.656	0.695
3/8	+ 0.023	0.719	0.781	0.719	0.781
13/32	+0.031 - 0.000	0.714	0.760	0.742	0.789
1/2	+0.039 - 0.000	0.808	0.854	0.898	0.945
5/8	+0.042 - 0.000	0.933	0.979	1.054	1.101
1/2 special	+ 0.031	.844	.906	.844	.906

TABLE VI -- DIMENSIONS OF TEST SPECIMEN AND FEELER GAUGE FOR DEFORMATION TEST

Hose inside diameter *		Specimen dimension (see fig. 4)		Feeler gauge dimensions	
In.	mm	Depth (inch)	Length (inch)	Width (inch)	Thick-ness (inch)
7/32	5	3/64	1	1/8	3/64
1/4	6	1/16	1	1/8	1/16
9/32		1/16	1	1/8	1/16
11/32	8	5/64	1	3/16	5/64
3/8	10	3/32	1	3/16	3/32
7/16		5/64	1	1/4	5/64
15/32		5/64	1	1/4	5/64
1/2	12	1/8	1	1/4	1/8
5/8	16	5/32	1	1/4	5/32
3/4		3/16	1	1/4	3/16
1		1/4	1	1/4	1/4

* These sizes are listed to provide test values for brake hoses manufactured in these sizes. They do not represent conversions.

TABLE V --- VACUUM BRAKE HOSE TEST REQUIREMENTS

Hose inside diameter *		High temperature resistance		Low temperature resistance		Bend		Deformation--- collapsed inside diameter (dimension D), inches
Inches	Millimeters	Hose length, inches	Radius of cylinder, inches	Hose length, inches	Radius of cylinder, inches	Hose length, inches	Maximum collapse of outside diameter, inches	
7/32	5	8	1 1/2	17 1/2	3	7	11/64	3/64
1/4	6	9	1 1/2	17 1/2	3	8	3/32	1/16
9/32		9	1 3/4	19	3 1/2	9	12/64	4/64
11/32	8	9	1 3/4	19	3 1/2	11	13/64	5/64
3/8	10	10	1 3/4	19	3 1/2	12	5/32	3/32
7/16		11	2	20 1/2	4	14	17/64	5/64
15/32		11	2	20 1/2	4	14	17/64	5/64
1/2	12	11	2	20 1/2	4	16	7/32	1/8
5/8	16	12	2 1/4	22	4 1/2	22	7/32	5/32
3/4		14	2 1/2	24	5	28	7/32	3/16
1		16	3 1/4	28 1/2	6 1/2	36	9/32	1/4

TABLE IV --- AIR BRAKE HOSE DIAMETERS AND TEST CYLINDER RADII

Nominal hose diameter, in. *	1/8	3/16	1/4	5/16	3/8, 13/32	7/16, 1/2	5/8
mm.*	3	4, 5	6	8	10	12	16
Radius of test cylinder in inches	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2

* These sizes are listed to provide test values for brake hoses manufactured in these sizes. They do not represent conversions.

ITEM 96-47

Parking lamps

APEC Regulation Analysis Findings
Item No. 96-47: Parking Lamps

1. Canada and the U.S. subscribe to the FMVSS regulation for parking lamps. Few other member economies have specifications for these lamps.

2. New Zealand requires ECE, ADR, Japanese, FMVSS as alternative.

3. Other member economies provide few specific requirements for parking lamps.

4. A comparison of specific requirements for parking lamps is as follows.

(1) Photometry (C-a-1): A specific light distribution value is established by the U.S., Canada and ECE. The U.S. and Canada subscribe to the FMVSS regulation, which provides a slightly higher value (cd) of light distribution than the corresponding ECE regulation.

(2) Color of light (C-a-2): Member economies are unanimous in requiring red rear parking lamps. But they vary in requiring white, yellow or amber front parking lamps. Only the Philippines prohibits white front parking lamps.

(3) Luminous area (C-a-3): Only Japan has specifications for the luminous areas of parking lamps.

(4) Bulb power (C-a-4): Japan, Papua New Guinea and ECE specify a permissible bulb power range, all falling between 3W and 7W.

(5) Visibility (C-b-1): There are three types of defining the visibility of parking lamps. First, specification of the minimum luminous intensity in a designated conspicuous range (ECE type). Second, specification of a conspicuous range (FMVSS types). Third, specification of a conspicuous distance (Japan type). Requirements for parking lamp visibility can be divided into the following groups:

* FMVSS group - U.S., Canada
* ECE group - ECE
* Japan group - Japan, Papua New Guinea, Philippines

ITEM No. 96-47: Parking Lamp

A: Application Passenger Car

Economy	A. Application	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b Position	C-b-1 Visibility	C-b-2 Connection	D Marking	E Reference Standard Alternative Regulation
Australia			ADR 13-ECE R48/01				ADR 13-ECE R48/01	ADR 13-ECE R48/01	ADR 13-ECE R48/01		
Brunei											
Canada	Motor vehicles	FMVSS 108 (SAE J222 Mar 86) Min.: 4 cd (H-V)	White or Yellow			FMVSS 108 (SAE J575 Dec 88) Vibration Test Moisture Test Dust Test Corrosion Test	Both side for vehicle	20 dig. L to 20 dig. R 10 dig. U to 10 dig. D	Same time lighted position lamp etc.		
Chile											
China											
Hong Kong											
Indonesia											
Japan	Motor vehicles	SRRV 37-3	Front: White, Yellow or Amber Rear: Red	10 sq. cm. or more	3 W or more		Both side for vehicle		The parking lights shall be so wired that they may be turned on only when the vehicle is not in operation. Parking lights on the front shall be on only when the rear are on.		
Malaysia											
Mexico											
New Zealand	Motor Vehicles										ECE 7 76/758/EEC ADR 49/00 SRRV 34, 35-2, 37 JIS D5500 FMVSS
Papua New Guinea	Motor Vehicles		White or Amber		Less than 7W			Visible from 200m at night			
Philippines	Motor Vehicles		Front: Yellow or Amber Rear: Red					Visible from 100m at night	The parking lights shall be so wired that they may be turned on only when the vehicle is not in operation. Parking lights shall be on when head light are on.		
Singapore											FMVSS
Chinese Taipei											
Thailand	Motor Cars		White or Amber						Same time lighted position lamp etc.		
USA	Motor vehicle	FMVSS 108 Fig. 1a ,1b &1c Min.: 4 cd (H-V) Max.: 125 cd (H or above) 250 cd (Below H)	Front: White or Amber			FMVSS 108 (SAE J575e) Vibration Test Moisture Test Dust Test Corrosion Test	Both side for vehicle	20 dig. L to R 10 dig. U to D	Same time lighted position lamp etc.		
ECE	ECE 48-01	ECE No. 77 Front: Min.: 2 cd (H-V) Max.: 60 cd Rear: Min.: 2 cd (H-V) Max.: 30 or 60 cd	ECE 48-01		ECE No. 37 or Non-replaceable bulb	Durability of vibration	Both side for vehicle (ECE 48-01)	0 to 45 dig. outboard 15 dig. U to 15 dig. D Min.: 0.05 cd ECE 48-01	Same time lighted position lamp etc. (ECE 48-01)	Approval mark	

Economy : Canada

Title of Standard : CMVSS No.108 and TSD No.108

A. Application : Motor Vehicles

C-a-1 : Photometry : SAE J222 Mar86 Table 1 or Table 2

C-a-2 : Color : White or Yellow

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test
Moisture Test
Dust Test
Corrosion Test

C-b-1 : Visibility : see C-a-1

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the headlamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Economy : Japan

Title of Standard : Safety Regulations for Road Vehicles Article 37-3
Motor Vehicle Inspection Procedures 4-27-3

A. Application : Motor Vehicles

C-a-1 : Photometry :
The illuminating light of a parking lamp on the front or the rear shall be clearly visible at night at a distance of 150m from the front or the rear of the vehicle respectively.

C-a-2 : Color :
Front : White, Yellow or Amber
Rear : Red

C-a-3 : Luminous Area :
Size of the indicating surface is 10 square centimeter or more.

C-a-4 : Bulb Wattage :
Light source is 3 watts or more.

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :
Parking lamps on the front shall be on only when the rear are on.
Parking lamps shall be so wired that they may be turned on only when the vehicle is not in operation.

Economy : New Zealand

Title of Standard : Vehicle Standards Regulation 16

A. Application : Every motor vehicle

C-a-1 : Photometry : N/R

C-a-2 : Color : N/R

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulations No. 96

A. Application :
Motor vehicle, Side car and exceed 1.5m width trailer

C-a-1 : Photometry : N/R

C-a-2 : Color : White or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : Shall not exceed 7W

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : Visible from a distance of 200m at night

C-b-2 : Electrical Connection : N/R

Economy : Philippines

Title of Standard : Motor Vehicle Inspection System, Section 8 d-AD,
S34-g ra 4136, S9-d-AD

A. Application :
All Motor vehicle
(Except motor cycle, side car and trailer)

C-a-1 : Photometry : N/R

C-a-2 : Color :
Front Parking : Yellow or Amber
Rear Parking : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : Visible from a distance of 100m at night

C-b-2 : Electrical Connection :
The parking lights shall be so wired that they may be turned on only when the vehicle is not in operation.

Parking lights shall be on when head light are on.
(Road vehicle safety requirements 4.4.1)

Economy : Chinese Taipei

Title of Standard : Road Traffic Safety Standards 39-12-7-4

A. Application :

C-a-1 : Photometry :

C-a-2 : Color :

C-a-3 : Luminous Area :

C-a-4 : Bulb Wattage :

C-a-5 : Mechanical :

C-b-1 : Visibility :

C-b-2 : Electrical Connection :

Economy : Thailand

Title of Standard : Ministerial Regulations No. 22 Article 2 (1) (c)

A. Application : Motor car

C-a-1 : Photometry : N/R

C-a-2 : Color :
White or Amber
Both side shall be same color

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :
Device shall give out light only when the tail lights give out light as well

Economy : U.S.A.

Title of Standard : FMVSS No.108

A. Application : Motor Vehicles

C-a-1 : Photometry : FMVSS No.108 Figure 1a, 1b, and 1c

Figure 1a-Required Percentages of Minimum Candlepower of Figure 1b

Test Points (degree)		Required Percentages
10U, 10D	5L, 5R	20
5U, 5D	20L, 20R	10
	10L, 10R	20
	V	70
H	10L, 10R	35
	5L, 5R	90
	V	100

Note : Minimum design candlepower requirements are determined by multiplying the percentages given in this Figure by the minimum allowable candlepower values in Figure 1b. The resulting values shall be truncated after one digit to the right of the decimal point.

Figure 1b-Minimum and Maximum Allowable Candlepower Values

	Lighted sections
	1
Parking Lamp	4.0/125

Note : The maximum candlepower value of 125 applies to all test points at H or above. The maximum allowable candlepower value below H is 250.

Figure 1c-Sum of the Percentages of Grouped Minimum Candlepower

Group and test points	Required Percentages
1 10U-5L, 5U-20L, 5D-20L, 10D-5L	60
2 5U-10L, H-10L, 5D-10L	75
3 H-5L, 5U-V, H-V, 5D-V, H-5R	420
4 5U-10R, H-10R, 5D-10R	75
5 10U-5R, 5U-20R, 5D-20R, 10D-5R	60

C-a-2 : Color : White or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test
Moisture Test
Dust Test
Corrosion Test

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the headlamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Economy: ECE

Title of Standard : ECE Uniform Regulation No. 77

A. Application : N/R

C-a-1 : Photometry :

Front parking lamp

Minimum intensity (H-V) : 2cd

Maximum intensity (Over-all) : 60cd

Rear parking lamp

Minimum intensity (H-V) : 2cd

Maximum intensity (Over-all) : 30*cd

* If luminous intensity of 60cd shall be permitted for parking lamps directed to the rear incorporated with stop lamps below a plane forming an angle of 5dig. with and downward from the horizontal plane.

Table of standard light distribution

U 10dig.			20%		20%		
5dig.	10%	20%		70%		20%	10%
H 0dig.		35%	90%	100%	90%	35%	
5dig.	10%	20%		70%		20%	10%
D 10dig.			20%		20%		
	20dig.	10dig.	5dig.	0dig.	5dig.	10dig.	20dig.
	L			V			R

C-a-2 : Color : N/R

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage :

Replaceable light sources : See ECE Reg. No. 37-03

Non-replaceable light sources : N/R

C-a-5 : Mechanical :

The devices must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1 : Visibility :

Horizontal : 0dig. to 45dig. outboard form reference center
Vertical : 15dig. above and 15dig. below form reference center

Above area minimum intensity shall be not less than 0.05cd

C-b-2 : Electrical Connection :

N/R
(or same time lighted front position, side marker, endout-line marker and License plate lamp. ECE No. 48-01 S5.11)

ITEM 96-48

Vehicle alarm system

APEC Regulation Analysis Findings
Item No.96-48: Vehicle Alarm System

1. Only Chinese Taipei adopts a regulation for vehicle alarm systems.
   Chinese Taipei requires that no instrumentations have a defect and that the speedometer accurately functions, but specific requirements concerning construction and performance are not provided by Chinese Taipei.

Item No: 96-48 Vehicle Alarm System

A : Application : Passenger Vehicle

Economy	B	C	C-a	D	E
Economies	Structure Reg.	Performance	Part	Marking	Reference Std. Alternative Reg.
Australia					
Brunei					
Canada					
Chile					
China					
Hong Kong					
Indonesia					
Japan					
Korea					
Malaysia					
Mexico					
New Zealand					
Papua New Guinea					
Philippines					
Singapore					
Chinese Taipei	39-16	Instruments shall be in good working order Speedometers shall indicate vehicle speed accurately			
Thailand					
United States					
ECE					

96-48. Vehicle Alarm System

Chinese Taipei: Road Traffic Safety Rules (Article 39-16)		
ITEM	CONTENT	Illustration / Supplement
A : Application	Motor Vehicles	
B : Structure requirement	None	
C : Performance requirement	* Instruments shall be in good working order. * Speedometers shall indicate vehicle speed accurately. * Taximeter installed on the small passenger vehicles operated for reward shall be completely sealed up with lead.	

ITEM 96-49

Front and rear protective devices (bumpers)

APEC Regulation Analysis Findings
Item No. 96-49: Front and Rear Protective Devices (Bumpers)

1. The U.S.(Part 581), ECE and Korea have similar rigidity requirement, although ECE does not require a barrier crash requirement.

2. Canada requires an impact speed that is two times faster than that of the U.S.(Part 581).

3. Indonesia, Chinese Taipei and Thailand provide structural and equipment requirements.

4. Other member economies do not have bumper specifications.

5. A comparison of specific requirements for bumpers is as follows.

(1) Construction and equipment (B-a, B-b): Indonesia, Chinese Taipei and Thailand adopt simple requirements. Chinese Taipei and Thailand demand rigid bumpers, while Indonesia requires bumpers that do not protrude more than 50cm forward of the vehicle front.

(2) Longitudinal pendulum impact test (C-a-1): The U.S., ECE, Korea and Canada set forth requirements, with Canada specifying an impact speed of 8.0km/h and the remaining trio requiring an impact speed of 4.1km/h.

(3) Pendulum impact test on bumper corner (C-a-2): The U.S., ECE, Korea and Canada provide requirements, with Canada specifying an impact speed of 4.8km/h and the remaining trio requiring an impact speed of 2.5km/h.

(4) Barrier crash test (C-a-3): The U.S., Korea and Canada set forth requirements, with Canada specifying an impact speed of 8.0km/h and the remaining duo requiring an impact speed of 4.1km/h.

(5) Impact test evaluation criteria (C-a-4): The U.S., ECE, Korea and Canada adopt similar evaluation criteria. Only the U.S., however, evaluates the damage to the bumper as well.

(6) Overall, the bumper regulations of the U.S., ECE and Korea can be regarded as belonging to the same group.

Item No. 96-49 Bumper

A : Application Passenger Car:

Economy	B : Structure Reg.	B-a Part	B-b Installation
Australia			
Brunei			
Canada			
Chile			
China			
Hong Kong			
Indonesia	44-1993-70, 78, 79		Obligatory on front & rear front bumper protrusion in the front most Part < 50cm
Japan			
Korea			
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei	39-15	Bumpers shall be in good condition	
Thailand	22	Bumpers must be sturdy and safe	Obligatory on front & rear
U. S. A			
ECE			

Economy	C : performance	C-a : Part	C-a-1 :Longitudinal pendulum test
Australia			
Brunei			
Canada	CMVSS 215	Front & rear bumper	8 km/h, 2 times
Chile			
China			
Hong Kong			
Indonesia			
Japan			
Korea	KMVSS 93	Front & rear bumper	4.1km/h, Twice
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
U. S. A	49 CFR Part 581	Front & rear bumper	4km/h, 2 times
ECE	ECE R. 42	Front & rear bumper	4.1km/h-0 +0.25 2times

Economy	C-a-2 : Corner pendulum test	C-a-3 : Barrier test	C-a-4 :Criteria
Australia			
Brunei			
Canada	4.8 km/h Once	8 km/h Once	Lighting shall continue to operate. Hood, trunk, and doors shall be operable. No damage to cooling system. No damage to fuel system. No damage to exhaust system. No damage to chassis.
Chile			
China			
Hong Kong			
Indonesia			
Japan			
Korea	2.5km/h Once	4.1km/h Once	Lighting shall continue to operate. Hood, trunk, and doors shall be operable. No damage to fuel system. No damage to cooling system. No damage to exhaust system. No damage to chassis. No damage to pressure vessel
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
U. S. A	2.4 km/h Once	4 km/h Once	Lighting shall continue to operate. Hood, trunk, and doors shall be operable. No damage to fuel system. No damage to cooling system. No damage to exhaust system. No damage to chassis. No damage to pressure vessel. No damage to bumper.
ECE	2.5 km/h -0 +0.1 Once		Lighting shall continue to operate. Doors shall be operable. No damage to cooling system, exhaust system and chassis.

Economy	C -b : Installation	D : Marking	E : Reference Standard Alternative regulation
Australia			
Brunei			
Canada			
Chile			
China			
Hong Kong			
Indonesia			
Japan			
Korea			
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
U. S. A			
ECE			

CMVSS 215　BUMPERS

Canadian Standard (CMVSS 215)

ITEM	CONTENT	Illustration / Supplement
A : Application	This standard applies to passenger motor vehicles other than multipurpose passenger vehicles.	
B : Structure requirement	None	
C : Performance requirement	Each vehicle shall meet the damage criteria (1) to (9) when the following each impact tests are conducted. a) Longitudinal impact test impacted by a pendulum at 8 km/h (5 mph) b) Corner impact test impacted by a pendulum at 4.8 km/h (3 mph) c) Barrier impact test of forward and rearward at 8 km/h (5 mph) (Refer to D:Test method)	Test vehicle condition (1) The vehicle is at unloaded vehicle weight. (2) The front wheels are in the straight ahead position. (3) Tires are inflated to the vehicle manufacturers recommended pressure for the specified loading condition. (4) Brakes are disengaged and the transmission is in neutral. (5) Trailer hitches and license plate brackets are removed from the vehicle.
Damage criteria	(1) Each lamp or reflective device, except license plate lamps, free of cracks and meeting the visibility requirements of Section 108 or 108.1, whichever is applicable. (2) The aim of each headlamp to which section 108 is applicable adjustable to within the beam aim inspection limits specified in	

Canadian Standard (CMVSS 215)

ITEM	CONTENT	Illustration / Supplement
	SAE Standard J599, Lighting Inspection Code (May 1981). (3) The aim of each headlamp to which Section 108.1 of this Schedule is applicable adjustable to within the beam aim inspection limits required under that section. (4) The hood, trunk and doors operating in the normal manner. (5) No leaks in the fuel and cooling systems and no constricted fluid passages and all sealing devices and caps operating in the normal manner. (6) No leaks or constriction in the exhaust system. (7) The propulsion, suspension, steering and braking systems in adjustment and operating in the normal manner.	
D: Test method D-a) Longitudinal impact test	Every vehicle shall be impacted on the front surface and rear surface two times each with the impact line at any height between 500 mm (20 inches) and 400 mm (16 inches) in accordance with the following longitudinal impact test procedure: (1) for impacts at a height between 500 mm (20 inches) and 400 mm (16 inches), place the test device shown in Figure 2 to this section so that plane A is vertical and the impact line is horizontal at a height within the range;	Pendulum test conditions (1) The test device consists of a block with one side contoured as specified in Figures 1 and 2 with the impact ridge made of hardened steel.

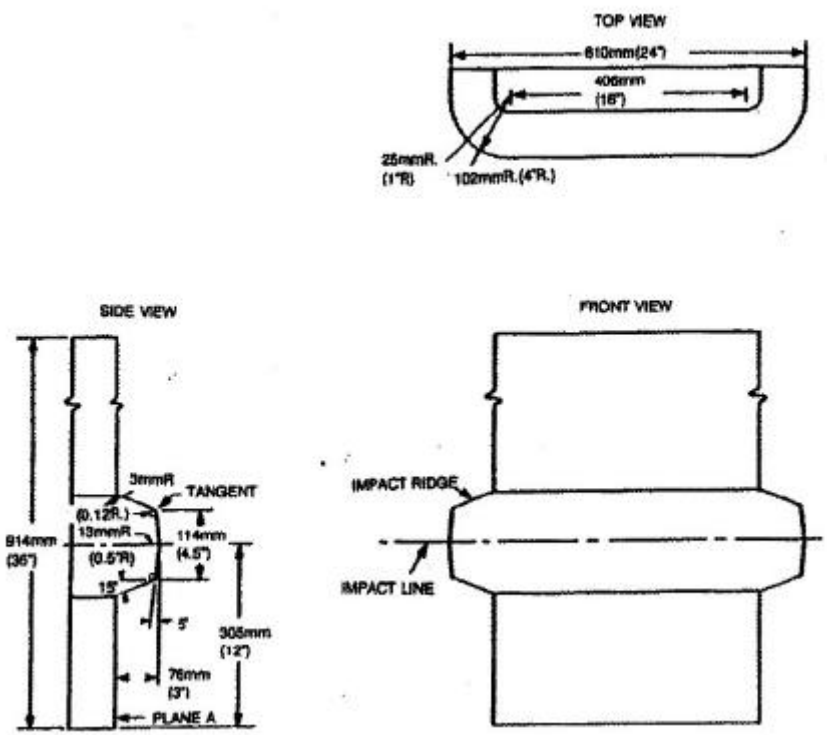
Canadian Standard (CMVSS 215)

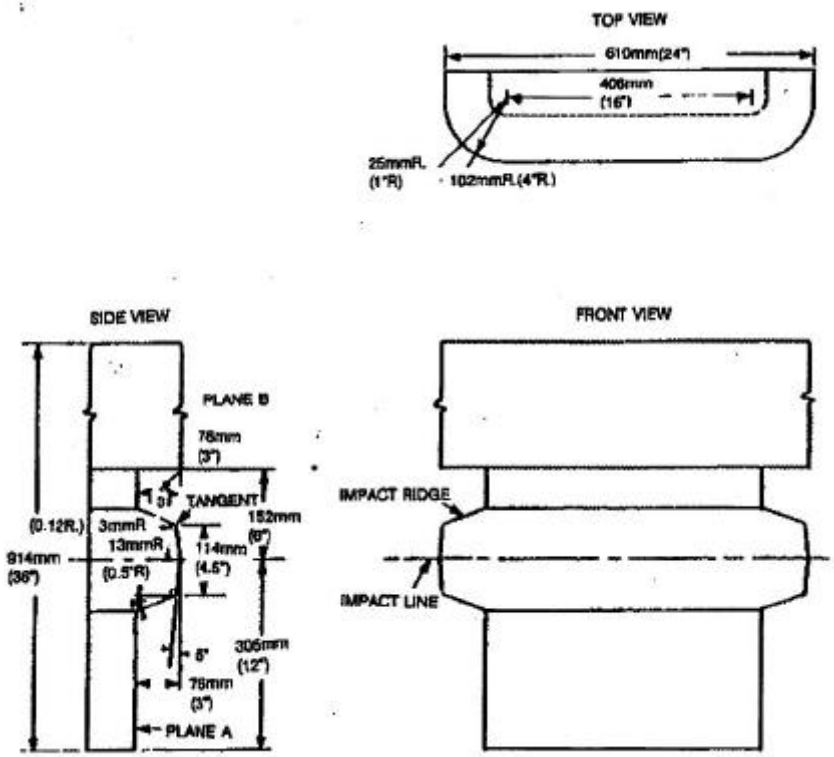
ITEM	CONTENT	Illustration / Supplement
D-a) Longitudinal impact test	(2) for each impact, position the test device so that the impact line is at least 50 mm (2 inches) apart in vertical direction from its position in any prior impact, unless the midpoint of the impact line with respect to the vehicle is to be positioned more than 300 mm (12 inches) apart laterally from its position in any prior impact; (3) for each impact, align the vehicle so that it touches, but does not move, the test device, with the vehicle's longitudinal centerline perpendicular to the plane that includes plane A of the test device and with the test device at any position inboard of the vehicle corner test position specified in Corner impact test; (4) move the test device away from the vehicle, then release it so that plane A remains vertical from release until the onset of rebound, and the arc described by any point on the impact line is constant, with a radius of not less than 3.3 m (11 feet), and lies in a plane parallel to the vertical plane through the vertical longitudinal centerline; (5) impact the vehicle with the test device moving at 8 km/h (5 mph) at the moment of impact; and (6) perform the impacts at intervals of not less than 30 minutes.	(2) With plane A vertical, the impact line shown in the Figures 1 and 2 is horizontal at the same height as the test device’s center of percussion. (3) The effective impacting mass of the test device is equal to the mass of the tested vehicle. (4) When impacted by the test device, the vehicle is at rest on a level, rigid concrete surface.

Canadian Standard (CMVSS 215)

ITEM	CONTENT	Illustration / Supplement
D-b) Corner impact test	Every vehicle shall be impacted on a front corner and a rear corner once each with the impact line at a height of 500 mm (20 inches) in accordance with the following procedure; (1) for an impact at a height of 500 mm (20 inches) place the test device shown in Figure 1 to this section so that plane A is vertical and the impact line is horizontal at the specified height; (2) for each impact align the vehicle so that a vehicle corner touches, but does not move, the lateral center of the test device, with plane A of the test device forming an angle of 60 degrees with a vertical longitudinal plane; (3) move the test device away from the vehicle, then release it so that plane A remains vertical from release until the onset of rebound, and the arc described by any point on the impact line is constant, with a radius of not less than 3.3 m (11 feet), and lies in a vertical plane at an angle of 30 degrees to the vertical plane through the vehicle's longitudinal centerline; and (4) impact each corner with the test device moving at 4.8 km/h (3 mph) at the moment of impact	
D-c) Barrier Test	(1) At the onset of a barrier impact, the vehicle's engine is operating at idling speed in accordance with the manufacturer's	

Canadian Standard (CMVSS 215)		
ITEM	CONTENT	Illustration / Supplement
	specifications. (2) After pendulum-type tests, every vehicle is impacted into a fixed-collision barrier that is perpendicular to the line of travel of the vehicle, while traveling longitudinally forward at 8 km/h (5 mph), then longitudinally rearward at 8 km/h (5 mph).	

Canadian Standard (CMVSS 215)		
ITEM	CONTENT	Illustration / Supplement
	Figure 1 	

Canadian Standard (CMVSS 215)		
ITEM	CONTENT	Illustration / Supplement
	Figure 2 	

49. Front and rear protective devices (bumpers)

Indonesia: Vehicles and Drivers (Government Regulation 44/1993, Paragraph 11, Article 70, 78, 79)		
ITEM	CONTENT	Illustration / Supplement
A : Application	The auxiliary components of a motorised vehicle as referred to in Article 3 sub-article (2) letter a.	
B : Structure requirement	* Bumpers shall be fitted: a. on the front and back of a passenger car and a bus; b. in front for a cargo van. * The front bumper must not protrude by over 50 cm in the frontmost part of the body of a motorised vehicle.	* Further stipulations on auxiliary components of a motorised vehicle shall be laid down in a Ministerial Decree (Article 79)
C : Performance requirement	None	

49. Front and rear protective devices (bumpers)

Korea: The regulation of the motor vehicle safety standards (Article 93 / Bumper)

ITEM	CONTENT	Illustration / Supplement
A : Application	Each passenger vehicle (except for geep-type vehicles and mini passenger vehicle)	
B : Structure requirement	None	
C : Performance requirement 1) Requirements	* Each passenger vehicles (except for geep-type vehicles and mini passenger vehicle) shall meet each of the following requirements when the test prescribed in this Article is conducted. 1. The lighting system, except registration plate lamps, shall have no cracks and breakages, and shall meet the requirements of Article 38 para.1 item 3 and 6, Article 39 item 6, Article 42 item 4, Article 43 para. 1 item 6 and Article 44 item 2. However, this requirement does not apply to auxiliary lighting systems installed on the bumper. 2. The doors and the engine and trunk hoods shall be opened and closed normally. 3. The fuel and cooling systems shall have no leaks and constricted fluid passages and all sealing device and caps shall operate normally. 4. The exhaust system shall have no leaks of emission gas and the exhaust pipe system shall have no constricted passages. 5. The power train, suspension system and brake systems shall operate normally. 6. The exterior protection system which uses gas or fluid to absorb impact energy shall have no leakages of gas or fluid because of damages to the pressure vessel. 7. The acting force on the area other than the impact areas of the	Article 38 para.1 item 3: Driving beam aiming requirements item 6: Head lamp visibility requirements Article 39 item 6: Backup lamp observation mark visibility requirements Article 42 item 4: Tail lamp illumination area requirements Article 43 para. 1 item 6: Stop lamp illumination area requirements Article 44 item 2: Turn signal lamp illumination area requirements

49. Front and rear protective devices (bumpers)

Korea: The regulation of the motor vehicle safety standards (Article 93 / Bumper)

ITEM	CONTENT	Illustration / Supplement
	test device shall not exceed 905 kg during the pendulum test. 8. The exterior surfaces and parts shall have no permanent deformations, no separations of surface materials of paint and protective materials from the surface 30min. after completion of each test, except where such damages occur to the bumper face bar and the component s and associated fasteners that directly attach the bumper face bar to the chassis frame.	
C. Performance Requirement 2) Tests	1. Each of the front and rear bumpers of the test vehicle is impacted twice by the pendulum equal to the curb weight of the test vehicle at a speed of 4.1 km/h and each corner of the front and rear bumpers is impacted once by the pendulum equal to the curb weight of the test vehicle at a speed of 2.5 km/h. 2. The vehicle shall undergo the front and rear fixed collision battier crash tests at speed of 4.1 km/h.	

49. Front and rear protective devices (bumpers)

Chinese Taipei: Road Traffic Safety Rules (Article 39-15)		
ITEM	CONTENT	Illustration / Supplement
A : Application	Motor Vehicles	
B : Structure requirement	* Bumpers shall be in good condition.	
C : Performance requirement	None	

49. Front and rear protective devices (bumpers)

Thailand: Ministerial Regulations (No. 22, Article 2)

ITEM	CONTENT	Illustration / Supplement
A : Application	Motor cars	
B : Structure requirement	* Bumpers on both at the front and at the rear, must be sturdy and safe. * In case of a motorcycle, there may be only the rear bumper. * In case of private truck or private motor car carrying more than 7 passengers, there may be only the front bumper.	
C : Performance requirement	None	

PART 581 BUMPER STANDARD

US Standard (PART 581)

ITEM	CONTENT	Illustration / Supplement
A : Application	This standard applies to passenger motor vehicles other than multipurpose passenger vehicles.	
B : Structure requirement	None	
C : Performance requirement	Each vehicle shall meet the damage criteria (1) to (9) when the following each impact tests are conducted. a) Corner impact test impacted by a pendulum at 1.5 mph b) Longitudinal impact test impacted by a pendulum at 2.5 mph c) Barrier impact test of forward and rearward at 2.5 mph (Refer to D:Test method)	Test vehicle condition. (1) The vehicle is at unloaded vehicle weight. (2) The front wheels are in the straight ahead position. (3) Tires are inflated to the vehicle manufacturers recommended pressure for the specified loading condition. (4) Brakes are disengaged and the transmission is in neutral. (5) Trailer hitches, license plate brackets, and headlamp washers are removed from the vehicle. Running lights, fog lamps, and equipment mounted on the bumper face bar are removed from the vehicle if they are optional equipment.
Damage criteria	(1) Each lamp or reflective device except license plate lamps shall be	

US Standard (PART 581)

ITEM	CONTENT	Illustration / Supplement
	free of cracks and shall comply with applicable visibility requirements of S4.3.1.1 of Standard No. 108. The aim of each headlamp shall be adjustable to within the beam aim inspection limits specified in Table 2 of SAE Recommended Practice J599b, July 1970, measured with a mechanical aimer conforming to the requirements of SAE Standard J602a, July 1970. (2) The vehicle's hood, trunk, and doors shall operate in the normal manner. (3) The vehicle's fuel and cooling systems shall have no leaks or constricted fluid passages and all sealing devices and caps shall operate in the normal manner. (4) The vehicle's exhaust system shall have no leaks or constrictions. (5) The vehicle's propulsion, suspension, steering, and braking systems shall remain in adjustment and shall operate in the normal manner. (6) A pressure vessel used to absorb impact energy in an exterior protection system by the accumulation of gas pressure or hydraulic pressure shall not suffer loss of gas or fluid accompanied by separation of fragments from the vessel. (7) The vehicle shall not touch the test device, except on the impact	

US Standard (PART 581)

ITEM	CONTENT	Illustration / Supplement
	ridge shown in Figures 1 and 2, with a force that exceeds 2000 pounds on the combined surfaces of Planes A and B of the test device.	
Damage criteria	(8) The exterior surfaces shall have no separations of surface materials, paint, polymeric coatings or other covering materials from the surface to which they are bonded, and no permanent deviations from their original contours 30 minutes after completion of each pendulum and barrier impact, except where such damage occurs to the bumper face bar and the components and associated fasteners that directly attach the bumper face bar to the chassis frame. (9) Except as provided in above (8) there shall be no breakage or release of fasteners or joints.	
D: Test method D-a) Corner impact test	(1) Impact a front corner and a rear corner of the vehicle once each with the impact line at a height of 20 inches and impact the other front corner and the other rear corner once each with the impact line at any height from 16 to 20 inches, inclusive, in accordance with the following procedure. (2) For an impact at a height of 20 inches, place the test device shown in Figure 1 so that the Plane A is vertical and the impact line is horizontal at the specified height.	Pendulum test conditions (1) The test device consists of a block with one side contoured as specified in Figure 1 and Figure 2 with the impact ridge made of A1S1 4130 steel hardened to 34 Rockwell "C". The impact ridge and the surfaces in Planes A and B of the test device are

US Standard (PART 581)

ITEM	CONTENT	Illustration / Supplement
	(3) For an impact at a height between 16 inches and 20 inches, place the test device shown in Figure 2 so that Plane A is vertical and the impact line is horizontal at a height within the range.	finished with a surface roughness of 32 as specified by SAE
D-a) Corner impact test	(4) Align the vehicle so that a vehicle corner touches, but does not move, the lateral center of the test device with Plane A of the test device forming an angle of 60 degrees with a vertical longitudinal plane. (5) Move the test device away from the vehicle, then release it to impact the vehicle. (6) Perform the impacts at intervals of not less than 30 minutes .	Recommended Practice J449A June 1953. Front the point of release of the device until the onset of rebound, the pendulum suspension system holds Plane A vertical, with the arc described by any point on the impact line lying in a vertical plane (for Longitudinal Impact Test, longitudinal, for Corner Impact Test, at an angle of 30' to a vertical longitudinal plane) and having a constant radius of not less than 11 feet. (2) With Plane A vertical, the impact line shown in Figures 1 and 2 is horizontal at the same height as the test device's center of percussion. (3) The effective impacting mass of

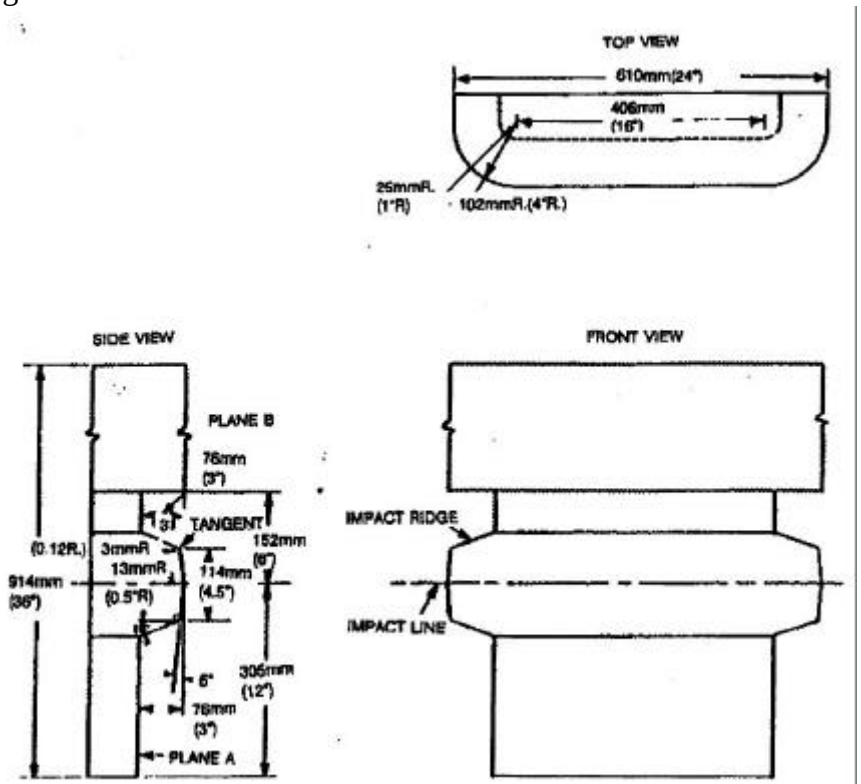
US Standard (PART 581)

ITEM	CONTENT	Illustration / Supplement
		the test device is equal to the mass of the tested vehicle . (4) When impacted by the test device, the vehicle is at rest on a level rigid concrete surface.
D-b) Longitudinal Impact Test	(1) Impact the vehicle's front surface and its rear surface two times each with the impact line at any height from 16 to 20 inches, inclusive, in accordance with the following procedure . (2) For impacts at a height of 20 inches, place the test device shown in Figure 1 so that Plane A is vertical and the impact line is horizontal at the specified height . (3) For impacts at a height between 20 inches and 16 inches, place the test device shown in Figure 2 so that Plane A is vertical and the impact line is horizontal at a height within the range. (4) For each impact, position the test device so that the impact line is at least 2 inches apart in vertical direction from its position in any prior impact, unless the midpoint of the impact line with respect to the vehicle is to be more than 12 inches apart laterally from its position in any prior impact. (5) For each impact, align the vehicle so that it touches, but does not	

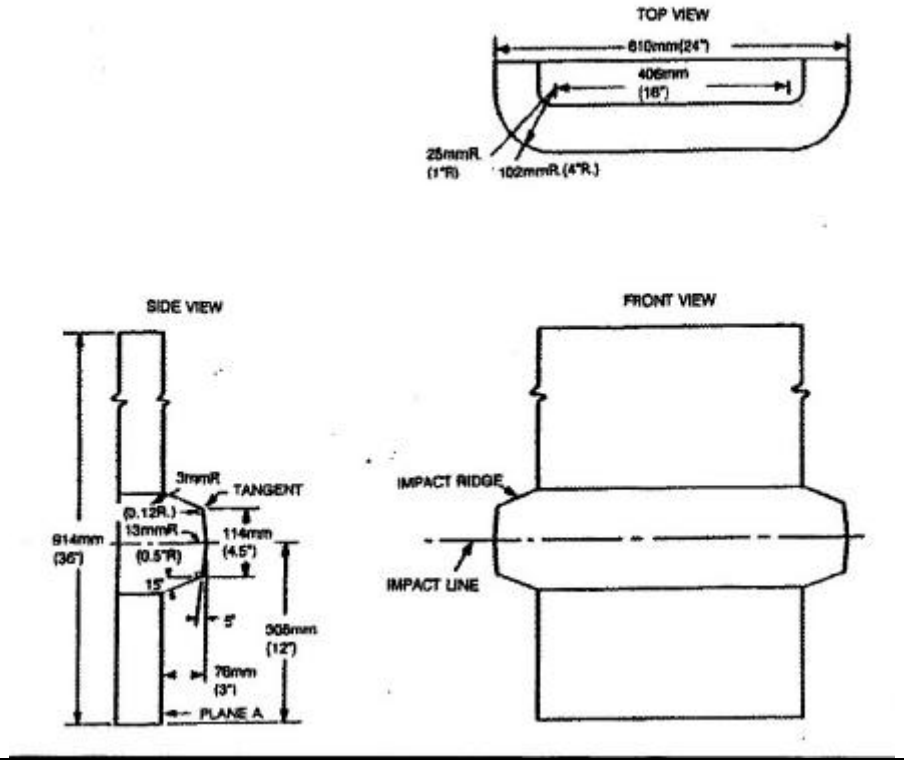
US Standard (PART 581)

ITEM	CONTENT	Illustration / Supplement
	move, the test device, with the vehicle's longitudinal centerline perpendicular to the plane that includes Plane A of the test device and with the test device inboard of the vehicle corner test positions specified in the Corner impact test. (6) Move the test device away from the vehicle, then release it to impact the vehicle. (7) Perform the impacts at intervals of not less than 30 minutes.	
D-c) Barrier Test	(1) At the onset of a barrier impact, the vehicle's engine is operating at idling speed in accordance with the manufacturer's specifications. (2) Vehicle systems that are not necessary to the movement of the vehicle are not operating during impact. (3) After pendulum-type tests, every vehicle is impacted into a fixed-collision barrier that is perpendicular to the line of travel of the vehicle, while traveling longitudinally forward at 2.5 mph, then longitudinally rearward at 2.5 mph.	

US Standard (PART 581)

ITEM	CONTENT	Illustration / Supplement
	Figure 1 	

PART 581 BUMPER STANDARD

US Standard (PART 581)		
ITEM	CONTENT	Illustration / Supplement
	Figure 2 	

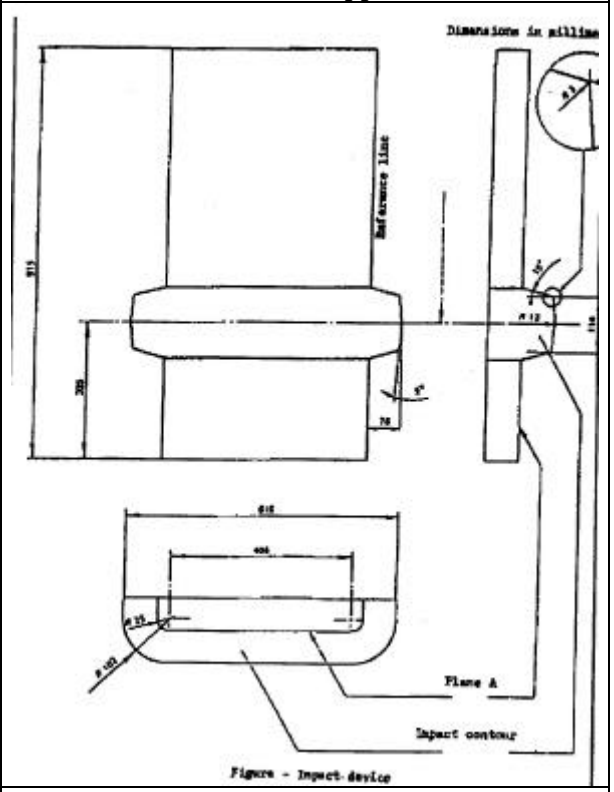
ECE Regulation (ECE 42)

ITEM	CONTENT	Illustration / Supplement
A : Application	This Regulation applies to the behavior of certain parts of the front and rear structure of passenger cars when involved in a collision at low speed.	
B : Structure requirement	None	
C : Performance requirement C-a : Performance of vehicle 1) Requirements	(Regulation) *After each impact test the vehicle shall meet the following requirements: *The lighting and signaling devices shall continue to operate correctly and to remain visible. Should the adjustment of the factory-fitted lighting devices be disturbed, it may be corrected to conform to the required specifications, provided this can be done by the normal means of adjustment. Bulbs may be replaced in the event of filament failure. *The vehicle's bonnet (hood), boot lid (trunk lid) and doors shall be operable in the normal manner; in addition, the side doors of the vehicle shall not be able to open under the effect of the impact. *The vehicle's fuel and cooling systems shall have neither leaks nor constricted fluid passages which prevent normal functioning; their sealing devices and caps shall be operable in the normal manner. *The vehicle's exhaust system shall not suffer any damage or displacement which would prevent its normal function. *The vehicle's propulsion, suspension (including tyres), steering and braking systems shall remain in adjustment and shall operate in a normal manner.	
C-a : Performance of vehicle 2) Longitudinal impact test	(Test method) *This test consists of two impacts on the front surface and two impacts on the rear surface of the vehicle. On each surface one impact is made with the vehicle under "unladen weight", and the	"Unladen weight" means the weight of the vehicle in running order, unoccupied and unladen but complete with fuel, coolant, lubricant, tools and a spare wheel (if

ECE Regulation (ECE 42)

<table>
<tr><th>ITEM</th><th>CONTENT</th><th>Illustration / Supplement</th></tr>
<tr><td></td><td>other is made with the vehicle under “laden test weight”.
For the impacts on the front and rear surfaces, the choice of location of the impactor for the first impact is free, but for the second impact the median plane of the impactor shall be at a distance at least 300 mm from the first, provided that during these impacts the extremeties of the impactor do not pass outside a zone defined by two planes parallel to the longitudinal median plane and passing through the corners of the vehicle.
The impactor shown in the figure should be placed so that plane A is vertical and the reference line is horizontal at the reference height of 445 mm.
The vehicle should be aligned so that a point between the vehicle corners touches but does not move, the impactor, the longitudinal median plane of the vehicle being perpendicular to plane A of the impactor.
The Vehicle should be impacted at a speed of 4 km/h -0 +0.25</td><td>provided as standard equipment by the vehicle manufacturer).
“Laden test weight” means the weight of the vehicle when it is loaded to “Unladen weight” conditions plus the weight of the passengers (taking 75 kg per passenger) distributed as follows:
<table>
<tr><th>Number of seating positions</th><th>Number of passengers</th><th>Distribution</th></tr>
<tr><td>2 and 3</td><td>2</td><td>2 in the front seats</td></tr>
<tr><td>4 and 5</td><td>3</td><td>2 in the front seats
1 in the back seat</td></tr>
<tr><td>6 and 7</td><td>4</td><td>2 in the front seats
2 in the rearmost seat</td></tr>
<tr><td>8 and 9</td><td>5</td><td>2 in the front seats
3 in the rearmost seat
When the rear row of seats has only 2 seating positions, one person shall be on the second row from the rear</td></tr>
</table></td></tr>
<tr><td>C-a : Performance of vehicle
3) Corner impact test</td><td>(Test method)
*This test consists of an impact at one front corner and an impact at one rear corner of the vehicle, which is at unladen weight, and an impact at the other front corner and the other rear corner with the vehicle at laden test weight.
*The impactor shown in the figure should be placed so that plane A</td><td>Figure of Impact device</td></tr>
</table>

ECE Regulation (ECE 42)

ITEM	CONTENT	Illustration / Supplement
	is vertical and the reference line is horizontal and at the reference height of 445 mm. *The vehicle should be aligned so that a corner of the vehicle touches the impactor without moving it. In addition the following conditions shall be met: (a) plane A of the impactor shall make an angle of 60 ± 5° with the longitudinal median plane of the vehicle; (b) the point of the first contact shall be in the vertical median plane of the impactor (within a tolerance of ± 25 mm). *The vehicle should be impacted at a speed of 2.5 km/h -0 +0.1.	 Figure - Impact device
C-a : Performance of vehicle 4) Test condition	(Testing ground) *The test area shall be large enough to accommodate the impactor (striker) propulsion system and to permit after impact displacement of the vehicle impacted and installation of the test equipment. the vehicle shall be placed on a horizontal and level rigid smooth surface.	

ECE Regulation (ECE 42)

ITEM	CONTENT	Illustration / Supplement
C-a : Performance of vehicle 4) Test condition	(State of the vehicle) *The vehicle shall be at rest. *The front wheels shall be in the straight-ahead position. *The tyres shall be inflated to the pressure recommended by the vehicle manufacturer. *The brakes shall be disengaged and the transmission control shall be in neutral position. *Vehicles equipped with hydropneumatic, hydraulic or pneumatic suspension or a device for automatic leveling according to load shall be tested in the normal running conditions specified by the manufacturer.	
	(Impactor (striker)) *The impactor shall be of rigid construction, the impact contour being of hardened steel. *The impacting surface shall conform to the diagram in the figure. *The effective mass shall be equal to the mass corresponding to the “unladen weight” of the vehicle to be tested. *With plane A of the impactor vertical, the reference line shall be horizontal. *The first contact of the impactor with the vehicle shall be by the impact contour on the protective device. In the two vehicle-loading conditions the protective device between the corners, shall be intersected by the horizontal plane passing through the reference line. *The reference height is 445 mm	“Vehicle corner” means the vehicle’s point of contact with a tangent vertical plane which makes an angle of 60° with the longitudinal median plane of the vehicle.
	(Propulsion of the impactor) *The impactor may either be secured to a carriage (moving barrier) or form part of a pendulum.	

ECE Regulation (ECE 42)

ITEM	CONTENT	Illustration / Supplement
C-a : Performance of vehicle 4) Test condition	(Special provisions applicable where a moving barrier is used) *If the impactor is secured to a carriage (moving barrier) by a restraining element, the latter must be rigid and be incapable of being deformed by the impact; the carriage shall at the moment of impact be capable of moving freely and no longer be subject to the action of the propelling device.	
	(Special provisions applicable where a pendulum is used) *The distance between the pivot and the center of percussion shall be at least 3.3 m. The reference line shall coincide with the center of percussion. *Plane A of the pendulum shall remain parallel with its axis of rotation throughout the test. *In the case of a parallelogram-suspended pendulum the trajectory described by any point on the reference line shall be constant with a radius of at least 3.3 m.	
D: Label marking requirement	None	

ITEM 96-50

Warning devices (audible)

APEC Regulation Analysis Findings
Item No. 96-50: Warning Devices (Audible)

1. People's Republic of China and ECE have similar regulations for audible warning devices. Further, People's Republic of China accepts 70/388/EEC Annex I as an alternative.

2. Japan and Korea adopt similar requirements, although they employ different numerical units for sound pressures.

3. Indonesia, New Zealand, Papua New Guinea and Chinese Taipei have their unique sound pressure requirements.

4. Australia, Brunei Darussalam, Hong Kong, Philippines and Singapore merely provide sound tone specifications.

5. Canada, Chile, Malaysia, Mexico, Thailand and U.S. do not adopt any requirements.

6. A comparison of specific requirements for audible warning devices is as follows.

(1) Parts (B-a): Australia, Brunei Darussalam, Hong Kong, Indonesia, Japan, New Zealand and Singapore prohibit the use of sirens, bells, etc.

(2) Installation (B-b): Australia, Brunei Darussalam, Hong Kong, Indonesia, Japan, Korea, New Zealand, Papua New Guinea, Philippines, Singapore and Chinese Taipei require that vehicles be equipped with an audible warning device.

(3) Performance (C): Australia, People's Republic of China, Indonesia, Japan, Korea, New Zealand, Papua New Guinea, Chinese Taipei and ECE adopt a performance requirement.

(4) Tones of parts (C-a): Australia, People's Republic of China, Papua New Guinea and ECE have a tone requirement. The tones specified by these member economies are steady and continuous, and similar to each other. Other tones are prohibited by these member economies.

(5) Sound pressures of parts (C-a-1): People's Republic of China and ECE have similar requirement. Indonesia and Papua New Guinea adopt only vague requirements.

(6) Durability test on parts (C-a-3): Only People's Republic of China and ECE provide this test and similar requirements.

(7) Tones of mounted audible warning devices (C-b): Only Japan adopt this requirement, which is similar to other member economies' requirements for the tones of parts.

(8) Sound pressures of mounted audible warning devices (C-b- 1): People's Republic of China and ECE are similar in demand a sound pressure of 93dB(A) or more. Japan and Korea adopt mutually similar requirements, although their numerical units differ (Japan's dB(C), Korea's dB). Indonesia, New Zealand and Chinese Taipei have different requirements.

(9) Regulations for audible warning devices can be divided into the following groups:

* ECE group - People's Republic of China, ECE
* Japan group - Japan, Korea

Item No. 96-50 Warning Device(Audible)

A : Application Passenger Car, Commercial vehicle and motor cycle

Economy	B : Structure Reg.	B-a Part	B-b Installation
Australia	ADR 42, 21	Siren, repeater horn, bell etc. prohibited	Obligatory
Brunei	RTR 20	Siren, bell, gong, multitoned	Obligatory
Canada			
Chile			
China	GB 1572-1995		
Hong Kong	RTR 38	Siren, bell, gong, multitoned horn etc. prohibited	Obligatory
Indonesia	GR 44-1993-70, 74, 75	Siren prohibited	Obligatory
Japan	SRRV 43	Siren and bell prohibited	Obligatory
Korea	KMVSS 53	Siren and bell prohibited	Obligatory
Malaysia			
Mexico			
New Zealand	TR 69	Siren, bell, whistle prohibited	Obligatory
Papua New Guinea	MTR 125K		Obligatory in a position readily operated by the driver
Philippines	Ao-91-005S.8-d-AO, S. 34-B1 ra		
Singapore	RTR C-24	Sirens, bells, gongs etc. prohibited	Obligatory
Chinese Taipei	RTSR 39-11		Obligatory
Thailand			
U. S. A			
ECE	ECE 28		

Economy	C: Performance	C-a Parts test sound	C-a-1 Parts test sound pressure
Australia	ADR 42.21	Constant amplitude and frequency characteristics	
Brunei			
Canada			
Chile			
China	GB1572-1995	Continuous	105 dB(A) - 118 dB(A)
Hong Kong			
Indonesia	GR 44/1993-70, 74, 75		Audible from a distance of 60m
Japan	SRRV 43		
Korea	KMVSS 53		
Malaysia			
Mexico			
New Zealand	TR 69		
Papua New Guinea	MTR 125K	Not strindend, continuous and uniform	Audible from a distance of not less than 100m
Philippines			
Singapore			
Chinese Taipei	RTSR 39-11	RTSR 39-11	
Thailand			
U. S. A			
ECE	ECE R.28	Continuous and uniform	Not exceed 105 dB(A)

Economy	C-a-2: Distance of the microphone from the device	C-a-3 : Endurance test	C-b :Vehicle test sound
Australia			
Brunei			
Canada			
Chile			
China	2m	50,000 times, sound in 1 second followed by interval in 4 seconds	
Hong Kong			
Indonesia			
Japan			Continuous sound level and unchangeable
Korea			Continuous sound in the same tone
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
U. S. A			
ECE	2±0.01m	50,000 times, sound in 1 second followed by interval in 4 seconds	

Economy	C-b-1: Vehicle test sound pressure	C-b-2 : Distance of the microphone from the vehicle	D: Marking	E: Reference Standard
Australia				
Brunei				
Canada				
Chile				
China	Not less than 93dB(A)	7m		70/388/EEC Annex 1
Hong Kong				
Indonesia	Not less than 90dB(A) and not more than 118 dB(A)	2m		
Japan	90dB(C) of more and 115dB(C) or less	2m		
Korea	Not less than 90 dB but not more than 115 dB in the same level	2m		
Malaysia				
Mexico				
New Zealand	Audible from a distance of not less than 100m			
Papua New Guinea				
Philippines				
Singapore				
Chinese Taipei	Not less than 70 phone A and not more than 90 phone A	2m		
Thailand				
U. S. A				
ECE	Not less than 93 dB(A) and not exceed 122 dB (A)	7m	Approval mark on the parts	

50. Warning devices (audible)

Australia: Australian Design Rule 42/02 General Safety Requirements (Clause 42.21 / WARNING DEVICES - AUDIBLE)

ITEM	CONTENT	Illustration / Supplement
A : Application	All motor vehicles	
B : Structure requirement 1) Warning devices	* Every motor vehicle shall be fitted with a least one warning device capable of giving sufficient audible warning of the presence of the vehicle. * A warning device may be powered by any energy source including compressed air.	
2) Sirens etc.	* No siren, repeater horn, bell, exhaust whistle or compression whistle or other device capable of producing a sound resembling that produced by any such siren, repeater horn, bell or whistle shall be attached to a motor vehicle other than an emergency community service vehicle.	Repeater horn: any device which generates an audible sound (to be emitted) alternating between different tones or frequencies on a regular time cycle
3) Reversing alarms	* A reversing alarm may be fitted which when and only when reverse gear is selected emits an intermittent audible signal on a regular time cycle.	
C : Performance requirement 1) Warning devices	* A warning device shall give an audible signal having constant amplitude and frequency characteristics.	
2) Reversing alarms	* A reversing alarm shall not emit a signal louder than is necessary to warn persons of the proximity of the reversing vehicle.	

50. Warning devices (audible)

Brunei: Road Traffic Regulations (Article 20 / Horns)		
ITEM	CONTENT	Illustration / Supplement
A : Application	Every vehicle other than an animal or hand-drawn vehicle	
B : Structure requirement 1) Warning devices 2) Sirens etc.	 * Every vehicle other than an animal or hand-drawn vehicle shall be fitted with an instrument capable of giving audible and sufficient warning of its approach or position. * No such instrument shall consist of a gong or siren or bell or multitoned horn, except in the case of a motor vehicle used solely for the fire brigade, ambulance or police purposes.	
C : Performance requirement	None	

50. Warning devices (audible)

People's Republic of China : GB1572-1995

ITEM	CONTENT	Illustration / Supplement
A : Application	*Audible warning devices (AWD) intended for fitting to motor vehicles	
B : Structure requirement	None	
C : Performance requirement C-a: Performance of AWD 1) Sound characteristics and sound-pressure level	(Regulation) *The AWD shall emit a continuous sound. *The sound-pressure level measured at a distance of 2 m from AWD shall be 105 dB(A) - 118 dB(A). (Test method) <u>Test area</u> * The AWD should be tested in an anechoic environment. It may be tested in a semi-anechoic chamber or in an open space. (Ambient noise and wind noise shall be at least 10dB(A) below the noise being measured). * The radius of center area where the measurements are made shall be not less than 20m. * The center area is practically level, surfaced with concrete, asphalt or similar material, and not covered with snow, glass, light soil or ashes. *Measurements shall be carried out in fine weather. * No person other than observer taking the readings from the apparatus may remain near the AWD or the microphone. * Fluctuations of the pointer unrelated to the characteristics of the general sound level shall be ignored in taking readings. <u>Measuring instruments</u> * A sound level meter conforming to the specifications of IEC Publication No. 179 shall be used. * The measurement of the overall sound-pressure level shall be made using the weighting curve A. * Electric measuring devices shall have class 0.5 precision.	* Open space with a radius of 50m is accepted.

50. Warning devices (audible)

People's Republic of China : GB1572-1995

ITEM	CONTENT	Illustration / Supplement
C-a : Performance of AWD 1) Sound characteristics and sound level	Test voltages and resistances *The AWD shall be supplied with current, as appropriate, at the following voltages and resistances (including the resistances of leads and plugs), unless otherwise specified: Nominal voltage Supply voltage Resistance 12 V 13.0 V 0.10 _ 24 V 26.0 V 0.20 _ Mounting of the AWD on a support *The AWD under test shall be mounted rigidly, by means of the equipment indicated by the manufacturer, on a metal support whose mass is at least ten times that of the AWD under test and not less than 15 kg. Measurement of continuous sound * The AWD is operated for 30 seconds continuously. Measurement of sound-pressure level *The height of microphone shall be 1.2 m. from the ground. The axis of maximum sensitivity of the microphone shall coincide with the direction of the maximum sound level of the device. *The microphone shall be so placed that its diaphragm is at a distance of 2 m from the device.	
C-a : Performance of AWD 2) Time lapse	(Regulation) * The time lapse between the moment when the AWD is actuated and the moment when the sound reaches 105 dB(A) shall not exceed 0.2 second. (Test method) * Test area, Measuring instruments, Test voltages and resistances and Mounting of the AWD on a support shall be the same as those specified in C-a-1). * Ambient temperature shall be 23 ± 5 °C.	

50. Warning devices (audible)

People's Republic of China : GB1572-1995ITEM		
ITEM	CONTENT	Illustration / Supplement
C-a : Performance of AWD 3) Endurance	(Regulation) * AWD shall endure 50,000 times of operations. *AWD which has been subjected to endurance test shall meet the following requirements: * It shall meet the sound-pressure level requirement (2nd regulation of C-a-1)). * It shall meet the time lapse requirement (C-a-2)) * With the supply voltage varying between 115% and 95% of the rated voltage, its sound-pressure level in the frequency band 1,800 to 3,550 Hz, measured at a distance of 2 m from the AWD, shall be greater than that of any component of a frequency above 3,550 Hz and in any event equal to or greater than 105 dB(A). (Test method) * Test area, Measuring instruments, Test voltages and resistances and Mounting of AWD on a support are the same as those specified in C-a-1). *The ambient temperature shall be not less than 15°C - 30°C. * During the test, the AWD shall be ventilated by an air current having a speed of approximately 10 m/sec. Endurance inspection *The AWD shall be supplied with current at the rated voltage and resistances, and operated 50,000 times, in each time for one second followed by an interval of four seconds. *If, after the AWD has been operated 25,000 times, the sound-level characteristics are no longer the same as before the test, the AWD may be adjusted. After being operated 50,000 times, the AWD may be adjusted again. Frequency spectrum inspection * Inspection shall be conducted in an anechoic chamber. * Mass of a support shall be at least ten times of AWD under test and not less than 30 kg.	*If the test is made in an anechoic chamber, the chamber shall be large enough to ensure normal dispersal of the heat released by the warning device during the test.

50. Warning devices (audible)

People's Republic of China : GB1572-1995ITEM		
ITEM	CONTENT	Illustration / Supplement
C-b: Specifications for audible signals of motor vehicles	(Regulation) *The maximum sound-pressure level of the audible signal of vehicle, measured at a distance of 7m from the vehicle, shall be at least equal to 93 dB(a). (Test method) * Measuring instruments and Test voltages and resistences shall be the same as those specified in C-a-1). * AWD shall be fitted on the prescribed position of a vehicle. * The vehicle shall be placed on an open site, on ground as smooth as possible with its engine stopped. * A microphone shall be placed at a distance of 7m to the front of the vehicle. * The maximum sound-pressure level shall be sought within the range of 0.5 and 1.5 m above the ground.	

50. Warning devices (audible)

Hong Kong: Road Traffic (Construction and Maintenance of Vehicles) Regulations (Article 38 / Warning instruments)

ITEM	CONTENT	Illustration / Supplement
A : Application	Every motor vehicle	
B : Structure requirement 1) Warning devices 2) Sirens etc.	 * Every motor vehicle shall be fitted with an instrument capable of giving audible and sufficient warning of its approach or presence. * No motor vehicle shall be fitted with the below-mentioned instruments, unless authorized by the Commissioner by permit in writing and any such permit shall be subject to such conditions as he may specify: (a) a gong or bell; (b) a siren; (c) a multi-toned horn giving a succession of different notes; (d) a two-tone horn; or (e) a sound producing device giving an unduly harsh, shrill, loud alarming noise.	
C : Performance requirement	None	

50. Warning devices (audible)

Indonesia: Vehicles and Drivers (Government Regulation No. 44/1993, Paragraph 11, Article 70, 74, 75) & Decision of the Director General of Land Communication No. KM8 of 1980

ITEM	CONTENT	Illustration / Supplement
A : Application	The auxiliary components of a motorised vehicle as referred to in Article 3 sub-article (2) letter a.(Article 70 of No.44)	Article 3 (2) a.: The construction of a trailer and a linked car shall comprise: a. a base, which includes the chassis of the base, a wheel system, a brake system, a lights and light reflectors, as well as auxiliary components.
B : Structure requirement 1) Warning devise	* The auxiliary components of a motorised vehicle as referred to in Article 3 sub-article (2) letter a. comprise a horn. (Article 70 of No.44)	* Further stipulations on auxiliary components of a motorised vehicle shall be laid down in a Ministerial Decree (Article 79)
2) Sirens etc.	* The sound warning in the form of a siren may be fitted only on the following motorised vehicles: a. those used by certain law-enforcing officers; b. those used by a fire brigade; c. those used to tackle disasters; d. ambulances; e. those used by red-cross units; f. hearses. (Article 75 of No.44)	
C : Performance requirement	* A horn must be able to produce a sound which in a normal condition shall be audible from a distance of 60m. (Article 74 of No.44) * Sound level of klaxon of motor vehicles shall be not less than 90dB(A) and not more than 118dB(A). (Article 7 of KM8) * The sound level shall be measured 2m to the front of the vehicle, at the place where the influence of the surroundings on sound level is the least level and have no acoustic reflection. (Article 7 of KM8)	* Further stipulations on auxiliary components of a motorised vehicle shall be laid down in a Ministerial Decree (Article 79)

50. Warning devices (audible)

Japan: Safety Regulations for Road Vehicles (Article 43 / Horns)

ITEM	CONTENT	Illustration / Supplement
A : Application	Motor vehicle (except trailers)	
B : Structure requirement 1) Warning devices	* Motor vehicle (except trailers) shall have horns. * Horns shall not be a siren or bell * No motor vehicle (except emergency motor vehicles) shall have a device which emanates sound toward the vehicle exterior and can be easily mistaken for a horn. However, this provision shall not apply to buzzers or other devices which, for the purpose of warning pedestrians or other traffic, when the vehicle is making a right or left turn, changing lanes or reversing.	
C : Performance requirement	* The sound level of a horn of a motor vehicle (if two or more horns are operating simultaneously, the mixed sound level of all horns) shall be 90dB(C) or more and 115dB(C) or less (for a horn or horns of a motor vehicle with a maximum speed of less than 20 km/h a proper sound level 115dB(C) or less) measured at a distance of 2m to the front. * The sound of a horn shall be continuous, and the sound level and tone quality thereof shall be unchangeable.	

50. Warning devices (audible)

Korea: The regulation of the motor vehicle safety standards (Article 53 / Horn)

ITEM	CONTENT	Illustration / Supplement
A : Application	The horn of a motor vehicles (except sirens and bells)	
B : Structure requirement	Motor vehicle shall have horn. Horn shall not be siren or bell.	
C : Performance requirement	* The horn shall produce an continuous sound in the same tone. * The sound level shall be not less than 90 decibels but not more than 115 decibels, in the same level.	

50. Warning devices (audible)

New Zealand: Traffic Regulations (Clause 69 / Warning devices)

ITEM	CONTENT	Illustration / Supplement
A : Application	Motor vehicles (other than trailers)	
B : Structure requirement 1) Warning devices 2) Sirens etc.	* No person shall operate a motor vehicle (other than a trailer) unless it is equipped with a warning device in good working order capable of giving a warning, audible, under normal conditions from a distance of not less than 100 m . * No person shall operate a motor vehicle if it is equipped with a bell, siren, or whistle, save as provided in this Regulations son in or associated with the use of the vehicle is in distress.	
C : Performance requirement	* No person shall operate a motor vehicle (other than a trailer) unless it is equipped with a warning device in good working order capable of giving a warning, audible, under normal conditions from a distance of not less than 100 m .	

50. Warning devices (audible)

Papua New Guinea: Motor Traffic Regulation (Regulation No. 125K / WARNING DEVICES)		
ITEM	CONTENT	Illustration / Supplement
A : Application	A motor vehicle other than a trailer	
B : Structure requirement	* A person shall not operate a motor vehicle, other than a trailer unless that motor vehicle is equipped with a warning device. * The device shall be located in such a position that it can be readily operated by the driver.	
C : Performance requirement	* A warning device shall be capable of giving a warning audible under normal conditions from a distance of not less than 100m. * A warning device shall emit a sound that is not strident and is continuous and uniform, except with the written approval of the Superintendent.	

50. Warning devices (audible)

Philippines: Administrative Order No. AO-91-005 (Section 8 - i / Horn) and Republic Act No. 4136 (Article IV section 34 b-1/ Horns)		
ITEM	CONTENT	Illustration / Supplement
A : Application	Motor vehicles	
B : Structure requirement 1) Warning devices	* Every motor vehicle shall be provided with a horn or signaling device in good working order: Provided, however, that no horn or signaling device emitting an exceptionally loud, startling, or disagreeable sound shall be installed or used on any motor vehicle. (No. 4136) * The horn shall not be a siren or bell. (No. AO-91-005) * No vehicle not classified as a motor vehicle under this Republic Act shall be equipped with a horn or signaling device similar to the horn customarily used on motor vehicles. (No. 4136)	
C : Performance requirement	None	

50. Warning devices (audible)

Singapore: Road Traffic (Motor Vehicles, Construction and Use) Rules (Clause 24 / Audible warning instruments)		
ITEM	CONTENT	Illustration / Supplement
A : Application	Every motor vehicle	
B : Structure requirement 1) Warning devices 2) Sirens etc.	 * Every motor vehicle shall be fitted with an instrument capable of giving audible and sufficient warning of its approach of position. * No such instrument shall consist of the below-mentioned instruments: a. a gong or bell, except in the case of a motor vehicle used solely for fire brigade, ambulance, military, police or customs purposes; b. a siren, except in the case of a vehicle used solely for fire brigade, military, police or customs purposes, or a vehicle owned by a police officer or a fire service officer or a civil defense officer and used by him in the execution of his duties; c. a multi-tone horn giving a succession of different notes, except in the case of a vehicle used solely for ambulance purposes; or d. a sound producing device giving an unduly harsh, shrill, loud or alarming noise, except in the case of a vehicle used solely for fire brigade, military, police or customs purposes.	
C : Performance requirement	None	

50. Warning devices (audible)

Chinese Taipei: Road Traffic Safety Rules (Article 39 - 11)

ITEM	CONTENT	Illustration / Supplement
A : Application	Motor vehicles	
B : Structure requirement	* Motor vehicles shall be equipped with audible warning devices.	
C : Performance requirement	* The sound level of audible warning devices shall be not less than 70 phon A and not more than 90 phon A measured at a distance 2m to the front of the vehicle and at a height of 1m from the ground.	

50. Warning devices (audible)

Thailand : The Ministerial regulation No.22		
ITEM	CONTENT	Illustration / Supplement
A : Application	Passenger car	
B : Structure requirement	Motor vehicle shall be equippd with the born which is a monotone with sufficiently loud.	
C : Performance requirement		

ECE Regulation (ECE 28)

ITEM	CONTENT	Illustration / Supplement
A : Application	*This regulation applies to: – audible warning devices (AWD) supplied with direct or alternating current or compressed air, which are intended for fitting to motor vehicles of categories L3 to 5, M and N, excluding mopeds (categories L1 and L2) – the audible signals of motor vehicles listed above.	
B : Structure requirement	None	
C : Performance requirement C-a : Performance of AWD 1) General specification	(Regulation) *The AWD shall emit a continuous and uniform sound; its acoustic spectrum shall not vary substantially during its operation. *For warning devices supplied with alternating current, this requirement shall apply only at constant generator speed.	in the case of AWDs supplied with alternating current, the current shall be supplied by an electric generator of the type normally used with this type of AWD.
2) Measurement of the sound characteristics	(Regulation) *The sound-pressure level weighted in accordance with curve A shall not exceed the following values: (a) 115 dB(A) for AWDs intended principally for motorcycles with a power less than or equal to 7 kW; (b) 118 dB(A) for AWDs intended principally for vehicles of categories M and N, and motorcycles with a power greater than 7 kW. *In addition, the sound-pressure level in the frequency band 1,800 to 3,550 Hz shall be greater than that of any component of a frequency above 3,550 Hz and in any event equal to or greater than: (a) 95 dB(A) for AWDs intended principally for motorcycles with a power less than or equal to 7 kW; (b) 105 dB(A) for AWDs intended principally for vehicles of categories M and N, and motorcycles with a power greater than 7 kW.	Pneumatic or electro-pneumatic warning devices shall, when operating under the power supply conditions established for the devices by the manufacturers, satisfy the same acoustic requirements as are prescribed for electrically-operated audible warning devices. In the case of multiple-tone devices in which each sound-emitting unit is capable of functioning independently, the minimum values specified above shall be obtained when each of the constituent units is operated separately. The maximum value of the over-all sound level shall not be exceeded when all the constituent units are operated simultaneously.

ECE Regulation (ECE 28)

ITEM	CONTENT	Illustration / Supplement
C-a : Performance of AWD 2) Measurement of the sound characteristics	(Test method) *Test site should be an anechoic environment, a semi-anechoic chamber or an open space. *As for a semi-anechoic chamber and an open space, compliance with the spherical divergence to a limit of 1 dB within a hemisphere of not less than 5 m radius, up to the maximum frequency to be measured, especially in the measuring direction and at the height of the apparatus and the microphone, shall be checked. *The ambient noise level shall be at least 10 dB lower than the sound pressure level to be measured. *The device to be tested and the microphone shall be placed at the same height. *This height shall be between 1.15 and 1.25 m. The axis of maximum sensitivity of the microphone shall coincide with the direction of the maximum sound level of the device. *The microphone shall be so placed that its diaphragm is at a distance of 2 ± 0.01 m from the plane of the sound outlet of the device. In the case of devices with several outlets, the distance shall be determined in relation to the plane of the nearest outlet to the microphone.	(Test method) The measurement of the sound pressure levels shall be made with a class 1 precision sound level meter conforming to the specifications of IEC Publication No. 651, first edition (1979). All measurements shall be made using the time constant "F". The measurement of the over-all sound pressure level shall be made using the weighting curve A. The spectrum of the sound emitted shall be measured according to the Fourier transform of the acoustic signal.

ECE Regulation (ECE 28)

ITEM	CONTENT	Illustration / Supplement
C-a : Performance of AWD 2) Measurement of the sound characteristics	(Test method) *The AWD shall be supplied with current, as appropriate, at the following voltages: in the case of AWDs supplied with direct current, at one of the test voltages of 6.5, 13 or 26 volts measured at the terminal of the electric power source and corresponding respectively to rated voltages of 6, 12 or 24 volts; in the case of AWDs supplied with alternating current, the current shall be supplied by an electric generator of the type normally used with this type of AWD. The acoustic characteristics of the AWD shall be recorded for electric generator speeds corresponding to 50%, 75% and 100% of the maximum speed indicated by the manufacturer of the generator for continuous operation. During this test, no other electrical load shall be imposed on the electric generator. *If a rectified current source is used for the test of an AWD supplied with direct current, the alternating component of the voltage measured at its terminals, when the warning devices are in operation, shall not be more than 0,1 volt, peak to peak. *For AWDs supplied with direct current, the resistance of the connecting leads, including terminals and contacts, shall be as close as possible to: – 0,05 ohm for a rated voltage of 6 volts, – 0,10ohm for a rated voltage of 12volts, – 0,20 ohm for a rated voltage of 24 volts. *The warning device shall be mounted rigidly, by means of the equipment indicated by the manufacturer, on a support whose mass is at least ten times that of the warning device under test and not less than 30 kg. In addition, arrangements must be made to ensure that reflections on the sides of the support and its own vibrations have no appreciable effect on the measuring results.	

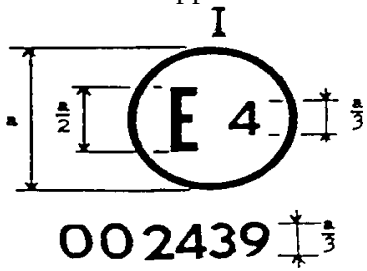
ECE Regulation (ECE 28)

ITEM	CONTENT	Illustration / Supplement
C-a : Performance of AWD 3) Endurance test	(Regulation) *The specifications indicated above (C-a 2)) shall be met by a device subjected to the endurance test, with the supply voltage varying between 115% and 95% of its rated voltage for AWDs supplied with direct current or, for AWDs supplied with alternating current, between 50% and 100% of the maximum speed of the generator indicated by the manufacturer for continuous operation. (Test method) *The AWD shall be supplied with current at the rated voltage and with the connecting lead resistances specified above, and operated, respectively: 10,000 times for AWDs intended principally for motorcycles with a power less than or equal to 7 kW 50,000 times for AWDs intended principally for vehicles of categories M and N and motorcycles with a power greater than 7 kW, each time for one second followed by an interval of four seconds. During the test, and AWD shall be ventilated by an air current having a speed of approximately 10 m/sec. *If the test is made in an anechoic chamber, the chamber shall be large enough to ensure normal dispersal of the heat released by the warning device during the test. *The ambient temperature in the testing room shall be between +15 and +30°C. *If, after the AWD has been operated for half the number of times prescribed, the sound-level characteristics are no longer the same as before the test, the AWD may be adjusted. After being operated the prescribed number of times, and after further adjustment if necessary, the AWD must pass the test described in paragraph above. *For warning devices of the electro-pneumatic type, the device may be lubricated with the oil recommended by the manufacturer after every 110,000 times of operation.	

ECE Regulation (ECE 28)

ITEM	CONTENT	Illustration / Supplement
C-b : Specifications for audible signals of motor vehicles	(Regulation) *The maximum sound-pressure level of the audible signal tested shall be at least: (a) equal to 83 dB(A) and not more than 112 dB(A) for the signals of motorcycles of a power less than or equal to 7 kW; (b) equal to 93 dB(a) and at most 112 dB(A) for the signals of vehicles of categories M and N and motorcycles of a power greater than 7 kW.	(Test method) The test voltage and the sound pressure measurements are same as C-a. The A-weighted sound pressure level emitted by the device(s) fitted on the vehicle at a distance of 7 m in front of the vehicle, the latter being placed on an open site, on ground as smooth as possible and, in the case of devices supplied with direct current, with its engine stopped. The microphone of the measuring instrument shall be placed approximately in the mean longitudinal plane of the vehicle; The sound pressure level of the background noise and wind noise must be at least 10 dB(A) below the sound to be measured; The maximum sound-pressure level shall be sought within the range of 0.5 and 1.5 m above the ground;

ECE Regulation (ECE 28)

ITEM	CONTENT	Illustration / Supplement
D : Label marking requirement D-a : Approval marking for AWD	*The samples of the audible warning devices submitted for approval shall bear the manufacturer's trade name or mark; this mark must be clearly legible and indelible. *Each sample shall have a space of adequate dimensions for the approval mark. *On every audible warning device which conforms to a type approved under this Regulation, there shall be affixed conspicuously, in an easily accessible place , an international approval mark .	Arrangement of the approval mark of AWD 

ITEM 96-51

Warning devices (audible-motorcycles)

APEC Regulation Analysis Findings
Item No. 96-51: Warning Devices (Motorcycles)

1. Member Economy Comparison

(1) Some of the Australian requirements for motorcycle warning devices are adopted by Brunei Darussalam, Hong Kong and Singapore.

(2) The sound volume requirement of Japan is incorporated in the Korea regulation.

(3) New Zealand and Papua New Guinea adopt the same requirements for motorcycle warning devices.

(4) Other member economies lack specific requirements.

2. Item Comparison

(1) Construction (B): Member economies are unanimous in requiring single-tone warning devices, which exclude the sounds of sirens, gongs and bells.

(2) Performance (C): There are member economies which designate a sound volume (dB) and those member economies which specify the minimum distance from where the warning sound is audible.

3. Grouping
ADR group - Australia, Brunei Darussalam, Hong Kong, Singapore
Japan group - Japan, Korea

Item No.96-51 Warning Devices

A: Application Motorcycles

Member Economies	B: Structure	C: Performance	D: Label	E: Reference
Australia	ADR 42/02 (Shall be fitted with at least one warning device which shall not be a siren, repeater horn, bell, whistle)	ADR 42/02 (Capable of giving sufficient audible warning and a constant amplitude and frequency)		
Brunei	Unique (Shall be fitted with a warning instrument which shall not consist of a gong or bell, a siren, a multi-tone horn)			
Canada				
Chile				
China				
Hong Kong	Unique (Shall be fitted with a warning instrument which shall not consist of a gong or bell, a siren, a multi-tone horn)			
Indonesia				
Japan	SRRV 43,64,72 (Shall have horns which not be a siren or bell)	SRRV 43,64,72 (90 dB(C) or more and 115 dB(C) or less)		
Korea	None	SRRV 43, 64, 72 (not less than 90dB, but not more than 115 dB)		
Malaysia				
Mexico				
New Zealand	Unique (Shall be equipped with a warning device)	Unique (Shall be audible from not less than 100 m)		
Papua New Guinea	Unique (Shall be equipped with a warning device)	Unique (Shall be audible from not less than 100 m)		
Philippines				
Singapore	Unique (Shall be fitted with a warning instrument which shall not consist of a gong or bell,a siren, a multi-tone horn)			
Chinese Taipei				
Thailand				
U.S.A				
ECE	ECE 28 (Supplied with DC or AC or compressed air)	ECE 28 (93~112 dB(A) at 7m in front of vehicle)		

51 Warning devices (audible - motorcycles)

AUSTRALIA	ADR 42/02	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycle, Motor tricycle, Moped (2 wheels & 3 wheels)	
B : Structure requirement	*Every motor vehicle must be fitted with a least one warning device. *No siren, repeater horn, bell, exhaust or compression whistle or other device capable of producing a sound resembling that produced by any such siren, repeater horn, bell or whistle must be attached to a motor vehicle other than an emergency community service vehicle.	
C : Performance requirement	*It shall be capable of giving sufficient audible warning of the presence of the vehicle. *It must give an audible signal having constant amplitude and frequency characteristics.	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

BRUNEI	Road Traffic Regulation (Article 20)	
ITEM	CONTENT	Illustration / Supplement
A : Application	This regulation shall apply to wheeled vehicles only	
B : Structure requirement	*Every vehicle other than an animal or handdrawn vehicle shall be fitted with an instrument capable of giving audible and sufficient warning of its approach or position. *Provided that no such instrument shall consist of a gong or siren or bell or multitoned horn, except in case of a motor vehicle used solely for the fire brigade, ambulance or police purposes.	
C : Performance requirement	None	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

HONG KONG	Road Traffic Regulations 38	
ITEM	CONTENT	Illustration / Supplement
A : Application	Construction and Maintenance of Vehicles	
B : Structure requirement	*Every motor vehicle shall be fitted with an instrument capable of giving audible and sufficient warning of its approach or presence. *No motor vehicle shall be fitted with a gong or bell, a siren, a multi-toned horn giving an unduly harsh, shrill, loud or alarming noise, unless authorized by the Commissioner by permit in writing and any such permit shall be subject to such conditions as he may specify.	
C : Performance requirement	None	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

JAPAN	Safety Regulation for Road Vehicles 43	
ITEM	CONTENT	Illustration / Supplement
A : Application	Two-wheeled motor vehicles	
B : Structure requirement	*Motor vehicle shall have horns. *The horn shall not be a siren or bell. *No motor vehicle (except emergency motor vehicles) shall have a device which emanates sound toward the vehicle exterior and can be easily mistaken for a horn.	
C : Performance requirement	*The sound level of a horn of a motor vehicle shall be 90 dB(C) or more and 115 dB(C) or less measured at a distance of 2 m to the front. *The sound of a horn shall be continuous, and the sound level and tone quality thereof shall be unchangeable.	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

KOREA	The Regulations of the Motor Vehicle Safety Standards (Art. 83)	
ITEM	CONTENT	Illustration / Supplement
A : Application	For the structures and equipment of motor vehicles and two-wheeled motorcycles	
B : Structure requirement	Motorcycle shall have horn. Horn shall not be siren or bell.	
C : Performance requirement	*The horn shall produce a continuous sound in the same tone. *The sound level shall be not less than 90 decibels but not more than 115 decibels, in the same level.	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

NEW ZEALAND	Road Traffic Law (TR 69)	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motor vehicle (other than a trailer)	
B : Structure requirement	*A motor vehicle shall be equipped with a warning device.	
C : Performance requirement	*It shall be audible under normal conditions from a distance of not less than 100 m.	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

PAPUA NEW GUINEA	Motor Traffic Regulations (Regulation No.125K)	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motor vehicle warning devices	
B : Structure requirement	*A motor vehicle is equipped with a warning device that is located in such a position that it can be readily operated by the driver.	
C : Performance requirement	*A warning device is capable of giving a warning audible under normal conditions from a distance of not less than 100 meters. *Except with the written approval of the Superintendent a warning device referred in above mentioned requirement shall emit a sound that is:- (a) not strident; and (b) continuous and uniform.	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

PHILLIPPINES (ADMINISTRATIVE ORDER (Sec.8), REPUBLIC ACTS (SEC.34)) S-8-AO, S-34-b1 ra 4136		
ITEM	CONTENT	Illustration / Supplement
A : Application		
B : Structure requirement	Motor vehicles shall be provided with a horn. The horn shall not be a siren or bell. No horn or signaling device emitting an exceptionally loud, startling, or disagreeable sound shall be installed or used on any motor vehicle.	
C : Performance requirement	None	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

SINGAPORE	Road Traffic Rules (Article 24)	
ITEM	CONTENT	Illustration / Supplement
A : Application	These rules shall apply to wheeled vehicles only.	
B : Structure requirement	*Every motor vehicle shall be fitted with an instrument capable of giving audible and sufficient warning of its approach or position. *No such instrument shall consist of a gong or bell, a siren, a multi-tone horn, a sound producing device giving an unduly harsh, shrill ,loud or alarming noise, except in case of a vehicle used solely for special purposes.	
C : Performance requirement	None	
D : Label marking requirement	None	

51 Warning devices (audible - motorcycles)

THAILAND	The ministerial regulation No.22	
ITEM	CONTENT	Illustration / Supplement
A : Application	Motorcycles	
B : Structure requirement	Monotone type horn with sufficient loud.	
C : Performance requirement	None	
D : Label marking requirement	None	

ITEM 97-1

Hazard warning lamps

APEC Regulation Analysis Findings
Item No. 97-1: Hazard Warning Lamp

1. A regulation for hazard warning lamps exits in Australia, Canada, Hong Kong, Indonesia, Japan, Korea, Singapore, Taiwan, U.S., and Europe (ECE).

2. A comparison of specific requirements is as follows:

(1) General Performance
The regulations of all the above member economies and ECE require the winking of the direction indicator lamps to serve as hazard warning signals.

(2) Switching
Australia, Hong Kong, and ECE require independent switching control.

(3) Ignition Switch
Australia, Canada, Korea, Singapore, U.S., and ECE require the activation of hazard warning independently from the ignition switch.

(4) Telltale
Australia and Singapore adopt a telltale requirement that is similar to that of ECE. Canada's requirement is similar to that of FMVSS. Hong Kong simply requires telltales to be furnished, while Japan stipulates the compulsory furnishing of telltales and necessary furnishing conditions.

ITEM No. 97-1 Hazard Warning Lamps

«A: application» → All vehicles

Economy	C-b-1 General Performance	C-b-2 Electrical Connection : Switching	C-b-3 Electrical Connection: Ignition	C-b-4 Electrical Connection : Tell-tale
Australia	Common The signal shall be given by simultaneous operation of the direction indicator lamp	Common The signal shall operate by separate control	Common The signal shall operate independently of the ignition system.	ADR 13 Closed circuit tell-tale, flashing warning light, operate with turn signal device tell-tale.
Brunei	N/A	N/A	N/A	N/A
Canada	Common The signal shall be given by simultaneous operation of the direction indicator lamp	N/R	Common The signal shall operate independently of the ignition system.	FMVSS101 Provide display according to tables.
Chile				
China	N/A	N/A	N/A	N/A
Hong Kong	Common The signal shall be given by simultaneous operation of the direction indicator lamp	Common The signal shall operate by separate control	N/R	Unique Shall include a warning light capable of indicating to the driver of the vehicle.
Indonesia	Common The signal shall be given by simultaneous operation of the direction indicator lamp	N/R	N/R	N/R
Japan	Common The signal shall be given by simultaneous operation of the direction indicator lamp	N/R	N/R	SRRV 41-3 Shall provide tell-tale if driver can not see the operating status.

Economy	C-b-1 General Performance	C-b-2 Electrical Connection : Switching	C-b-3 Electrical Connection: Ignition	C-b-4 Electrical Connection : Tell-tale
Korea	Common The signal shall be given by simultaneous operation of the direction indicator lamp	N/R	Common The signal shall operate independently of the ignition system.	N/R
Malaysia	N/A	N/A	N/A	N/A
Mexico				
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
Phillipins	N/A	N/A	N/A	N/A
Singapore	Common The signal shall be given by simultaneous operation of the direction indicator lamp	N/R	Common The signal shall operate independently of the ignition system.	ECE 48 Closed circuit tell-tale, flashing warning light, operate with turn signal device tell-tale.
Chinese Taipei	Common The signal shall be given by simultaneous operation of the direction indicator lamp	N/R	N/R	N/R
Thailand	N/A	N/A	N/A	N/A
U.S.A.	Common The signal shall be given by simultaneous operation of the direction indicator lamp	N/R	Common The signal shall operate independently of the ignition system.	FMVSS101 Provide display according to a table.
ECE	Common The signal shall be given by simultaneous operation of the direction indicator lamp	Common The signal shall operate by separate control	Common The signal shall operate independently of the ignition system.	ECE 48 Closed circuit tell-tale, flashing warning light, operate with turn signal device tell-tale.

1Economy : Australia
Title of Standard : ADR 13/00

A. Application : All Vehicles

C-b-1. General Performance :

The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical connection, Switching:

The signal shall operate by means of a separate control enabling all the lamps to flash

C-b-3. Electrical connection, Ignition:

The signal shall operate even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.

C-b-4. Electrical Connection, Tell-tale:

Closed-circuit tell-tale mandatory. Flashing warning light, which can operate in conjunction with the tell-tale of turn signal device.

Economy : Canada

Title of Standard : CMVSS No. 108 / No.101

A. Application : All vehicles

C-b-1. General Performance

The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical Connection, Switching: N/R

C-b-3. Electrical Connection, Ignition:

The signal shall operate independently of the ignition system.

C-b-4. Electric Connection, Tell-tale

Provide display according to tables of CMVSS 101.

Economy : Hong Kong
Title of Standard : Road Traffic Regulation (Construction & Maintenance) No.117

A. Application : All vehicles

C-b-1. General Performance :

The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical Connection, Switching :

The signal shall operate by means of a separate control enabling all the lamps to flash.

C-b-3. Electrical Connection, Ignition : N/R

C-b-4. Electrical Connection, Tell-tale :

The signal shall include a warning light capable of indication to the driver of the vehicle.

Economy : Indonesia

Title of Standard : Government Regulation No. 44/1993

A. Application All vehicles

C-b-1. General Performance :

The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical Connection Switching : N/R

C-b-3. Electrical Connection, Ignition : N/R

C-b-4. Electrical Connection, Tell-tale: N/R

Economy : Japan

Title of Standard : Safety Regulation of Road Vehicles, Article 41-3

A. Application : All Vehicles

C-b-1. General Performance

The signal shall be given by simultaneous operation of the direction indicator lamp except those for the lamp mounted on each side of motor vehicle.

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C-b-2. Electrical Connection, Switching : N/R

C-b-3. Electrical Connection, Ignition : N/R

C-b-4. Electrical Connection, Tell-tale:

In the case the driver in his seat can not confirm directly and easily the operation thereof, a tell-tale device shall be provided to inform the driver of the correct operation of these lamps.

Economy : Korea

Title of Standard : The regulation of the motor vehicle safety standards (KMVSS)
Article 45

A. Application : All vehicles

C-b-1. General Performance
The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical Connection, Switching : N/R

C-b-3. Electrical Connection, Ignition :
The signal shall operate even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.

C-b-4. Electrical Connection, Tell-tale: N/R

Economy : Singapore

Title of Standard : Road Traffic (Motor Vehicle, Constructions & Use) Rules 29A

A. Application : All vehicles

C-b-1. General Performance :

The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical Connection, Switching : N/R

C-b-3. Electrical Connection, Ignition :

The signal shall operate independently of the ignition system.

C-b-4. Electrical Connection, Tell-tale:

Closed-circuit tell-tale mandatory. Flashing warning light, which can operate in conjunction with the tell-tale of turn signal device.

Economy : Chinese Taipei

Title of Standard : Road Traffic Safety Standard, Annex No.7,Section 10

A. Application : All vehicles

C-b-1. Photometry :

The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical Connection, Switching : N/R

C-b-3. Electrical Connection, Ignition : N/R

C-b-4. Electrical Connection, Tell-tale: N/R

Economy : USA
Title of Standard : FMVSS No.108 / No.101

A. Application : All vehicles

C-b-1. Photometry :
The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electric Connection, Switching : N/A

C-b-3. Electric Connection, Ignition :
The signal shall operate independently of the ignition system.

C-b-4. Electric Connection, Tell-tale
Provide display according to tables of FMVSS 101.

Economy : ECE
Title of Standard : ECE Regulation No.48/01

A. Application : All Vehicles

C-a-1. Photometry :

The signal shall be given by simultaneous operation of the direction indicator lamps.

C-b-2. Electrical Connection, Switching :

The signal shall operate by means of a separate control enabling all the lamps to flash.

C-b-3. Electrical Connection, Ignition :

The signal shall operate even if the device which starts or stops the engine is in a position which makes it impossible to start the engine.

C-b-4. Electrical Connection, Tell-tale:

Closed-circuit tell-tale mandatory. Flashing warning light, which can operate in conjunction with the tell-tale of turn signal device.

ITEM 97-2

End outline marker lamps

APEC Regulation Analysis Findings
Item No. 97-2: End Out Line Marker Lamp

1. Australia has a regulation equivalent to ECE. China also adopts an ECE-equivalent regulation, except for visibility requirement (C-b-1).

2. Canada's regulation is equivalent with the U.S. counterpart.

3. Indonesia and Malaysia specify only the color of light beams.

4. Singapore specifies beam color, luminous area, and bulb wattage.

5. A comparison of specific requirements is as follows:

(1) Light Beam Distribution (C-a-1)
Australia and China have a regulation equivalent to the ECE regulation. Canada's regulation is equivalent to FMVSS.

(2) Beam Color (C-a-2)
Australia, China, Indonesia, Malaysia, and Singapore has an ECE-type requirement (i.e., white beams for front lamps and red beams for rear lamps). In addition, Malaysia permits amber beams for the front and rear end out line marker lamps. Indonesia allows yellow beams for the front lamps. Canada is FMVSS-type in requiring amber beams for the front lamps and red beams for the rear lamps.

(3) Luminous Area (C-a-3)
Only Singapore specifies the luminous areas of end out line marker lamps.

(4) Bulb Wattage (C-a-4)
Only Singapore provides requirements for bulb wattage.

(5) Mechanical Requirements (C-a-5)
Australia and China have ECE-type mechanical requirements. Canada adopts FMVSS-type requirements.

(6) Visibility (C-b-1)
Australia provides ECE-type requirements. China sets forth the same visibility value as ECE, but differs in the visibility range.

(7) Electrical Connection (C-b-2)
Australia and China adopt ECE-type requirements.

ITEM No. 97-2 End Outline Marker lamps

A: application→ All Vehicles (>2.1m wide)

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical
Australia	ADR 49 F: 4 cd Min. 60cd Max R: 4 cd Min,12cd Max	Common F: White R: Red	N/R	N/R	ADR 49 (General)
Brunei	N/A	N/A	N/A	N/A	N/A
Canada	FMVSS 108 F: 0.25 cd Min. R: 0.62 cd Min,15cdMax.	FMVSS 108 F: Amber R: Red	N/R	N/R	FMVSS 108 (Vibration, Moisture, Dust and Corrosion)
Chile					
China	ECE 7/02 F:4cdMin, 60cdMax R:4cdMin, 12cdMax	Common F: White R: Red	N/R	N/R	ECE 7 (General)
Hong Kong	N/A	N/A	N/A	N/A	N/A
Indonesia	N/R	Common F: White *1 R: Red	N/R	N/R	N/R
Japan	N/A	N/A	N/A	N/A	N/A
Korea	N/A	N/A	N/A	N/A	N/A
Malaysia	N/R	Common F: White*2 R: Red*2	N/R	N/R	N/R
Mexico					
New Zealand	N/A	N/A	N/A	N/A	N/A

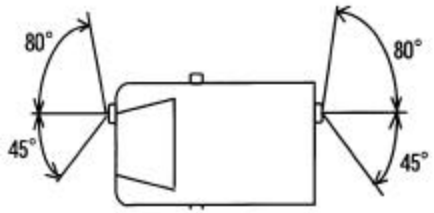
*1: Yellow is also allowed

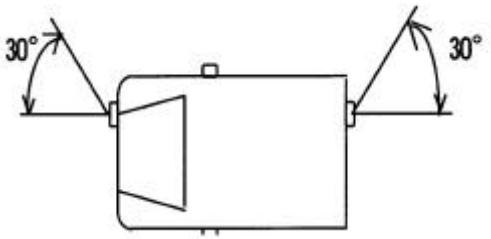
*2: Amber is also allowed

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical
Papua New Guinea	N/A	N/A	N/A	N/A	N/A
Philippine	N/A	N/A	N/A	N/A	N/A
Singapore	N/R	Common F: White R: Red	Unique F: Not less than 50mm in diameter or Equivalent area R: Not less than 88mm in diameter or 60cm2	Unique (5W to 7W)	N/R
Chinese Taipei	N/A	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A	N/A
U.S.A.	FMVSS 108 F: 0.25cdMin R:0.62cdMin, 15cdMax	FMVSS 108 F: Amber R: Red	N/R	N/R	FMVSS 108 (Vibration, Moisture, Dust and Corrosion)
ECE	ECE R7 F: 4cdMin, 60cdMax R:4cdMin, 12cd Max	Common F: White R: Red	N/R	N/R	ECE R7 (General)

Economy	C-b-1 Visibility	C-b-2 Connection	D Label	E Alternative
Australia	ADR 49 (0.05cd Min in the field)*1	ADR 13 (General)	N/R	(ECE7)
Brunei	N/A	N/A	N/A	N/A
Canada	N/R	N/R	N/R	N/R
Chile				
China	Unique (0.05cd Min in the field)*2	ECE 48 (General)	N/R	N/R
Hong Kong	N/A	N/A	N/A	N/A
Indonesia	N/R	N/R	N/R	N/R
Japan	N/A	N/A	N/A	N/A
Korea	N/A	N/A	N/A	N/A
Malaysia	N/R	N/R	N/R	N/R
Mexico				
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
Philippines	N/A	N/A	N/A	N/A
Singapore	N/R	N/R	N/R	N/R
Chinese Taipei	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A
USA	N/R	N/R	N/R	N/R
ECE	ECE R48 (0.05 cd Min in the field)*1	ECE R48 (General)	ECE R7 Approval mark, radename/Number Bulb category	N/R

*1 : the field is as follows *2 : the field is as follows





ITEM 97-2-2-3

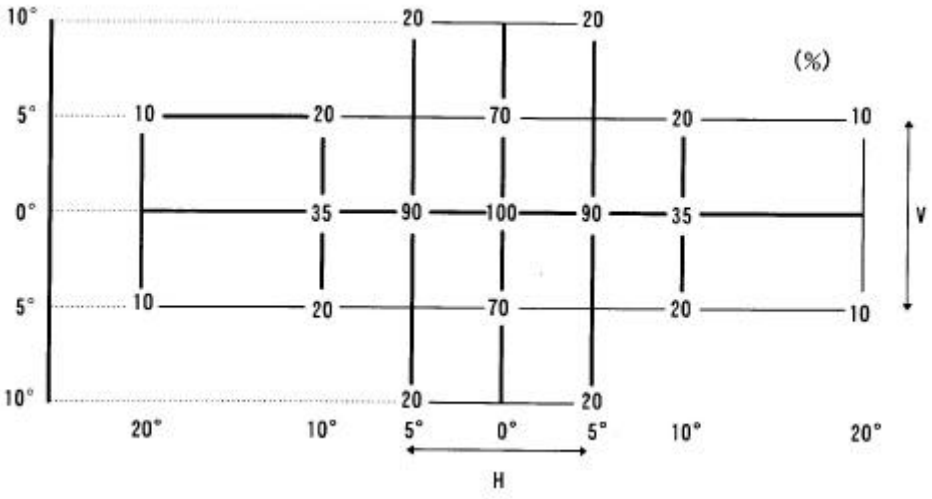
Economy : Australia
Title of Standard : ADR 49/00 and 13/00

A. Application : All vehicles exceeding 2.10m in width.

C-a-1. Photometry :

Installation position	Minimum intensities (cd) (at H-V point)	Maximum intensities (cd)
Front	4cd	60cd
Rear	4cd	12cd

The minimum intensity at each test point is the minimum intensity specified in the above table multiplied by the percentage at each test point shown in the below figure.



C-a-2. Color : Front: White
Rear: Red

C-a-3. Luminous Area : N/R.

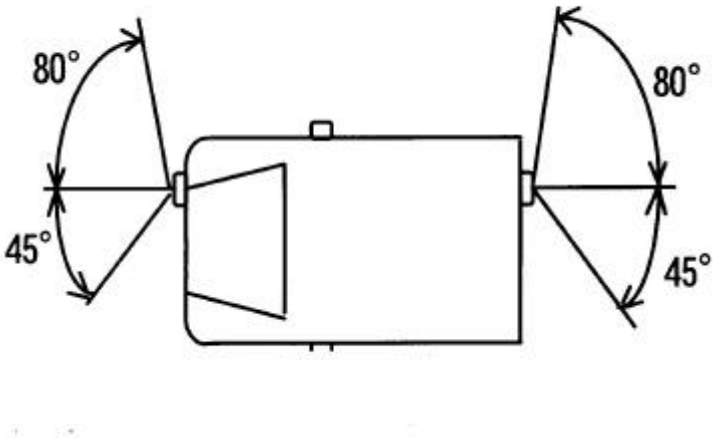
C-a-4. Bulb Wattage : N/R.

C-a-5. Mechanical :

The device must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angles, see figure below.



Vertical angles: 15° above and below the horizontal.

Through the fields defined above, the intensity shall be not less than 0.05 cd.

C-b-2. Electrical Connection :

The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps the side marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously.

D. Label : N/R

E. Alternative : ECE7

Economy : Canada

Title of Standard : CMVSS No. 108, SAE J592e

A. Application : All vehicles exceeding 2.032 m in width

C-a-1. Photometry :

TABLE 1 - PHOTOMETRIC REQUIREMENTS

Test Points (deg)	Minimum Luminous Intensity (cd)		
	Minimum (cd)		Max (cd)
	Yellow	Red	Red
10U-45L	0.25	0.62	15
10U-V	0.25	0.62	15
10U-45R	0.25	0.62	15
H-45L	0.25	0.62	15
H-V	0.25	0.62	15
H-45R	0.25	0.62	15
10D-45L	0.25	0.62	15
10D-V	0.25	0.62	15
10D-45R	0.25	0.62	15

C-a-2. Color : Front: Amber
Rear : Red

C-a-3. Luminous Area : N/R

C-a-4. Bulb Wattage : N/R.

C-a-5. Mechanical : Vibration, Moisture, Dust and Corrosion Tests shall be applied.

C-b-1. Visibility : N/R.

C-b-2. Electrical Connection : N/R.

D. Label : N/R

E. Alternative : N/R

Economy : China

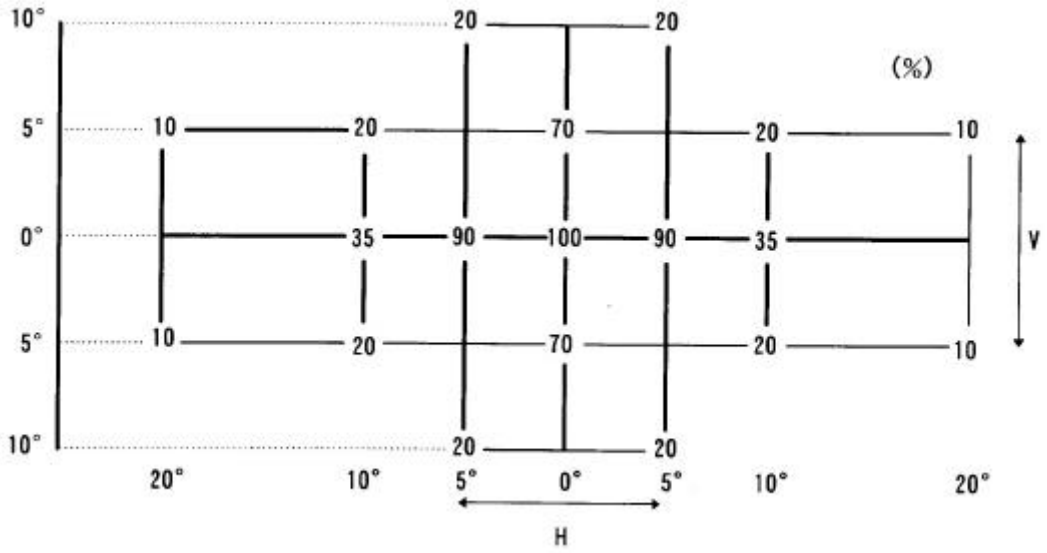
Title of Standard : GB 5920-94, GB4785-84

A. Application : All vehicles except passenger car

C-a-1. Photometry :

Installation position	Minimum intensities (cd) (at H-V point)	Maximum intensities (cd)
Front	4cd	60cd
Rear	4cd	12cd

The minimum intensity at each test point is the minimum intensity specified in the above table multiplied by the percentage at each test point shown in the below figure.



C-a-2. Color : Front: White
Rear: Red

C-a-3. Luminous Area : N/R.

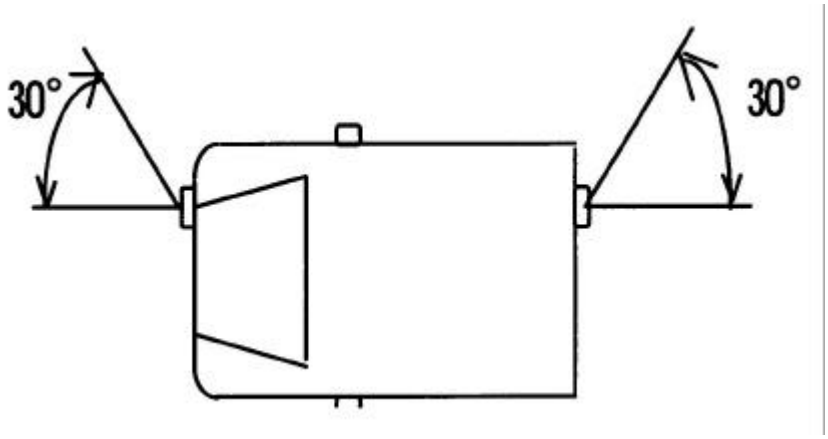
C-a-4. Bulb Wattage : N/R.

C-a-5. Mechanical :

The device must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angles, see figure below.



Vertical angles 5° above and 20° below the horizontal.

Through the fields defined above, the intensity of the light emitted must be not less than 0.05 cd.

C-b-2. Electrical Connection :

The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps the side marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously.

D. Label : N/R

E. Alternative : N/R

Economy : Indonesia

Title of Standard : Government Regulation No. 44/1993

A. Application All vehicles exceeding 2.10m in width

C-a-1. Photometry : N/R.

C-a-2. Color : Front: White or Yellow
Rear: Red

C-a-3. Luminous Area : N/R.

C-a-4. Bulb Wattage : N/R.

C-a-5. Mechanical : N/R.

C-b-1. Visibility : N/R

C-b-2. Electrical Connection : N/R.

D. Label : N/R

E. Alternative : N/R

E**conomy : Malaysia**

Title of Standard : Motor Vehicles (Construction and Use) Rules, 1959

A. Application : All vehicles exceeding 2.10m in width

C-a-1. Photometry : N/R.

C-a-2. Color : Front: Amber or White
Rear: Amber or Red

C-a-3. Luminous Area : N/R

C-a-4. Bulb Wattage : N/R

C-a-5. Mechanical : N/R.

C-b-1. Visibility : N/R.

C-b-2. Electrical Connection : N/R.

D. Label : N/R

E. Alternative : N/R

Economy : Singapore

Title of Standard :

Road Traffic (Motor Vehicles, Construction and Use) Rules, No. 12, No.20.

A. Application : Public service vehicle more than 2.5m in hight

C-a-1. Photometry : N/R.

C-a-2. Color : Front: White
Rear: Red

C-a-3. Luminous Area :
Front: Not less than 50mm in diameter or eqivalent and include 20mm diameter circle.
Rear: Not less than 88mm in diameter or 60 $cm^{2.}$

C-a-4 Bulb wattage:
* Not less than 5W and not more than 7W

C-a-5. Mechanical : N/R.

C-b-1. Visibility : N/R.

C-b-2. Electrical Connection : N/R.

D. Label : N/R

E. Alternative : N/R

Economy : U.S.A.

Title of Standard : FMVSS No. 108, SAE J592e

A. Application : All vehicles exceeding 2.032 m in witdh

C-a-1. Photometry :

TABLE1-PHOTOMETRIC REQUIREMENTS

Test Points (deg)	Minimum Luminous Intensity (cd)		
	Minimum (cd)		Max (cd)
	Yellow	Red	Red
10U-45L	0.25	0.62	15
10U-V	0.25	0.62	15
10U-45R	0.25	0.62	15
H-45L	0.25	0.62	15
H-V	0.25	0.62	15
H-45R	0.25	0.62	15
10D-45L	0.25	0.62	15
10D-V	0.25	0.62	15
10D-45R	0.25	0.62	15

C-a-2. Color : Front: Amber
Rear: Red

C-a-3. Luminous Area : N/R.

C-a-4. Bulb Wattage : N/R.

C-a-5. Mechanical : Vibration, Moisture, Dust and Corrosion Tests shall be applied.

C-b-1. Visibility : N/R.

C-b-2. Electrical Connection : N/R.

D. Label : N/R

E. Alternative : N/R

Economy : ECE

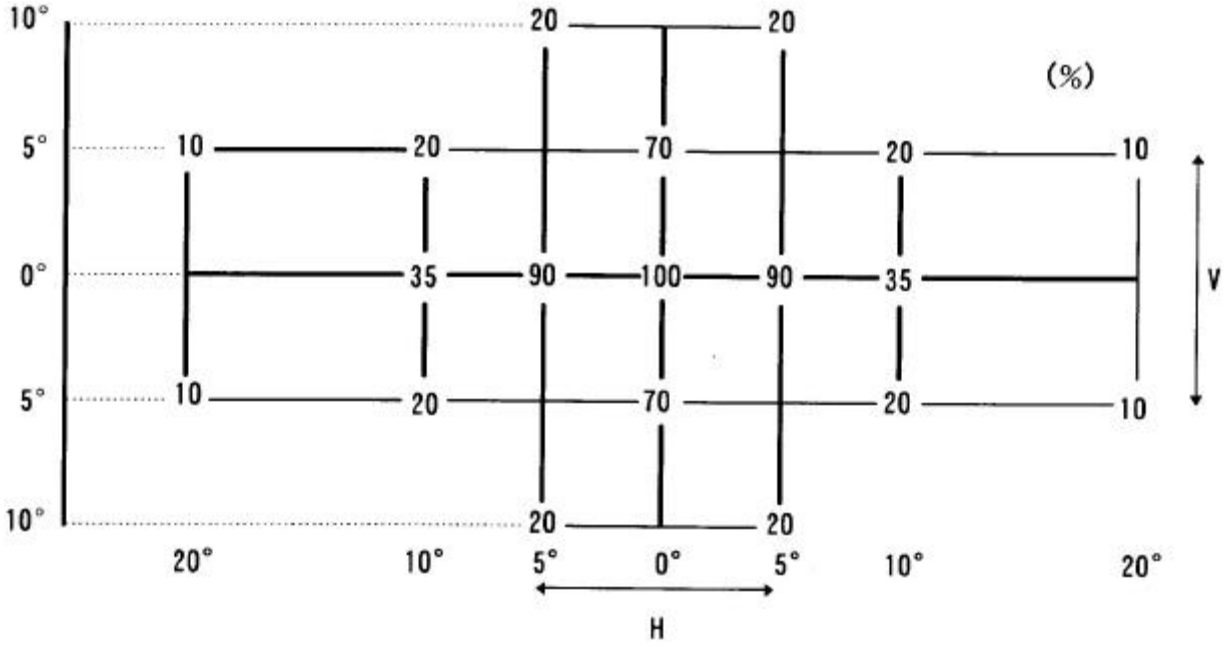
Title of Standard : ECE Regulation No.7/02 series, and No. 48/01 series

A. Application : All vehicles exceeding 2.10m in width

C-a-1. Photometry :

Installation position	Minimum intensities (cd) (at H-V point)	Maximum intensities (cd)
Front	4cd	60cd
Rear	4cd	12cd

The minimum intensity at each test point is the minimum intensity specified in the above table multiplied by the percentage at each test point shown in the below figure.



C-a-2. Color : Front: White
Rear: Red

C-a-3. Luminous Area : N/R.

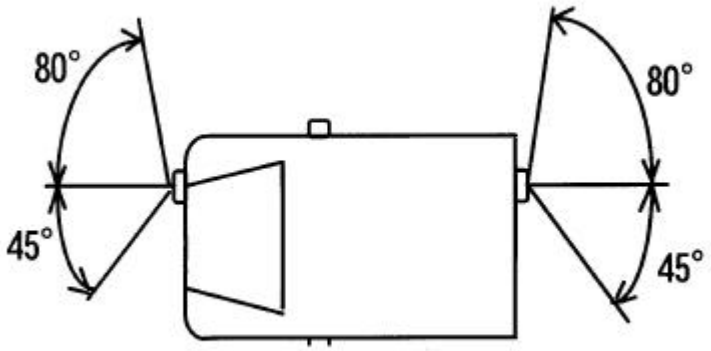
C-a-4. Bulb Wattage : N/R.

C-a-5. Mechanical :

The device must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1. Visibility :

Horizontal angles, see figure below.



Vertical angles: 15° above and below the horizontal.

Through the fields defined above, the intensity shall be not less than 0.05 cd.

C-b-2. Electrical Connection :

The electrical connections must be such that the front and rear position lamps, the end-outline marker lamps the side marker lamps, if they exist, and the rear registration plate lamp can only be switched on and off simultaneously.

D. Label : Approval mark, tradename, number and balb category shall be bare.

E. Alternative : N/R

ITEM 97-3

Antitheft

APEC Regulation Analysis Findings
Item No. 97-3: Anti-theft

1. Regulations for anti-theft protection devices can be divided into the ECE and FMVSS types, and their general requirements are the same.

   (1) ECE sets forth detailed requirements for the strength, wear resistance, etc. of the protection device.

   (2) FMVSS provides a shift lock requirement for automatic transmissions and a driver warning requirement to prevent the key from being left in the locking system. Canada has anti-theft requirements identical with FMVSS.

2. Australia and China adopt almost all of the ECE requirements for anti-theft protection devices.

3. Japan and Korea have only general feature requirements which are partly identical with ECE or FMVSS.

4. ECE requirements for protection devices can substitute for the similar requirements of Australia, China, Japan, and Korea.

5. Aside from FMVSS, the U.S. sets forth a parts marking requirement (49 CFR Part 541).

6. In addition to protection device requirements, ECE stipulates detailed requirements for alarm systems in the ECE 97 Regulation.

Item No. 97-3 Anti-theft

A. Application Passenger Cars

Member Economics	B. Structure Requirements				
	B-a. Anti-theft Alarms General Specification	B-b-1. Protective Devices - General Future	B-b-2. Protective Device - Specific Requirement	B-b-3. Anti-theft Alarms	B-b-4. Parts Marking
Australia	N/R	ADR 25/02	ADR 25/02 (durability and strength requirement)	ADR 25/02	N/R
Brunei Darussalam	N/A	N/A	N/A	N/A	N/A
Canada	N/R	FMVSS 114	FMVSS 114	N/R	N/R
Chile					
China	N/R	ECE 18.01	ECE 18.01	ECE 18.01	N/R
Hong Kong	N/A	N/A	N/A	N/A	N/A
Indonesia	N/A	N/A	N/A	N/A	N/A
Japan	N/R	ECE 18.01 FMVSS 114	N/R	N/R	N/R
Korea	N/R	ECE 18.01 FMVSS 114	N/R	N/R	N/R
Malaysia	N/A	N/A	N/A	N/A	N/A
Mexico	N/A	N/A	N/A	N/A	N/A
New Zealand	N/A	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A	N/A
Philippines	N/A	N/A	N/A	N/A	N/A
Singapore	N/A	N/A	N/A	N/A	N/A
Chinese Taipei	N/A	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A	N/A
USA	N/R	FMVSS 114	FMVSS 114 (automatic transmission lock requirement and warning system requirement)	N/R	49 CFR Part 541
ECE	ECE 97*	ECE 18.02	ECE 18.02 (durability and strength requirement)	ECE 18.02 ECE 97*	N/R

Item No. 97-3 Anti-theft

A. Application Passenger Cars

Member Economics	C. Performance Requirements				D. Label	E. Alternative Standards
	C-a-1. Anti-theft Alarms Particular Specifications	C-a-2. Anti-theft Alarms Operation Parameters and Test Conditions	C-b-1. Anti-theft Alarms Particular Specifications	C-b-2. Anti-theft Alarms Test Conditions	Anti-theft Alarms Instructions	
Australia	N/R	N/R	N/R	N/R	N/R	ECE 18.01
Brunei Darussalam	N/A	N/A	N/A	N/A	N/A	N/A
Canada	N/R	N/R	N/R	N/R	N/R	N/R
Chile	N/R	N/R	N/R	N/R	N/R	N/R
China	N/R	N/R	N/R	N/R	N/R	N/R
Hong Kong	N/A	N/A	N/A	N/A	N/A	N/A
Indonesia	N/A	N/A	N/A	N/A	N/A	N/A
Japan	N/R	N/R	N/R	N/R	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R	N/R
Malaysia	N/A	N/A	N/A	N/A	N/A	N/A
Mexico	N/A	N/A	N/A	N/A	N/A	N/A
New Zealand	N/A	N/A	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A	N/A	N/A
Philippines	N/A	N/A	N/A	N/A	N/A	N/A
Singapore	N/A	N/A	N/A	N/A	N/A	N/A
Chinese Taipei	N/A	N/A	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A	N/A	N/A
USA	N/R	N/R	N/R	N/R	N/R	N/R
ECE	ECE 97*	ECE 97*	ECE 97*	ECE 97*	ECE 97*	N/R

* : ECE 97 is in effect from January 1, 1996, but not mandatory.
N/A : Not Applicable
N/R : No Requirement

3. Anti-theft (Passenger Cars)

Australia ADR 25/02		1/1
ITEM	CONTENT	Illustration / supplement
A. Application	Motor tricycles, Passenger cars, Buses up to 3.5t GVW, Trucks up to 3.5t GVW.	
B. Structure Requirement B-b-1. Protective Devices - General Future B-b-2. Protective Devices - Specific Requirement B-b-3. Anti-theft Alarms	The technical requirements of this rule are generally same as those of ECE 18.01.	
E. Alternative Standards	The technical requirements of ECE 18.01 are deemed to be equivalent to the technical requirements of this rule.	

3. Anti-theft (Passenger Cars)

Canada CMVSS114		1/1
ITEM	CONTENT	Illustration / supplement
A. Application	Passenger cars, Multi-purpose passenger vehicles, and trucks.	
B. Structure Requirements B-b-1. Protective Device - General Future B-b-2. Protective Device - Specific Requirement	The technical requirements of this standard are same as those of FMVSS114.	

3. Anti-theft (Passenger Cars)

China GB15740-1995		1/1
ITEM	CONTENT	Illustration / supplement
A. Application	Motor Vehicles having at least three wheels.	
B. Structure Requirements B-b-1. Protective Device - General Future B-b-2. Protective Device - Specific Requirement B-b-3 Anti-theft Alarms	The technical standards of this GB are generally same as those of ECE 18.01.	

3. Anti-theft (Passenger Cars)

Japan	Article 11-2	1/1
ITEM	CONTENT	Illustration / supplement
A. Application	Motor vehicles exclusively for carriage of less than 11 passengers	
B. Structure Requirements B-b-1. Protective Devices - General Future	The locking device for the engine, power train system, running system, transmission or steering system of a motor vehicle shall comply with the following requirements. 1. When operated, the device shall prevent the function of the system provided that. 2. The device can be easily operated by the driver in his seat. 3. The device shall be secure and constructed so that the function of the device may not be easily disabled. 4. When operated, the device shall prevent the activation of the starter. 5. The device shall not be affected by vibration and shocks, and shall not be activated by vibration and shocks.	

3. Anti-theft (Passenger Cars)

Korea Article 22		1/1
ITEM	CONTENT	Illustration / supplement
A. Application	Passenger vehicle and bus, truck and special-purpose vehicle with GVW 4.5t or less.	
B. Structure Requirements B-b-1. Protective Device - General Future	1. When the key is removed from the key-locking system, it shall prevent the normal activation of the vehicle's engine or motor or steering. 2. When the key is inserted in the key-locking system and vehicle's engine is off, the steering system shall be normally operative. 3. The number of different combinations of the key-locking system shall be at least 1,000. However, the number may be equal to the number of the vehicles of that type when 1,000 or less motor vehicles are manufactured by such manufacturer.	

3. Anti-theft (Passenger Cars)

USA FMVSS114		1/1
ITEM	CONTENT	Illustration / supplement
A. Application	Passenger cars, Multi-purpose passenger vehicles, and Trucks	
B. Structure Requirements B-b-1. Protective Device - General Future	1. Key-locking system which, whenever the key is removed, prevents : (a) The normal activation of the engine or motor. and (b) Either steering or forward self-mobility, or both. 2. The means for deactivating the engine or motor shall not activate device which prevent the steering or forward self-mobility or both. 3. The number of different combinations of the key-locking systems shall be at least 1,000 or a number equal to the number of vehicles, whichever is less. 4. A warning to the driver shall be activated whenever the key has been left in the locking system and the driver's door is opened.	
B-b-2. Protective Device - Specific Requirement	1. Key-locking system in vehicle which has an automatic transmission with a 'park' position shall prevent removal of the key unless the transmission is locked in 'park' or becomes locked in 'park' as the direct result of removing the key. 1.1. Vehicle may have a device which permits the removal of the key when electrical failure occur, if the steering is prevented when the key is removed. This device shall be covered by non-transparent surface. 1.2. Vehicle may have a device which permits moving the transmission form 'park' after the removal of the key. This device shall either be operable : (a) By the key. or (b) By another means, provided that steering is prevented when the key is removed from the ignition, and shall be covered by non-transparent surface. 2. Vehicle shall not move more than 150mm on a 10% grade when automatic transmission is locked 'park'.	

3. Anti-theft (Passenger Cars)

USA 49 CFR Part 541		1/1
ITEM	CONTENT	Illustration / supplement
A. Application	Passenger cars, Multi-purpose passenger vehicles, and trucks	
B-b-4. Marking Requirements	Following major parts of high theft passenger motor vehicle shall be marked VIN (original equipment parts) or symbols (replacement parts). • Engine • Transmission • Right and left front fender • Hood • Right and left front door • Right and left rear door • Sliding or cargo door • Front and rear bumper • Right and left quarter panel (Passenger Cars) • Right- and left-side assembly (Multi-purpose Passenger Vehicles) • Pickup box, and/or cargo box (Trucks) • Rear door, decklid, tailgate, or hatchback Also the performance requirements for marking are specified.	

3. Anti-theft (Passenger Cars)

ECE 18.02		1/2
ITEM	CONTENT	Illustration / supplement
A. Application	Category M1 and N1 - PART 1, Other than category M1 and N1 - PART2	
PART 1		
B. Structure Requirements B-b-1. Protective device - General Future	1. The protective device shall be so designed that it is necessary to put it out of action in order to enable the engine to be started by means of the normal control and the vehicle to be steered, driven or moved forward under its own power. 2. The protective device and the vehicle components on which it operates, shall be so designed, that it cannot rapidly and without attracting attention, be opened, rendered ineffective, or destroyed by, for example, the use of low cost, easily-concealed tools, equipment or fabrications readily available to the public at large. 3. The key locking system must provide at least 1,000 different key combinations or a number equal to the total number of vehicles manufactured annually if less than 1,000. 4. The key and lock shall not be visibly coded. 5. The locking must be effected by an operation, which is separate from that required for stopping the engine. If the operation is withdrawal of the key, such withdrawal must not exceed 2mm before it affects the locking. 6. Electrical / electronic locking systems are required a rolling code etc. 7. Power assistance may be used only to activate the locking and / or unlocking the action of the device.	
B-b-2. Protective device - Specific Requirement	1. The lock shall be so designed that turning of the lock cylinder, when in the locked position, with a torque of less than 0.245 mdaN (2.45 Nm)is not possible with anything other than the mating key. 1.1. Lock cylinder • No more than two identical tumblers operating in the same direction shall be positioned adjacent to each other. • In a lock there shall not be more than 60% identical pin tumblers or 50% identical disk tumblers.	

3. Anti-theft (Passenger Cars)

ECE 18.02		2/2
ITEM	CONTENT	Illustration / supplement
B-b-2. Protective Device - Specific Requirement (cont.)	2. The protective device shall be so designed and constructed that it remains fully effective even after some degree of wear as a result of 2,500 locking cycles in each direction. 3. Protective devices acting on the steering shall withstand, without damage, a torque of 300 Nm about the axis of the steering shaft. Alternative requirements are specified. 4. The protective device acting on the transmission shall be strong enough to withstand, without damage likely to compromise safety, the application in both direction and in static conditions of a torque 50% greater than the maximum torque that can normally be applied to the transmission. 5. Protective devices acting on the gear shaft control - on manual gear boxes it must be possible to lock the gear shift lever in reverse or neutral only ; on automatic gear boxes it must be possible to lock the gear selector lever in the parking, neutral and/or reverse gear only.	
B-b-3 Anti-theft Alarms	Requirements for anti-theft alarms are given in general terms, and only conditionally. It fitted, the design shall meet the followings. 1. The signal emitted by the warning device shall be brief and shall end automatically after not more than 30 seconds. 2. If the signal is acoustic, it may be emitted by the audible warning device normally fitted to the vehicle. 3. If the signal is visual, it shall be produced solely by flashing of the vehicle's passing lights.	

3. Anti-theft (Passenger Cars)

ECE 97 Alarm Systems		1/5
ITEM	CONTENT	Illustration / supplement
A. Application	Part I : Vehicle Alarm System (VAS) which are intended to be permanently fitted to vehicles of category M1 and those of category N1 with a maximum mass of not more than 2 tons. (12 volts electrical systems) Part II : Vehicles of category M1 and those of category N1 with maximum mass of not more than 2 tons, with regard to their Alarm System(s) (AS). (12 volts electrical systems)	
Part I : Vehicle Alarm Systems (VAS) B-a. General Specifications	1. VAS shall, in the event of intrusion into or interference with a vehicle, provide a warning signal. The warning signal shall be audible and in addition may include optical warning devices, or be a radio alarm or any combination of the above. 2. VAS shall be constructed and installed in such a way that the vehicle when equipped shall continue to comply with regard the electromagnetic compatibility. 3. VAS and components thereof shall not activate inadvertently, particularly whilst the engine is in its running mode. 4. VAS, its components and the parts controlled by them shall be designed, built and installed in such a way to minimize the risk for anyone to make them inoperable or to destroy them rapidly and without calling attention, e.g. using low-cost easily-concealed tools, equipment or fabrications readily available to the public at large. 5. VAS may include an immobilizer which shall comply with the requirements of paragraph C-a-1.5. below.	
C-a-1. Particular Specifications	1. Protection range • The VAS shall at least detect and signal the opening of any vehicle door, engine bonnet and luggage compartment. Additionally, it may comprise an immobilization facility. • Safety against false alarm is specified.	

3. Anti-theft (Passenger Cars)

ECE 97 Alarm Systems		2/5
ITEM	CONTENT	Illustration / supplement
C-a-1. Particular Specifications (cont.)	2. Audible alarm • In addition to the original equipment audible warning device, a separate audible warning device may be fitted in the rear of the vehicle. • Duration of the audible signal. Max. 30s, Min. 25s • Specifications concerning the audible signal Constant tone or frequency modulation Sound level : according to ECE R28, Part I 3. Optical alarm - if fitted Duration : 25s to 5min. Flashing of all direction indicators and/or passenger compartment light of the vehicle, including all lamps in the same electrical circuit. 4. Radio alarm - if fitted 5. Immobilizer - if fitted If this facility, when fitted, has an influence to the ignition and/or the fuel supply system, measures shall be provided to avoid immobilization of the vehicle whilst the engine is in its running mode. 6. Setting and unsetting of the VAS Setting - Any suitable means of setting of the VAS is allowed. Unsetting - Unsetting of the VAS shall be achieved by one or a combination of the following devices. (1) A mechanical key (2) Electrical / electronic device, e.g. remote control (3) A mechanical key or an electrical / electronic device within the protected passenger compartment, with timed exit / entry delay.	

3. Anti-theft (Passenger Cars)

ECE 97 Alarm Systems		3/5
ITEM	CONTENT	Illustration / supplement
C-a-1. Particular Specifications (cont.)	7. Exit delay It shall be possible for the exit delay to be set to between 15 seconds and 45 seconds after switch has been operated. 8. Entry delay A delay of 5 seconds minimum and 15 seconds maximum shall be allowed before the activation of the audible and optical signals. 9. Status delay To provide information on the status of the VAS (set, unset, alarm setting period, alarm has been activated), optical displays inside and outside the passenger compartment are allowed. 10. Panic alarm An optical and / or audible and / or radio alarm is allowed independent of the state (set or unset) and / or function of the VAS.	
C-a-2. Operation Parameters and Test Conditions	1. Operation parameters All components of the VAS shall operate without any failure under the following conditions. (1) Climatic conditions Passenger or luggage compartment parts : - 40°C to + 85°C Engine compartment parts : - 40°C to + 125°C (2) Degree of protection for installation The degree of protection in accordance with IEC Publication 529-1989 are specified. (3) Weatherbility (4) Electrical conditions	

3. Anti-theft (Passenger Cars)

ECE 97 Alarm Systems		4/5
ITEM	CONTENT	Illustration / supplement
C-a-2. Operation Parameters and Test Conditions (cont.)	2. Test Conditions 2.1. Operation tests (1) Compliance of the VAS with the following specification shall be checked during or after the specified test conditions. (a) Alarm duration (b) Frequency and on / off ratio (c) Number of alarm cycles (d) Alarm system setting lock check (2) Test conditions (a) Normal test conditions (b) Resistance to temperature and voltage changes (c) Safe operation after foreign body and water-tightness testing (d) Safe operation after condensed water test (e) Test for safety against reversed polarity (f) Test for safety against short-circuits (g) Safe operation after vibration test 2.2. Energy consumption in the set condition The energy consumption in set condition under the normal test conditions shall not exceed 20 mA for the complete alarm system including status display. 2.3. Durability test Under the normal test conditions, triggering of 300 complete alarm cycles (audible and / or optical) with a rest time of the audible device of 5 min. 2.4. Test for external key switch (installed on the outside of the vehicle)	

3. Anti-theft (Passenger Cars)

ECE 97 Alarm Systems		5/5
ITEM	CONTENT	Illustration / supplement
C-a-2. Operation Parameters and Test Conditions (cont.)	2.5. Electromagnetic compatibility 2.6. Safety against false alarm in the event of an impact on the vehicle 2.7. Safety against false alarm in the event of a voltage reduction 2.8. Test for safety against false alarm of the passenger compartment control	
D. Instructions	1. Each VAS shall be accompanied by : 1.1. Instruction for installation. 1.2. A blank installation certification. 1.3. A general statement to the VAS purchaser calling his attention. 1.4. Instruction for use. 1.5. Instruction for maintenance. 1.6. A general warning regarding the danger of making any alteration or additions to the system. 1.7. Indication of the location(s) of the international approval mark and / or the international certification of conformity.	
Part II : Alarm System B-b General Specifications C-b-1 Particular Specifications C-b-2 Test Conditions	} These requirements are generally same as those of the Part I VAS.	
D. Instruction	Each vehicle shall be accompanied by : 1. Instructions for use. 2. Instructions for maintenance. 3. A general warning regarding the danger of making any alterations or additions to the system.	

ITEM 97-4

Speedometer

APEC Regulation Analysis Findings
Item No. 97-4: Speedometer

1. Australia, Japan, and Korea requires the installation of an odometer. Australia specifically requires a six-digit odometer.

2. Speed unit:

   (1) Australia, Japan, Singapore, Thailand, and China specify only "km/h" as the unit of speed reading. Hong Kong, Indonesia, Korea and Philippines also specify "km/h" in their regulations.
   (2) Although "km/h" is the main unit, Canada also permits the indication of "MPH" in parallel with the "km/h" reading.
   (3) The U.S. and Malaysia specify "MPH" as the main unit of speed.

3. Only China specifies graduations by 5 km/h. (ECE provides 1, 2, 5 and 10 km/h graduations.)

4. China requires numerical indication at every 20 km/h (the same as ECE).

5. Australia, Canada, and U.S. require the speedometer lighting to be adjustable by at least two luminous levels.

6. Japan and Philippines set forth anti-glare requirements.

7. Speed reading error:

   (1) -20% / +20% (Philippines)
   (2) -10% / +10% (Australia, Hong Kong, Malaysia, Singapore, Thailand)
   (3) -10% / +15% (Japan, Indonesia, Korea)
   (4) $O \leq V1 - V2 \leq V2/10 + 4$(km/h) (China)
   (5) The U.S. and Canada do not specify speed reading error.

8. Only Japan specifies the swing range of the speedometer pointer.

9. Overall grouping of speedometer regulations:

   (1) The group based on the U.S. regulation consists of Australia, Canada, and U.S. - (adjustable luminous levels).
   (2) The group based on the Japanese regulation is comprised of Japan, Singapore, Thailand - (exclusive km/h reading); and Hong Kong, Indonesia, Korea, Malaysia, and Philippines - (permitting minus error).
   (3) The ECE-based country is China - (permitting only plus error).

Item No.97-4 : Speedometer

A : Application: All vehicles except trailers

Member Economies	Regulation No.	B-a-1	B-a-2	B-a-3	B-a-4	B-a-5	B-a-6	B-b-1
		odometer	speed limiter	speedometer				
				Unit	Graduation	Speed value indicated	Illumination	Location
Australia	ADR18	ADR18 Indication of distance (1-600,000km for passenger car, 1-999,999km for other categories)		SRRV-46 km/h only			FMVSS101 (Variable intensity)	FMVSS101 (To be readily visible to driver when seated in normal driving position.)
Brunei								
Canada	CMVSS 101			ECE39 km/h(or km/h & mph)			FMVSS101	FMVSS101
Chile								
China	GB 15082-94			ECE39 km/h or mph(mph is used for the countries where imperial units are used.)	Unique 5 km/h(or mph)	ECE39 Interval of 20 km/h(or mph)	ECE39 To be legible by day and by night.	ECE36 (To be in the driver's direct field of vision.)
Hong Kong	C&Mof VEHICLES-24							SRRV-46
Indonesia	Reg.No.44/1993-127							
Japan	SRRV-46	SRRV-46 Obligation of installation except for minisized cars		SRRV-46 km/h only	SRRV-46 Unit of gaduation of indication is 2.5 km/h or less for a disital type speedometer		SRRV-46 A lighting device or luminous dial or pointer is required.	SRRV-46 (To be easily confirmed the speed by the driver.)
Korea	KMVSS-54,-110	SRRV-46	Unique 100 km/h for special bus and 80 km/h for special truck					

	Regulation No.	B-a-1	B-a-2	B-a-3	B-a-4	B-a-5	B-a-6	B-b-1
		odometer	speed limiter	speedometer				
				Unit	Graduation	Speed value indicated	Illumination	Location
Malaysia	LN170/1959-17			FMVSS101 miles per hour (**?**)				SRRV-46
Mexico								
New Zealand								
Papua New Guinea								
Philippines	AO-91-005:Sec.12						SRRV-46	SRRV-46
Singapore	RTR14			SRRV-46				SRRV-46
Chinese Taipei								
Thailand	MR9			SRRV-46			ECE39 Illumination for night.	
United States	FMVSS101			FMVSS101 MPH,or MPH and km/h			FMVSS 101 At least two levels of brightness	FMVSS101 To be visible to the driver restrained with a seat belt.
ECE	ECE R 39/00			ECE39 km/h or mph (mph is used for the countries where imperial units are used.)	ECE39 1,2,5,10 km/h	ECE39 Interval of 20 km/h when max. scale is less than 200 km/h and 30 km/h when more than 200km/h.	ECE39 To be legible both by day and night.	ECE39 To be in the driver’s direct field of vision.

A:Application:All vehicles except trailers

Member Economies	Regulation No.	C-a-1	C-b-1	C-b-2	C-b-3	D Label	E Refrence Std.
		speedometer					
		maintenance	Accuracy	Oscillation	glare-proof		
Australia	ADR18		ADR18 To be of +10%/-10% at a speed of 40 km/h or more.				
Brunei							
Canada	CMVSS 101						
Chile							
China	GB 15082-94		ECE39 Allowance of indicated speed V_1 is $0 \leq V_1 - V_2 \leq \frac{V_2}{10} + 4\ km/h$ (V_2 is true speed)				GB/T 12534
Hong Kong	C&Mof VEHICLES-24	Unique To be in a good working ordder.	ADR18 To be of +10%/-10% at a speed of 15 km/h or more.				
Indonesia	Reg.No.44/1993-127		SRRV-46 To be of +15%/-10% at a speed of 40 km/h or more.				
Japan	SRRV-46		SRRV-46 To be of +15%/-10% at a speed of 35 km/h or more.	SRRV-46 Oscillation of a pointer shall be +/-3 km/h.	SRRV-46 To be glare-proof.		
Korea	KMVSS-54,-110		SRRV-46 Article 54:To be of +15%/-10% at a speed of 40 km/h or more. ECE39 Article 110:Allowance of indicated speed V_1 is $0 \leq V_1 - V_2 \leq \frac{V_2}{10} + 4\ km/h$ (at homorogation) (V_2 is true speed)				

	Regulation No.	C-a-1	C-b-1	C-b-2	C-b-3	D Label	E Refrence Std.
		speedometer					
		maintenance	Acccuracy	Oscillation	glare-proof		
Malaysia	LN170/1959-17		ADR18 To be of +10%/-10% at the max.speed.				
Mexico							
New Zealand							
Papua New Guinea							
Philippines	AO-91-005:Sec.12		Unique To be between 32 and 48 km/h at a speed of 40 km/h.		SRRV-46		
Singapore	RTR14		ADR18 To be of +10%/-10% at a speed of more than 20 km/h.				
Chinese Taipei							
Thailand	MR9		ADR18 To be of +10%/-10%				
United States	FMVSS101						
ECE	ECE 39/00		ECE39 Allowance of indicated speed V_1 is $0 \leq V_1 - V_2 \leq \frac{V_2}{10} + 4\ \text{km/h}$ (V_2 is true speed)				

Economy / AUSTRALIA / ADR 18

A. Application :All vehicles

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Odometer

A motor vehicle shall be fitted with an odometer which shall indicate distance traveled in one km units(or less)from 1 to 600,000 km for MA,MB and MC category vehicles (999,999 km for all other category vehicles) and its accuracy is +/- 4%

B-a-2:Indication of the speed

Indications of speed shall be km per hour only.

B-a-3:Illumination

The speedometer must be provided with variable intensity when illuminated.(For MA category only)

B-b: Structure of parts installed to vehicle

B-b-1:Location

The speedometer must be installed so that its indication is readily visible to the driver when seated in the normal driving position.(The location of the speedometer is provided in detail in the regulation.)

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle

C-b-1:Accuracy

The accuracy of the indication of the actual speed shall be of +10%/-10% at a speed of 40km/h or more.

D : Label Marking Requirement: None

E : Reference Standards: None

Economy / CANADA/ CMVSS 101

A. Application : Passenger cars, multi-purpose vehicles, trucks and buses.

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Graduation

The speedometer is graduated in km per hour .

B-a-2:Abbreviations

Abbreviations of speed shall be km/h.

B-b: Structure of parts installed to vehicle

B-b-1:Location

The speedometer shall be identifiable by the driver while the driver is seated in the driver's designated seating position and fastened by the seat belt.

B-b-2:Illumination

The speedometer shall be illuminated whenever the head lamps are activated.

The illumination shall have at least two levels of intensity, one of which is so low as to be barely discernible to a driver whose eyes adapted to dark ambient road conditions.

C : Performance

C-a:Performance of parts: None

C-b:Performance of parts installed to vehicle: None

D : Label Marking Requirement: None

E : Reference Standards: None

Economy / CHINA / GB 15082-94

A. Application :M(Passenger Car)and N(Truck).

B :Structure Requirement

B-a:Structure of Parts

B-a-1:Range

Range of speeds indicated must be large enough to include the maximum speed.

B-a-2:Graduation

The graduation shall be 5 km/h (Same for mph).

B-a-3:Value of speed indicated

Speed value indicated shall be at interval of 20 km/h (or mph)

B-a-4:Abbreviations

Abbreviations of speed shall be km/h.

In the case of vehicles manufactured for sales in any country where imperial units are used, the speedometer shall be marked in mph.

B-b: Structure of parts installed to vehicle

B-b-1:Location

The speedometer shall be situated in the driver's direct field of vision.

B-b-2:Illumination

The speedometer display shall be legible both by day and by night.

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle:

C-b-1:Allowance of the indicated speed

The speed indicated must never be less than the true speed. There shall be the following relationship between the speed indicated on the dial of the speedometer (V1) and the true speed (V2) : $0 \leq V_1 - V_2 \leq \frac{V_2}{10} + 4\ \text{km/h}$ (or mph)

D : Label Marking Requirement: None

E : Reference Standards: GB/T 12534(Motor Vehicle Road Test Method Notice)

Economy / HONG KONG / C&M of VEHICLES : Article 24

A. Application :All vehicles except a motor vehicle with max. speed of less than 20 km/h and an invalid carriage.

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Calibrations

The speedometer shall be calibrated and marked so as to indicate clearly the speed at which the motor vehicle is being driven.

B-b: Structure of parts installed to vehicle

B-b-1:Location

The speedometer shall be so placed that the driver may easily read the speed.

The speedometer shall be kept free from any obstruction

C : Performance

C-a: Performance of parts

C-a-1:The speedometer shall be maintained in good working order.

It shall be a good defense for an owner to prove that when the defect was detected and that the defect has been remedied with all reasonable expedition.

C-b: Performance of parts installed to vehicle

C-b-1:Accuracy

The accuracy of the indication of a speedometer shall be between +10%/-10% at a speed of 15km/h or more.

D : Label Marking Requirement: None

E : Reference Standards: None

Economy / INDONESIA / Regulation No.44/1993 : Article 127

A. Application : All vehicles

B :Structure Requirement

B-a: Structure of Parts: None

B-b: Structure of parts installed to vehicle : None

C : Performance

C-a: Performance of parts : None

C-b: Performance of parts installed to vehicle

C-b-1:Accuracy

The accuracy of the indication of a speedometer shall be between +15%/-10% at a speed of 40km/h.

D : Label Marking Requirement: None

E : Reference Standards: None

Economy / JAPAN / SRRV-Article 46

A. Application : All vehicles except a motor vehicle with max. speed of less than 20 km/h and a trailer.

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Odometer

A motor vehicle shall have a speedometer with an odometer at a position easily seen by the driver. However, for a mini-sized motor vehicle, the odometer may be omitted.

B-a-2:Indication of the speed

Indications of speed shall be km per hour.

However, the switch off system to mile per hour is permissible.

B-a-2:Unit of graduation

The unit of graduation of indication of a disital type speedometer shall be 2.5km/h or less. However this requirement shall not apply to cases when speed is 20 km/h or more.

B-a-3:Illumination

The speedometer shall have a lighting device or be illuminous or shall have luminous dial plate and pointer.

B-b: Structure of parts installed to vehicle

B-b-1:Construction

The speedometer shall be constructed so that the driver may easily confirm the speed.

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle

C-b-1:Allowance

The allowance of the indication of a speedometer shall be between +15%/-10% at a speed of 35km/h or more.

C-b-2:Oscillation

The oscillation of the pointer of an analog type speedometer shall be +/-3km/h at a speed of 35 km/h or more.

C-b-3:Glare-proof

The speedometer shall be glare-proof.

D : Label Marking Requirement: None

E : Reference Standards: None

Economy /KOREA / KMVSS- Article 54

A. Application :All vehicles except a motor vehicle with max. speed of less than 25 km/h.

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Odometer

A motor vehicle shall have an odometer, too. The odometer shall be capable of measuring the total distance.

B-a-2 Speed limiter

Special commercial bus and truck shall be equipped with the speed limiter and the maximum speed is 100 km/h and 80 km/h , respectively.

B-b: Structure of parts installed to vehicle

B-b-1:Construction: None

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle

C-b-1:Accuracy

Article 54: The accuracy of the speedometer shall be between +15%/-10% at a speed of 40km/h.

Article 110(for type approval): Allowance of indicated speed V_1 is $0 \leq V_1 - V_2 \leq V_2/10 + 4$ (km/h).

V_2 is true speed

D : Label Marking Requirement: None

E : Reference Standards: None

Economy /MALAYSIA/ LN 170 /1959 - Rule 17

A. Application : All vehicles except a motor vehicle with max. speed of less than **10 mile per hour**.

B :Structure Requirement

B-a: Structure of Parts : None

B-b: Structure of parts installed to vehicle

B-b-1 : B-b-1:Location

The speedometer shall be so constructed and in such a position as at all times readily to indicate the speed to the driver.

C : Performance

C-a :Performance of parts: None

C-b: Performance of parts installed to vehicle

C-b-1:Accuracy

The accuracy of the speedometer shall be between +10%/-10% at a speed prescribed as the maximum speed (or if no such speed is prescribed , at 30 mile per hour).

D : Label Marking Requirement: None

E : Reference Standards: None

Economy /PHILIPPINES/ Administration Order No.AO-91-005 : Sec.12

A. Application :All vehicles

B :Structure Requirement

B-a: Structure of Parts

B-a-1 : Illumination

The speedometer shall be provided with a lighting device or shall be a illuminous-painted dial plate with pointer.

B-b: Structure of parts installed to vehicle

B-b-1 : Location

The speedometer shall be so constructed that the driver may easily confirm the speed while the motor vehicle is running..

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle

C-b-1:Accuracy

The indication in the speedometer tester shall be between 32 and 48 km/h when the speedometer indicates a speed of 40 km/h

C-b-2:Glare-proof

The speedometer shall be glare-proof.

D : Label Marking Requirement: None

E : Reference Standards: None

Economy /SINGAPORE/ Road Traffic (Motor vehicle, Construction & Use) Rules:14

A. Application :All vehicles except a motor vehicle with max. speed of less than 20 km/h.

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Indication of the speed

Indications of speed shall be km per hour.

B-b: Structure of parts installed to vehicle

B-b-1 : Location

The speedometer shall be so constructed and in such a position as at all times readily to indicate the speed to the driver.

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle

C-b-1:Accuracy

The accuracy of the speedometer shall be between +10%/-10% at a speed of more than 20 km/h.

D : Label Marking Requirement: None

E : Reference Standards: None

Economy / THAILAND / Land Transport Act,B.E.2522(A.D.1979), Motor vehicle Act., B.E.2522

Busses :Ministerial Regulation No.9(B.E.2524)-1(1)(q)

Trucks :Ministerial Regulation No.9(B.E.2524)-15(1)(q)

Passenger Car, MPV : Ministerial Regulation No.22(B.E.2537)-2(10)

A. Application :Buses, Trucks and passenger car, Multi purpose vehicle

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Indication of the speed

Indications of speed shall be km per hour.

B-a-2:Illumination

The speedometer shall must work and have a illumination to enable the visibility at night.

B-b: Structure of parts installed to vehicle : None

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle

C-b-1:Allowance

The allowance of the indication of a speedometer shall be between +10%/-10%.

D : Label Marking Requirement: None

E : Reference Standards: None

Economy / USA / FMVSS 101

A. Application : Passenger cars, multi-purpose vehicles, trucks and buses.

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Graduation

The speedometer is graduated in mile per hour .

B-a-2:Abbreviations

Abbreviations of speed shall be MPH.

If the speedometer is graduated in mph and km/h, the identifying word on abbreviations shall be 'MPH'and 'km/h' in any combination of upper or lower case letters.

B-a-3:Illumination

The speedometer shall be illuminated when the ignition switch and/or head lamps are activated.

The illumination shall have at least two levels of brightness, one of which is barely discernible to a driver who has adapted to dark ambient roadway conditions. The adjustable means may be operable manually or automatically.

B-b: Structure of parts installed to vehicle

B-b-1:Location

The speedometer shall be visible to the driver who is restrained under the condition of FMVSS 208.

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle: None

D : Label Marking Requirement: None

E : Reference Standards: None

Economy / ECE/ECE R39-00

A. Application : All vehicles which have a maximum design speed exceeding 50 km/h.

B :Structure Requirement

B-a: Structure of Parts

B-a-1:Range

Range of speeds indicated must be large enough to include the maximum speed.

B-a-2:Graduation

The graduation shall be of 1,2,5 or 10 km/h(Same for mph).

B-a-3:Value of speed indicated

Speed value indicated shall be at interval of 20 km/h when the highest value on the dial is less than 200 km/h, and at the interval of 30 km/h when the highest value on the dial is 200 km/h or more. Smaller speed interval is permissible.

The value of speed indicated in mph shall not exceed 20 mph commencing at 10 mph or 20 mph.

B-a-4:Abbreviations

Abbreviations of speed shall be km/h.

In the case of vehicles manufactured for sales in any country where imperial units are used, the speedometer shall be marked in mph.

B-b: Structure of parts installed to vehicle

B-b-1:Location

The speedometer shall be situated in the driver's direct field of vision.

B-b-2:Illumination

The speedometer display shall be legible both by day and by night.

C : Performance

C-a: Performance of parts: None

C-b: Performance of parts installed to vehicle:

C-b-1:Allowance of the indicated speed

The speed indicated must never be less than the true speed.There shall be the following relationship between the speed indicated on the dial of the speedometer (V1) and the true speed (V2) :

$$0 \leq V_1 - V_2 \leq \frac{V_2}{10} + 4 \text{ km/h}$$

D : Label Marking Requirement: None

E : Reference Standards: None

ITEM 97-5

Center high mounted stop lamp

APEC Regulation Analysis Findings
Item No. 97-5: Center High Mounted Stop Lamp

1. Regulations for center high mounted stop lamps are virtually harmonized with FMVSS 108 among Australia, U.S., Canada, and Korea. For specific differences, refer to (1), (3), (5), and (6) below.

2. New Zealand recognizes the regulations of Australia, Japan, U.S., and ECE as alternatives.

3. Requirements for this type of lamp are very few in other member economies; consequently, unique requirements are non-existent.

4. A comparison of specific requirements is as follows:

   (1) Light Beam Distribution (C-a-1)
   Australia, Canada, Korea, U.S., and ECE have a regulation for the beam distribution of center high mounted stop lamps. While Australia, U.S. and Korea set luminous intensity levels between 25 and 160 cd at the H-V point, ECE requires lower levels between 25 and 80 cd at the H-V point.

   (2) Beam Color (C-a-2)
   Australia, Canada, Japan, Korea, Papua New Guinea, Taiwan, U.S., and ECE provide beam color requirements, all specifying red.

   (3) Luminous Area (C-a-3)
   Luminous area requirements exist in Australia, Korea, Taiwan, and U.S., specifying 29 cm^2 (28 cm^2 in Korea).

   (4) Bulb Wattage (C-a-4)
   No member economies have a requirement for the bulb wattage of center high mounted stop lamps.

   (5) Mechanical Requirements (C-a-5)
   Australia, Canada, U.S., and ECE provide these requirements. The first three provide tests on resistance to vibration, humidity, dust and corrosion, and are harmonized with FMVSS 108. ECE lays down requirements for general vibration-resistant construction.

   (6) Visibility (C-b-1)
   This regulation exists in Australia, Canada, Korea, Japan, U.S., and ECE. Australia, Korea, and ECE specify a visible field of 10° left, right, upward, and downward. Canada and U.S. require 45° right and left. Japan defines the visible field of the lamp to be within the 0-2.5m range from the ground as measured from 10m rearward from the lamp.

   (7) Electrical Connection (C-b-2)
   Australia, Japan, Korea, Thailand, Taiwan, and ECE provide these requirements. All these are basically harmonized among themselves in requiring the center high mounted stop lamp to light up (not blink) only when the brake is operated.

ITEM No.97-5　Center high mounted stop lamp

A:Application　Passenger Car

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Australia	ADR 60 (25 to 160 cd)	Common (Red)	ADR 60 (29 cm² or more)	N/R	ADR 60 (Vibration, Moisture, Dust and Corrosion)	ADR 60 (10°L to 10°R, 10°U to 5°D)	Common (Service brake)
Brunei	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Canada	FMVSS 108	Common	FMVSS 108	N/R	FMVSS 108	FMVSS 108	N/R
Chile							
China	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hong Kong	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indonesia	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Japan	N/R	Common (Red)	N/R	N/R	N/R	SRRV 39-2 (10m to the rear)	Common (Service brake)
Korea	FMVSS 108	Common	Unique (28 cm² or more)	N/R	N/R	ADR 60 ECE R48	Common

Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical	C-b-1 Visibility	C-b-2 Connection
Malaysia	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mexico							
New Zealand	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Papua New Guinea	N/R	Common	N/R	N/R	N/R	N/R	N/R
Philippine	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Singapore	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chinese Taipei	N/R	Common	FMVSS 108	N/R	N/R	N/R	Common
Thailand	N/R	Common	N/R	N/R	N/R	N/R	Common
U.S.A.	FMVSS 108 (25 to 160 cd)	Common (Red)	FMVSS 108 (4.5 sq. in./ approx. 29 cm^2 or more)	N/R	FMVSS 108 (Vibration, Moisture, Dust and Corrosion)	FMVSS 108 (45°L to 45°R)	N/R
ECE	ECE R7 (25 to 80 cd)	Common (Red)	N/R	N/R	ECE R7 (General)	ECE R48 (10°L to 10°R, 10°U to 5°D)	Common (Service brake)

ITEM 97-5-2-2

Country : Australia

Title of Standard : ADR 60/00

A. Application : Passenger vehicle, Goods vehicles and Trailers

C-a-1. Photometry :

Test Points (deg)	Minimum Intensity (cd)
5U-V	25
H-5L	25
H-V	25
H-5R	25
5D-V	25
5U-5R	25
5U-10R	16
H-10R	16
5D-10R	16
5D-5R	25
5U-5L	25
5U-10L	16
H-10L	16
5D-10L	16
5D-5L	25
10U-10L	8
10U-V	16
10U-10R	8

Note 1 : The maximum intensity is 160 cd (Max.) within the area bounded by the test points 10U-10L, 10U-10R, 5D-10L, and 5D-10R.

C-a-2. Color : Red

C-a-3. Luminous Area :

Effective projected luminous area shall be at least 29 cm^2.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical :

Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied, except for the Moisture, Dust and Corrosion tests are not applied when the lamp is mounted inside the vehicle.

C-b-1. Visibility :

Horizontal angles: from 10°to the left to 10°to the right

Vertical angles : from 10°to the above to 5°to the below

C-b-2. Electrical Connection :

Must be activated upon and only upon application of the service brakes.

Country : Brunei

Title of Standard : N/R.

Country : Canada

Title of Standard : CMVSS No. 108
SAE J186a

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

Zone	Test Points (deg)	Minimum Intensity (cd)	
		Individual	Zone
I	5U-V	25	125
	H-5L	25	
	H-V	25	
	H-5R	25	
	5D-V	25	
II	5U-5R	25	98
	5U-10R	16	
	H-10R	16	
	5D-10R	16	
	5D-5R	25	
III	5U-5L	25	98
	5U-10L	16	
	H-10L	16	
	5D-10L	16	
	5D-5L	25	
IV	10U-10L	8	32
	10U-V	16	
	10U-10R	8	

Note 1 : The maximum intensity is 160 cd (Max.) within the area bounded by the test points 10U-10L, 10U-10R, 5D-10L, and 5D-10R.

Note 2 : The measured values at each test point shall not be less than 60 % of the value above-listed.

C-a-2. Color : Red

C-a-3. Luminous Area :

Functional lighted lens area shall be at lest 4.5 square inches (approx. 29 cm^2).

C-a-4. Bulb Wattage : N/A

C-a-5. Mechanical :

Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility :

Horizontal angles : from 45°to the left to 45°to the right

Vertical angles : N/A.

C-b-2. Electrical Connection : N/A.

Country : China

Title of Standard : N/R.

Country : Hong Kong

Title of Standard : N/R.

Country : Indonesia

Title of Standard : N/R.

Country : Japan

Title of Standard : Safety Regulation of Road Vehicles, Article 39-2

A. Application : Vehicles

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Visible from a point at any height of 2.5 m or less above the ground at a distance of 10 m to the rear.

C-b-2. Electrical Connection :

Center high mounted stop lamp shall be so wired that it may be turned on only when the service brake system or the auxiliary brake system is operated.

Country : Korea

Title of Standard : The regulation of the motor vehicle safety standards (KMVSS), Article 43 and 106

A. Application : Motor vehicles and two-wheeled motorcycles

C-a-1. Photometry :

Test Points (deg)	Minimum Intensity (cd)
5U-V	25
H-5L	25
H-V	25
H-5R	25
5D-V	25
5U-5R	25
5U-10R	16
H-10R	16
5D-10R	16
5D-5R	25
5U-5L	25
5U-10L	16
H-10L	16
5D-10L	16
5D-5L	25
10U-10L	8
10U-V	16
10U-10R	8

Note 1 : The maximum intensity is 160 cd (Max.) within the area bounded by the test points 10U-10L, 10U-10R, 5D-10L, and 5D-10R.

C-a-2. Color : Red

C-a-3. Luminous Area : Effective projected luminous lens area shall not less than 28 cm^2.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Horizontal angles: from 10°to the left to 10°to the right

Vertical angles : from 10°to the above to 5°to the below

C-b-2. Electrical Connection :

Stop lamp shall be activated upon application of the service brake and in the steady-burning state until removal of braking.

Country : Malaysia

Title of Standard : N/R.

Country : New Zealand

Title of Standard : Transport (Vehicle Standards) Regulations 1990, No. 19
Traffic Regulations 1976, No. 61A

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : N/A.

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Country : Papua New Guinea

Title of Standard : Motor Traffic Regulation, No. 99

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Country : Philippine

Title of Standard : N/R.

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Country : Singapore

Title of Standard : Road Traffic (Motor Vehicles, Construction and Use) Rules, No. 30

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : N/A.

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection : N/A.

Country : Chinese Taipei

Title of Standard : Road Traffic Safety Standard, Annex 7, Section 6

A. Application : Motor vehicle

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area :

Effective area of lens shall be at least 29 cm^2

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Center high mounted stop lamp shall be activated in the steady-burning state upon application of the service brake, and shall not be flashed.

Country : Thailand

Title of Standard : Ministerial Regulations No.22 (B.E. 2537)-3(1)(e), Motor vehicle act

A. Application : Passenger car

C-a-1. Photometry : N/A.

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility : N/A.

C-b-2. Electrical Connection :

Center high mounted stop lamp shall be activated in the steady-burning state upon application of the service brake, and shall not be flashed.

Country : U.S.A.

Title of Standard : FMVSS No. 108
SAE J186a

A. Application : Passenger cars, Multipurpose passenger vehicles, Trucks, Buses, Trailers, and Motorcycles

C-a-1. Photometry :

Zone	Test Points (deg)	Minimum Intensity (cd)	
		Individual	Zone
I	5U-V	25	125
	H-5L	25	
	H-V	25	
	H-5R	25	
	5D-V	25	
II	5U-5R	25	98
	5U-10R	16	
	H-10R	16	
	5D-10R	16	
	5D-5R	25	
III	5U-5L	25	98
	5U-10L	16	
	H-10L	16	
	5D-10L	16	
	5D-5L	25	
IV	10U-10L	8	32
	10U-V	16	
	10U-10R	8	

Note 1 : The maximum intensity is 160 cd (Max.) within the area bounded by the test points 10U-10L, 10U-10R, 5D-10L, and 5D-10R.

Note 2 : The measured values at each test point shall not be less than 60 % of the value above-listed.

C-a-2. Color : Red

C-a-3. Luminous Area :

Functional lighted lens area shall be at lest 4.5 square inches (approx. 29 cm^2).

C-a-4. Bulb Wattage : N/A

C-a-5. Mechanical :

Vibration, Moisture, Dust and Corrosion Tests per SAE J575e shall be applied.

C-b-1. Visibility :

Horizontal angles : from 45°to the left to 45°to the right

Vertical angles : N/A.

C-b-2. Electrical Connection : N/A.

Country : EC

Title of Standard : ECE Regulation No. 7, 02 series, and No.48, 01 series

A. Application : N/A

C-a-1. Photometry :

Test Points (deg)	Minimum Intensity (cd)
5U-V	25
H-5L	25
H-V	25
H-5R	25
5D-V	25
5U-5R	25
5U-10R	16
H-10R	16
5D-10R	16
5D-5R	25
5U-5L	25
5U-10L	16
H-10L	16
5D-10L	16
5D-5L	25
10U-10L	8
10U-V	16
10U-10R	8

Note : The maximum intensity is 160 cd (Max.).
In detail, see ECE Reg. No.7

C-a-2. Color : Red

C-a-3. Luminous Area : N/A.

C-a-4. Bulb Wattage : N/A.

C-a-5. Mechanical : N/A.

C-b-1. Visibility :

Horizontal angles: from 10°to the left to 10°to the right

Vertical angles : from 10°to the above to 5°to the below

Throughout the field defined above, the intensity shall be not less than 0.3 cd.

C-b-2. Electrical Connection :

Must light up when the service brake is applied. The center high mounted stop lamps need not function if the device which starts and/or stop the engine is in a position which makes it impossible for the engine to operate. The center high mounted stop lamps may be activated by the application of a retarder or similar device.

ITEM 97-6

Omnibus Rollover strength

APEC Regulation Analysis Findings
Item No. 97-6: Omnibus Rollover Strength

1. A Comparison Among Member Economies

ADR 59/00 is referenced on ECE R.66, and both have the same requirements for body strength. In the case of buses having a window(s) on the roof, New Zealand stipulates that the "Director" may query the bus manufacturer about the designed strengths of the roof and pillars.

2. A Comparison of Requirements

Australian requirements are identical with those of ECE. New Zealand differs from Australia and ECE in that buses with a window(s) on the roof are required to have certain strengths of the roof and pillars.

3. Grouping

Japan and U.S. do not have a bus rollover regulation. New Zealand's regulation is much simpler than those of Australia and ECE. The only existing regulations for omnibus rollover strength are the above-mentioned ADR 59/00 and ECE R.66.

97-6. Omnibus Rollover Strength

«application» Omnibus

Economy	Application	Structure Requirement
Australia	Single deck omnibus of more than 16 passengers	Strength of body should be verified by roll-over test of complete vehicle, body section or representative, pendulum test of body section or calculation.
Brunei	N/A	N/A
Canada	N/R	N/R
Chile	N/A	N/A
China	N/R	N/R
Hong Kong	N/R	N/R
Indonesia	N/R	N/R
Japan	N/R	N/R
Korea	N/R	N/R
Malaysia	N/A	N/A
Mexico	N/A	N/A
New Zealand	Omnibus, trolley omnibus, service coach, school bus	The Director may ask for information and testing of the roof and supporting pillars for buses with panoramic windows.
Papua new guinea	N/A	N/A
Philippines	N/A	N/A
Singapore	N/R	N/R
Chinese Taipei	N/R	N/R
Thailand	N/R	N/R
USA	N/R	N/R
ECE	Single deck omnibus of more than 16 passengers	Strength of body should be verified by roll-over test of complete vehicle, body section or representative, pendulum test of body section or calculation.

ITEM 97-6-2-1

6. Omnibus Rollover Strength

Australia	ADR59/00	Omnibus Rollover Strength
ITEM	CONTENT	Illustration/Supplement
A. Application	Single deck omnibus of the carriage of more than 16 passengers excluding the crew	
B. Structure Requirement	Strength of the body should be verified by one of the following methods. After the test, no displaced part intrudes into the residual space and no part of the residual space projects the outside of the deformed structure.	Residual space : the volume within the passenger compartment swept when the transverse vertical plane defined in figure 1(a) is moved in a straight line or lines so that the point "R" passes the point of the rearmost outer seat, through the point of every intermediate outer seat to that of the foremost outer seat. The point "R" shown in figure 1(b) shall be assumed to be 500mm above the floor under the passenger feet, 300mm from the inside surface of the vehicle and 100mm in front of the seat back in the centre line of the outboard seats. See attached figure 1.
B-a. Roll-over test of complete Vehicle	The test vehicle is located on the horizontal platform and tilted at the angular velocity of not bigger than 5 degrees per second to fall down to the lower plane lower than the platform by 800mm.	
B-b. Roll-over test of body section or representatives	The test body section is located on the horizontal platform and tilted at the angular velocity of not bigger than 5 degrees per second to fall down to the lower plane lower than the platform by 800mm.	

B-c. Pendulum test of body sections	The body section is struck by a pendulum made of steel or plywood 20mm±5mm thickness. Shape of the pendulum is square and wider than the width of the section and not less than 800mm height. The pendulum strikes the section at the angle of 25°(+0°;-5°). Energy(E) of the impact is calculated by one of the following formulae:	

Australia	ADR59/00	Omnibus Rollover Strength
ITEM	CONTENT	Illustration/Supplement
	E = 0.75 x M x g x h (Nm) E = 0.75 x M x g x $\left[\sqrt{\left(W/2\right)^2 + H^2} - \frac{W}{2H}\sqrt{H^2 - 0.8^2} + 0.8\frac{H}{H}\right]$ (Nm) where: M = unladen mass of the vehicle (kg) g = 9.8 m/s^2 h = the difference of the center of the gravity between the highest point and the point of turned over when subjected to the roll-over test. W = the overall width of the vehicle Hs= the height of the center of gravity of the unladen vehicle (m) H = the height of the vehicle	

Australia	ADR59/00	Omnibus Rollover Strength
ITEM	CONTENT	Illustration/Supplement
B-d. Verification by calculation	The structure should be analyzed and a mathematical model be produced. This will define the separate member to be considered and identify the points at which plastic hinges may develop. The dimensions of the members and the properties of materials used to be stated. Physical test must be made on the points to determine the force-deformation characteristics in the plastic mode. The strain rate and the dynamic yield stress appropriate for the strain rate must be determined. If the calculation method will not indicate when a significant fracture will occur it will be essential to determine, by experiment separate analysis or appropriate dynamic tests that significant fracture will not occur. The assumed distribution of loading along the length of the vehicle should be stated. The calculation method shall include the deformations up to the limits of the material and identification of where plastic hinge will form and the subsequent formation of other plastic hinges unless the position and sequence is known from the previous experience. The method shall accommodate the change of the geometry of the structure. The calculation shall simulate the energy and the direction of impact when submitted to the roll-over test as prescribed in annex 3.	

6. Omnibus Rollover Strength

New Zealand	Passenger Service Vehicle Construction Regulation 1978	Omnibus Rollover Strength
ITEM	CONTENT	Illustration/Supplement
A. Application	Omnibus, trolley omnibus, service coach, school bus	
B. Structure Requirement	Where windows of a panoramic type are specified, the Director may call for such information and the testing of the design of the roof and support pillars as will satisfy him of the adequacy of that design.	

6.Omnibus Rollover Strength

ECE	Regulation No.66	Strength of Superstructure (large passenger vehicle)
ITEM	CONTENT	Illustration/Supplement
A. Application	Single deck omnibus of the carriage of more than 16 passengers excluding the crew	
B. Structure Requirement	Strength of the body should be verified by one of the following methods. After the test, no displaced part intrudes into the residual space and no part of the residual space projects the outside of the deformed structure.	Residual space: the volume within the passenger compartment swept when the transverse vertical plane defined in figure 1(a) is moved in a straight line or lines so that the point "R" passes the point of the rearmost outer seat, through the point of every intermediate outer seat to that of the foremost outer seat. The point "R" shown in figure 1(b) shall be assumed to be 500mm above the floor under the passenger feet, 300mm from the inside surface of the vehicle and 100mm in front of the seat back in the center line of the outboard seats. See attached figure 1.
B-a. Roll-over test ..of complete Vehicle	The test vehicle is located on the horizontal platform and tilted at the angular velocity of not bigger than 5 degrees per second to fall down to the lower plane lower than the platform by 800mm.	
B-b. Roll-over test of body section or representatives	The test body section is located on the horizontal platform and tilted at the angular velocity of not bigger than 5 degrees per second to fall down to the lower plane lower than the platform by 800mm.	

ECE	Regulation No.66	Strength of Superstructure (large passenger vehicle)
ITEM	CONTENT	Illustration/Supplement
B-c. Pendulum test of body sections	The body section is struck by a pendulum made of steel or plywood 20mm±5mm thickness. Shape of the pendulum is square and wider than the width of the section and not less than 800mm height. The pendulum strikes the section at the angle of 25°(+0°;-5°). Energy(E) of the impact is calculated by one of the following formulae: E = 0.75 x M x g x h (Nm) E = 0.75 x M x g x $\left[\sqrt{(W/2)^2 + H_s^2} - \frac{W}{2H}\sqrt{H^2 - 0.8^2} + 0.8\frac{H}{H_s}\right]$ (Nm) where: M = unladen mass of the vehicle (kg) g = 9.8 m/s^2 h = the difference of the center of the gravity between the highest point and the point of turned over when subjected to the roll-over test. W = the overall width of the vehicle Hs= the height of the center of gravity of the unladen vehicle (m) H = the height of the vehicle	

ECE	Regulation No.66	Strength of Superstructure (large passenger vehicle)
ITEM	CONTENT	Illustration/Supplement
B-d. Verification by calculation	The structure should be analyzed and a mathematical model be produced. This will define the separate member to be considered and identify the points at which plastic hinges may develop. The dimensions of the members and the properties of materials used to be stated. Physical test must be made on the points to determine the force-deformation characteristics in the plastic mode. The strain rate and the dynamic yield stress appropriate for the strain rate must be determined. If the calculation method will not indicate when a significant fracture will occur it will be essential to determine, by experiment separate analysis or appropriate dynamic tests that significant fracture will not occur. The assumed distribution of loading along the length of the vehicle should be stated. The calculation method shall include the deformations up to the limits of the material and identification of where plastic hinge will form and the subsequent formation of other plastic hinges unless the position and sequence is known from the previous experience. The method shall accommodate the change of the geometry of the structure. The calculation shall simulate the energy and the direction of impact when submitted to the roll-over test as prescribed in annex 3.	

ITEM 97-7

Side marker lamps

APEC Regulation Analysis Findings
Item No.97-7: Side Marker Lamp

1. The Canadian regulation for side marker lamps is equivalent with FMVSS. The Australian and Korean regulations can also be considered as equivalent with FMVSS.

2. New Zealand recognizes the regulations of Australia, Japan, U.S., ECE, and EEC as alternatives.

3. Brunei, China, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Chinese Taipei, and Thailand specify side marker lamps, but do not give many detailed requirements.

4. A comparison of specific requirements is as follows:

   (1) Light Beam Distribution (C-a-1)
   Australia, Canada, Korea, U.S., and ECE provide luminous intensity values. Canada and U.S. are equivalent under FMVSS. The requirements of Brunei, China, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Chinese Taipei, and Thailand slightly differ among themselves; however, they are consistent in requiring higher luminous intensities from vehicles having a greater width.

   (2) Beam Color (C-a-2)
   Australia, Canada, Japan, New Zealand, Thailand, U.S., and ECE require amber beams from front side marker lamps and red from rear lamps. All member economies specify red for rear lamps, except that Papua New Guinea requires white-beam rear lamps. Hong Kong and Korea do not distinguish between front and rear side marker lamps when it comes to beam color.

   (3) Luminous Area (C-a-3)
   Only Hong Kong sets forth luminous area requirements.

   (4) Bulb Wattage (C-a-4)
   ECE provides requirements for bulb wattage. Hong Kong require bulb wattage to be 7W or higher, while Papua New Guinea specifies it to be 7W or less.

   (5) Visibility (C-b-1)
   Only a small number of member economies set forth visibility (and/or conspicuity) requirements for side marker lamps. New Zealand stipulates both conspicuous range and conspicuous distance. Australia and ECE have equivalent visibility ranges.

ITEM No. 97-7 Side Marker Lamp

«A : Application» Passenger Car

Country	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical
Australia	ADR 45/01 (Max.: 0.25 cd Min.: 15 cd)	ADR 45/01 and 13/00 (F: Amber R: Red)	N/R	N/R	ADR 45/01 (General)
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	FMVSS 108	ADR 45/01 and 13/00 FMVSS 108	N/R	N/R	FMVSS 108
Chile					
China	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	N/R	N/R	N/R
Hong Kong	N/R	Unique (White or Red)	Unique (Min. 25 mm diameter)	Unique (Min. 7 W)	Unique (Clean and efficient condition)
Indonesia	N/R	N/R	N/R	N/R	N/R
Japan	SRRV 35-2 (The light shall be clearly visible at night at a distance of 150m from the side of the vehicle)	SRRV 35-2 (F: Amber R: Amber or Red)	N/R	N/R	SRRV 32 (General)
Korea	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico					
New Zealand	N/R	Unique (F: White or Amber R: Red)	N/R	N/R	N/R
Papua New Guinea	N/R	Unique (F: White R: Red)	N/R	Unique (Max. 7 W)	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Thailand	N/R	SRRV-35-2 ECE R91 & R48	N/R	N/R	N/R
USA	FMVSS 108 (Max.: 15 cd Min.: 0.25 cd for Amber, 0.62 cd for Red)	FMVSS 108 (F: Amber R: Red)	N/R	N/R	FMVSS 108 (Corrosion, Dust, Moisture & Vibration)
ECE	ECE R91 (Category SM2, Max.: 25 cd Min.: 25 cd)	ECE R91 & R48 (F: Amber R: Amber or Red)	N/R	ECE R37 (See each Sheet)	ECE R91 (General)

ITEM No. 97-7 Side Marker Lamp

Country	C-b Position	C-b-1 Visibility	C-b-2 Connection	D Markings	E Reference Standards Alternative Regulation
Australia	Common (On each side of vehicle)	ADR 13/00 (10 dig. U to 10 dig. D and 45 dig. L to 45 dig. R)	Common (At same time lighted position lamp)	N/R	N/A
Brunei	N/R	N/R	N/R	N/R	N/A
Canada	Common	N/R	Common	N/R	N/A
Chile					
China	N/R	N/R	N/R	N/R	N/A
Chinese Taipei	N/R	N/R	N/R	N/R	N/A
Hong Kong	N/R	N/R	N/R	N/R	N/A
Indonesia	N/R	N/R	N/R	N/R	N/A
Japan	Common	SRRV 35-2	Common	N/R	N/A
Korea	N/R	N/R	N/R	N/R	N/A
Malaysia	N/R	N/R	N/R	N/R	N/A
Mexico					
New Zealand	N/R	N/R	N/R	N/R	N/A
Papua New Guinea	N/R	N/R	N/R	N/R	N/A
Philippines	N/R	N/R	N/R	N/R	N/A
Singapore	N/R	N/R	N/R	N/R	Unique (FMVSS 108)
Thailand	N/R	N/R	Common	N/R	N/A
USA	Common (On each side of vehicle)	N/R	Common (At same time lighted position lamp)	N/R	N/A
ECE	Common (On each side of vehicle)	ECE R91 (Fro category SM2 10 dig. U to 10 dig. D and 30 dig. L to 30 dig. R)	Common (At same time lighted position lamp)	ECE R91 (Approval mark, Tradename/number, Bulb category)	N/A

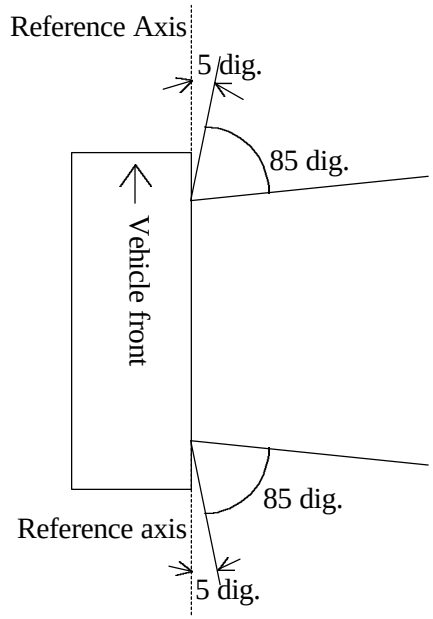
Economy : Australia

Title of Standard : 3rd Australia Design Rule 45/01

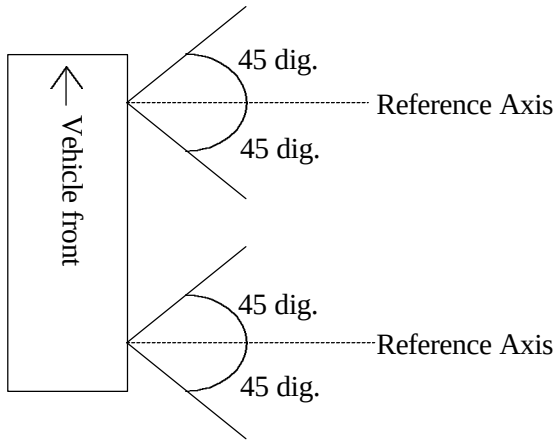
A. Application : All vehicle

C-a-1 : Photometry :

Vehicle type		Others	Passenger car
Minimum intensity (within the specified angular field)		0.3cd	0.25cd
Maximum intensity (Over-all)		12cd	15cd
Angle field	Horizontal	5 to 85dig.	±45dig.
	Vertical	±10dig.	±10dig.



Others car



Passenger car

Horizontal angle field

C-a-2 : Color :

Front side marker : Amber

Rear side marker : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical :

The devices must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1 : Visibility :

Passenger car

Horizontal : 45dig. forward and 45dig. backward form reference center

Vertical : 10dig. above and 10dig. below form reference center

Others car

Horizontal : 5dig. outward and 85dig. outward form vertical plane

Vertical : 10dig. above and 10dig. below form reference center

C-b-2 : Electrical Connection :

N/R

(or same time lighted front position, side marker, endout-line marker and License plate lamp. 3rd ADR 13/00 Appendix A)

Economy : Canada

Title of Standard : CMVSS No.108 and TSD No.108

A. Application : Motor Vehicles

C-a-1 : Photometry : SAE J592e Table 1

C-a-2 : Color :

Front Side : Amber

Rear Side : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test

Moisture Test

Dust Test

Corrosion Test

C-b-1 : Visibility : see C-a-1

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the headlamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Economy : Hong Kong

Title of Standard : Road Traffic (Safety Equipment) Regulations

A. Application : Motor Vehicles

C-a-1 : Photometry : N/R

C-a-2 : Color : White or Red

C-a-3 : Luminous Area : Not less than 25mm in diameter or equivalent

C-a-4 : Bulb Wattage : Not more than 7W

C-a-5 : Mechanical : Clean and efficient condition

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Japan

Title of Standard : Safety Regulations for Road Vehicles Article 35-2

A. Application :

Front, Center and Rear : Motor Vehicles with a length of 9m or more

Front and Rear : Motor Vehicles with a length of less than 9m but 6m or more

C-a-1 : Photometry :

The light of a side marker lamp shall be clearly visible at night at a distance of 150m from the side of the vehicle

C-a-2 : Color :

Front and Center : Amber

Rear : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :

Side marker lamps shall be wired so that it may not be put out at the driver's seat. It must be turned on whenever the headlamps, auxiliary headlamps or clearance lamps are turned on.

Economy : Korea

Title of Standard :

The Regulations of the Motor Vehicle Safety Standards 38 & 106

A. Application : Motor Vehicle

C-a-1 : Photometry :

1. Maximum luminous intensity
   a) On and above the H line : not more than 125 candela
   b) Below the H line : not more than 250 candela

2. Minimum luminous intensity at each test point.
   a) Minimum luminous intensity at each test point in the case of a motor vehicle with a width of more than 200 centimeters. (candela)

Test Point (degree)	Minimum Luminous Intensity
45L-10U, H, 10D	0.62
V-10U, H, 10D	0.62
45R-10U, H, 10D	0.62

Note : If the measured value at each test point in the table above is not less than 60 percent of the minimum luminous intensity and the measured value at each test point in the table below meets the requirements of the sum of the minimum luminous intensity, it shall be deemed to be in compliance with the requirements of the minimum luminous intensity.

Test Point (degree)	Sum of Minimum Luminous Intensity
45L-10U, H, 10D	1.86
V-10U, H, 10D	1.86
45R-10U, H, 10D	1.86

   b) Minimum luminous intensity at each test point in the case of a motor vehicle with a width of 200 centimeters or less(candela)

Test Point (degree)		Luminous Intensity (candela)
10U, 10D	5L, 5R	0.8
5U, 5D	20L, 20R	0.4
	10L, 10R	0.8
	V	2.8
H	10L, 10R	1.4
	5L, 5R	3.6
	V	4.0

Note : If the measured value at each test point in the table below meets the requirements of the sum of the minimum luminous intensity, it shall be deemed to be in compliance with the requirements of the minimum luminous intensity.

Test Point (degree)		Luminous Intensity (candela)
20L-5U,5D	5L-10U, 10D	2.4
10L-5U, H, 5D		3.0
H-5L, V, 5R	V-5U, 5D	16.8
10R-5U, H, 5D		3.0
20R-5U,5D	5R-10U, 10D	2.4

C-a-2 : Color : White, Yellow or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : New Zealand

Title of Standard :

Transport (Vehicle Standards) Regulations 16

A. Application :

Exceeds 1.5m width--- Every motor vehicle

Exceeds 2.0m width--- Every motor vehicle and trailer

C-a-1 : Photometry : N/R

C-a-2 : Color : White or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility :

Visible from a distance of 200m at night,

Vertical : 15 dig. above and below form reference center

Horizontal : 45 dig. inboard and 80 dig. outboard from reference center

C-b-2 : Electrical Connection : N/R

Economy : New Zealand

Title of Standard :

Transport (Vehicle Standards) Regulations 16

A. Application : Every motor vehicle

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility :

Visible from a distance of 200m at night,
Vertical : 15 dig. above and below form reference center
Horizontal : 45 dig. inboard and 80 dig. outboard from reference center

C-b-2 : Electrical Connection : N/R

Economy : Papua New Guinea

Title of Standard : Motor Traffic Regulations No. 97

A. Application :
exceed 7.5m length motor truck trailer or semi-trailer

C-a-1 : Photometry : N/R

C-a-2 : Color :
Front side marker : White
Rear side marker : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : Shall not exceed 7W

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Economy : Thailand

Title of Standard : Ministerial Regulations No. 22 Article 3 (1) (b), Motor vehicle act

A. Application : Motor car and MPV (may be)

C-a-1 : Photometry : N/R

C-a-2 : Color :

Front side marker : Amber

Rear side marker : Amber or Red

Both side shall be same color

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :

Device shall give out light only when the tail lights give out light as well (same time lighted of tail light)

Economy : U.S.A.

Title of Standard : FMVSS No.108

A. Application : Motor Vehicles

C-a-1 : Photometry :

SAE J592e Table 1 unit : cd

Test Points		Red	Amber
10U	45L	0.25	0.62
	V	0.25	0.62
	45R	0.25	0.62
H	45L	0.25	0.62
	V	0.25	0.62
	45R	0.25	0.62
10D	45L	0.25	0.62
	V	0.25	0.62
	45R	0.25	0.62

Note : In the case of red side marker lamps, maximum luminous intensity shall not exceed 15cd

C-a-2 : Color :

Front and Center : Amber

Rear : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test

Moisture Test

Dust Test

Corrosion Test

C-b-1 : Visibility : see C-a-1

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the headlamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Economy : EC

Title of Standard : ECE Uniform Regulation No. 91

A. Application : N/R

C-a-1 : Photometry :

Category		SM1	SM2
Minimum intensity	Reference enter (H-V)	4.0cd	0.6cd
	Within the specified angular field, other than above	0.6cd	0.6cd
Maximum intensity (Over-all)		25cd	25cd
Angle field	Horizontal	±45dig.	±30dig.
	Vertical	±10dig.	±10dig.

Table of standard light distribution for category SM1

	45dig.	40dig.	30dig.	20dig.	10dig.	5dig.	V	5dig.	10dig.	20dig.	30dig.	40dig.	45dig.
10dig.													
5dig.													
H													
5dig.													
10.dig													

Table of standard light distribution for category SM2

	30dig.	20dig.	10dig.	5dig.	V	5dig.	10dig.	20dig.	30dig.
10dig.									
5dig.									
H									
5dig.									
10.dig									

For SM1 and SM2 category of side-marker lamps it may be sufficient to check only five points selected by test authority.

C-a-2 : Color :

Front side marker : Amber

Rear side marker : Amber or Red*

* : If rear side marker lamp is grouped or combined or reciprocally incorporated with the rear position lamp, rear endout-line marker lamp, rear fog lamp, stop lamp, or is grouped with or has part of the light emitting surface in common with the rear retro-reflector.

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage :

Replaceable light sources : See ECE Reg. No. 37-03

Non-replaceable light sources : N/R

C-a-5 : Mechanical :

The devices must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1 : Visibility :

Category SM1

Horizontal : 45dig. forward and 45dig. backward form reference center

Vertical : 15dig. above and 15dig. below form reference center

Category SM2

Horizontal : 30dig. forward and 30dig. backward form reference center

Vertical : 15dig. above and 15dig. below form reference center

Above area maximum intensity shall be not more than 25cd

C-b-2 : Electrical Connection :

N/R

(or same time lighted front position, side marker, endout-line marker and License plate lamp. ECE No. 48-01 S5.11)

ITEM 97-8

Windows and ventilation

APEC Regulation Analysis Findings
Item No. 97-8: Windows and Ventilation (Passenger Car)

1. Australia, Japan, and Korea set forth a ventilation regulation for cars. Their regulations provide requirements for only ventilation construction, not for ventilation performance, and can be regarded as being equivalent among themselves.

2. No other member economies have a ventilation regulation for cars.

Item No.97-8 Windows and Ventilation

A : Application Passenger Car

Country	B: Construction	B-b : Ventilation
Australia		ADR 42/02 (By half the number of windows or by an alternative method of ventilation)
Brunei		
Canada		
Chile		
China		
Hong Kong		
Indonesia		
Japan		SRRV 20 (Compartment of a motor vehicle shall be constructed to ensure adequate ventilation)
Korea		SRRV 20
Malaysia		
Mexico		
New Zealand		
Papua New Guinea		
Philippines		
Singapore		
Chinese Taipei		
Thailand		
United States		
ECE		

Country	C: Function	D: Marking	E: Reference standards / Alternative regulation
Australia			
Brunei			
Canada			
Chile			
China			
Hong Kong			
Indonesia			
Japan			
Korea			
Malaysia			
Mexico			
New Zealand			
Papua New Guinia			
Philippines			
Singapore			
Chinese Taipei			
Thailand			
United States			
ECE			

Item No.97-8 Windows & Ventilation (Passenger Car)

Economy : AUSTRALIA ADR 42/02		
Item	Content	Illustration / supplement
A : Application B : Structure Requirement B-b : Ventilation	Passenger car At least half the number of windows must be capable of being opened or the vehicle must be provided with an alternative method of ventilation.	

Item No.97-8 Windows & Ventilation (Passenger Car)

Economy : JAPAN Safety Regulations for Road Vehicles, Article 20		
Item	Content	Illustration / supplement
A : Application B : Structure Requirement B-b : Ventilation	Passenger car The drivers and passenger compartment of a motor vehicle shall be constructed to ensure adequate ventilation.	

Item No.97-8 Windows & Ventilation (Passenger Car)

Economy : KOREA Motor Vehicle Safety Standards, Article 23		
Item	Content	Illustration / supplement
A : Application B : Structure Requirement B-b : Ventilation	Passenger car The occupant compartment of each motor vehicle shall be equipped with ventilation systems (except for convertibles, or open-body type vehicles).	

ITEM 97-9

Field of view

APEC Regulation Analysis Findings
Item No. 97-9 : Frontal field of Vision

1. Australia, Japan and Europe have a regulation for the frontal field of vision (refer to detailed analysis). Europe's regulation is established in EEC, not in ECE. As some APEC member economies conform with this EEC regulation, ECE is included in the analysis as a reference regulation.

2. China and Korea adopt a domestic law conforming with European laws concerning the frontal field of vision.

3. Brunei and some other member economies prohibit the furnishing of accessories which will impair the field of vision. Australia, Japan Korea and U.S. specify the transmittance of window glass, with Australia requiring 75% and the other three 70%.

ITEM97-9 Field of view

Economy	Scope	Transparency	Specified Zone
Australia	All	75%	Refer to the detail
Brunei			
Canada			
Chile			
China	Passenger cars	70%	Refer to the detail(Harmonized with 77/649/EEC)
Hong Kong			
Indonesia			
Japan	All	70%	Refer to the detail
Korea	Passenger cars	70%	Refer to the detail(Harmonized with 77/649/EEC)
Malaysia			
Mexico			
New Zealand			
Papua New Guinea			
Philippines			
Singapore			
Chinese Taipei			
Thailand	Passenger car	40%	
USA	All	70%	Not specified
ECE			
77/649/EEC	Passenger cars	70%	Refer to the detail

ITEM 97-9-2-1

ITEM No.9 Australia, Australian Design Rule 8

A: Application		All
B: Structure requirements		———
C: Performance requirements	Optical Transmission	There must be not less than 75% optical transmission in the primary vision area. The area is inclined 15degrees to the right and 56 degrees to the left. The area is between a plane tangential to the top of 95percentile Eye Ellipses, inclined 10degree above the horizontal and a horizontal line at ground level 11m from eye position.
D :Label		———
E : Reference requirements		———

ITEM No.9 Brunei, The road traffic Enactment 1954, The road traffic regulations.

A: Application		All
B-b: Structure requirements		(1)All glass and transparent material shall not obscure the vision of driver. (2)No tinted glass shall be used except the prior permission of commissioner of police, or controller of Land transport. (3)Windscreen shall not be obscured by any curtain, blinds, stickers.
C: Performance requirements		———
D: Label		———
E: Reference requirements		———

ITEM No.9 China, Chinese standards GB11562-94

A: Application		Passenger cars
B: Structure requirements		———
C: Performance requirements	1.Transparent Area	The area whose light transmittance measured at following six points, is not less than 70%. i) A horizontal datum point forward of V1 and 17° left. ii) An upper vertical datum point forward of V1 and 7° above the horizontal. iii) A lower vertical datum point forward of V2. iv) On the opposite half of window screen symmetrical to the above.
	2. Angle of obstruction of A- pillar	The total number of A-pillar shall not exceed two and the angle of obstruction for each A-pillar shall not exceed 6°.
	3.Obstruction	There should be no obstruction in the driver's 180° forward direct vision, below a horizontal plane passing through V1, and above three planes through V2 one being prependicular to the plane X-Z and declining forward 4° below the horizontal, and the other two being prependicular to the plane Y-Z and declining 4° below the horizontal. Other than the obstruction created by A- pillars, the fixed or movable vent, side window division bars, outside radio aerials, rear view mirrors and windscreen wipers.
D: Label		———
E: Reference requirements		———

ITEM No.9 Japan, Safety Regulations for Road Vehicles Act 21, Act 29

A: Application		All
B: Structure requirements		-The driver's seat shall be constructed so that the driver may have a full view for driving. -The windshield glass and side windows shall be transparent and free from any distortion.
C: Performance requirements	Optical Transmission	-The rate of light transmission at sections concerned with the driver's view necessary shall be 70% or more. -No substances other than specified regulation shall be applied to nor painted on the windshield glass on windows. (1)Windshield, the visible light transmission test zones is excluding the section specified below. i) Sections above a plane includes a straight line passing through point VI (In case of the vehicle other than passenger car: point O) and perpendicular to the longitudinal plane of vehicle and which also intersects the horizontal plane at angle of 7° upward (10°, other than passenger cars) ii) Sections which are located within 10mm from the installation frame, instrument panel and other sections where the windshield overlaps with the vehicle body. (2) Side glass, those zones excluding the sections specified below. i) Window glass at the lower part of the door at the side of the vehicle. ii) Ranges below a horizontal plane which includes the seating surface of the seat. iii) Sections above a plane which includes a straight line passing through the point VI and in parallel to the longitudinal plane of the vehicle and which also intersects the horizontal plane at an angle of 7° upward. iv) Sections which are located within 10mm from the installation flame and other sections where the side windows overlap with the vehicle body and sections where the window glass is overlapped with window glass.
D: Label		———
E: Reference standards		———

ITEM No.9 Korea, The regulations of the motor vehicle safety standards

A: Application		Passenger vehicle and bus with a seating capacity of 10passengers or less shall meet requirement.
B-b: Structure requirements		———
C: Performance requirements	Optical Transmission	1.Windshields, including points set forth below on the front windshield surface, shall be capable of transmitting visible light not less than 70%. (a)A point 17° left of straight ahead from VI point. (b)A point ahead of VI point and raised 7° with respect to the horizontal line. (c)A point ahead of V2 point and lowered 5° with respect to the horizontal line. (d)Point at which the above 3 points are respectively symmetric to the plane which includes vehicle center line and is also vertical to the ground. 2.The number of A-pillar shall be less than 2 and its disturbance angle shall not exceed 6° . 3.Any disturbance object except for the A-pillar, windshield retention structure, outside radio antenna, rearview mirror, and windshield wiper shall not be installed in the field of visibility of a driver which is composed of points set forth. (a)Lower part of the horizontal plane which passes through VI point. (b)Upper part of the plane which is at angle of 4° to the downward of straight ahead of the plane which is vertical to X-Z plane and passes through V2 point. (c)Upper part of the plane which is at angle of 4° to the left and downward of the plane which is vertical to Y-Z plane and passes through V2 point. (d)(d)Upper part of the plane which is at angle of 4° to the right and downward of the plane which is vertical to Y-Z plane and passes through V2 point.
D: Label		———
E: Reference requirements		———

ITEM No.9 Singapore, Road Traffic(Motor Vehicle Construction & Use) Rule

A: Application		All
B-b: Structure requirements		(1)All glass and any transparent material shall not obscure the vision of driver. (2)No tinted glass shall be used except the prior permission of registrar.
C: Performance requirements		———
D: Label		———
E: Reference requirements		———

Item No. 9 Thailand, Ministerial regulation No.23 (B.E. 2538)

A: Application		Motor vehicle
B-b: Structure requirements		(1) All glass and transparent material shall not obscure the driver vision (2) Any material can be not sticked on the windscreen except 1. The symbol or sign under the provision of DLT., but not obscure the driver vision 2. Tinted on the top of the windscreen ≤ 25% of windscreen area

ITEM No.9 EEC, 77/649/EEC, 81/643/EEC, 88/366/EEC, 90/630/EEC

A: Application		Passenger Cars
B: Structure requirements		———
C: Performance requirements	Transparent Area	The area whose light transmittance measured at following six points, is not less than 70%. i) A horizontal datum point forward of V1 and 17° left. ii) An upper vertical datum point forward of V1 and 7° above the horizontal. iii)A lower vertical datum point forward of V2. iv)On the opposite half of window screen symmetrical to the above.
	Angle of Obstruction of A- pillar	The total number of A-pillar shall not exceed two and the angle of obstruction for each A-pillar shall not exceed 6°.
	Obstruction	There should be no obstruction in the driver's 180° forward direct vision, below a horizontal plane passing through V1, and above three planes through V2 one being prependicular to the plane X-Z and declining forward 4° below the horizontal, and the other two being prependicular to the plane Y-Z and declining 4° below the horizontal. Other than the obstruction created by A- pillars, the fixed or movable vent, side window division bars, outside radio aerials, rear view mirrors and windscreen wipers.
D: Label		———
E: Reference requirements		———

ITEM 97-10

Brake tubing and brake hose

APEC Regulation Analysis Findings
Item No.97-10: Brake Tubing and Hose

1. Hydraulic Brake Hose

- Different from Canada and U.S., Australia does not provide a water absorption test (C-a-6) and a brake fluid compliance test (C-a-8); other requirements are the same among the three member economies.
- China provides requirements for inner radius shrinkage (C-a-1), cubage expansion (C-a-2), tear strength (C-a-3), and tension test (C-a-5). These requirements are identical with those of Australia, Canada, and U.S. As a special requirement, China sets forth a 100% pressure resistance test.

2. Air Brake Hose

- Canada and U.S. have the same requirements, which are stipulated in detail for some dozen requirement items.
- Australia simply stipulates that air brake hoses be free from "chafing, kinking and other mechanical damage."
- The requirement items of China, a small in number, are identical with the corresponding requirements of Canada and U.S.

3. Vacuum Brake Hose

- The same as the above air brake hose requirements.

4. Others

- Japan and ECE do not provide requirements for brake tubing and brake hoses as separate unit parts; however, these are treated as part of the braking system. Japan's JIS standard gives a tear strength standard value that is different from those of Australia, Canada, and U.S. Also, JIS sets forth an oil resistance test in the place of FMVSS's brake fluid compliance test.
- Malaysia, Papua New Guinea, and Singapore do not provide requirements for brake tubing and brake hoses as separate unit parts. These are subjected to the requirements for brakes.
- Other member economies do not have a regulation for brake tubing and brake hoses.

ITEM No.10 BRAKE TUBING & BRAKE HOSE

<< A:application >> Passenger Car

Economy	B-1 Construction	C-b-1 Test Procedure : General	C-b-2 Temperature of testing room	C-b-3 Stabilizing of test samples
Australia (ADR 7/00)	N/R	In accordance with ISO 3996-'78 or ASTM Standard D 571-'55	Between 20 and 35 °C (Except in the case of the "Cold test")	The hose assemblies shall be stabilized at room temp. prior to testing.
Brunei	N/A	N/A	N/A	N/A
Canada (MVSR 106)	Same as FMVSS 106	N/R	N/R	N/R
Chili	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
China (GB 4784)	N/R	N/R	N/R	N/R
Hong Kong	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Indonesia	N/A	N/A	N/A	N/A

<table>
<tr><th>Economy</th><th>C-b-4
External protections</th><th>C-a-1
Constriction Test</th><th>C-a-2
Expansion Test</th></tr>
<tr><td>Australia</td><td>Testing must be done with external protection.
But, when it is not integral with Brake Hose and all others external appendages, they shall be removed.</td><td>The plug gauge shall drop of its own weight a distance of 75 mm within 5 seconds.
a. For 3.2mm I/D Hose : 2.03mm
b. For 4.8mm I/D Hose : 3.05mm
c. For 6.3mm I/D Hose : 4.19mm</td><td>Not exceed the value in below. The value is in milliliters per meter (mm per foot).
<table>
<tr><th rowspan="2">Nominal Hose Size in mm (inch)</th><th colspan="2">6.9MPa</th><th colspan="2">10.3MPa</th></tr>
<tr><th>Regular E. Hose</th><th>Low E. Hose</th><th>Regular E. Hose</th><th>Low E. Hose</th></tr>
<tr><td>3.2 (1/8)</td><td>2.17(0.66)</td><td>1.08(0.33)</td><td>2.59(0.79)</td><td>1.38(0.42)</td></tr>
<tr><td>4.8 (3/16)</td><td>2.82(0.86)</td><td>1.81(0.55)</td><td>3.35(1.02)</td><td>2.36(0.72)</td></tr>
<tr><td>6.3 (1/4)</td><td>3.41(1.04)</td><td>2.69(0.82)</td><td>4.27(1.30)</td><td>3.84(1.17)</td></tr>
</table></td></tr>
<tr><td>Brunei</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Canada</td><td>N/R</td><td>Same as FMVSS 106</td><td>Common-Same as ADR 7/00, FMVSS 106 and GB 4748</td></tr>
<tr><td>Chili</td><td>N/A</td><td>N/A</td><td>N/A
There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.</td></tr>
<tr><td>China</td><td>N/R</td><td>Same as ADR 7/00</td><td>Common-Same as ADR 7/00, FMVSS 106 and MVSR 106</td></tr>
<tr><td>Hong Kong</td><td>N/A</td><td>N/A</td><td>N/A
There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.</td></tr>
<tr><td>Indonesia</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
</table>

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<table>
<tr><th>Economy</th><th>C-a-3
Bursting Strength Test</th><th>C-a-4
Whip Test</th><th>C-a-5
Tensile Test</th></tr>
<tr><td>Australia</td><td>a. The hose shall withstand the pressure in the below for 2 minutes.
b. And then, shall not rupture at less than the pressure in the below.
(The rate of increasing pressure shall be between 100 to 250 MPa.)
<table>
<tr><th>Nominal Hose Size
mm (inch)</th><th>Testing Pressure
MPa (psi)</th><th>Minimum Bursting Strength
MPa (psi)</th></tr>
<tr><td>3.2 (1/8)
4.8 & 6.3(3/16,1/4)</td><td>27.56 (4000)
19.98 (2900)</td><td>34.45 (5000)
31 (4500)</td></tr>
</table></td><td>The hose shall not rupture to be continuous running on a flexing machine for 35 hours.
Ranging of Hose Free Length is from 200 to 600 mm for 3.2 I/D Hose and from 200 to 400 mm for 4.8 & 6.3 I/D Hose.</td><td>The hose shall withstand a pull of 1.44 kN force without separation of the hose from its end fittings.
A speed of pulling is approximately 25 mm per minute.</td></tr>
<tr><td>Brunei</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Canada</td><td>Same as FMVSS 106</td><td>Same as FMVSS 106</td><td>Same as FMVSS 106</td></tr>
<tr><td>Chili</td><td>N/A
There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.</td><td>N/A</td><td>N/A</td></tr>
<tr><td>China</td><td>Same as FMVSS 106</td><td>N/R</td><td>Same as FMVSS 106</td></tr>
<tr><td>Hong Kong</td><td>N/A
There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Indonesia</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
</table>

Economy	C-a-6 Water Absorption → Bursting , Tensile & Whip Test	C-a-7 Cold Test
Australia	N/R	The hose shall not show crack or brake visible without magnification after the test. a.Set up the hose in cold box : in a straight position b.Temperature : minus 40°Celsius c.Time : for 72 hours d.Diameter of Mandrel to use :76 mm for 3 mm Hose , 90 mm for 4.8 & 6.3 mm Hose e.The hose shall be bent around the mandrel still at the temperature in cold box.
Brunei	N/A	N/A
Canada	Same as FMVSS 106	Common - Same as ADR 7/00 and FMVSS 106 (however,the exposure time is 70 hours.)
Chili	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.	
China	N/R	N/R
Hong Kong	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.	
Indonesia	N/A	N/A

Economy	C-a-8 Brake Fluid Compatibility Test Constriction & Bursting Test	C-a-9 Ozone Test
Australia	N/R	The outer cover of hose shall show no cracks visible under 7-power magnification after the test. Test Method: ASTM D 622-'65 a. Bind the hose 360° around the cilinder with a diameter 8 times the nominal outside diameter of hose. b. Conditioning at room temperature for 24 hours. c. Ozone exposure in the chamber *Time: 70 hours *Temperature: 40° Celsius *Ozone Proportion: 50 pphm
Brunei	N/A	N/A
Canada	Same as FMVSS 106	Common-Same as ADR 7/00 and FMVSS 106
Chili	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.	
China	N/R	N/R
Hong Kong	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.	
Indonesia	N/A	N/A

Economy	C-a-10 Salt Spray Test	C-a-11 100 % Pressure Test	D-1 Manufacturer I.D.(Labelling)	E-1 Alternative Standards
Australia	End fittings shall withstand to the Salt Spray Test. Test Method : ASTM B 117-'64 a. Salt Solution : 5 ± 1 % * PH : 6.5 - 7.2 * Specific Gravity : 1.03 -1.04 b. Temperature : 34 - 36°C c. Period : 24 hours	N/R	Hose Assembly shall bear a distinctive designation prominently & permanently indicating the name or trade mark of its "Manufacturer".	* SAE J 1401 JAN 81 * FMVSS 106-74
Brunei	N/A	N/A	N/A	N/A
Canada	Common-Same as ADR 7/00 and FMVSS 106	N/R	Same as FMVSS 106	N/A
Chili	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
China	N/R	Hose Assembly shall withstand the pressure test. * Medium: Water or Brake Fluid * Pressure: 20.7-24 Mpa * Time : 10-25 Seconds	N/R	N/R
Hong Kong	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Indonesia	N/A	N/A	N/A	N/A

Economy	C-a-12 Air or Vacuum brake tubing and brake hose
Australia (ADR 42/02)	Air or Vacuum brake tubing and brake hose must be so fitted to prevent "Chafing", "Kinking" or other mechanical damage under normal motion of the part.
Brunei	N/A
Canada (MVSR 106)	Same as FMVSS 106
Chili	N/A There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.
China (GB 7062) (GB 10484)	GB 7062 is for the spec. of Air Brake Hose and GB 10484 is for the spec. of Vacuum Brake Hose. These spec.s are same as FMVSS 106 and MVSR 106, but the required item are a little.
Hong Kong	N/A There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.
Indonesia	N/A

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Economy	B-1 Construction	C-b-1 Test Procedure : General	C-b-2 Temperature of testing room	C-b-3 Stabilizing of test sample
Japan	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit. However, Japan has a requirement of brake hose assembly which is a Japanese Industrial Standard, not regal. (JIS D 2601)			
Korea	N/A	N/A	N/A	N/A
Malaysia	N/A	N/A	N/A	N/A
Mexico	———	———	———	———
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Philipine	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Singapore	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Chinese Taipei	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A

Economy	C-b-4 Construction	C-a-1 Test Procedure : General	C-a-2 Expansion Test	
Japan	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit. However, Japan has a requirement of brake hose assembly which is a Japanese Industrial Standard, not regal. (JIS D 2601)			
Korea	N/A	N/A	N/A	N/A
Malaysia	N/A	N/A	N/A	N/A
Mexico	———	———	———	———
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Philipine	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Singapore	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Chinese Taipei	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A

Economy	C-a-3 Bursting Strength Test		C-a-4 Whip Test	C-a-5 Tensile Test
Japan	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit. However, Japan has a requirement of brake hose assembly which is a Japanese Industrial Standard, not regal. (JIS D 2601)			
Korea	N/A	N/A	N/A	N/A
Malaysia	N/A	N/A	N/A	N/A
Mexico	———	———	———	———
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Philipine	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Singapore	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Chinese Taipei	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A

Economy	C-a-6		C-a-7	
	Water Absorption	Bursting , Tensile & Whip Test	Cold Test	
Japan	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit. However, Japan has a requirement of brake hose assembly which is a Japanese Industrial Standard, not regal. (JIS D 2601)			
Korea	N/A	N/A	N/A	N/A
Malaysia	N/A	N/A	N/A	N/A
Mexico	———	———	———	———
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Philipine	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Singapore	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Chinese Taipei	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A

Economy	C-a-8		C-a-9	
	Brake Fluid Compatibility Test	Constriction & Bursting Test	Ozone Test	
Japan	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit. However, Japan has a requirement of brake hose assembly which is a Japanese Industrial Standard, not regal. (JIS D 2601)			
Korea	N/A	N/A	N/A	N/A
Malaysia	N/A	N/A	N/A	N/A
Mexico	———	———	———	———
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Philipine	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Singapore	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Chinese Taipei	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A

Economy	C-a-10 Salt Spray Test	C-a-11 100 % Pressure Test	D- Manufacturer I.D.(Labelling)	E-1 Alternative Standard
Japan	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit. However, Japan has a requirement of brake hose assembly which is a Japanese Industrial Standard, not regal. (JIS D 2601)			
Korea	N/A	N/A	N/A	N/A
Malaysia	N/A	N/A	N/A	N/A
Mexico	———	———	———	———
New Zealand	N/A	N/A	N/A	N/A
Papua New Guinea	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Philipine	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Singapore	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.			
Chainese Taipei	N/A	N/A	N/A	N/A
Thailand	N/A	N/A	N/A	N/A

Economy	C-a-12 Air or Vacuum brake tubing and brake hose
Japan	N/A There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.
Korea	N/A
Malaysia	N/A
Mexico	———
New Zealand	N/A
Papua New Guinea	N/A There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.
Philipine	N/A There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.
Singapore	N/A There are no regal requirements of brake hose assembly, but are the requirements of total system of brake unit.
Chinese Taipei	N/A
Thailand	N/A

Economy	B-1 Construction	C-b-1 Test Procedure : General	C-b-2 Temperature of testing room	C-b-3 Stabilizing of test sample
U.S.A (FMVSS 106)	Brake Hose Assembly shall have permanently attached brake hose end fittings which are attached by deformation of the fitting about the hose by crimping or swaging	N/R	N/R	N/R
ECE	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake system.			

Economy	C-b-4 External protection	C-a-1 Constriction Test	C-a-2 Expantion Test
U.S.A	N/R	Brake Hose Assembly shall not less than 64% of the nominal inside diameter (Note) 64% of the nominal inside diameter is equal to ADR 7/00. a. For 3.2mm I/D Hose : 2.03mm b. For 4.8mm I/D Hose : 3.05mm c. For 6.3mm I/D Hose : 4.19mm	Common -- Same as ADR 7/00, MVSR 106 AND GB 4748
ECE	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake system.		

Economy	C-a-3 Bursting Strength Test	C-a-4 Whip Test	C-a-5 Tensile Test
U.S.A	a.. the hose shall withstand the pressure of 4000 psi(27.56Mpa) for 2 minutes. b. And then, shall not rupture at less than 5000 psi(34.45.Mpa) (note) Any size of I/D of hose required the same Bursting Strength. ADR 7/00 specified to the different Bursting Strength for difference of Hose I/D.	Common -- Same as ADR 7/00, and MVSR 106	Common -- Same as ADR 7/00, MVSR 106 AND GB 4784
ECE	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake system.		

Economy	C-a-6 Water Absorption Bursting, Tensile & Whip Test	C-a-7 Cold Test
U.S.A	Hydraulic Brake Hose Assembly, after immertion in water for 70 hours, a. shall withstand water pressure of 4000 psi for 2 minutes, and then shall not rupture at less than 5000 psi.(C-a-3) b. shall withstand a pull of 325 pounds without separation of the hose from its end fittings.(C-a-5) c. shall not rupture when run continuously on a flexing machine for 35 hours.(C-a-4)	Common -- Same as ADR 7/00 and MVSR 106 However,the exposure time is different. FMVSS 106 & MVSR 106 : 70 hours ADR 7/00 : 72 hours
ECE	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake system.	

Economy	C-a-8 Brake Fluid Compatibility Consticton & Bursting Test	C-a-9 Ozone Test
U.S.A	Hydraulic Brake Hose Assembly, after testing of SAE RM－**1** compatibility brake fluid at 200°F(121 °C). a. shall meet the constriction test (C-a-1). b. and then shall withstand water pressure of 4000psi for 2 minutes, and shall not rupture at less than 5000psi.(C-a-3)	Common Same as ADR 7/00, and MVSR 106
ECE	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake system.	

Economy	C-a-10 Salt Spray Test	C-a-11 100% pressure Test	D-1 Manufacturer I.D.(Labeling)	C-b-2 Alternative Standards
U.S.A	Common - Same as ADR 7/00 and MVSR 106	N/R	a. Hose shal be labeled the following informations at intervals of not more than 6 inches, in block capital letter and at least 1/8 inches high. *DOT *A designation of hose manufacturer *The Month and Year or the Month, *Day and Year *The nominal I/D *HR or HL indicated expansion type b.Hose Assembly shall be labeled DOT and Designation on the band 1/8 inches high, or Designation the end fitting 1/16 inches high.	N/A
ECE	N/A	N/A	N/A	N/A
	There are no regal requirements of brake hose assembly, but are the requirements of total system of brake system.			

Economy	C-a-12 Air or Vacuum brake tubing and brake hose
U.S.A	The requirement of Air Brake Hose is more than 10 items including “Labeling”. And also, the requirement of Vacuum Brake Hose is more than 10 items.
ECE	N/A There are no regal requirements of brake hose assembly, but are the requirements of total system of brake system.

Economy : Australia

Title of Standard : ADR7/00 and ADR 42/02

A: Application: Passenger

C-b-1 Test procedure : general

All tests shall be made in accordance with ISO3996-1978(E) ‘’hydraulic Brake Hose Assemblies – Non Petroleum Base Hydraulic Standard’’ or the ASTM Standards D571-55 ‘’Testing Automotive Hydraulic Hose’’.

C-b-2 Temperature of testing room

Except in the case of the ‘’Cold test’’, the temperature of the testing room shall be between 20 and 35 degrees Celsius.

C-b-3 Stabilizing of test samples

The hose assemblies for test shall be stabilized at room temperature prior to testing.

C-b-4 External protections

When external protection such as helicaliy wound wire or metallic braid is moulded into the brake hose, testing must be done with protective medium fitted. Howecer, loose fitting external protection that is not integral with the brake hose an all other external appendages, such as mounting brackets and collars shall be removed or long tubes shortened or both.

C-a-1 Constriction test

The constriction of the brake hose assembly shall be measured with gauge plug whose ’’A’’ dimensions hall be 2.03mm minimum in diameter for 3.2 mm inside diameter hose, 3.05 mm minimum in diameter for 4.8 mm inside diameter hose and 4.19 mm minimum in diameter for the 6.3 mm inside diameter hose. The time required for gauge plug to drop of its own weight a distance of 75 mm into the hose assembly shall not exceed 5 seconds.

C-a-2 Expansion Test

The maximum expansion in milliliters per metre (milliliters per foot), of the brake hose assembly so tested shall not exceed the values in Table I.

TABLE I

	6.9Mpa (1000 psi)		10.3MPs(1500 psi)	
Nominal Hose Size, in Mm(inch)	Regular Expansion Hose	Low Expansion Hose	Regular Expansion Hose	Low Expansion Hose
3.2 (1/8) 4.8(3/16) 6.3(1/4)	2.17(0.66) 2.18(0.86) 3.41(1.04)	1.08(0.33) 1.18(0.55) 2.69(0.82)	2.59(.079) 3.35(1.02) 4.27(1.30)	1.38(0.42) 2.36(0.72) 3.84(1.17)

C-a-3 Bursting strength test

When tested under hydraulic pressure, the hose shall withstand the test pressure indicate in Table II for 2 minutes. The pressure shall then be increased at a rate of between 100 to 250 Mpa per minute (15,000 to 35,000 psi per minute) until a burst occurs. The minimum bursting strength shall be not less than the value indicated in Table II.

TABLE II

Nominal Hose Size in mm(inch)	Test Pressure In Mpa(psi)	Minimum Bursting strength in Mpa (psi)
3.2 (1/8) 4.8 and 6.3 (3/16, 1/4)	27.56(4000) 19.98(29000)	34.45(5000) 31(45000)

C-a-4 Whip test

The minimum life of a hose assembly run continuously on the flexing machine shall be 35 hours for free hose lengths ranging from 200 to 600 mm for 3.2 mm hose and from 200 mm to 400 mm for 4.8mm and 6.3 mm hose.

C-a-5 Tensile Test

All brake hose assemblies shall withstand a minimum pull of 1.44 kN(325 Pounds) force without the end fittings pulling off or rupture of the hose when fixed in the testing machine and pulled at a speed of approximately 25 mm per minute.

C-a-7 Cold test

The brake hose assembly shall be conditioned in a cold box in a straight position at a temperature minus 40 degrees Celsius for 72 hours. While still at this temperature, the hose shall be bent around a mandrel of 76 mm diameter for 3 mm hose and 90 mm diameter for 4.8 and 6.3 mm hose. The hose shall not crack or break.

C-a-9 Ozone test

The outer cover of the hose shall show no cracking when tested in accordance with ASTM D622-65.

C-a-10 Salt spray test

The brake hose assembly end connections sall withstand 24 hour exposure to salt spray when tested in accordance with ASTM B117-64.

C-a-12 Air or vacuum brake tubing and brake hose

Air or vacuum brake tubing and air and vacuum brake hose flexible and hydraulic power hose and thus not subject to ADR 7/…'' Hydraulic brake hoses'' must conform to BSS, SAE, or other 'approved' standards specified for air brake tubing or hose or vacuum brake tubing or hose or hydraulic power tubing or hose and be so fitted to the vehicle as to prevent chafing, kicking or other mechanical damage under normal motion of the parts to which they are attached.

D-1 Manufacturer's Identification

Each brake hose assembly shall bear a distinctive designation Prominently and permanently indicating the name or trade mark of its ''Manufacturer''.

E-1 Alternative standards

The technical requirements of SAE J 1401 Jan 81 or FMVSS 106-74 shall be deemed to be equivalent to the technical requirement of this Rule.

Economy: Canada

Title of Standard: CMVSS106

A: Application: Passenger

B-1 Construction

Every hydraulic brake hose assembly shall have brake hose end fittings that are permanently attached to the hose by deformation of the fitting about the hose by crimping .

C-a-1 Construction test

Every hydraulic brake hose assembly shall have an inside diameter of not less than 64 percent of the nominal inside diameter of the brake hose, except for that part of an end fitting that does not contain brake hose.

C-a-2 expansion test

Every hydraulic brake hose assembly shall not have a maximum expansion at 6,895 kpa (1,000 psi) and 10,342kpa (1,500 psi) exceeding the values specified in Table I to this section.

C-a-3 Bursting strength test

Every hydraulic brake hose assembly shall withstand hydrostatic pressure of 27,579kpa(4,000psi) for 2 minutes without rupture, and not rupture under hydrostatic pressure of less than 34,474 kpa (5,000psi)

C-a-4 Whip test

Every hydraulic brake hose assembly shall not rupture when run continuously on a flexing machine for 35 hours.

C-a-5 Tensile test

Every hydraulic brake hose assembly shall withstand a pull of 1446N (325 pounds) without separation of the hose from its end fittings.

C-a-6 Water absorption Burst strength, tensile strength and whip resistance

Every hydraulic brake hose assembly shall after immersion on water for 70 hours, withstand hydrostatic pressure of 27,579 kpa(4,000 psi) for 2 minutes and not rupture at less than 34,474 kpa(5,000psi); after immersion in water for 70 hours, withstand a pull of 1,446N(325 pounds) without separation of the hose from its end fittings : after immersion in water for 70 hours, not rupture when run continuously on a flexing machine for 35 hours.

C-a-7 Cold test

When conditioned at -40°C (-40°F) for 70 hours, every hydraulic brake hose assembly shall not show cracks visible without magnification when bent around a cylinder specified in the test method.

C-a-8 Brake Fluid Compatibility Constriction & Bursting Test

Every hydraulic brake hose assembly shall after having been subjected to a temperature of 93.3°C (200 °F) for 70 hours while filled with SAE Compatibility Fluid, except for brake hose assemblies designed for use with mineral-based or petroleum-based brake fluid,

(i) meet the constriction requirement of paragraph (C-a-1)

(ii) withstand hydrostatic pressure of 27,579 kpa(4,000 psi) for 2 minutes, and

(iii)not repute under hydrostatic pressure of less than 34,474 kpa(5,000psi)

C-a-9 Ozone test

When exposed to ozone for 70 hours at 40°C(104°F), every hydraulic brake hose assembly shall not show cracks visible under 7- power magnification.

C-a-10 Salt spray test

Every hydraulic brake hose and fitting that is subjected to motor vehicle safety test methods, section 106, ‘brake hoses’, shall after 24 hours of exposure to salt spray, not show base metal corrosion on the end fitting surface except where deformation by crimping or the application of labeling information has caused displacement of the protective coating.

C-a-12 Air or vacuum brake tubing and brake hose

The requirement of Air brake hose is more than 10 items as follows :

*Labeling (manufacturer I.D. etc.)

*Constriction test

*High temperature resistance test

*Low temperature resistance test

*Oil resistance test

*Ozone resistance test

*Length change test

*Adhesion test

*Air pressure test

*Burst strength test

*Tensile strength test

*Water absorption Tensile strength test

*Zinc chloride resistance test

*End fitting corrosion resistance (Salt spray)test

And also, the requirement of vacuum brake hose is more than 10 items as Follows:

*Labeling (Manufacturer I.D. etc.)

*Constriction test

*High temperature resistance test

*Low temperature resistance test

*Ozone resistance test

*Burst strength test

*Vacuum test

*Bend test

*Swell test

*Adhesion test

*Deformation test

*End fitting corrosion resistance test

D-1 Manufacturer I.D. (Labeling)

Every hydraulic brake hose shall have at least two clearly identifiable stripes not less than 1.6 mm(0.062 in.)in width, placed on opposite sides of the brake hose parallel to its longitudinal azis, of which stripes one may be interrupted by the information mentioned below(a) to (d) and the other may be interrupted by

additional information at the manufacturer's option.

(a) a designation that identifies the manufacturer of the hose;

(b) the month, day and year, or the month and year, of manufacture, expressed in numerals in that sequence;

(c) the nominal inside diameter of the hose; and

(d) either the letters "HR" to indicate that the hose is regular expansion hydraulic hose or "HL" to indicate that the hose is low expansion hydraulic hose.

Every hydraulic brake hose assembly, unless assembled and installed by a manufacturer in a vehicle manufactured by him, shall, at the manufacturer's option, have at least one brake hose end fitting that is etched, embossed or stamped with a designation at least 1.6mm (0.062 in.) in height that identifies the manufacturer of the hose assembly.

Table I

Maximum expansion of free length brake hose, ml / m(ml/ft.)

Test Pressure				
	6,895kpa (1,000psi)		10,342kpa (1,000psi)	
Hydraulic Brake hose Inside diameter	Regular Expansion Hose	Low Expansion Hose	Regular Expansion Hose	Low Expansion Hose
3.18mm(1/8 in)or less	2.17(0.66)	1.08(0.33)	2.59(0.79)	1.38(0.52)
4.76mm(3.16in)	2.82(0.86)	1.80(0.55)	3.35(1.02)	2.36(0.72)
6.35mm(1/4 in)or more	3.41(1.04)	2.69(0.82)	4.27(1.30)	3.84(1.17)

Economy : China.

Title of Standard: GB4784

A: Application: Passenger

C-a-1 Constriction Test

The constriction of the brake hose assembly shall be measured with gauge plug whose “A” dimensions shall be 2.03 mm minimum in diameter for 3.2 mm inside diameter hose, 3.05mm minimum in diameter for 4.8 mm inside diameter hose and 4.19 mm minimum in diameter for the 6.3 mm inside diameter hose. The time required for gauge plug to drop of its own weight a distance of 76mm into the hose assembly shall not exceed 5 seconds.

C-a-2 Expansion test

The maximum expansion in milliliters per metre (milliliters per foot), of the brake hose assembly so tested shall not exceed the values in Table I.

TABLE I

	7.9 Mpa (1000 psi)		10.3 Mpa (1500psi)	
Nominal Hose Size, in Mm(inch)	Regular Expansion Hose	Low Expansion Hose	Regular Expansion Hose	Low Expansion Hose
3.2 (1/8) 4.8(3/16) 6.3(1/4)	2.19(0.66) 2.20(0.86) 3.41(1.04)	1.08(0.33) 1.18(0.55) 2.69(0.82)	2.59(.079) 3.36(1.02) 4.27(1.30)	1.38(0.42) 2.37(0.72) 3.84(1.17)

C-a-3 Bursting strength test

When tested under hydraulic pressure, the hose shall withstand the test pressure indicated in Table II for 2 minutes. The pressure shall then be increased at a rate of between 100 to 250 Mpa per minute (15,000 to 35,000 psi per minute) until a burst occurs. The minimum bursting strength shall be not less than the value indicated in Table II.

TABLE II

Nominal Hose Size in mm(inch)	Test Pressure In Mpa(psi)	Minimum Bursting strength in Mpa (psi)
3.2 (1/8) 4.8 and 6.3 (3/16, 1/4)	28.56(4000) 19.98(29000)	34.45(5000) 31(45000)

C-a-5 Tensile test

All brake hose assemblies shall withstand a minimum pull of 1.44 KN (325 pounds) force without the end fittings pulling off or rupture of the hose when fixed in the testing machine and pulled at a speed of approximately 25 ±3mm per minute.

C-a-11 100% pressure test

The hose assembly shall be subjected to a pressure test by using water or brake fluid as the pressure medium.

The test pressure shall be held for not less than 10 s and not more than 25 s.

Hose assemblies showing leaks under this test shall be rejected and destroyed.

Economy : U.S.A.

Title of Standard: FMVSS NO 106

A Application : Passenger

B-1 Construction

Every hydraulic brake hose assembly shall have permanently attached brake hose end fittings which are attached by deformation of the fittings about the hose by crimping or swaging.

C-a-1 Construction test

Except for that part of an end fitting which dose not contain hose, every inside diameter of any section of hydraulic brake hose assembly shall be not less than 64 percent of the nominal inside diameter of the brake hose.

C-a-2 Expansion test

The maximum expansion of a hydraulic brake hose assembly at 1,000 psi and 1,500 psi shall not exceed the values specified in Table I.

C-a-3 Bursting strength test

A hydraulic brake hose assembly shall then withstand water pressure of 4,000 psi for 2 minutes without rupture, and shall not rupture at less than 5,000 psi.

C-a-4 Whip test

A hydraulic brake hose assembly shall not rupture when run continuously on a flexing machine for 35 hours.

C-a-5 Tensile test

A hydraulic brake hose assembly shall withstand a pull of 325 pounds without separation of the hose from its end fittings.

C-a-6 Water absorption and burst strength

A hydraulic brake hose assembly, after immersion in water for 70 hours, shall withstand water pressure of 4,000 psi for 2 minutes, an then shall not rupture at

less than 5,000 psi.

Water absorption and tensile strength

A hydraulic brake hose assembly, after immersion in water for 70 hours, shall withstand a pull if 325 pounds without separation of the hose from its end fittings.

Water absorption and whip resistance

A hydraulic brake hose assembly, after immersion in water for 70 hours, shall not rupture when rum continuously on a flexing machine for 35 hours.

C-a-7 Cold test

A hydraulic brake hose conditioned at minus 40° F for 70 hours shall not show cracks visible without magnification when bent around a cylinder as specified in below…

Hose size	Diameter of cylinder
Less than 1/8 1/8 1/16 and 1/4 greater than 1/4	2 1/2 3 3 1/2 4

C-a-8 Brake fluid compatibility Constriction & Bursting test

A hydraulic brake hose assembly shall meet the constriction requirement of C-a-1, after having been subjected to a temperature of 200° F for 700 hours while filled with SAE RM-1 compatibility brake fluid. It shall then withstand water pressure of 4,000 psi for 2 minutes and thereafter shall not repute at less than 5,000 psi.

C-a-9 Ozone test

A hydraulic brake hose assembly shall not show cracks visible under 7-power magnification after exposure to ozone for 70 hours at 104° F.

C-a-10 Salt spray test

After 24 hours of exposure to salt spray, a hydraulic brake hose end fitting shall show no base metal corrosion on the end fitting surface except where crimping or the application of labeling information has caused displacement of the protective coating.

D-1 Manufacturer I.D. (Laveling)

Each hydraulic brake hose shall be labeled at intervals of not more than 6 inches, measured from the end of one legend to the beginning of the next, in block capital letters and numerals at least one-eighth of an inch high. With the information listed in below (a) through (e).

(a) the symbol DOT.

(b) A designation that identifies the hose manufacturer,

(C) The month, day, and year, or the month and year, of manufacture, expressed in numerals,

(d) The nominal inside diameter of the hose expressed in inches or fractions of inches,

(e) Either 'HR' to indicate that. The hose is regular expansion hydraulic hose or 'HL' to indicate that, the hose is low expansion hydraulic hose.

Each hydraulic brake hose assembly shall be labeled by means of a band around the brake hose assembly as specified in this paragraph or. At the option of the manufacturer, by means of labeling as specified in below.

(a) The symbol DOT

(b) A designation that identifies the manufacturer of the hose assembly

or

At least on end fitting of a hydraulic brake hose assembly shall be etched, stamped, or embossed with a designation at least one-sixteenth of an inch high that identifies the manufacturing of the hose assembly.

Table 1- Maximum expansion of free length brake hose, cc/ft.

Test Pressure				
	1,000psi		1,500psi	
Hydraulic Brake hose Inside diameter	Regular Expansion Hose	Low Expansion Hose	Regular Expansion Hose	Low Expansion Hose
1/8 inch or less	0.66	0.33	0.79	0.52
3.16 inch	0.86	0.55	1.02	0.72
1/4 inch or more	1.04	0.82	1.30	1.17

C-a-12 Air or Vacuum brake tubing and brake hose

The requirement of Air brake hose is more than 10 items a follows

*Labeling (Manufacturer I.D. etc.)
*Constriction test
*High temperature resistance test
*Low temperature resistance test
*Oil resistance test
*Ozone resistance test
*Length change test
*Adhesion test
*Air pressure test
*Burst strength test
*Tensile strength test
*Water absorption Tensile strength test
*Zinc chloride resistance test
*End fitting corrosion resistance (Salt spray) test

And also, the requirement of vacuum brake hose is more than 10 items as follows:

*Labeling (Manufacturer I.D. etc.)
*Constriction test
*High temperature resistance test
*Low temperature resistance test
*Ozone resistance test
*Burst strength test
*Vacuum test
*Bend test
*Swell test
*Adhesion test
*Deformation test
*End fitting corrosion resistance test

ITEM 97-11

Side intrusion

APEC Regulation Analysis Findings
Item No. 97-11: Side intrusion

< General >

1. Australia, Canada, Korea, Japan and USA have regulation for side intrusion.
2. The requirements are divided into two groups—static and dynamic.

< Static requirements >

(1) Australia, Canada, Korea and USA adopt static requirements for side intrusion.

(2) The static requirements of Canada and Korea are equivalent to those of USA (FMVSS 214). Although Australian's domestic law ADR 29/00 differs slightly from FMVSS214, Australia accepts the U.S. regulation as an alternative. Consequently, it can be said that the harmonization of static requirements is centered around FMVSS 214 in the APEC region.

(3) Australia differs form FMVSS 214 in respect of initial and intermediate crush resistance.

< Dynamic Requirements >

(1) Australia, Japan and U.S. adopt dynamic requirements for side intrusion.

(2) U.S. requirements are provided in FMVSS 214, while Japan's and Australian requirement are virtually equivalent with ECE95. Although Australian domestic law ADR 72/00 differs slightly from FMVSS214, Australia accepts the U.S. regulation as an alternative.

(3) Major differences in the dynamic requirements Japan, Australia (ECE95 equivalent) and U.S. (FMVSS 214) lie in :(1) testing equipment, (2) dummy, (3) standard value (injury value) and (4) test conditions such as impact speed, impact angle and dummy sitting position.

A: Application : Passenger cars

Item No.11 Side intrusion

Member Economies	B-a-1 Barrier (For dynamic test)					B-a-2 Dummy (for Dynamic test)
	(1) Type	(2) Weight	(3) Side impactor		(4) Minimum road clearance	
			1 Tread	2 Wheel base		
Australia	ADR72/00 (Moving Deformable Barrier)	ADR72/00 (950±20kg)	ADR72/00 (1500±10mm)	ADR72/00 (3000±10mm)	ADR72/00 (260±10mm)	ADR72/00 (EUROSID-1)
Brunei						
Canada	N/R	N/R	N/R	N/R	N/R	N/R
Chile						
China						
Hong Kong						
Indonesia						
Japan	Article13-3 (Moving Deformable Barrier)	Article13-3 (950±20kg)	Article13-3 (1500±10mm)	Article13-3 (3000±10mm)	Article13-3 (300±10mm)	Article13-3 (EUROSID-1)
Korea	N/R	N/R	N/R	N/R	N/R	N/R
Malaysia						
Mexico						
New Zealand	N/R	N/R	N/R	N/R	N/R	N/R
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
USA	FMVSS214 (Moving Deformable Barrier)	FMVSS214 (3015lbs)	FMVSS214 (74”)	FMVSS214 (102”)	FMVSS214 (13”)	FMVSS214 (Part572 Subpart F Dummy)
ECE	ECE95-01 (Moving Deformable Barrier)	ECE95-01 (950±20kg)	ECE95-01 (1500±10mm)	ECE95-01 (3000±10mm)	ECE95-01 (300±10mm)	ECE95-01 (EUROSID-1)

Member Economies	B-a-2 Dummy (for dynamic test)	B-a-3 Loading device (for Static test)		B-b-1 Barrier (for dynamic test)	B-b-2 Dummy (for dynamic test)	C-a Performance of Parts
	(2) Stabilized temperature	(1) Construction	(2) Length	(1) Location	(1) Location	
Australia	ADR72/00 (22±4°C)	ADR29/00 (A rigid cylinder or semi-cylinder 305±5mm in diameter with edge radius of 12±1mm)	ADR29/00 (See B-a-3(1) in Item 11-3 for Australia)	ADR72/00 (See B-b-1(1) in Item 11-3 for Australia)	ADR72/00 (Front seat in impacted side)	N/R
Brunei						
Canada	N/R	FMVSS214	FMVSS214	N/R	N/R	N/R
Chile						
China						
Hong Kong						
Indonesia						
Japan	Article13-3 (22±4°C)	N/R	N/R	Article13-3 (See B-b-1(1) in Item 11-3 for Japan)	Article13-3 (Front seat in impacted side)	N/R
Korea	N/R	FMVSS214	FMVSS214	N/R	N/R	N/R
Malaysia						
Mexico						
New Zealand	N/R	N/R	N/R	N/R	N/R	N/R
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
USA	FMVSS 214 (66-78°F)	FMVSS214 (A rigid cylinder or semi-cylinder 305mm (12”) in diameter with edge radius of 13mm (1/2”))	FMVSS214 (See B-a-3(1) in Item 11-3 for USA)	FMVSS214 (See B-b-1(1) in Item 11-3 for USA)	FMVSS214 (Front and 2nd seat in impacted side)	N/R
ECE	ECE95-01 (22±4°C)	N/R	N/R	ECE95-01 (See B-b-1(1) in Item 11-3 for ECE)	ECE95-01 (Front seat in impacted side)	N/R

Member Economies	C-b-1 Dynamic test					
	(1) Injury criteria	(2) Other requirements				(3) Test condition
		1 Door opening	2 Possibility to escape	3 Sharp edge	4 Fuel leakage	1 Vehicle speed
Australia	ADR72/00 (HPC ≤ 1000, Thorax : RDC ≤ 42mm Abdomen Peak Force : APF ≤ 2.5kN, Pelvis : PSPF ≤ 6kN, VC ≤ 1.0m/s)	ADR72/00 (No door shall be open during test)	ADR72/00 (See C-b-1(2) 2 in Item 11-3 for Australia)	ADR72/00 (See C-b-1(2) 3 in Item 11-3 for Australia)	ADR72/00 (≤30g/min)	ADR72/00 (50±1km/h)
Brunei						
Canada	N/R	N/R	N/R	N/R	N/R	N/R
Chile						
China						
Hong Kong						
Indonesia						
Japan	Article13-3 (HPC ≤ 1000, Thorax : RDC ≤ 42mm Abdomen Peak Force : APF ≤ 2.5kN, Pelvis : PSPF ≤ 6kN, VC ≤ 1.0m/s)	Article13-3 (No door shall be open during test)	Article13-3 (See C-b-1(2) 2 in Item 11-3 for Japan)	Article13-3 (See C-b-1(2) 2 in Item 11-3 for Japan)	Article13-3 (≤30g/min)	Article13-3 (50±1km/h)
Korea	N/R	N/R	N/R	N/R	N/R	N/R
Malaysia						
Mexico						
New Zealand	N/R	N/R	N/R	N/R	N/R	N/R
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
USA	FMVSS214 (1 Thorax : TTI≤85g 4door TTI≤90g 2door 2 Pelvis : Peak G ≤ 130g)	FMVSS214 (See C-b-1(2) 1 in Item 11-3 for USA)	FMVSS214 (See C-b-1(2) 2 in Item 11-3 for USA)	FMVSS214 (See C-b-1(2) 3 in Item 11-3 for USA)	FMVSS214 (≤5 x10^-4kg/s)	FMVSS214 (33.5MPH)
ECE	ECE95-01 (HPC ≤ 1000, Thorax : RDC ≤ 42mm Abdomen Peak Force : APF ≤ 2.5kN, Pelvis : PSPF ≤ 6kN, VC ≤ 1.0m/s)	ECE95-01 (No door shall be open during test)	ECE95-01 (See C-b-1(2) 2 in Item 11-3 for ECE)	ECE95-01 (See C-b-1(2) 3 in Item 11-3 for ECE)	ECE95-01 (≤30g/min)	ECE95-01 (50±1km/h)

Member Economies	C-b-1 Dynamic test					
	(3) Test condition					
	2 Angle at impact	3 Impacted vehicle condition	4 Test weight	5 Fuel capacity	6 Door	7 Transmission
Australia	ADR72/00 (Perpendicular to the impacted vehicle)	ADR72/00 (Static)	ADR72/00 (unladen vehicle weight+100kg)	ADR72/00 (90% mass of a fuel load as stated by manufacturer.)	ADR72/00 (Unlock, closed)	ADR72/00 (Neutral)
Brunei						
Canada	N/R	N/R	N/R	N/R	N/R	N/R
Chile						
China						
Hong Kong						
Indonesia						
Japan	Article13-3 (Perpendicular to the impacted vehicle)	Article13-3 (Static)	Article13-3 (unladen vehicle weight+100kg	Article13-3 (90% mass of a fuel load as stated by manufacturer.)	Article13-3 (Unlock, closed)	Article13-3 (Neutral)
Korea	N/R	N/R	N/R	N/R	N/R	N/R
Malaysia						
Mexico						
New Zealand	N/R	N/R	N/R	N/R	N/R	N/R
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
USA	FMVSS214 (63° to the impacted vehicle)	FMVSS214 (Static)	FMVSS214 (See C-b-1 (3) 4 in Item11-3 for USA)	FMVSS214 (See C-b-1(3) 5 in Item 11-3 for USA)	FMVSS214 (Unlock, closed, full latch)	FMVSS214 (M/T : 2nd A/T : Neutral)
ECE	ECE95-01 (Perpendicular to the impacted vehicle)	ECE95-01 (Static)	ECE95-01 (unladen vehicle weight+100kg	ECE95-01 (90% mass of a fuel load as stated by manufacturer.)	ECE95-01 (Unlock, closed)	ECE95-01 (Neutral)

Member Economies	C-b-1 Dynamic test		C-b-2 Static test		D Label	E Reference standard
	(3) Test condition		(1) Requirement	(2) Test condition		Alternative standard
	8 Parking Brake	9 Seat position				
Australia	ADR72/00 (OFF)	ADR72/00 (In midway between foremost and rearmost position and lowest position if vertically adjusted)	ADR29/00 (See C-b-2 (1) in Item11-3 for Australia)	ADR29/00 (See C-b-2 (2) in Item11-3 for Australia)	N/R	ECE95, FMVSS214
Brunei						
Canada	N/R	N/R	FMVSS214	FMVSS214	N/R	FMVSS214
Chile						
China						
Hong Kong						
Indonesia						
Japan	Article13-3 (OFF)	Article13-3 (In midway between foremost and rearmost position and lowest position if vertically adjusted)	N/R	N/R	N/R	96/27/EC
Korea	N/R	N/R	FMVSS214	FMVSS214	N/R	N/R
Malaysia						
Mexico						
New Zealand	N/R	N/R	N/R	N/R	N/R	N/R
Papua New Guinea						
Philippines						
Singapore						
Chinese Taipei						
Thailand						
USA	FMVSS214 (ON)	FMVSS214 (In midway between foremost and rearmost position and lowest position if vertically adjusted)	FMVSS214 (See C-b-2 (1) in Item11-3 for USA)	FMVSS214 (See C-b-2(2) in Item 11-3 for USA)	N/R	N/R
ECE	ECE95-01 (OFF)	ECE95-01 (In midway between foremost and rearmost position and lowest position if vertically adjusted)	N/R	N/R	ECE95-01 (Label marking approval No. Is necessary on the vehicle)	96/27/EC

Item 97-11. Side intrusion

Australia (ADR 29/00)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars(MA, MB, MC) In case where vehicles meet the requirements of either ECE95 or FMVSS214, these vehicle deemed to comply with the requirement of this rule.	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	<u>B-a-1 : Loading Device (for static test)</u> (1) Structure : The loading device must be consist of rigid steel cylinder or semi-cylinder 305±5mm in diameter with an edge radius of 12±1mm. (2) Length : The top surface of the loading device is at least 12mm above bottom edge of the door window opening but not of a length that will cause contact with any structure above the bottom edge if the door window opening during test.	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	N/R <u>C-b-1 : Static test</u> (1) Requirements : 1 Initial crush resistance ≥ 10kN or curb weight X 0.83 (whichever is less) 2 Intermediate crush resistance ≥15.5kN or curb weight X 1.3 (whichever is less) (without seat) ≥ 19.44kN or curb weight X 1.63 (whichever is less) (with seat) 3 Peak crush resistance ≥ 31kN or curb weight X 2 (whichever is less) (without seat) ≥ 55.33kN or curb weight X 3.5 (whichever is less) (with seat) (2) Test conditions : Using loading device, apply a load to the outer surface of the door in an inboard direction normal to a vertical plane along the vehicle's longitudinal centerline.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	FMVSS214 (Static)	

Item 97-11. Side intrusion

Australia (ADR72/00)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars(MA : R point ≤ 700mm)	
B: Structure requirement B-a: Structure of parts	<u>B-a-1: Barrier (for dynamic test)</u> (1) Type : Moving Deformable Barrier (2) Mass : 950±20kg (3) Tread ; 1500±10mm Wheel base : 3000±10mm (4) Minimum Road Clearance : 260±5mm <u>B-a-2 : Dummy (for dynamic test)</u> (1) Type : EUROSID-1 dummy (2) Stabilized temperature : 22±4°C <u>B-a-3 : Loading Device (for static test)</u> N/R	
B-b: Construction of parts installed to the vehicle	<u>B-b-1 : Barrier (for dynamic test)</u> (1) Location : The trajectory of mobile deformable barrier longitudinal median vertical plane shall be perpendicular to the longitudinal median vertical plane of the impacted vehicle. <u>B-b-1 : Dummy (for dynamic test)</u> (1) Location : In the front seat on the impact side.	

Item 97-11. Side intrusion

Australia (ADR72/00)		
ITEM	CONTENT	Illustration / supplement
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	N/R <u>C-b-1: Dynamic test</u> (1) Injury criteria : 1 HPC (Head performance criteria) ≤ 1000 2 Thorax performance criteria : - RDC (Rib deflection criteria) ≤ 42mm - VC (Soft Tissue Criterion) ≤ 1.0m/s 3 Pelvis performance criterion : - PSPF (Public Synphysis Peak Force ≤ 6kN - APF (Abdomen Peak Force) ≤ 2.5kN (2) Other requirements : 1 Door opening : No doors shall open during test. 2 Ability to escape from the impacted vehicle. After the impact, it shall be possible without the use of tools to; - open a sufficient number of doors provided for normal entry and exit of passengers to allow evacuation of all occupants; - release the dummy from the protective system; - remove the dummy from the vehicle. 3 Sharp projections or jagged edges: No interior device or component shall become detached in such a way as noticeable to increase the risk of injury from sharp projections or jagged edges. 4 Fuel leakage : ≤ 30g/min	

Australia (ADR72/00)		
ITEM	CONTENT	Illustration / supplement
	(3) Test condition : 1 MDV speed : 50±1km/h 2 The trajectory of the mobile deformable barrier longitudinal median vertical plane shall be perpendicular to the longitudinal median vertical plane of the impacted vehicle. 3 Vehicle condition : Static 4 Test weight : Unloaded vehicle weight + 100kg 5 Fuel capacity : 90% of the mass of a full load of fuel as specified by the vehicle manufacturer. 6 Door : Unlock, Closed 7 Transmission : Neutral 8 Parking brake : OFF 9 Seat position : Nearest to mid way between the foremost and rearmost positions. C-b-2 : Static test N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R There shall be affixed to every vehicle conforming to a vehicle type approved under this Regulation.	
E: Referred standards (1)Alternative standards	 ECE 95-00	

CANADA (CMVSS214)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	B-a-1: Barrier (for dynamic test) N/R B-a-2 : Dummy (for dynamic test) N/R B-a-3 : Loading Device (for static test) N/R (1) Structure : N/R (2) Length : B-b-1 : Barrier (for dynamic test) N/R B-b-2 : Dummy (for dynamic test) N/R	
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	N/R C-b-1 : Dynamic test N/R C-b-2 : Static test (1) Requirements : 1 Initial crush resistance ≥ 10.01 kN 2 Intermediate crush resistance ≥ 15.57 kN (without seat) ≥ 19.46 kN (with seat) 3 Peak crush resistance ≥ 31.14 kN or curb weight X 2 (whichever is less) (without seat) ≥ 53.38 kN or curb weight X 3.5 (whichever is less) (with seat) (2) Test condition : N.R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 N/R	

JAPAN (Article 13-3)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars (R point ≤ 700mm)	
B: Structure requirement B-a: Structure of parts	B-a-1: Barrier (for dynamic test) (1) Type : Moving Deformable Barrier (2) Mass : 950±20kg (3) Tread ; 1500±10mm Wheel base : 3000±10mm (4) Minimum Road Clearance : 300±5mm B-a-2 : Dummy (for dynamic test) (1) Type : EUROSID-1 dummy (2) Stabilized temperature : 22±4°C B-a-3 : Loading Device (for static test) N/R	
B-b: Construction of parts installed to the vehicle	B-b-1 : Barrier (for dynamic test) (1) Location : The trajectory of mobile deformable barrier longitudinal median vertical plane shall be perpendicular to the longitudinal median vertical plane of the impacted vehicle. B-b-1 : Dummy (for dynamic test) (1) Location : In the front seat on the impact side.	

JAPAN (Article 13-3)		
ITEM	CONTENT	Illustration / supplement
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	N/R <u>C-b-1: Dynamic test</u> (1) Injury criteria : 1 HPC (Head performance criteria) ≤ 1000 2 Thorax performance criteria : - RDC (Rib deflection criteria) ≤ 42mm 3 Pelvis performance criterion : - PSPF (Public Synphysis Peak Force ≤ 6kN - APF (Abdomen Peak Force) ≤ 2.5kN (2) Other requirements : 1 Door opening : No doors shall open during collision. 2 Ability to escape from the impacted vehicle. After the impact, it shall be possible without the use of tools to; - open a sufficient number of doors provided for normal entry and exit of passengers to allow evacuation of all occupants; - release the dummy from the protective system, furthermore, no buckle of seat belt shall be disengaged during the collision; - remove the dummy from the vehicle. 3 Sharp projections or jagged edges: No interior device or component shall become detached in such a way as noticeable to increase the risk of injury from sharp projections or jagged edges. 4 Fuel leakage : ≤ 30g/min	

JAPAN (Article 13-3)		
ITEM	CONTENT	Illustration / supplement
	(3) Test condition : 1 MDV speed : 50±1km/h 2 The trajectory of the mobile deformable barrier longitudinal median vertical plane shall be perpendicular to the longitudinal median vertical plane of the impacted vehicle. 3 Vehicle condition : Static 4 Test weight : Unloaded vehicle weight + 100kg 5 Fuel capacity : 90% of the mass of a full load of fuel as specified by the vehicle manufacturer. 6 Door : Unlock, Closed 7 Transmission : Neutral 8 Parking brake : OFF 9 Seat position : Nearest to mid way between the foremost and rearmost positions. C-b-2 : Static test N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R There shall be affixed to every vehicle conforming to a vehicle type approved under this Regulation.	
E: Referred standards (1)Alternative standards	 EU 96/27	

KOREA (ARTICLE 89)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	 N/R N/R	
C: Performance of requirement C-a: Performance of parts (1)Body block test C-b: Performance of parts installed to the vehicle (1)Barrier collision test	 When the steering control system is impacted by a body block at a relative speed of 24.2km/h, the impact force developed on the chest of the body block transmitted to the steering control system shall not exceed 1130kg continuously for more than 3 milliseconds. However, this requirement is not applicable if the angle between the steering column and the horizontal plane is larger than 35 degrees. When a passenger vehicle (except forward control vehicles) is impacted into a fixed collision barrier at a speed of 48.3km/h, the upper end of the steering column and shaft not be displaced more than 127mm in the horizontal rearward direction parallel to the longitudinal axis of the motor vehicle.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards		

97-11. Side intrusion

USA (FMVSS214)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars(dynamic & Static), MPV ≤ GVWR 1000lbs (Static)	
B: Structure requirement B-a: Structure of parts B-b: Construction of parts installed to the vehicle	<u>B-a-1: Barrier (for dynamic test)</u> (1) Type : Moving Deformable Barrier (2) Mass : 3015 lbs (3) Tread ; 74” Wheel base ; 102” (4) Minimum Road Clearance ; 13” <u>B-a-2 : Dummy (for dynamic test)</u> (1) Type : Part572 Subpart F test dummy (2) Stabilized temperature : 67°F-78°F <u>B-a-3 : Loading Device (for static test)</u> (1) Structure : The loading device must be consist of rigid steel cylinder or semi-cilinder 305mm (12”) in diameter with an edge radius of 13mm(1/2”). (2) Length : (for door with window) The top surface of the loading device is at least 13mm(1/2”) above bottom edge of the door window opening but not of a length that will cause contact with any structure above the bottom edge if the door window opening during test. (for door without window) The top surface of the loading device is at the same height above the ground as when the loading device is positioned in accordance with paragraph just above for purpose of testing a front door with windows on the same vehicle. <u>B-b-1 : Barrier (for dynamic test)</u> (1) Location : The line of forward motion of the moving deformable barrier forms an angle of 63 degrees with center line of the test vehicle. The longitudinal centerline of the moving deformable barrier is perpendicular to the longitudinal centerline if the test vehicle when the barrier strikes the test vehicle.	

USA (FMVSS214)

ITEM	CONTENT	Illustration / supplement
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	N/R <u>C-b-1: Dynamic test</u> (1) Injury criteria : 1 Thorax : TTI≤85g (4-door passenger cars, MPV) TTI≤90g (2-door passenger cars) 2 Pelvis : Peak lateral acceleration ≤ 130g (2) Other requirements : 1 Door opening : Any door (including a rear hatch back or tailgate), which is struck by the moving deformable barrier, shall not separate totally from the car. a) The door shall not disengage from the latched position. b) The latch shall not separate from the striker, and the hinge components shall not separate from each other or from their attachment to the vehicle. c) Neither the latch not the hinge systems of the door shall pull out of their anchorage. (3) Test condition : 1 MDV speed : 33.5 MPH 2 The line of forward motion of the moving deformable barrier forms an angle of 63 degrees with the centerline of the test vehicle. 3 Vehicle condition : Static 4 Test weight : Unloaded vehicle weight + 300lbs, or its related cargo and luggage capacity (whichever is less), secured in the luggage or load-carrying area + the weight of necessary dummies. 5 Fuel capacity : An amount which is equal to not less than 92% and not more than 94% of the fuel tank’s usable capacity stated by the vehicle’s manufacturer + the amount of needed to fill the entire fuel system from the fuel tank through the engine’s induction system. 6 Door : Unlock, Close. Full latch 7 Transmission : Manual transmission - 2nd Automatic transmission - Neutral 8 Parking brake : ON 9 Seat position : In the adjustment position midway between the forward most and rearmost positions, and if separately adjustable in a vehicle in a vertical direction are at the lowest position.	

USA (FMVSS214)		
ITEM	CONTENT	Illustration / supplement
	C-b-2 : Static test (1) Requirements : 1 Initial crush resistance ≥ 2250 lbs 2 Intermediate crush resistance ≥ 3500 lbs (without seat) ≥ 4375 lbs (with seat) 3 Peak crush resistance ≥ 7000 lbs or curb weight X 2 (whichever is less) (without seat) ≥ 12000 lbs or curb weight X 3.5 (whichever is less) (with seat) (2) Test conditions : Using loading device, apply a load to the outer surface of the door in an inboard direction normal to a vertical plane along the vehicle's longitudinal centerline.	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R N/R	
E: Referred standards (1)Alternative standards	 N/R	

97-11. Side intrusion

ECE (ECE95-01)		
ITEM	CONTENT	Illustration / supplement
A: Application	Passenger cars(M1), (R point ≤ 700mm)	
B: Structure requirement B-a: Structure of parts	B-a-1: Barrier (for dynamic test) (1) Type : Moving Deformable Barrier (2) Mass : 950±20kg (3) Tread ; 1500±10mm Wheel base : 3000±10mm (4) Minimum Road Clearance : 300±5mm B-a-2 : Dummy (for dynamic test) (1) Type : EUROSID-1 dummy (2) Stabilized temperature : 22±4°C B-a-3 : Loading Device (for static test) N/R	
B-b: Construction of parts installed to the vehicle	B-b-1 : Barrier (for dynamic test) (1) Location : The trajectory of mobile deformable barrier longitudinal median vertical plane shall be perpendicular to the longitudinal median vertical plane of the impacted vehicle. B-b-1 : Dummy (for dynamic test) (1) Location : In the front seat on the impact side.	

ECE (ECE95-01)		
ITEM	CONTENT	Illustration / supplement
C: Performance of requirement C-a: Performance of parts C-b: Performance of parts installed to the vehicle	N/R <u>C-b-1: Dynamic test</u> (1) Injury criteria : 1 HPC (Head performance criteria) ≤ 1000 2 Thorax performance criteria : - RDC (Rib deflection criteria) ≤ 42mm - VC (Soft Tissue Criterion) ≤ 1.0m/s 3 Pelvis performance criterion : - PSPF (Public Synphysis Peak Force ≤ 6kN - APF (Abdomen Peak Force) ≤ 2.5kN (2) Other requirements : 1 Door opening : No doors shall open during test. 2 Ability to escape from the impacted vehicle. After the impact, it shall be possible without the use of tools to; - open a sufficient number of doors provided for normal entry and exit of passengers to allow evacuation of all occupants; - release the dummy from the protective system; - remove the dummy from the vehicle. 3 Sharp projections or jagged edges: No interior device or component shall become detached in such a way as noticeable to increase the risk of injury from sharp projections or jagged edges. 4 Fuel leakage : ≤ 30g/min	

ECE (ECE95-01)		
ITEM	CONTENT	Illustration / supplement
	(3) Test condition : 1 MDV speed : 50±1km/h 2 The trajectory of the mobile deformable barrier longitudinal median vertical plane shall be perpendicular to the longitudinal median vertical plane of the impacted vehicle. 3 Vehicle condition : Static 4 Test weight : Unloaded vehicle weight + 100kg 5 Fuel capacity : 90% of the mass of a full load of fuel as specified by the vehicle manufacturer. 6 Door : Unlock, Closed 7 Transmission : Neutral 8 Parking brake : OFF 9 Seat position : Nearest to mid way between the foremost and rearmost positions. <u>C-b-2 : Static test</u> N/R	
D: Label marking requirements D-a: Label marking its own requirements D-b: Label marking installed to a vehicle	 N/R There shall be affixed to every vehicle conforming to a vehicle type approved under this Regulation.	
E: Referred standards (1)Alternative standards	 EU 96/27	

ITEM 97-12

Windscreen wipers

APEC Regulation Analysis Findings
Item No. 97-12: Windscreen Wiper

1. The Canadian regulation for windscreen wiper is equivalent to FMVSS.

2. The Chinese regulation is based on FMVSS, SRRV, and ADR.

3. The Korean regulation is based on EEC 78/318.

4. New Zealand accepts FMVSS 104, EEC 78/318, SRRV 45, and Jisha 1079, and ADR 16 as alternatives.

5. Brunei, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, and Thailand require windscreen wipers to be fitted.

6. Mexico, Papua New Guinea, Taiwan, and ECE do not have requirements for wipers and washers.
   (1) ADR requires the washer tank capacity (B-a-1) to be at least 1 liter. China also adopts this requirement.
   (2) All member economies require wipers and washers to be fitted to the vehicle (B-b-1). Hong Kong, Indonesia, Thailand also specify the number of wipers and washers.
   (3) ADR and FMVSS stipulate that SAE J942 be applied to the performance of the washing system (C-a-1).
   (4) ADR, FMVSS, and SRRV are harmonized with respect to wiper speed (C-b-1).
   (5) Requirements for wiping area (C-b-2) can be divided into two groups--the FMVSS group specifying only area and the SRRV group specifying both area and wiping ratio.
       FMVSS type - Australia, Canada, Korea, U.S.
       SRRV type - China, Japan (Load conditions differ from FMVSS)
       Other - Indonesia ("extensive area")
   (6) High-speed wiping requirement (C-b-3) exists in SRRV.
   (7) Forced stalling (C-b-4) is specified in SRRV, and is adopted by China.
   (8) Wiper movement (C-b-5) is specified in SRRV.
   (9) The freezing strength of the wiper (C-b-6) is specified in SRRV, and is adopted by China.
   (10) Requirements for "clear area by the washer" (C-b-7) can be divided into the following two groups:
       FMVSS type - Australia, Canada, Korea, U.S.
       SRRV type - China, Japan
   (11) Injection capability (C-b-8) is specified in ADR and SRRV, and China adopts the SRRV requirements.

   (12) Temperature operation tests (C-b-9) are harmonized between FMVSS and SRRV, and are adopted by Canada and China. ADR provides a unique temperature operation test.

ITEM NO.97-12 Windscreen wipers

A: Application — Passenger Car

Member Economy	Regulation Number	B-a-1 min. washer tank capacity	B-b-1 Wiper & washer fitted to the vehicle	C-a-1 Performance of washing system	C-b-1 Wiper speed
Australia	ADR16/01	ADR16/01 (min. 1L)	Common (to be fitted)	N/R	ADR16/01 (General)
Brunei	The Road Traffic Enactment sec.30	N/R	Common	N/R	N/R
Canada	CMVSS 104	N/R	Common	FMVSS 104	FMVSS 104
Chile	N/A				
China	GB15085-94	ADR16/01	Common	N/R	FMVSS104 SRRV 45 ADR16/01
Hong Kong	Road Traffic(C.M) Regulations CAP.374-29	N/R	Unique (min. 1pce.)	N/R	N/R
Indonesia	R44/93-73	N/R	Unique (min. 1pce.)	N/R	N/R
Japan	SRRV 45	N/R	Common (to be fitted)	N/R	SRRV 45 (General)
Korea	KMVSS 109	N/R	Common	N/R	N/R
Malaysia	Motor Vehicle (Construction & Use) Rules, 1959 (L.N. 170/1959-23)	N/R	Common	N/R	N/R
Mexico	NA				
New Zealand	VSR 27	*should be complied to at least one regulation of ADR, FMVSS,SRRV-Jisha1079 or EEC			
PNG	N/A				
Philippines	S34h RA 4136	N/R	Common	N/R	N/R
Singapore	C22,23	N/R	Common	N/R	N/R
Chinese Taipei	N/A				
Thailand	MRNo.22(B.E. 2524) MVA:2(3)	N/R	Unique (min. 1pce.)	N/R	N/R
USA	FMVSS 104	N/R	Common (to be fitted)	FMVSS 104 (SAE.J 942)	FMVSS 104 (at least 2 speeds min: more than 20 cycles/min. max: more than 45 cycles/min. difference: more than 15 cycles)
ECE	NA				

ITEM NO.97-12 Windscreen wipers

A: Application — Passenger Car

Member Economy	Regulation Number	C-b-2 Wiping area and Load condition	C-b-3 High-speed wiping requirement	C-b-4 Forced stalling
Australia	ADR16/01	ADR16/01 (A:80%, B:94%, C:99%) Load : 68kg x 5 SAE J903a	N/R	N/R
Brunei	The Road Traffic Enactment sec.30	N/R	N/R	N/R
Canada	CMVSS 104	FMVSS 104	N/R	N/R
Chile	N/A			
China	GB15085-94	SRRV 45 *Load: 65kg x 1 Area definition is the same as SRRV 45	N/R	SRRV 45
Hong Kong	Road Traffic(C.M) Regulations CAP.374-29	N/R	N/R	N/R
Indonesia	R44/93-73	Unique (clean the extensive part of windscreen)	N/R	N/R
Japan	SRRV 45	SRRV 45 (A:98%, B:80%) Load: 55kg x 2 Area definition is different from FMVSS.	SRRV 45 (98% of A area during high speeding)	SRRV 45 (return to the initial position automatically)
Korea	KMVSS 109	FMVSS 104 ADR16/01	N/R	N/R
Malaysia	Motor Vehicle (Construction & Use) Rules, 1959 (L.N. 170/1959-23)	N/R	N/R	N/R
Mexico	NA			
New Zealand	VSR 27	*should be complied to at least one regulation of ADR, FMVSS,SRRV-Jisha1079 or EEC		
PNG	N/A			
Philippines	S34h RA 4136	N/R	N/R	N/R
Singapore	C22,23	N/R	N/R	N/R
Chinese Taipei	N/A			
Thailand	MRNo.22(B.E. 2524) MVA:2(3)	N/R	N/R	N/R
USA	FMVSS 104	FMVSS 104 (A:80%, B:94%, C:99%) Load: 68kg x 5 SAE J903a	N/R	N/R
ECE	NA			

ITEM NO.97-12 Windscreen wipers

A: Application — Passenger Car

Member Economy	Regulation Number	C-b-5 Wiper movement	C-b-6 Freezing strength of wiper	C-b-7 Clear area by washer	C-b-8 Injection capability of washer
Australia	ADR16/01	N/R	N/R	ADR16/01 (75% of A,B,C area within 10 cycles)	ADR16/01 (withstanding the load when nozzle plugging more than 60 seconds)
Brunei	The Road Traffic Enactment sec.30	N/R	N/R	N/R	N/R
Canada	CMVSS 104	N/R	N/R	FMVSS 104	N/R
Chile	N/A				
China	GB15085-94	N/R	SRRV 45	SRRV 45	SRRV 45
Hong Kong	Road Traffic(C.M) Regulations CAP.374-29	N/R	N/R	N/R	N/R
Indonesia	R44/93-73	N/R	N/R	N/R	N/R
Japan	SRRV 45	SRRV 45 When two or more wipers provided, the movement shall be interlocked	SRRV 45 (operative for min. 2 minutes at –18deg)	SRRV 45 (60% of A area)	SRRV 45 (injection capability and plugging withstanding characteristic)
Korea	KMVSS 109	N/R	N/R	FMVSS 104 ADR16/01	N/R
Malaysia	Motor Vehicle (Construction & Use) Rules, 1959 (L.N. 170/1959-23)	N/R	N/R	N/R	N/R
Mexico	NA				
New Zealand	VSR 27	*should be complied to at least one regulation of ADR, FMVSS,SRRV-Jisha1079 or EEC			
PNG	N/A				
Philippines	S34h RA 4136	N/R	N/R	N/R	N/R
Singapore	C22,23	N/R	N/R	N/R	N/R
Chinese Taipei	N/A				
Thailand	MRNo.22(B.E. 2524) MVA:2(3)	N/R	N/R	N/R	N/R
USA	FMVSS 104	N/R	N/R	FMVSS 104 (75% of Area A,B,C)	N/R
ECE	NA				

ITEM NO.97-12 Windscreen wipers

A: Application — Passenger Car

Member Economy	Regulation Number	C-b-9 Temperature operation test	D Marking	E Reference Standards Alternative Regulation
Australia	ADR16/01	ADR16/01 (washer freezing ~80deg) (washer shall be operative after each 2,000 activations at 25deg, 65deg, - 5deg and 25deg)	N/R	N/A
Brunei	The Road Traffic Enactment sec.30	N/R	N/R	N/A
Canada	CMVSS 104	FMVSS 104	N/R	FMVSS 104
Chile	N/A			N/A
China	GB15085-94	SRRV 45	N/R	N/A
Hong Kong	Road Traffic(C.M) Regulations CAP.374-29	N/R	N/R	N/A
Indonesia	R44/93-73	N/R	N/R	N/A
Japan	SRRV 45	SRRV 45 (-18deg, 80deg)	N/R	N/A
Korea	KMVSS 109	N/R	N/R	N/A
Malaysia	Motor Vehicle (Construction & Use) Rules, 1959 (L.N. 170/1959-23)	N/R	N/R	N/A
Mexico	NA			N/A
New Zealand	VSR 27	*should be complied to at least one regulation of ADR, FMVSS,SRRV-Jisha1079 or EEC		FMVSS104 EEC78/318 SRRV 45 Jisha1079 ADR16
PNG	N/A			N/A
Philippines	S34h RA 4136	N/R	N/R	N/A
Singapore	C22,23	N/R	N/R	N/A
Chinese Taipei	N/A	N/A	N/A	N/A
Thailand	MRNo.22(B.E. 2524) MVA:2(3)	N/R	N/R	N/A
USA	FMVSS 104	FMVSS 104 (-18deg~80deg)	N/R	N/A
ECE	NA			N/A

97-12 Windscreen Wipers

Australia
Regulation Name : Australian Design Rule
ADR 16/01 Windscreen Wipers and Washers

Items	Summary	Figure and additional explanations
A : Application	Passenger Car	Passenger Car includes followings; -MA: Passenger car -MB: Forward -control Passenger Vehicle -MC: Off-road Passenger Vehicle -MD1: Light Omnibus up to 3.5 tones 'GVM', up to 12 seats
B : Structure Requirement		
B-a: Structure of Parts	Washer -mini. tank capacity : 1 liter	
B-b: Structure of Parts Installed in Body	Windscreen wipers and washers shall be fitted to the vehicles.	
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	<Wiper> Wiper speed -more than 2 different speeds -min. speed: more than 20 cycle/min. -max. speed: more than 45 cycle/min. -difference between mini. and max. speed : more than 15 cycle/min. Wiping area (Load condition: 68kg x 5) -A area : not less than 80 % * -B area : not less than 94 % * -C area : not less than 99 % *	* : Detail requirements are different by vehicle width.

Items	Summary	Figure and additional explanations
C-b: Performance of Parts Installed in body	<Washer> Clear area by washer - 75 % of Area A, B and C within 10 cycles Freezing strength of washer - Washing system shall be operative after 6 cycles freezing-thawing test Injection capability -Washing system shall have injection capability and plugging withstanding characteristics. Temperature test - Washing system shall be operative at 80°for more than 8 hours. -Washing system shall be operative after each of 2,000 activation at 25°,65°, minus 5°, and 25°(total: 8,000 activation)	
D: Label Marking Requirement	None	
E: Reference Standards		

12 Windscreen Wipers

Brunei Regulation Name : The Road Traffic Act chapter 88 Motor Vehicle Regulations, 1988		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	An efficient automatic windscreen wiper shall be fitted to every motor vehicle.	
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	None	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

Canada
Regulation Name : Canada Motor Vehicle Safety Standards
CMVSS 104 Windshield Wiping and Washing System

Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	Every vehicle shall have a power-driven windshield wiping system and a windshield washing system that meet the requirements.	
C : Performance Requirement		
C-a: Performance of Parts	Washing system -Washing system shall meet the requirements of SAE Recommended Practice J942, 'Passenger Car Windshield Washer Systems,' November 1965.	
C-b: Performance of Parts Installed in body	<Wiper> Wiping frequency -Wiping system shall have at least two frequencies or speeds. -One frequency or speed shall be at least 45 cycles per minute. -The highest and one lower frequency or speed shall differ by at least 15 cycles per minute. -Such lower frequency or speed shall be at least 20 cycles per minute Wiping area (Load condition: 68 kg x 5) -Wiping system shall wipe the following percentage of areas A, B and C (*). A: not less than 80 % B: not less than 94 % C: not less than 99 %	(*): Details are different by vehicle width.

Items	Summary	Figure and additional explanations
C-b: Performance of Parts Installed in body	<Washer> Clear area by washer -75% of Area A,B and C Temperature test - -18°~80°	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

China
Regulation Name : National Standard of the People's Republic of China, GB15085-94

<table>
<tr><th>Items</th><th>Summary</th><th>Figure and additional explanations</th></tr>
<tr><td>A : Application</td><td>Passenger Car</td><td></td></tr>
<tr><td>B : Structure Requirement</td><td></td><td></td></tr>
<tr><td>B-a: Structure of Parts</td><td>The capacity of the reservoir shall not be less than 1L.</td><td></td></tr>
<tr><td>B-b: Structure of Parts Installed in Body</td><td>Every motor vehicle must be equipped with windshield wipers and washers.</td><td></td></tr>
<tr><td>C : Performance Requirement</td><td></td><td></td></tr>
<tr><td>C-a: Performance of Parts</td><td>None</td><td></td></tr>
<tr><td>C-b: Performance of Parts Installed in body</td><td><Wiper>
Wiping area
- The windshield wiper field must cover;
*Area A: not less than 98%
**Area B: not less than 80%
<table><tr><th>Area</th><th colspan="4">Angle</th></tr><tr><th></th><th>Left</th><th>Right</th><th>Up (V1)</th><th>Down (V2)</th></tr><tr><td>A</td><td>13</td><td>20</td><td>3(V1)</td><td>1(V2)</td></tr><tr><td>B</td><td>17</td><td>17*</td><td>7(V1)</td><td>5(V2)</td></tr></table>*Symmetrical
(Load condition: 65kg x 1)</td><td>(V1),(V2): Reference point of each area</td></tr>
</table>

Items	Summary	Figure and additional explanations
C-b: Performance of Parts Installed in body	-Wiper speed The windshield wiper must have at least two frequencies. The high frequency : not less than 45 cycles/min The low frequency : not be less than 20 cycles/min The difference between the high and the low : at least than 15 cycles/min. - Forced stalling When the windshield wiper system is stopped, the blade should return to their position of rest automatically. -Freezing strength The windshield wiper system should be capable of operating for two minutes on a dry windshield with the outside temperature at -18±3°C. <Washer> -Clear area by washer The windshield washer system should be capable of supplying enough fluid to clear more than 60% of vision area A at normal temperature. -Temperature test The windshield washer system should be withstand the temperature test(-18°~ 80°), and after the test specified are carried out, the system should be still with the injection performance. -Injection capability The windshield washer system should be withstand the loads produced when the nozzles are plugged, and after that, the system should be still inject fluid to the windshield.	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

Hong Kong Regulation Name : Road Traffic (Construction and Maintenance of Vehicles) Regulations CAP374-29		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	-Wiper The vehicle shall be fitted with one or more efficient automatic windscreen wipers capable of cleaning. -Washer* The vehicle with windscreen wiper shall be fitted with a windscreen washer capable of clearing.	* shall not apply to; (a) a land tractor (b) vehicles not exceeding 35km/h
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	None	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

Indonesia Regulation Name : Regulation under Government Regulation of Rep. Of Indonesia N0.44/1993 on Vehicles and Drivers		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	-Wipers Minimum 1 piece. Wipers shall be activated mechanically and/or electronically.	
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	Wipers shall be able to clean an extensive part of the windscreen.	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

Japan Regulation Name : SRRV45		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	Motor vehicle shall have automatic windshield wipers and washers. Windscreen washers shall squirt an adequate amount of cleaning liquid.	Type of windshield washing system Manual type Electric type
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	<Wiper> Wiping frequency -Wiping system shall have at least two frequencies or speeds Movement -When two or more wipers are provided, their movement shall be interlocked. Sweep frequency Max. : more than 45 cycles / min. Min. : more than 10 cycles / min. Difference : more than 15 cycles / min. Forced stalling - The wiper blade shall automatically return to the initial position. - Continued-	

<table>
<tr><th>Items</th><th>Summary</th><th>Figure and additional explanations</th></tr>
<tr><td>C-b: Performance of Parts Installed in body</td><td>Wiped area (Load condition: 55kg x 2)
Area A : more than 98%
Area B : more than 80%
<table>
<tr><td>Area</td><td colspan="4">Angle</td></tr>
<tr><td></td><td>Left</td><td>Right</td><td>Up (V1)</td><td>Down (V2)</td></tr>
<tr><td>A</td><td>13</td><td>20</td><td>3(V1)</td><td>1(V2)</td></tr>
<tr><td>B</td><td>17</td><td>17*</td><td>7(V1)</td><td>5(V2)</td></tr>
</table>
* Symmetrical
Low temperature test
- (-18°±3°, operation at least 2 minutes)
High-speed wiping requirement
- The wiped area of Area A shall be more than 98% in the sweep performance test during high speed running.
<Washer>
Injection capability of washing system
-The washing system shall have the injection capability and plugging-withstanding characteristic.
Clear area by washer
- The windshield wiping and washing system shall have a washing capability to wipe more than 60% of the Area A.
Temperature test
- (-18°/ 80°)</td><td>(V1),(V2):Reference point of each area</td></tr>
<tr><td>D: Label Marking Requirement</td><td>None</td><td></td></tr>
<tr><td>E: Reference Standards</td><td>SRRV 45 is equivalent to 78/318/EEC</td><td></td></tr>
</table>

12 Windscreen Wipers

Korea
Regulation Name : The Regulations of the Motor Vehicle Safety Standards
Article 109 Windshield Wiping and Washing System

Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	None	
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	<Wiper> -Wiping system shall be capable of wiping the following percentage of areas A,B and C. A: not less than 80% B: not less than 94% C: not less than 99% (The area definition is the same as FMVSS = SAE J 903a) -Sweep frequency: Min: more than 20 cycle/min <Washer> - The windshield washer system shall be capable of supplying enough washing fluid to clear, within 10 wiper cycles, at least 75 percent of Areas A,B,C.	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

Malaysia Regulation Name : Motor Vehicles (Construction and Use) Rules, 1959(L.N.170/1959-23)		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	An efficient automatic windscreen wiper shall be fitted to every motor vehicle.	
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	None	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

New Zealand Regulation Name : The Transport (Vehicle Standards)Regulations 1990 Section 27 Windscreen Wiping and Washing		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	Windscreen wiping and washing equipment shall be fitted to the vehicles.	
C : Performance Requirement	Windscreen wiping and washing equipment have to comply with one of reference standards at least.	
C-a: Performance of Parts	Refer to reference standards	
C-b: Performance of Parts Installed in body	Refer to reference standards	
D: Label Marking Requirement	None	
E: Reference Standards	EEC78/318, FMVSS104, ADR16/01, SRRV 45 & Jisha 1079	

12 Windscreen Wipers

Republic of Philippine Regulation Name : Republic Act No. 4136 Sec. 34-h		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	Every motor vehicle shall be equipped with a mechanically or electrically operated device for wiping off raindrops or other moisture from its front windshield.	
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	None	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

Singapore Regulation Name : Road Traffic (Motor Vehicles, Construction and Use) Rule CAP. 276, R9 - 22&23		
Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	The windscreen of every motor vehicle shall be fitted with efficient automatic windscreen wipers capable of cleaning. Every motor vehicle shall be fitted with one or more efficient automatic windscreen washer capable of cleaning.	
C : Performance Requirement		
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	None	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

Thailand
Regulation Name : The Ministerial Regulation No.22 (B.E.2537) issued under the provision of the Motor Vehicles Act, B.E.2522 (A.D.1979) No.2(3)

Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	At least one windscreen wiper shall be fitted to the front of a vehicle.	
C : Performance Requirement	It can work very well and can clean sufficient area for driver to see the traffic in front of the vehicle.	
C-a: Performance of Parts	None	
C-b: Performance of Parts Installed in body	None	
D: Label Marking Requirement	None	
E: Reference Standards	None	

12 Windscreen Wipers

U.S.A.
Regulation Name : Federal Motor Vehicle Safety Standards
FMVSS 104 Windshield wiping and washing systems

Items	Summary	Figure and additional explanations
A : Application	Passenger Car	
B : Structure Requirement		
B-a: Structure of Parts	None	
B-b: Structure of Parts Installed in Body	Each vehicle shall have a power-driven windshield wiping system and a windshield washing system that meet the requirements.	
C : Performance Requirement		
C-a: Performance of Parts	Washing system -Washing system shall meet the requirements of SAE Recommended Practice J942, 'Passenger Car Windshield Washer Systems,' November 1965.	

Items	Summary	Figure and additional explanations
C-b: Performance of Parts Installed in body	<Wiper> Wiping frequency -Wiping system shall have at least two frequencies or speeds. -One frequency or speed shall be at least 45 cycles per minute. -The highest and lower frequency or speed shall differ by at least 15 cycles per minute. -Such lower frequency or speed shall be at least 20 cycles per minute. Wiped area (Load condition: 68kg x 5) -Wiping system shall wipe the following percentage of areas A, B and C (*). A: not less than 80 % B: not less than 94 % C: not less than 99 % (Wiped pattern is in accordance with SAE J903a) <Washer> Clear requirement by washer : - 75% of Area A,B and C Temperature test - -18°~80°	(*): Details are different by vehicle width.
D: Label Marking Requirement	None	
E: Reference Standards	None	

ITEM 97-13

Tyres

APEC Regulation Analysis Findings
Item No. 97-13: Tyres

1. Tyres regulations in the APEC region can be divided into the following two groups:

   a) Requirements for fitting tyres to the wheels and vehicle body are provided, but tyre performance is not specified.

      10 member economies - Brunei, Chili, Japan, Hong Kong, Indonesia, Malaysia, New Zealand, Papua New Guinea, Singapore, Thailand.

   b) Requirements for tyre performance are provided.
      8 member economies - Australia, Canada, China, Korea, Mexico, Philippines, Chinese Taipei, U.S.

   These tyre performance requirements are based mostly on FMVSS, while ECE is adopted only in the high-speed driving tests of Australia and China.

   (1) Strength (C-a-1)
   All of the 8 member economies which specify tyre performance set forth the same standard for tyre strength, although there are slight differences arising from the use of metric and non-metric units.

   (2) Bead Unseating (C-a-2)
   The same status as the above (1) Strength.

   (3) Durability (C-a-3)
   The same status as the above (1) Strength and (2) Bead Unseating.

   (4) High-speed Performance (C-a-4)
   Of the 8 member economies which specify tyre performance, six economies (excluding Australia and China) adopt a high-speed test that is identical with the corresponding FMVSS test.

   (5) Marking (D)
   Most member economies require the marking on the tyre of its size, manufacturing date, brand, etc. Also, China, Korea, Chinese Taipei, and U.S. require the marking of the maximum air pressure. The U.S. additionally demands the marking of tread wear, traction and heat resistance performance in the interest of consumers.

ITEM No. 97-13 Tyres

<< A: application >> --> Passenger Car

ECONOMY	C-a-1 Strength	C-a-2 Bead unseating	C-a-3 Endurance	C-a-4 High speed	D Marking	E Reference/ Alternative
Australia	ADR 23/01 (General)	ADR23/01 (General)	ADR23/01 (General)	ADR 23/01 (General)	ADR 23/01 (General)	
Brunei	N/R	N/R	N/R	N/R	N/R	
Canada	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	
Chile	N/R	N/R	N/R	N/R	N/R	
China	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109 ECE 30/02	Unique (Tyre size, Date of manufacturer, Trade name or mark)	
Hong Kong	N/R	N/R	N/R	N/R	N/R	
Indonesia	N/R	N/R	N/R	N/R	N/R	
Japan	N/R	N/R	N/R	N/R	N/R	
Korea	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	
Malaysia	N/R	N/R	N/R	N/R	N/R	
Mexico	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	Unique (Tyre size, Trade name or mark)	
New Zealand	N/R	N/R	N/R	N/R	N/R	
Papua New Guinea	N/R	N/R	N/R	N/R	N/R	
Philippines	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	Unique (Tyre size, Trade name or brand name, Trade mark)	
Singapore	N/R	N/R	N/R	N/R	N/R	
Chinese Taipei	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	FMVSS 109	
Thailand	N/R	N/R	N/R	N/R	N/R	
United States	FMVSS 109 (General)	FMVSS 109 (General)	FMVSS 109 (General)	FMVSS 109	FMVSS 109 (Tyre size, Date of manufacturer, Trade name or mark, Maximum inflation pressure)	
ECE	N/R	N/R	N/R	ECE 30/02 (General)	ECE 30/02 (Tyre size, Date of manufacturer, Trade name or mark) (General)	

Economy : Australia

Title of Standard : ADR 23/01, 24/02

A. Application : Passenger car tyres

C-a-1. Strength :

Test inflation pressure 24psi----------295J
Test inflation pressure 28psi----------440J
Test inflation pressure 32psi----------585J
Test inflation pressure 180kPa----------295J
Test inflation pressure 220kPa----------585J
For rayon “Diagonal ply Tyres” or rayon “Bias-Belted Tyres”, the required breaking energy value is to be reduced by 36.5 percent.
For tyres with “Specified Design Section Width” less than 160mm (or 6.30 inches) the required breaking energy value is to be reduced (or further reduced) by 25.0 percent.

C-a-2. Bead unseating :

Nominal section width : S<160mm----------6670N
Nominal section width : 160mm≤S<205mm----------8890N
Nominal section width : S≥205mm----------11120N

C-a-3. Endurance :

Step	speed(km/h)	Duration(h)	Test load % of maximum load
1	80	4	85
2	80	6	90
3	80	24	100

C-a-4. High Speed

Test load equal to 80 % of maximum load
Step 1 : from zero to initial test speed---------10 minutes
initial test speed : prescribed maximum speed for the type of tyre,
less 40km/h in the case of the smooth wheel having 1.70m + 1% in diameter or
less 30km/h in the case the smooth wheel having 2m + 1% in diameter;
Step 2 : initial test speed----------10 minutes
Step 3 : initial test speed plus 10km/h---------10 minutes
Step 4 : initial test speed plus 30km/h---------10 minutes
Step 5 : initial test speed plus 30km/h---------20 minutes

C-b. Fitting :

All tyres fitted to vehicle for normal use road wheels must be of the same type of “Carcass” construction, but may vary in respect of “Cord” materials and number of “Plies”.

The “Rims” on the vehicle must be constructed to dimensions of a “Rim” specified for the tyre size designation as a approved fitment in the “Nominated Standard”.

D. Marking :

Tyre size designation

A date code consisting of 3 digits

Brand name and an “Approved” code mark

Economy : Brunei

Title of Standard : 31

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :
Every wheel of every vehicle when in use shall be equipped with pneumatic tyres

D. Marking : N/R

Economy : Canada

Title of Standard : CMVSS 109, 110

A. Application : Passenger car tyres

C-a-1. Strength :

		Size Designation below 160mm	Size Designation 160mm or above
Maximum Permissible inflation	220 kPa (32 psi)	220J (1950 in-lbs)	294J (2600 in-lbs)
Maximum Permissible inflation	240 kPa (35 psi)	220J (1950 in-lbs)	294J (2600 in-lbs)
Maximum Permissible inflation	250 kPa (36 psi)	330J (2925 in-lbs)	441J (3900 in-lbs)
Maximum Permissible inflation	275 kPa (40 psi)	441J (3900 in-lbs)	588J (5200 in-lbs)
Maximum Permissible inflation	280 kPa (41 psi)	441J (3900 in-lbs)	588J (5200 in-lbs)
Maximum Permissible inflation	300 kPa (44 psi)	220J (1950 in-lbs)	294J (2600 in-lbs)
Maximum Permissible inflation	340 kPa (50 psi)	441J (3900 in-lbs)	588J (5200 in-lbs)

For rayon bias ply tyres, the required value is to be reduced by 36.5%.

C-a-2. Bead unseating :

Tire designated section less than 155mm (6 inches)----------6670N(1500 pounds)
155mm (6 inches) or more but less than 205mm (8 inches)---------8895N(2000 pounds)
Tire designated section 205mm (8 inches) or more----------11120N(2500 pounds)

C-a-3. Endurance :

Step	Speed(km/h)	Duration (h)	Test load % of maximum load
1	80	4	85
2	80	6	90
3	80	24	100

C-a-4. High speed :

Step	Speed(km/h)	Duration	Test load % of maximum load
1	80	2 h	88
2	121	30 min.	88
3	129	30 min.	88
4	137	30 min.	88

C-b. Fitting :

The vehicle maximum load on the tire shall not be greater than the applicable maximum load rating as marked on the sidewall of the tire.

D. Marking :

The tire size designation

The name of the manufacturer or the brand name of tire and the symbols that identify the manufacturer of the tire

The maximum permissible inflation pressure

Economy : China

Title of Standard : GB 4502 4503, 4504, 7034

A. Application : Passenger car tyres

C-a-1. Strength :

	80 series and over section width 170 and less 80 series and less section width 180 and less	section width 170 and 180 and over
4PR (Nominal rim diameter 10)	1910 kgf.cm	---
4PR (Nominal rim diameter 12 and over)	2250 kgf.cm	3000 kgf.cm
6PR (Nominal rim diameter 10)	2860 kgf.cm	---
6PR (nominal rim Diameter 12 and over)	3370 kgf.cm	4490 kgf.cm

Compute the value of rayon carcass diagonal tyres by 60% in the table

C-a-2. Bead unseating :

Section width 155mm and less----------680 kgf
Section width 155mm - 205mm----------910 kgf
Section width 205mm and over----------1130 kgf

C-a-3. Endurance :

Step	Speed (km/h)	Duration (h)	Test load % of maximum load
1	80	4	85
2	80	6	90
3	80	24	100

C-a-4. High speed : Diagonal tyres

Step	Speed (km/h)		Duration	Test load % of maximum load
	Nominal rim diameter 10	Nominal rim diameter 12 and over		
1	80	80	2h	88
2	100	120	30 min.	88
3	110	130	30 min.	88
4	120	140	30 min.	88

C-a-4. High speed : Radial tyres

Test load equal 80% of maximum load

Step 1 : from zero to initial test speed----------10 minutes

Initial test speed : prescribed maximum speed from the type of tyre,
less 40km/h in the case of the smooth wheel having 1.70m ± 1% in diameter
less 30km/h in the case the smooth wheel having 2m ± 1% I diameter
For nominal rim diameter 10, the initial test speed is it be reduced by another 20km/h.
For nominal rim diameter 12, the initial test speed is to be reduced by another 10km/h

Step 2 : Initial test speed----------10 minutes

Step 3 : Initial test speed plus 10km/h--------10 minutes

Step 4 : Initial test speed plus 20km/h--------10 minutes

Step 5 : Initial test speed plus 30km/h--------20 minutes

C-a-b. Fitting : N/R

D. Marking :

Tyre size

Production number

Trade mark and manufacturer (or place name)

Standard rim

Economy : Hong Kong

Title of Standard : C & M Vehicle 22

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :
Pneumatic tyres of different types of structure shall be fitted to the same axle of a vehicle.

D. Marking : N/R

Economy : Indonesia

Title of Standard : R.44/93-15

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :

Any motor vehicle, trailer and semitrailer shall have a wheel system comprising wheels and wheel axles.

The wheel may be rims and tyres and axles or a combination of wheel axles which can guarantee safety.

The tyres shall have adequate adhesion, on dry as well as wet surfaces.

The design of the wheel axle and/or the combination of wheel axle and wheels shall depend on the class of road to be used.

D. Marking : N/R

Economy : Japan

Title of Standard : SRRV 7, 9

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :
For pneumatic tires or a solid tires whose ground-contact section is 25mm or thicker, the pressure of the ground-contact section shall not be more than 150kg/cm of the width of the ground-contact section.
The tires shall be free from any notable damage such as crack, bare cords, etc.

D. Marking : N/R

Economy : Korea

Title of Standard : KMVSS 10

A. Application : Passenger car tyres

C-a-1. Strength :

		Size Designation below 160mm	Size Designation 160mm or above
Maximum Permissible inflation	32 psi	1950 in-lbs	2600 in-lbs
Maximum Permissible inflation	36 psi	2925 in-lbs	3900 in-lbs
Maximum Permissible inflation	40 psi	3900 in-lbs	5200 in-lbs
Maximum Permissible inflation	240 kPa	1950 in-lbs	2600 in-lbs
Maximum Permissible inflation	280 kPa	3900 in-lbs	5200 in-lbs
Maximum Permissible inflation	300 kPa	1950 in-lbs	2600 in-lbs
Maximum Permissible inflation	340 kPa	3900 in-lbs	5200 in-lbs
Maximum Permissible inflation	350 kPa	1950 in-lbs	2600 in-lbs

For rayon bias ply tyres, the required value is to be reduced by 36.5%.

C-a-2. Bead unseating :

Tire designated section less than 6 inches----------1500 pounds
6 inches or more but less than 8 inches----------2000 pounds
Tire designated section 8 inches or more----------2500 pounds

C-a-3. Endurance :

Step	Speed(mph)	Duration (h)	Test load % of maximum load
1	50	4	85
2	50	6	90
3	50	24	100

C-a-4. High speed :

Step	Speed(mph)	Duration	Test load % of maximum load
1	50	2 h	88
2	75	30 min.	88
3	80	30 min.	88
4	85	30 min.	88

C-b. Fitting :

The vehicle maximum load on the tire shall not be greater than the applicable maximum load rating as marked on the sidewall of the tire.

D. Marking :

Size designation

Date of manufacturer

The name of the manufacturer, or brand name and number assigned to the manufacturer.

Maximum permissible inflation pressure

Economy : Malaysia

Title of Standard : 470/1959 46

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :
All the wheel of a vehicle shall vbe fitted with pneumatic tyres suitable size and design.

D. Marking : N/R

Economy : Mexico

Title of Standard : NOM-086-SCFI

A. Application : Passenger car tyres

C-a-1. Strength :

	Tires with size designation below 168mm	Tires with designation 168mm or above
4PR (Load Range B)	220J	294J
6PR (Load Range C)	331J	441J
8PR (Load Range D)	441J	588J

For rayon bias ply tyres, the required value is to be reduced by 36.5%.

C-a-2. Bead unseating :

Maximum cross section width under 155mm----------6.7kN (680kgf)
Maximum cross section width of 155mm to 202mm------8.9kN (907kgf)
Minimum cross section width of 203mm----------11.1kN (1134kgf)

C-a-3. Endurance :

Step	Speed (km/h)	Duration (h)	Test load % of maximum load
1	80	4	85
2	80	6	90
3	80	24	100

C-a-4. High speed :

Step	Speed (km/h)	Duration	Test load % of maximum load
1	80	2h	88
2	120	30 min.	88
3	128	30 min.	88
4	136	30 min.	88

C-b. Fitting : N/R

D. Marking :

Tyre size designation
Denomination or corporate name, or the registered trademark of the manufacturer

Economy : New Zealand

Title of Standard : VSR 14

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :

Tyres on the same axle shall be of the same nominal size and be of similar construction. Each tyre shall be pneumatic and of good quality and construction throughout, and shall comply with the appropriate vehicle standard.

Tyres and rims shall be matched and be of sufficient load capacity to meet reasonable requirements of service, and the sum of the load capacity of all the tyres and rims shall be not less than the gross vehicle mass.

D. Marking : N/R

Economy : Papua New Guinea

Title of Standard : R125H

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :

A tyre fitted a motor vehicle shall be free form any defect that is apparent by external examination and likely to render the use of the vehicle unsafe and have a clearly visible tread patter on all surface that normal come into contact with the road surface. A person shall not operate a motor vehicle if pneumatic tyres of different type of structure are fitted to the same axle of the vehicle or a diagonal ply tyre or a bias belted tyre is fitted on the rear axle, and a radial ply tyre is fitted on the front axle, of the vehicle.

D. Marking : N/R

Economy : Philippines

Title of Standard : PNS 25

A. Application : Pneumatic tyres

C-a-1. Strength :

	Tires with size designation below 160mm	Tires with size designation 160mm or above
4PR (Load Range B)	220 J	293 J
6PR (Load Range C)	331 J	440 J
8PR (Load Range D)	440 J	587 J

For rayon bias ply tyres, the required value is to be reduced by 36.5%.

C-a-2. Bead unseating :

Nominal section width : S<160mm----------6670 N

Nominal section width : 160mm ≤ S<205mm----------8890 N

Nominal section width : S ≥ 205mm----------11120 N

C-a-3. Endurance :

Step	Speed (km/h)	Duration (h)	Test load % of maximum load
1	80	4	85
2	80	6	90
3	80	24	100

C-a-4. High speed

Step	Speed (km/h)	Duration	Test load % of maximum load
1	80	2 h	88
2	120	30 min.	88
3	128	30 min.	88
4	136	30 min.	88

C-b. Fitting : N/R

D. Marking :

Tyre size designation

Registered trade name or brand name

Registered trademark

Economy : Singapore

Title of Standard : C15, C45, C109

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed : N/R

C-b. Fitting :
No person shall use or cause or permit to be used on a road any motor vehicle, or trailer, a wheel of which is fitted with a pneumatic tyre, if the tyre is unsuitable having regard to the use to which the motor vehicle or trailer is being put or to the types of tyres fitted to its other wheels.

D. Marking : N/R

Economy : Chinese Taipei

Title of Standard : CNS 4747

A. Application : Passenger car tyres

C-a-1. Strength :

	80 series and over section width 170 and less 80 series and less section width 180 and less	section width 170 and section width 180 and over
4PR (Nominal rim diameter 10)	1910 kgf.cm	---
4PR (Nominal rim diameter 12 and over)	2250 kgf.cm	3000 kgf.cm
6PR (Nominal rim diameter 10)	2860 kgf.cm	---
6PR (nominal rim Diameter 12 and over)	3370 kgf.cm	4490 kgf.cm

Compute the value of rayon carcass diagonal tyres by 60% in the table

C-a-2. Bead unseating :

Section width 155mm and less----------680 kgf
Section width 155mm - 205mm----------910 kgf
Section width 205mm and over----------1130 kgf

C-a-3. Endurance :

Step	Speed (km/h)	Duration (h)	Test load % of maximum load
1	80	4	85
2	80	6	90
3	80	24	100

C-a-4. High speed : Diagonal tyres

Step	Speed (km/h)		Duration	Test load % of maximum load
	Nominal rim diameter 10	Nominal rim diameter 12 and over		
1	80	80	2h	88
2	100	120	30 min.	88
3	110	130	30 min.	88
4	120	140	30 min.	88

C-a-4. High speed : Radial tyres

Test load equal 80% of maximum load

Step 1 : from zero to initial test speed----------10 minutes

Initial test speed : prescribed maximum speed from the type of tyre,
less 40km/h in the case of the smooth wheel having 1.70m±1% in diameter
less 30km/h in the case the smooth wheel having 2m±1% I diameter
For nominal rim diameter 10, the initial test speed is it be reduced by another 20km/h.
For nominal rim diameter 12, the initial test speed is to be reduced by another 10km/h

Step 2 : Initial test speed----------10 minutes

Step 3 : Initial test speed plus 10km/h--------10 minutes

Step 4 : Initial test speed plus 20km/h--------10 minutes

Step 5 : Initial test speed plus 30km/h--------20 minutes

C-a-b. Fitting : N/R

D. Marking :

Tyre size

Production number

Trade mark and manufacturer

Economy : United States

Title of Standard : FMVSS 109, 110

A. Application : Passenger car tyres

C-a-1. Strength :

		Size Designation below 160mm	Size Designation 160mm or above
Maximum Permissible inflation	32 psi	1950 in-lbs	2600 in-lbs
Maximum Permissible inflation	36 psi	2925 in-lbs	3900 in-lbs
Maximum Permissible inflation	40 psi	3900 in-lbs	5200 in-lbs
Maximum Permissible inflation	240 kPa	1950 in-lbs	2600 in-lbs
Maximum Permissible inflation	280 kPa	3900 in-lbs	5200 in-lbs
Maximum Permissible inflation	300 kPa	1950 in-lbs	2600 in-lbs
Maximum Permissible inflation	340 kPa	3900 in-lbs	5200 in-lbs
Maximum Permissible inflation	350 kPa	1950 in-lbs	2600 in-lbs

For rayon bias ply tyres, the required value is to be reduced by 36.5%.

C-a-2. Bead unseating :

Tire designated section less than 6 inches----------1500 pounds
6 inches or more but less than 8 inches----------2000 pounds
Tire designated section 8 inches or more----------2500 pounds

C-a-3. Endurance :

Step	Speed(mph)	Duration (h)	Test load % of maximum load
1	50	4	85
2	50	6	90
3	50	24	100

C-a-4. High speed :

Step	Speed(mph)	Duration	Test load % of maximum load
1	50	2 h	88
2	75	30 min.	88
3	80	30 min.	88
4	85	30 min.	88

C-b. Fitting :

The vehicle maximum load on the tire shall not be greater than the applicable maximum load rating as marked on the sidewall of the tire.

D. Marking :

Size designation

Symbol DOT (including date of manufacturer)

The name of the manufacturer, or brand name and number assigned to the manufacturer.

Maximum permissible inflation pressure

Economy : ECE

Title of Standard : ECE 30/02

A. Application : Passenger car tyres

C-a-1. Strength : N/R

C-a-2. Bead unseating : N/R

C-a-3. Endurance : N/R

C-a-4. High speed :

Test load equal to 80 % of maximum load

Step 1: from zero to initial test speed ------- 10 minutes

Initial test speed: prescribed maximum speed for the type of tyre ,
less 40km/h in the case of the smooth wheel having 1.70m±1% in diameter or
less 30km/h in the case the smooth wheel having 2m±1% in diameter

Step 2 : Initial test speed----------10 minutes

Step 3 : Initial test speed plus 10km/h--------10 minutes

Step 4 : Initial test speed plus 20km/h--------10 minutes

Step 5 : Initial test speed plus 30km/h--------20 minutes

C-b. Fitting : N/R

D. Marking :

The tyre size designation

The date of manufacturer

The trade name or mark

ITEM 97-14

Exhaust Noise

APEC Regulation Analysis Findings
Item No. 97-14: External Noise

1. In addition to its own regulation for external noise, Australia accepts ECE and EEC as alternatives.
2. Brunei and Hong Kong specifically require the vehicle to be equipped with a muffler.
3. Canada demands the external noise test provided either in the former ECE 9 Regulation or in the U.S. SAE standard.
4. Japan's requirements for acceleration and stationary noise are based on ECE. But its method of measuring acceleration noise is partly different from ECE. Also, Japan sets stationary noise limits and Japan specially regulate the steady running noise regulation, unlike ECE.
5. China and Malaysia adopt the acceleration noise requirements of the former ECE regulation.
6. Singapore have a stationary noise regulation that is equivalent with the corresponding Japanese regulation.
7. Taiwan is equivalent with ECE in acceleration noise, and with Japan in stationary noise.
8. ECE adopts an ISO standard for acceleration noise measuring surfaces, and has its unique requirements for marking and the durability of exhaust noise absorption materials.
9. A comparison of specific requirements is as follows:
   (1) Construction (B-a)
   Only Brunei and Hong Kong specifically require the vehicle to be equipped with a muffler.
   (2) Durability of Noise Absorption Materials (C-a)
   Only ECE specifies the durability of noise absorption materials used in the exhaust system.
   (3) Acceleration Noise (C-b-1)
   Measuring methods can be divided into the ECE type based on the ISO method and the Japan-U.S. type based on the SAE method.
   ECE changed its acceleration noise measuring method and limit values a number of times in the past. Australia, China, Malaysia, and Taiwan adopt them although not necessarily the latest version.
   Japan lays down acceleration noise limits equivalent to former ECE limits, and applies a unique measuring method matching the local driving conditions.
   Mexico adopts the SAE measuring method and the acceleration noise limits set by a number of American States.
   Canada accepts both ECE and SAE measuring methods.
   (4) Stationary Noise (C-b-2)
   Australia, Japan, Singapore, and Taiwan set forth requirements for stationary noise. Their measuring methods are equivalent, except for Australia. Japan, Singapore, and Taiwan provide stationary noise limits that are equivalent or partly arranged. Australia's measuring method is partly unique, while stationary noise limits are set by each Australian state.
   (5) Steady Running Noise (C-b-3)
   Only Japan establishes requirements for this type of noise.
   (6) Labeling and Marking (D)
   Only ECE has labeling and marking requirements concerning external noise.
   (7) Alternative Regulations (E)
   Only Australia accepts ECE and EEC as alternative regulations for external noise.

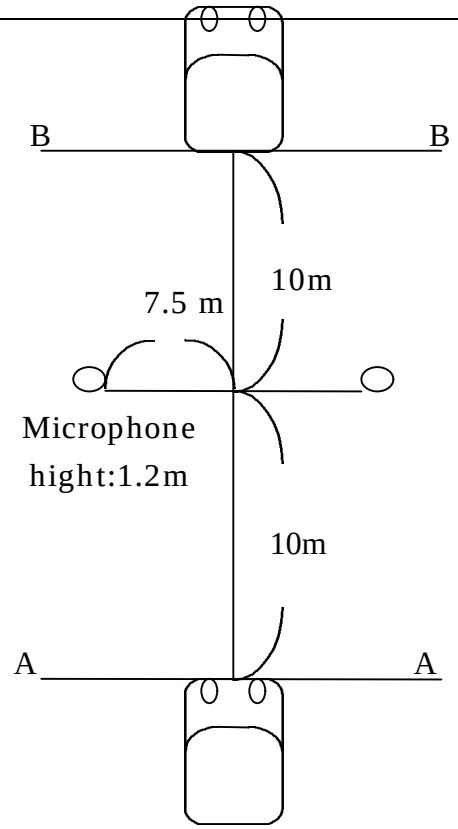
ITEM No97-14 External Noise

A: application Passenger Car

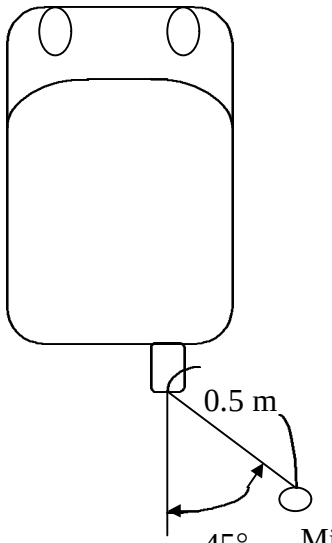
Economy	B-a : Structure of Parts	C-a : Performance of Parts (1) Exhaust systems containing fibrous materials	C-b: Performance of Parts Installed in body (1) Acceleration running noise	C-b: Performance of Parts Installed in body (2) Stationary noise	C-b: Performance of Parts Installed in body (3) Steady running noise	D : Label Marking Requirement D-a : Its Own Requirement	E : Reference Standards
Australia	N/R	N/R	ADR 28-01 (77+1dB(A))	ADR 28-01 (90dB(A))	N/R	N/R	ECE R 51
Brunei	Unique (To equip muffler)	N/R	N/R	N/R	N/R	N/R	N/R
Canada	N/R	N/R	Unique (82dB(A))	N/R	N/R	N/R	N/R
Chile	N/A	N/A	N/A	N/A	N/A	N/A	N/A
China	N/R	N/R	Unique (82dB(A))	N/R	N/R	N/R	N/R
Hong Kong	Unique (To equip muffler)	N/R	N/R	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R	N/R	N/R	N/R
Japan	N/R	N/R	SRRV 30 (78dB(A))	SRRV 30 (103dB(A))	SRRV 30 (70dB(A))	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	Unique (80dB(A))	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	Unique (SAE, 80dB(A))	N/R	N/R	N/R	N/R

Economy	B-a : Structure of Parts	C-a : Performance of Parts (1) Exhaust systems containing fibrous materials	C-b: Performance of Parts Installed in body (1) Acceleration running noise	C-b: Performance of Parts Installed in body (2) Stationary noise	C-b: Performance of Parts Installed in body (3) Steady running noise	D : Label Marking Requirement D-a : Its Own Requirement	E : Reference Standards
New Zealand	N/R	N/R	N/R	N/R	N/R	N/R	N/R
Papua New Guinea	N/R	N/R	N/R	N/R	N/R	N/R	N/R
Philippine	N/R	N/R	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	SRRV 30	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	Unique (78dB(A))	SRRV 30	N/R	N/R	N/R
Thailand	N/R	N/R	N/R	Unique (100 db(A))	N/R	Unique (TISI mark)	N/R
U.S.A.	N/R	N/R	N/R	N/R	N/R	N/R	N/R
ECE	N/R	ECE R 51 (10,000 km usage)	ECE R 51 (74+1dB(A))	N/R	N/R	ECE R 51 (E mark)	N/R

14 External Noise

Australia	ADR 28-01	
Items	Summary	Figures and additional explanations
A: Application	Passenger cars	
B-a : Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance of Parts Installed in body (1)Acceleration running noise	The vehicle shall be driven in a straight line over the acceleration section in such a way that the longitudinal median plane of the vehicle is as close as possible to the line CC and approach line AA a steady speed as specified below. When the front of the vehicle reaches the line AA , the throttle shall be opened as rapidly as practicable and held in the fully-opened position until the rear of the vehicle crosses line BB ; the throttle shall then be closed again as rapidly as possible. MT(manual - operated gearbox) approach speed: (3/4)S or 50km/h , whichever is lower (S: engine rotation speed as rated maximum power) choice of gear ratio: less than 4 or less forward gears 2nd gear; more than 4 forwards gears 2nd and 3rd gear The average value of the sound levels recorded for these two conditions shall calculated.	

		However , maximum engine power than 140kW and a permissible maximum-power/maximum-weight ratio grater than 75kW / t shall be tested only in third gear.	
	AT(manual selector with X position)		
	approach speed	(3/4)S or 50km/h , whichever is lower (S: engine rotation speed as rated maximum power) If down - shift to first gear , this down - shift may be avoided at the Manufacturer's choice either by * increasing the speed of the vehicle approach speed to maximum of 60 km/h * maintaining the approach speed at 50 km/h , with the fuel supply to the engine limited to 95 % per cent of the supply necessary for full load	
	position of manual selector	the position recommended by the manufacturer for the normal driving. External downshifting (for kick down) shall be excluded.	

	Sound level limits 77 dB(A) , to allow for lack of precision in the measuring instrument the figures read from it during measurement shall each be reduced by 1 dB(A). At least two measurements shall be made on each side of the vehicle.	
C-b: Performance of Parts Installed in body (2)Stationary noise	The engine is operated at a constant speed having (3/4)S for both controlled ignition engine and for diesel engines. When constant engine speed is reached , the throttle shall be returned swiftly to the idle position. The sound level shall be measured during a period of operation consisting of a brief maintenance of constant engine speed and throughout the entire deceleration period , the maximum sound level meter reading being taken as the test value. Position of the microphone position distance : 0.5 m , angle : 45°± 10° with the vertical plane containing the direction of the gas flow Operating conditions of the engine The engine is operated at a constant speed having the value : (3/4) S for both controlled ignition engine and diesel engines (S: engine rotation speed at rated maximum power)	

	Sound level limits : 90 dB(A) If the microphone position is less than 1 m from the engine compartment of the vehicle the calculated noise level shall be reduced by 2 dB(A) unless special acoustic shielding may be fitted to mask this sources so that the test is carried out on the exhaust noise alone. The specified procedure shall be repeated until four consecutive readings having a range less than or equal to 1 dB(A) are obtained for each microphone position. Noise level of the motor vehicle shall be the arithmetic mean of the four readings. When the sound level of the vehicle has been calculated , non - integer results shall be rounded down to the nearest whole decibel.	
C-b: Performance of Parts Installed in body (2)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	ECE 51/01 , 84/424/EEC - shall be deemed to be equivalent to the technical requirements of this rule provided that the noise level recorded during the test on the vehicle while stationary does not exceed the appropriate limit listed in above .	

14 External Noise

Brunei	The Road Traffic Enactment , Sec.21	
A: Application	Passenger cars	
B-a: Structure of Parts	Every motor vehicle shall be fitted with a silencer , expansion chamber or other contrivance suitable and sufficient for chamber.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance (1)Acceleration running noise	N. A.	
C-b: Performance (2)Stationary noise	N. A.	
C-b: Performance (3)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

Canada	CMVSS 1106	
A: Application	Passenger cars	
B-a : Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance (1)Acceleration running noise	Sound level limits 82 dB(A) according to ECE Regulation 9 or 80 dB(A) according to SAE J 986 a	
C-b: Performance (2)Stationary noise	N. A.	
C-b: Performance (3)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

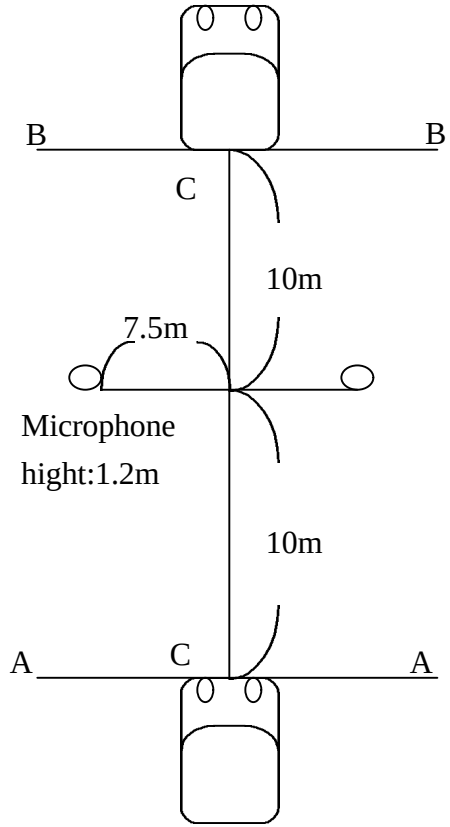
14 External Noise

China	GB 1495-79	
A: Application	Passenger cars	
B-a: Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance of Parts Installed in body (1)Acceleration running noise	Sound level limits Passenger cars : 82 dB(A)	
C-b: Performance of Parts Installed in body (2)Stationary noise	N. A.	
C-b: Performance of Parts Installed in body (3)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

Hong Kong	C & M of motor vehicle ; 30	
A: Application	Passenger cars	
B-a: Structure of Parts	Every vehicle propelled by an internal combustion engine shall be fitted with a silencer , expansion chamber or other contrivance suitable and sufficient for reducing , as far as may be reasonable , the noise caused by the escape of the exhaust gases from the engine.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance (1)Acceleration running noise	N. A.	
C-b: Performance (2)Stationary noise	N. A.	
C-b: Performance (3)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

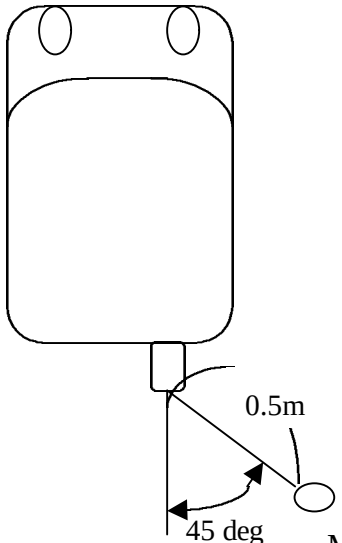
Japan	SRRV30	
A: Application	Passenger cars	
B-a : Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance of Parts Installed in body (1)Acceleration running noise	The vehicle shall be driven in a straight line over the acceleration section in such a way that the longitudinal center line of the vehicle is as close as possible to the line CC and approach line AA a steady speed as specified below. When the front of the vehicle reaches the line AA , the throttle shall be opened as rapidly as practicable and held in the fully-opened position until the rear of the vehicle crosses line BB ; the throttle shall then be closed again as rapidly as possible. MT(manual - operated gearbox) approach speed: (3/4)S or 50km/h , whichever is lower (S: engine rotation speed as rated maximum power) choice of gear ratio: less than 5 forward gears 2nd gear more than 4 forwards gears 3rd gear the vehicle will overrun , the next higher gear position shall be used.	

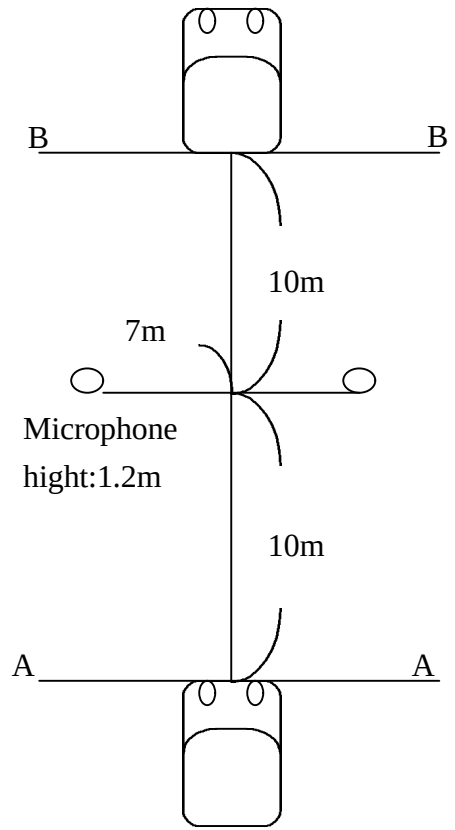
AT(manual selector with X position)

approach speed	(3/4)max speed or 50km/h , whichever is lower (S: engine rotation speed as rated maximum power)
position of manual selector	normally used for acceleration on a paved, level road (Use the 2nd gear for 2 - speed or 3 - speed transmissions)

Sound level limits : 80 dB(A)

The maximum values indicated by the sound level meter which in units of 1 dB(A) (with the first place of decimals rounded up).
When the difference between measured values of the motor vehicle noise level and the ambient noise level is 3 dB or more , but less than 10 dB , deduct the compensation level specified table from the measured value of motor vehicle noise level .
The larger of two measured motor vehicle noise level values shall become the test result.

C-b: Performance of Parts Installed in body (2)Stationary noise	The engine of the vehicle for about five seconds in a unloaded state at within ± 100 rpm of the engine speed at which 75% of the maximum engine output is delivered. Then release the accelerator pedal suddenly or closed the throttle valve suddenly. Make measurement be recording the maximum valve of the motor vehicle noise level during this operation. Position of the microphone position Distance: 0.5± 0.025 m Angle: 45± 10 degree with the vertical plane containing the direction of the gas flow Operating condition of the engine The engine in operated at a constant speed having the valve: (3/4)S for both controlled ignition engine and diesel engines (S: engine rotation speed as rated maximum power) Sound level limits: 103dB(A) The larger of two measured motor vehicle noise level values shall become the test result. When the difference between measured values of the motor vehicle noise level and the ambient noise level is 3dB or more, but less than 10dB, deduct the compensation level specified table from the measured value of motor vehicle noise level.	

C-b: Performance (3)Steady running noise	The vehicle shall be operated steadily, before the vehicle approaches the noise measuring zone. This constant speed shall be maintained until the rear end of the test vehicle passes through test area. Test speed: 60% of engine speed which delivers the maximum engine output, or at 35 km/h, whichever is lower. Gear position or range: normally used of operating the vehicle at the designated speed specified Noise level limit: 70 dB(A) The larger of two measured motor vehicle noise level values shall become the test result. When the difference between measured values of the motor vehicle noise level and the ambient noise level is 3dB or more, but less than 10dB, deduct the compensation level specified table from the measured value of motor vehicle noise level.	
D Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

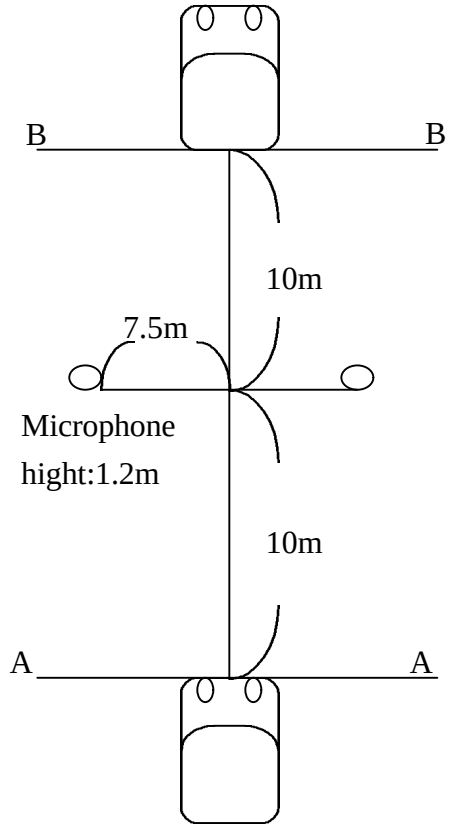
14 External Noise

<table>
<tr><td>Malaysia</td><td colspan="2">the Environmental Quality (Motor Vehicles Noise) Regulation 1987</td></tr>
<tr><td>A: Application</td><td colspan="2">Passenger cars</td></tr>
<tr><td>B-a : Structure of Parts</td><td colspan="2">N. A.</td></tr>
<tr><td>C-a: Performance of Parts
(1)Exhaust systems containing fibrous materials</td><td colspan="2">N. A.</td></tr>
<tr><td>C-b: Performance of Parts
Installed in body

(1)Acceleration running noise</td><td colspan="2">The vehicle shall be driven in a straight line over the acceleration section in such a way that the longitudinal median plane of the vehicle is as close as possible to the line CC and approach line AA a steady speed as specified below. When the front of the vehicle reaches the line AA , the throttle shall be opened as rapidly as practicable and held in the fully-opened position until the rear of the vehicle crosses line BB ; the throttle shall then be closed again as rapidly as possible.

MT(manual - operated gearbox)

approach speed: (3/4)S or 50km/h , whichever is lower (S: engine rotation speed as rated maximum power)

choice of gear ratio: less than 5 forward gears 2nd gear
more than 4 forwards gears 3rd gear
the vehicle will overrun , the next higher gear position shall be used.</td><td> 
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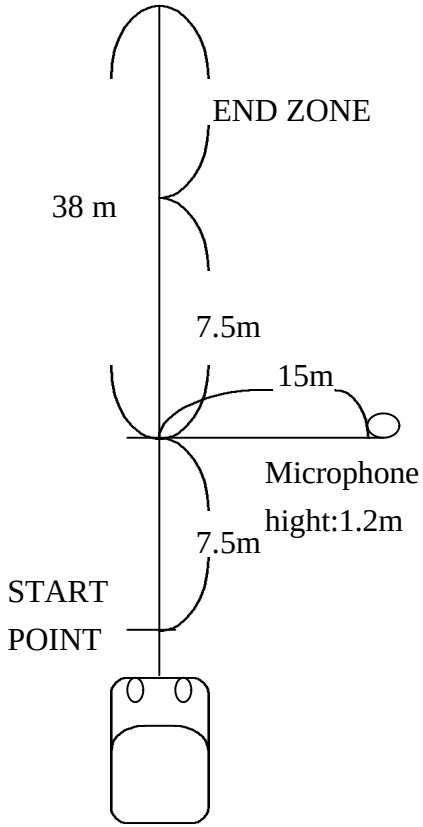
</table>

ITEM 14-3-13

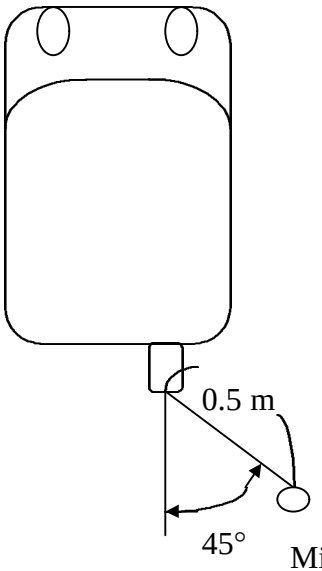
	AT(manual selector with X position) approach speed: (3/4)max speed or 50km/h , whichever is lower (S: engine rotation speed as rated maximum power) position of manual selector: normally used for acceleration on a paved , level road (Use the 2nd gear for 2 - speed or 3 - speed transmissions) Sound level limits : 80 dB(A)	
C-b: Performance of Parts Installed in body (2)Stationary noise	N. A.	
C-b: Performance of Parts Installed in body (Steady running noise	N. A.	
D Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

Mexico	NOM - 079 - ECOL - 1994	
A: Application	Passenger cars	
B-a : Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance of Parts Installed in body (1)Acceleration running noise	For gross vehicle weight is less than 3000 kg , The vehicle shall be approach the measurement area alone the vehicle path with the vehicle speed stabilized at 50 km/h. The highest - numerical - ratio transmission gear shall be used that will result in the front of the vehicle reaching or passing the entry point of the end zone before rated engine speed is attained. It is recommended that the approach speed be held constant for a distance of at least 7.5 m prior to reaching the start point. When the front of the vehicle reaches the start point , the throttle control shall be fully depressed as rapidly as possible and the vehicle allowed to accelerate until the engine speed reaches rated engine speed. The throttle control shall then be released sufficiently to maintain rated engine speed until the front of the vehicle reaches the end of the end zone , at which time the test run is terminated. Should rated engine speed not be attained in the zone , the test run is nonetheless terminated when the front of the vehicle reaches the end of the zone. The maximum engine speed attained should be noted.	

	Sound level limits Gross vehicle mass ≤ 1000 kg 80 dB(A)	
C-b: Performance of Parts Installed in body (2)Stationary noise	N. A.	
C-b: Performance of Parts Installed in body (3)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

Singapore	Road Traffic (Motor Vehicle , Construction and Use) Use C 36 , C37 ,C114	
A: Application	Passenger cars	
B-a : Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance of Parts Installed in body (1)Acceleration running noise	N. A.	
C-b: Performance of Parts Installed in body (2)Stationary noise	The engine is operated at a constant speed having (3/4)S for both controlled ignition engine and for diesel engines. When constant engine speed is reached , the throttle shall be returned swiftly to the idle position. The sound level shall be measured during a period of operation consisting of a brief maintenance of constant engine speed and throughout the entire deceleration period , the maximum sound level meter reading being taken as the test value. Position of the microphone position distance : 0.5 m , angle : 45°±10° with the vertical plane containing the direction of the gas flow	 Microphone height : the outlet's center (≥0.2m)

	Operating conditions of the engine The engine is operated at a constant speed having the value : (3/4) S for both controlled ignition engine and diesel engines (S: engine rotation speed as rated maximum power) Sound level limits : First registration 103 dB(A) , in - use 106 dB(A)	
C-b: Performance of Parts Installed in body (3)Steady running noise	N. A.	
D :Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

Chinese Taipei	C & M of vehicle 30	
A: Application	Passenger cars	
B-a: Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance (1)Acceleration running noise	Sound level limit : 78 dB(A)	
C-b: Performance (2)Stationary noise	Sound level limit : 103 dB(A) , in - use 103 + 5 dB(A)	
C-b: Performance (3)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

Thailand Ministerial regulation No.22 (B.E.2537) under the Motor Vehicle Act. No.2(8) and DLT' s Notification		
A: Application	Passenger cars	
B-a: Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	N. A.	
C-b: Performance (1)Acceleration running noise	N. A.	
C-b: Performance (2)Stationary noise	Sound level limit 100 db(A) at 0.5m. from the end of exhaust pipe on the same horizontal plane an at 45° to the direction of the exhaust gas	DLT's Notification date 8 Dec. 1993
C-b: Performance (3)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	N. A.	
E : Reference Standards	N. A.	

14 External Noise

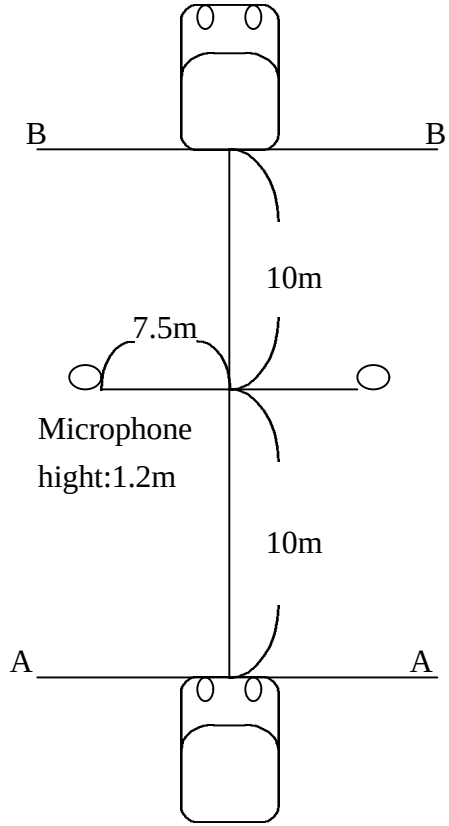
ECE	ECE 51-02	
Items	Summary	Figures and additional explanations
A: Application	Passenger cars	
B-a Structure of Parts	N. A.	
C-a: Performance of Parts (1)Exhaust systems containing fibrous materials	Exhaust systems containing fibrous materials Fibrous materials shall not be used in the construction of silencers unless suitable measures are undertaken at the design or production stages to ensure that the efficiency required to comply with the limits. *Continuous road operation for 10000km About half this operation consists of town driving and the other half of long - distance runs at high speed ; continuous road operation can be replaced by a corresponding test - track program. *Conditioning on a test bench Using standard parts and observing the vehicle manufacturer's instructions , the silencer must be fitted to the engine , which is coupled to a dynamometer. The test must be conducted in six six - hour periods with a break of at least 12 hours between each period in order to reproduce the effects of cooling any condensation which may occur. *Conditioning by pulsation The test apparatus must be adjusted in a such a way that the exhaust - gas flow is alternatively interrupted and re - established by the quick - action valve for 2500 cycles.	

<table>
<tr><td></td><td>The valve must open when the exhaust - gas back pressure , measured at least 100 mm downstream of the intake flange , reaches a value of between 0.35 and 0.40 bar. It must close when this pressure does not differ by more than 10% from its stabilized value with the valve open.</td><td></td></tr>
<tr><td>C-b: Performance of Parts Installed in body

(1)Acceleration running noise</td><td>The vehicle shall be driven in a straight line over the acceleration section in such a way that the longitudinal median plane of the vehicle is as close as possible to the line CC and approach line AA a steady speed as specified below. When the front of the vehicle reaches the line AA , the throttle shall be opened as rapidly as practicable and held in the fully-opened position until the rear of the vehicle crosses line BB ; the throttle shall then be closed again as rapidly as possible.

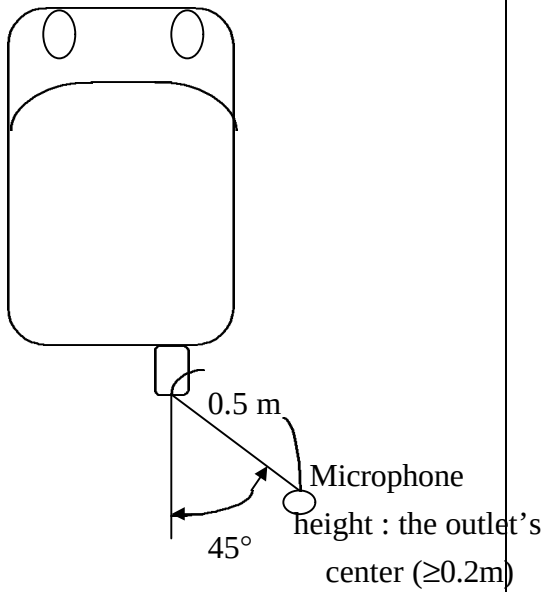
MT(manual - operated gearbox)
approach speed: (3/4)S or 50km/h , whichever is lower
(S: engine rotation speed as rated maximum power)

choice of gear ratio: less than 5 forward gears 2nd gear
more than 4 forwards gears 2nd and 3rd gear
The average value of the sound levels recorded for these two conditions shall calculated.

However , maximum engine power than 140kW and a permissible maximum-power/maximum-weight ratio grater than 75kW / t shall be tested only in third gear.</td><td> 
</td></tr>
</table>

		If during the test in second gear , the engine speed exceeds the engine speed S, at which the engine develops its rated maximum power , the test must be repeated with an approach speed and/or approach engine speed reduced by steps of 5% S , until the engine speed attained no longer exceed S.	
	AT(manual selector with X position) approach speed (3/4)S or 50km/h , whichever is lower (S: engine rotation speed as rated maximum power) position of manual selector the position recommended by the manufacturer for the normal driving. External downshifting (for kick down) shall be excluded. Sound level limits : 74 dB(A) , to allow for lack of precision in the measuring instrument the figures read from it during measurement shall each be reduced by 1 dB(A) At least two measurements shall be made on each side of the vehicle. Gearbox having more than four gears and equipped with an engine developing a maximum power greater than 140kW and having a maximum - power / maximum - mass ratio greater than 75 kW / t , the limit values shall be increased by 1 dB(A) , if the speed at which the rear of vehicle passes the line BB in third gear is greater than 61km/h.		

	For compression - ignition and direct - injection internal combustion engine , the limit values shall be increased by 1 dB(A). For vehicle types designed for off - road use and with a maximum authorized mass above 2 tones , the limit values shall be increased; by 1 dB(A) if they are equipped with an engine having a power of less than 150 kW by 2 dB(A) if they are equipped with an engine having a power of 150 kW or above. Specifications for the test site the specifications related to the physical characteristics and the laying of the test track. Required characteristics of the surface A surface is considered to conform to this standard provided that the texture and voids content or sound absorption coefficient having been measured and found to fulfill all the requirements below and provided that the design requirements. *Residual voids content : The residual void content of the test track paving mixture shall not exceed 8%. *Sound absorption coefficient : If the surface fails to comply with the residual void content requirement , the surface is acceptable only if its sound absorption coefficient $\alpha \leq 0.10$. For the measurement procedure. *Texture depth : The depth measured according to the volumetric method shall be TD $\geq$ 0.4 mm	

	*Homogeneity of surface : Every practical effort shall be taken to ensure that the surface is made to be as homogeneous as possible within the test area. Period of testing In order to check whether the surface continues to conform to the texture and voids content or sound absorption requirements stipulated in this standards , periodic testing of the surface shall be done.	
C-b: Performance of Parts Installed in body (2)Stationary noise	The engine is operated at a constant speed having (3/4)S for both controlled ignition engine and for diesel engines. When constant engine speed is reached , the throttle shall be returned swiftly to the idle position. The sound level shall be measured during a period of operation consisting of a brief maintenance of constant engine speed and throughout the entire deceleration period , the maximum sound level meter reading being taken as the test value. Position of the microphone position distance : 0.5 m , angle : 45°±10° with the vertical plane containing the direction of the gas flow Operating conditions of the engine The engine is operated at a constant speed having the value : (3/4) S	

	for both controlled ignition engine and diesel engines (S: engine rotation speed as rated maximum power) Sound level limit : No limit Readings , rounded of to the nearest decibel , shall be taken from the measuring instrument. The highest of these three values shall constitute the test result.	
C-b: Performance of Parts Installed in body (2)Steady running noise	N. A.	
D:Label Marking Requirement D-a : Its Own Requirement	The components of the noise reduction system , excluding fixing hardware and piping shall bear ; (1) the trade name or mark of the manufacturer (2) the manufacturer's trade description (3) ECE - approval number markings shall be clearly legible and be indelible even after fitting.	
E : Reference Standards	N. A.	

ITEM 97-15

Rear position lamps
(Tail lamps)

APEC Regulation Analysis Findings
Item No. 97-15: Rear Position Lamps

1. The rear position lamp regulations of Canada and Korea are equivalent with FMVSS.

2. In addition to having its own regulation, New Zealand recognizes the regulations of Australia, Japan, U.S., ECE, and EEC as alternatives.

3. Other member economies set forth very few requirements for rear position lamps.

4. A comparison of specific requirements is as follows:

   (1) Light Beam Distribution (C-a-1)
   Australia, Canada, China, Korea, U.S., and ECE provide specific luminous intensity values. Beam distribution can be divided into the ECE type (Singapore, China, ECE) and the FMVSS type (Canada, Korea, U.S.). The ECE type requires slightly higher luminous intensity levels. If rear position lamps of more than one bulb are considered, however, the FMVSS type requires higher luminous intensities.

   (2) Beam Color (C-a-2)
   All member economies require red beams for rear position lamps.

   (3) Luminous Area (C-a-3)
   Only Hong Kong and Japan set forth luminous area requirements.

   (4) Bulb Wattage (C-a-4)
   China and ECE specify acceptable bulbs. Hong Kong and Japan require bulb wattage to be 5W or higher, while Papua New Guinea specifies it to be 7W or less. Therefore bulbs specified by China and ECE and falling between 5W and 7W are acceptable to all member economies.

   (5) Visibility (C-b-1)
   Visibility requirements can be divided into three types: The FMVSS type specifies a luminous area within a conspicuous range. The ECE type specifies luminous intensity levels. The Japan type establishes a conspicuous distance, rather than a conspicuous range.
   FMVSS type - Canada, Korea, U.S.
   ECE type - Australia, ECE
   Japan type - Japan, Papua New Guinea, Philippines

ITEM No. 97-15 Rear Position Lamps (1/2)

«A : Application» → Passenger Car

Member Economy	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area	C-a-4 Bulb Wattage	C-a-5 Mechanical
Australia	ADR 49/00 (Min.: 4 cd at H-V Max.: 12 cd)	Common (Red)	N/R	N/R	ADR 47/00 (General)
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	FMVSS 108	Common	FMVSS 108	N/R	FMVSS 108
Chile					
China	ADR 47/00 ECE R3	Common	N/R	Unique (R5W, R10W, T4W, W5W, W3W)	N/R
Chinese Taipei	N/R	N/R	N/R	N/R	N/R
Hong Kong	N/R	N/R	Unique (Min. 50 mm diameter)	SRRV 37	N/R
Indonesia	N/R	Common	N/R	N/R	N/R
Japan	SRRV 37 (The lights shall be clearly visible at night at a distance of 300m from the rear of the vehicle)	Common (Red)	SRRV 37 (15 sq. cm. or more)	SRRV 37 (Min. 5W)	SRRV 37 (General))
Korea	Unique (Min.: 2 cd at H-V Max.: 18 cd at H line or above)	Common	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico					
New Zealand	N/R	N/R	N/R	N/R	N/R
Papua New Guinea	N/R	Common	N/R	Unique (Max. 7W)	N/R
Philippines	N/R	Common	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Thailand	N/R	Common	N/R	N/R	N/R
USA	FMVSS 108 (Min.: 2 cd at H-V Max.: 18 cd at H line or above)	Common (Red)	FMVSS 108 (12.5 Sq. in. at 45 dig. direction)	N/R	FMVSS 108 (Corrosion, Dust, Moisture & Vibration)
ECE	ECE R3 (Min.: 4 cd at H-V Max.: 12 cd)	Common (Red)	N/R	ECE R37 (See each Sheet)	ECE R7 (General)

ITEM No. 97-15 Rear Position Lamps (2/2)

Member Economy	C-b Position	C-b-1 Visibility	C-b-2 Connection	D Markings	E Reference Standards Alternative Regulation
Australia	Common (Both side of vehicle center)	ADR 13/00 (15 dig. U to 15 dig. D and 45 dig. Inward to 80 dig. outward)	Common (At same time lighted position lamp)	N/R	ADR 47/00 (ECE R7)
Brunei	N/R	N/R	N/R	N/R	N/A
Canada	Common	FMVSS 108	Common	N/R	N/A
Chile					
China	N/R	N/R	N/R	N/R	N/A
Chinese Taipei	N/R	N/R	N/R	N/R	N/A
Hong Kong	N/R	N/R	Unique (In the event of any failure of a bulb in either of the lamps)	N/R	N/A
Indonesia	N/R	N/R	N/R	N/R	N/A
Japan	Common (Both side of vehicle center)	N/R	Common (At same time lighted position lamp)	N/R	N/A
Korea	N/R	N/R	N/R	N/R	N/A
Malaysia	N/R	N/R	N/R	N/R	N/A
Mexico					
New Zealand	N/R	N/R	N/R	N/R	Unique (ECE R7 76/758/EEC ADR 49/00 SRRV 37 JIS D5500 FMVSS 108)
Papua New Guinea	N/R	Unique (Visible from 200 m at night)	N/R	N/R	N/A
Philippines	N/R	Unique (Visible from 100 m at night)	N/R	N/R	N/A
Singapore	N/R	N/R	N/R	N/R	N/A
Thailand	N/R	N/R	N/R	N/R	N/A
USA	Common (Both side of vehicle center)	FMVSS 108 (10 dig. U to 10 dig. D and 20 dig. L to 20 dig. R)	Common (At same time lighted position lamp)	N/R	N/A
ECE	Common (Both side of vehicle center)	ECE R48 (15 dig. U to 15 dig. D and 45 dig. Inward to 80 dig. outward)	Common (At same time lighted position lamp)	ECE R7 (Approval mark, Tradename/number, Bulb category)	N/A

Member Economy : Australia

Title of Standard : 3rd Australia Design Rule 49/00

A. Application :

Motor vehicle, Bus, Truck and Trailer

C-a-1 : Photometry :

Rear position lamp

Minimum intensity (H-V) : 4cd

Maximum intensity (over all) : 12cd

Table of standard light distribution

U 10dig.			20%		20%		
5dig.	10%	20%		70%		20%	10%
H 0dig.		35%	90%	100%	90%	35%	
5dig.	10%	20%		70%		20%	10%
D 10dig.			20%		20%		
	20dig.	10dig.	5dig.	0dig.	5dig.	10dig.	20dig.
	L ◄ V ► R						

C-a-2 : Color : Red, White or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical :

The devices must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1 : Visibility :

Horizontal : 45dig. inboard and 80dig. outboard form reference center

Vertical : 15dig. above and 15dig. below form reference center

Above area minimum intensity shall be not less than 0.05cd

C-b-2 : Electrical Connection :

N/R

(or same time lighted front position, side marker, end-out-line marker and License plate lamp. 3rd ADR 13/00 Appendix A)

Member Economy : Canada
Title of Standard : CMVSS No.108 and TSD No.108

A. Application : Motor Vehicles

C-a-1 : Photometry : SAE J585 Mar86 Table 1 or Table 2

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test
Moisture Test
Dust Test
Corrosion Test

C-b-1 : Visibility :

Each lamp shall have an unobstructed view of the outer lens surface at least 12.5 square centimeters measured at 45 degrees to the longitudinal axis of the lamp

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the head lamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Member Economy : China
Title of Standard : GB5920-94

A. Application : Motor Vehicles

C-a-1 : Photometry :

Minimum Intensity at H-V point : 4cd
Minimum Intensity in Visible Area : 0.07cd
Maximum Intensity : 12cd

10U			0.8		0.8		
5U	0.4	0.8		2.8		0.8	0.4
H		1.4	3.6	4.0	3.6	1.4	
5D		0.8		2.8		0.8	
10D	0.4	0.8		2.8		0.8	0.4
	20L	10L	5L	V	5R	10R	20R

unit : cd

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : R5W, R10W, T4W, W5W, W3W

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : see C-a-1

C-b-2 : Electrical Connection : N/A

Member Economy : Hong Kong
Title of Standard : Road Traffic (Safety Equipment) Regulations

A. Application : Motor Vehicles

C-a-1 : Photometry : N/R

C-a-2 : Color : N/R

C-a-3 : Luminous Area : Not less than 50mm in diameter or equivalent

C-a-4 : Bulb Wattage : Not less than 5W

C-a-5 : Mechanical : Clean and efficient condition

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :
In the event of any failure of a bulb in either of the lamps, the other lamp shall not thereby be extinguished.

Member Economy : Indonesia
Title of Standard : Government Regulation No.44/1993

A. Application : Motor Vehicles

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Member Economy : Japan

Title of Standard : Safety Regulations for Road Vehicles Article 37
Motor Vehicle Inspection Procedures 4-27

A. Application : Motor Vehicles

C-a-1 : Photometry :
The illuminating light of a tail lamp shall be clearly visible at night from a distance of 300m from the rear of the vehicle.

C-a-2 : Color : Red

C-a-3 : Luminous Area :
Size of the indicating surface is 15 square centimeter or more.

C-a-4 : Bulb Wattage :
Light source is 5 watts or more.

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection :
Side marker lamps shall be wired so that it may not be put out at the driver's seat. It must be turned on whenever the head lamps, auxiliary head lamps or clearance lamps are turned on.

Member Economy : Korea

Title of Standard : The Regulations of the Motor Vehicle Safety Standards

A. Application : Motor Vehicle

C-a-1 : Photometry :

1. Maximum luminous intensity on and above H line (unit:cd)

One-lamp Type	Two-lamp Type	Three-lamp Type
18	20	25

2. Minimum luminous intensity at each test point (unit:cd)

Test Point (degree)		One-lamp Type	Two-lamp Type	Three-lamp Type
10U, 10D	5L,5R	0.4	0.7	1.0
5U,5D	20L,20R	0.3	0.5	0.7
	10L,10R	0.8	1.4	2.0
	V	1.8	3.1	4.5
H	10L,10R	0.8	1.4	2.0
	5L,5R	2.0	3.5	5.0
	V	2.0	3.5	5.0

Note : If the measured value at each test point in the table below meets the requirements of the sum of the minimum luminous intensity, it shall be deemed to be in compliance with the requirements of the minimum luminous intensity.

Test Point(degree)	One-lamp Type	Two-lamp Type	Three-lamp Type
20L-5U,5D, 5L-10U,10D	1.4	2.4	3.4
10L-5U, H, 5D	2.4	4.2	6.0
H-5L, V, 5R, V-5U,5D	9.6	16.7	24.0
10R-5U, H, 5D	2.4	4.2	6.0
20R-5U,5D, 5R-10U,10D	1.4	2.4	3.4

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/A

C-b-1 : Visibility :

At least 12.5 square centimeters when measured at 45 degrees on the horizontal line from the center line of the tail lamp to the outward of the vehicle.

C-b-2 : Electrical Connection : N/R

Member Economy : New Zealand
Title of Standard : Vehicle Safety Regulation 16

A. Application : Every motor vehicle

C-a-1 : Photometry : N/R

C-a-2 : Color : N/R

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : N/R

C-b-2 : Electrical Connection : N/R

Member Economy : Papua New Guinea
Title of Standard : Motor Traffic Regulations No. 98

A. Application : Passenger car

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : Shall not exceed 7W

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : Visible from a distance of 200m at night

C-b-2 : Electrical Connection : N/R

Member Economy : Philippines
Title of Standard : Motor Vehicle Inspection System, Section 8 c

A. Application : Motor vehicle

C-a-1 : Photometry : N/R

C-a-2 : Color : Red

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : N/R

C-b-1 : Visibility : Visible from a distance of 100m

C-b-2 : Electrical Connection : N/R

Member Economy : U.S.A.
Title of Standard : FMVSS No.108

A. Application : Motor Vehicles

C-a-1 : Photometry : FMVSS No.108 Figure 1a, 1b, and 1c

Figure 1a-Required Percentages of Minimum Candlepower of Figure 1b

Test Points (degree)		Required Percentages
10U, 10D	5L, 5R	20
5U, 5D	20L, 20R	15
	10L, 10R	40
	V	90
H	10L, 10R	40
	5L, 5R	100
	V	100

Note : Minimum design candlepower requirements are determined by multiplying the percentages given in this Figure by the minimum allowable candlepower values in Figure 1b. The resulting values shall be truncated after one digit to the right of the decimal point.

Figure 1b-Minimum and Maximum Allowable Candlepower Values

	Lighted sections		
	1	2	3
Tail Lamp	2/18	3.5/20	5.0/25

Note : Maximum at H or above

Figure 1c-Sum of the Percentages of Grouped Minimum Candlepower

Group and test points	Required Percentages
1 10U-5L, 5U-20L, 5D-20L, 10D-5L	70
2 5U-10L, H-10L, 5D-10L	120
3 H-5L, 5U-V, H-V, 5D-V, H-5R	480
4 5U-10R, H-10R, 5D-10R	120
5 10U-5R, 5U-20R, 5D-20R, 10D-5R	70

C-a-2 : Color : Red
C-a-3 : Luminous Area : N/R
C-a-4 : Bulb Wattage : N/R

C-a-5 : Mechanical : Below mentioned Test and Requirements in SAE J575

Vibration Test
Moisture Test
Dust Test
Corrosion Test

C-b-1 : Visibility :

Each lamp shall have an unobstructed view of the outer lens surface at least 12.5 square centimeters measured at 45 degrees to the longitudinal axis of the lamp

C-b-2 : Electrical Connection :

When the parking lamps are activated, the tail lamps, license plate lamps and side marker lamps shall also be activated,
and when the head lamps are activated in a steady-burning state, the tail lamps, parking lamps, license plate lamps and side marker lamps shall also be activated.

Member Economy : ECE

Title of Standard : ECE Uniform Regulation No. 7-02

A. Application : N/R

C-a-1 : Photometry :

Rear position lamp

Minimum intensity (H-V) : 4cd

Maximum intensity (Over-all) : 12cd

Table of standard light distribution

U 10dig.			20%		20%		
5dig.	10%	20%		70%		20%	10%
H 0dig.		35%	90%	100%	90%	35%	
5dig.	10%	20%		70%		20%	10%
D 10dig.			20%		20%		
	20dig.	10dig.	5dig.	0dig.	5dig.	10dig.	20dig.
	L			V			R

C-a-2 : Color : Red, White or Amber

C-a-3 : Luminous Area : N/R

C-a-4 : Bulb Wattage :

Replaceable light sources : See ECE Reg. No. 37-03

Non-replaceable light sources : N/R

C-a-5 : Mechanical :

The devices must be so designed and constructed that in normal conditions of use, and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

C-b-1 : Visibility :

Horizontal : 45dig. inboard and 80dig. outboard form reference center

Vertical : 15dig. above and 15dig. below form reference center

Above area minimum intensity shall be not less than 0.05cd

C-b-2 : Electrical Connection :

N/R

(or same time lighted front position, side marker, end-out-line marker and License plate lamp. ECE No. 48-01 S5.11)

ITEM 97-16

Vehicle lighting installation

APEC Regulation Analysis Findings
Item No.97-16: Vehicle Lighting Installation

1. Headlamp

1) Australian and ECE are equivalent, except for the requirement concerning the number of headlamps to be installed. Japan, U.S. and other member economies differ in some of their requirements concerning the number of headlamps, beam color, installation position, and/or visible angle.

2) Specific Requirements
   (1) Japan, U.S. and ECE permit the installation of either two or four headlamps, while Australia allows two, four or six. Other member economies specify the required number to be two.
   (2) Regarding installation positions, Australia and ECE provide the identical ground clearance and horizontal positions. Japan, U.S. and other member economies have their unique requirements concerning measurement position (lamp center, upper edge or lower edge), ground clearance, and horizontal position.
   (3) Australia and ECE provide identical visible angle requirements. Similarly, China and Korea have the same visible angle requirements. Other member economies do not regulate visible angles. (Although Hong Kong and Malaysia have such requirements, these are not specific.)

2. Daytime Running Lamp

1) Only Canada requires the installation of these lamps. Australia, U.S. and ECE permit installation on an optional basis, but their requirements differ in the number of lamps and the color of light beams.

2) Specific Requirements
   (1) Canada permits either two or four daytime running lamps. Australia, U.S., and ECE allows two lamps on an optional basis.
   (2) Regarding installation positions, Australia and ECE are identical. Although Canada and U.S. differ, the Canadian requirements are such that compliance with them means compliance with the U.S. requirements.
   (3) Canada and ECE set forth identical visible angle requirements. Australia provide a different value. The U.S. does not have any visible angle requirements.

3. Front Fog Lamp

1) Only China requires the furnishing of front fog lamps in heavily foggy regions. Australia and ECE provide requirements concerning the optional furnishing of these lamps. Japan, New Zealand, Taiwan, and Thailand have their unique optional requirements.

2) Specific Requirements
   (1) China requires the finishing of two front fog lamps in heavily foggy regions.

Australia, New Zealand, Taiwan, and ECE allow two lamps on an optional basis. Japan and Thailand permit one or two front fog lamps on an optional basis.

(2) In respect of installation positions, Australia, China, and ECE are identical. Japan, Taiwan, and Thailand set forth their unique ground clearance values. New Zealand does not have any requirements.

(3) Australia, China, and ECE provide the same visible angle. Other member economies, except Thailand, lack visible angle requirements.

4. Rear Fog Lamps

1) Only ECE requires the furnishing of rear fog lamps. Australia, China, and Japan allow these lamps on an optional basis, providing identical requirements (although Japan does not set forth a visible angle requirement).

2) Specific Requirements

(1) Only ECE requires the furnishing of rear fog lamps. Australia, China, and Japan allows them on an optional basis. In all these cases, the permissible number of lamps is one or two.

(2) Australia, Canada, Japan, and ECE adopt identical ground clearance values.

(3) Australia, China, and ECE establishes the same visible angle, while Japan does not have such a requirement.

5. Cornering Lamp

1) Australia, Japan, and New Zealand allow the furnishing of cornering lamps on an optional basis, providing the same requirements. However, Australia differs in that it only specifies the distance between the lamp and the vehicle end. Other member economies lack requirements for cornering lamps.

2) Specific Requirements

(1) Australia, Japan, and New Zealand permit the furnishing of two cornering lamps on an optional basis. Other member economies do not provide requirements for cornering lamps.

(2) As for installation positions, Japan and New Zealand set forth identical ground clearance. Australia only specifies the distance between the lamp and the vehicle end.

(3) With regard to visible angles, no requirements exist in Australia, Japan, and New Zealand.

6. Front Position Lamp

1) Taiwan does not specify the number of front position lamps to be furnished. Chile, Malaysia, and Mexico lack requirements for front position lamps. All other member economies demand the equipping of two front position lamps.

Australia and ECE have the same requirements, but other members differ slightly in their requirements concerning installation position, visible angle, and beam color. Canada, Philippines, and U.S. lay down requirements for front position lamps in reference to parking lamps.

2) Specific Requirements
   (1) Taiwan does not limit the number of front position lamps to be installed. Other member economies (excepting Chile, Malaysia, and Mexico) require two lamps to be equipped.
   (2) Australia and ECE provide the same installation position requirements. Japan, U.S. and other member economies have their unique ground clearance values.
   (3) Australia, China, New Zealand, and ECE have identical visible angle requirements.

7. Rear Position Lamp (Tail Lamp)

1) Australia and ECE have the same requirements. Japan, U.S. and other member economies provide different installation position requirements, but they are identical in the number of lamps and the color of light beams. China, Malaysia, Papua New Guinea, Philippines, Taiwan, and Thailand require the furnishing of either two or four rear position lamps.

2) Specific Requirements
   (1) China, Malaysia, Papua New Guinea, Philippines, Taiwan, and Thailand require the furnishing of either two or four rear position lamps. Other member economies demand two lamps.
   (2) Regarding installation positions, Australia and ECE sets forth the same requirements. Other member economies differ in ground clearance and horizontal distance values.
   (3) Australia, China, New Zealand, and ECE provide identical visible angles. Canada and U.S. require their unique visible angles. No other member economies have visible angle requirements.

8. Stop Lamp

1) Australia and ECE adopt the same requirements. Japan, U.S. and other member economies provide different installation position requirements, but they are identical in the number of lamps and the color of light beams. China, New Zealand, and Thailand require the furnishing of either two or four stop lamps.

2) Specific Requirements
   (1) China, New Zealand, and Thailand require the furnishing of either two or four rear position lamps. Other member economies specify two lamps.
   (2) Regarding installation positions, Australia and ECE sets forth the same requirements. Other member economies differ in ground clearance and measurement positions.
   (3) Australia, China, Hong Kong, New Zealand, and ECE provide identical visible angles. Canada, Japan, and U.S. require their unique visible angles. No other member economies have requirements.

9. High Mount Stop Lamp
   1) Australia, Canada, New Zealand, Taiwan, U.S., and ECE require high mount stop lamp(s) to be furnished. ECE differs in requirements concerning visible angle and

ground clearance, Australia in visible angle requirements, and New Zealand in the number of lamps (one or more). Japan, Korea, and Thailand permit the furnishing of high mount stop lamps on an optional basis, although their ground clearance and visible angle values are different.

2) Specific Requirements
   (1) Australia, Canada, Taiwan, U.S., and ECE require that one lamp be installed. New Zealand demand one or more lamps. Japan, Korea, and Thailand allow the furnishing of one lamp on an optional basis.
   (2) Regarding installation positions, Australia, Canada, New Zealand, and U.S. have identical ground clearance requirements. Other member economies set forth their unique ground clearance requirements.
   (3) Australia, Canada, U.S., and ECE provide the same visible angle. Japan and Korea adopt identical requirements.

10. Turn Signal Lamp

1) Australia, China, Japan, and ECE demand two lamps on the front, rear and lateral sides, respectively. (Some member economies demand two or more lamps.) The U.S. and other member economies require two lamps on each of the front and rear sides. Except the identical visible angles of Australia, China and ECE, beam color and installation position requirements differ among member economies.

2) Specific Requirements
   (1) Australia, China, Japan, and ECE require the furnishing of two turn signal lamps on each of the front, rear and lateral sides. More exactly, Japan demands two or more on the front, rear and lateral sides, respectively. China requires two or four lamps on the rear and lateral sides. Thailand requires two or four on the rear side.
   (2) Regarding installation positions, Canada, New Zealand, Papua New Guinea, and U.S. adopt identical requirements. Other member economies have their unique requirements.
   (3) With respect to visible angle, Australia, China, New Zealand, and ECE lay down the same requirement for the front and rear turn signal lamps. Canada and U.S. adopt their unique requirements.

11. Backup Lamp

1) Australia, China and ECE are equivalent. In another group, Canada, Korea, and U.S. are equivalent with each other, although Korea differs from the duo in specifying ground clearance and in permitting yellow beams as well. Other member economies specify the same number of back up lamps, and their beam color and ground clearance requirements are slightly different from each other.

2) Specific Requirements
   (1) Indonesia requires only one backup lamp. Other member economies all demand one or two.
   (2) As for installation positions, Australia, China, Korea, and ECE sets forth the same ground clearance. (Korea's ground clearance is measured from the

center of the lamp.)

(3) Australia, Canada, China, U.S., and ECE have the same visible angle requirements. No other member economies have requirements.

12. Reflex Reflectors

1) Member economies differ in their furnishing requirements, installation positions, and the number of reflex reflectors to be furnished. However, they are in unison in requiring two or more red reflex reflectors in the rear.

2) Specific Requirements

(1) Canada, Philippines, U.S., and ECE demand reflex reflectors to be furnished in the front. Australia and China recognize front reflex reflectors on an optional basis. All member economies but China require the furnishing of rear reflex reflectors. (China allows rear reflectors on an optional basis.)

(2) Member economies slightly differ among themselves with regard to installation positions.

(3) With respect to visible angle, Australia and ECE set forth the same requirements. China demands a unique visible angle. No other member economies lay down requirements.

13. License Plate Lamp

1) Requirements are rather few and similar, with minor differences.

2) Specific Requirements

(1) Requirements concerning the furnishing of license plate lamps can be divided into one group demanding one or two lamps and the other group not specifying how many.

(2) Canada and U.S. specify that lighting be directed from either above or sideways.

(3) With respect to visible angle, Australia, Korea and ECE set forth different requirements.

14. Side Marker Lamp

1) Only Canada, Indonesia, and U.S. require the furnishing of two lamps in the front and rear, respectively. Australia, Thailand, and ECE also permit two front and two rear side marker lamps, but on an optional basis. Beam color and installation position requirements slightly differ from one member economy to another, with only Canada and U.S. having identical requirements.

2) Specific Requirements

(1) Canada, Indonesia, and U.S. require the furnishing of two lamps in the front and rear, respectively. Australia, Thailand, and ECE also permit two front and two rear side marker lamps, but on an optional basis.

(2) In reference to installation positions, required ground clearance values are different among member economies except that Canada and U.S. demand the same ground clearance.

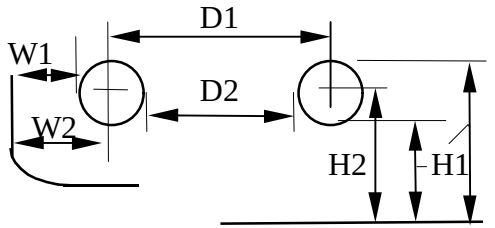
(3) Only Australia and ECE set forth the same visible angle.

15. Parking Lamp

1) Canada, Philippines, U.S., and ECE require the furnishing of parking lamps. (The parking lamp requirements of Canada, Philippines, and U.S. are compared in the front position lamp comparison table.) Australia, China, and Japan allow parking lamps on an optional basis. Other member economies lack requirements.

2) Specific Requirements
   (1) ECE demands two parking lamps on each of the front, rear and lateral sides. The Philippines require parking lamps at the four corners of the vehicle. Canada and U.S. demand two lamps only in the front. Japan requires two lamps in the front and rear respectively, while Australia requires two lamps on the front, rear and lateral sides respectively.
   (2) As for installation positions, Australia, Canada, China, U.S., and ECE set forth identical requirements. (China has a unique requirement concerning the distance between parking lamps.) Japan provides only a horizontal position requirement which is the same as those of Australia and ECE.
   (3) With respect to visible angle, only Australia, China, and ECE lay down identical requirements.

ITEM No. 16 Vehicle Lighting Installation



<A: application> Passenger Car

1. Headlamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt. Regulation
Australia	ADR13 (Hi:2, 4 or 6 Lo:2)	ADR13 (500≤H1≤1200, W1≤600)	ADR13 (White)	ADR13 (Up:15°Lo:10°Out:45°In:10°)	N/R
Brunei	Unique (2)	Unique (H2≤1500 W2≥300)	FMVSS108 (White)	N/R	N/R
Canada	FMVSS108 (2 or 4)	FMVSS108 (559≤H2≤1372)	FMVSS108 (White)	N/R	N/R
Chile					
China	SRRV32 (Hi:2 or 4 Lo:2)	Unique (Lo:500<H1<1200 W1<400 D1>600) (Hi:W1 of Hi beam>W1 of Lo beam)	Unique (White or yellow)	Unique (Lo-beam:Up:15°Lo:10°Out:45°In:10) (Hi-beam:Up:5°Lo:5°Out:5°In:5)	N/R
Hong Kong	Unique (2 or 4)	Unique (W1≥400 D1≥600)	Unique (White or yellow)	N/R	N/R
Indonesia	Unique (2)	Unique (H1≤1250 W1≤400)	SRRV32 (White or light yellow)	N/R	N/R
Japan	SRRV32 (Hi:2 or 4 Lo:2)	SRRV32 (500≤H1≤1200 W1≤400)	SRRV32 (White or Selective yellow)	N/R	N/R

Korea	FMVSS108 (2 or 4)	Unique (500≤H2≤1200)	Unique (White or yellow)	Unique (Lo-beam:Up:15°Lo:10°Out:45°In:10) (Hi-beam:Up:5°Lo:5°Out:5°In:5)	ECE R48
Malaysia	Unique (2)	Unique (H2≤1500 W2≥300)	FMVSS108 (White)	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	FMVSS108 (2 or 4)	N/R	Unique (White or amber)	N/R	N/R
Papua New Guinea	Unique (2)	Unique (Distance between lamp center and vehicle center ≥600)	FMVSS108 (White)	N/R	N/R
Philippines	Unique (2)	N/R	Unique (White or yellow)	N/R	N/R
Chinese Taipei	FMVSS 108 (2 or 4)	Unique (H2≤1400, W1≤400)	Unique (White or pale light yellow)	N/R	N/R
Singapore	Unique (2)	Unique (H2≤1500, W1≤400)	FMVSS108 (White)	N/R	N/R
Thailand	Unique (Hi:2or 4, Lo:2)	Unique (Hi:400≤H2≤1350) (Lo:400≤H2≤1350, W2≤400)	Unique (White or yellow)	N/R	N/R
U. S. A.	FMVSS108 (2 or 4)	FMVSS108 (559≤H2≤1372)	FMVSS108 (White)	N/R	N/R
ECE	ECE R48 (Hi:2 or 4 Lo:2)	ECE R48 (500≤H1≤1200, W1≤600)	ECE R48 (White)	ECE R48 (Up:15°Lo:10°Out:45°In:10°)	N/R

2. Daytime Running Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt. Regulation
Australia	ADR R13 (Optional:2)	ADR R13 (500≤H1≤1500, W1≤400, D1≤600)	ADR R13 (White)	ADR R13 (Up:15°Lo:15°Out:80°In:45°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	CMVSS108 (Mandatory:2or 4)	CMVSS108 (300≤H2≤2110)	CMVSS108 (White or yellow)	CMVSS108 (Up:10°Lo:10°RH:20°LH:20°)	N/R
Chile					
China	N/R	N/R	N/R	N/R	N/R
Hong Kong	N/R	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R	N/R
Japan	N/R	N/R	N/R	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	N/R	N/R	N/R	N/R	N/R
PNG	N/R	N/R	N/R	N/R	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	N/R	N/R	N/R
Thailand	N/R	N/R	N/R	N/R	N/R
U. S. A.	FMVSS108 (Optional:2)	FMVSS108 (Headlamp-Lo:560≤H2≤1370) (Headlamp-Hi:H2≤864) (Turnsignal:381≤H2≤2108) (Individual:H2≤1067)	FMVSS108 (White)	N/R	N/R
ECE	ECE R48 (Optional:2)	ECE R48 (250≤H1≤1500, W1≤400, D1≥600)	ECE R48 (White)	ECE R48 (Up:10°Lo:10°Out:20°In:20°)	N/R

3. Front Fog Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Optional:2)	ADR R13 (250≤H1≤Headlamp-Lo, W1≤400)	ADR R13 (White)	ADR R13 (Up:5°Lo:5°Out:45°In:10°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	N/R	N/R	N/R	N/R	N/R
Chile					
China	Unique (Mandatory for foggy zone:2)	Unique (250<H1<Headlamp-Lo, W1<400)	Unique (White or yellow)	ECE R48 (Up:5°Lo:5°Out:45°In:10°)	N/R
Hong Kong	N/R	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R	N/R
Japan	SRRV33 (Optional:<3)	SRRV33 (250≤H1≤Headlamp-Lo, W1≤400)	SRRV33 (White or Selective yellow)	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	ECE R48 (Optional:2)	N/R	Unique (White or amber)	N/R	N/R
Papua New Guinea	N/R	N/R	N/R	N/R	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	ECE R48 (Optional:2)	Unique (below the headlamp)	Unique (White, yellow or pale light yellow)	N/R	N/R

Thailand	SRRV33 (Optional:≤2)	Unique (250≤H2≤Headlamp-Lo)	Unique (White or yellow)	Unique (The focus of illuminated area ≥2°below)	N/R
U. S. A.	N/R	N/R	N/R	N/R	N/R
ECE	ECE R48 (Optional:2)	ECE R48 (250≤H1≤Headlamp-Lo, W1≤400)	ECE R48 (White)	ECE R48 (Up:5°Lo:5°Out:45°In:10°)	N/R

4. Rear Fog Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Optional:1 or 2)	ADR R13 (250≤H1≤1000, Distance between fog and stop≥100)	ADR R13 (Red)	ADR R13 (Up:5°Lo:5°RH:25°LH:25°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	N/R	N/R	N/R	N/R	N/R
Chile					
China	ADR R13 (Optional:1 or 2)	Unique (250<H1<1000, Distance between fog and stop>100)	ADR R13 (Red)	ADR R13 (Up:5°Lo:5°RH:25°LH:25°)	N/R
Hong Kong	N/R	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R	N/R
Japan	SRRV37-2 (Optional:≤2)	SRRV37-2 (250≤H1≤1000, Distance between fog and stop≥100)	SRRV37-2 (Red)	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	N/R	N/R	N/R	N/R	N/R
Papua New Guinea	N/R	N/R	N/R	N/R	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	ECE R48 (Optional:1 or 2)	Unique (below the headlamp)	ECE R48 (Red)	N/R	N/R
Thailand	N/R	N/R	N/R	N/R	N/R
U. S. A.	N/R	N/R	N/R	N/R	N/R
ECE	ECE R48 (Mandatory:1 or 2)	ECE R48 (250≤H1≤1000)	ECE R48 (Red)	ECE R48 (Up:5°Lo:5°RH:25°LH:25°)	N/R

5. Cornering Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Optional:2)	ADR R13 (Distance between lamp and front end≤2.5m)	ADR R13 (White or amber)	N/R	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	N/R	N/R	N/R	N/R	N/R
Chile					
China	N/R	N/R	N/R	N/R	N/R
Hong Kong	N/R	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R	N/R
Japan	SRRV33-2 (Optional:2)	SRRV33-2 (H1≤Headlamp-Lo)	SRRV33-2 (White or Selective yellow)	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	SRRV33-2 (Optional:2)	SRRV33-2 (H1≤Headlamp)	Unique (White or amber)	N/R	N/R
Papua New Guinea	N/R	N/R	N/R	N/R	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	N/R	N/R	N/R
Thailand	N/R	N/R	N/R	N/R	N/R
U. S. A.	N/R	N/R	N/R	N/R	N/R
ECE	N/R	N/R	N/R	N/R	N/R

6. Front Position Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	Common (2)	ADR R13 (350≤H1≤1500, W1≤400, D1≤600)	ADR R13 (White)	ADRR13 (Up:15°Lo:15°Out:80°In:45°)	N/R
Brunei	Common (2)	Unique (Same height)	N/R	N/R	N/R
Canada	Common (Parking Lamp:2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	FMVSS108 (White or amber)	N/R	N/R
Chile					
China	Unique (2 or 4)	Unique (350<H1<1500, W1<400, D1<600)	Unique (White or yellow)	ECE R48 (Up:15°Lo:15°Out:80°In:45°)	N/R
Hong Kong	Common (2)	Unique (H1≤1700)	ECE R48 (White)	N/R	N/R
Indonesia	Common (2)	Unique (H1≤1250, W1≤400)	Unique (White or light yellow)	N/R	N/R
Japan	Common (2)	SRRV34 (350≤H1≤2100, W1≤400)	SRRV34 (White, amber or Selective yellow)	N/R	N/R
Korea	Common (2)	Unique (350≤H2≤2000, W1≤400)	Unique (White, yellow or amber)	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New	Common	Unique	FMVSS108	ECE R48	N/R

Zealand	(2)	(H2≤1500)	(White or amber)	(Up:15°Lo:15°Out:80°In:45°)	
Papua New Guinea	Common (2)	Unique (H2≤1500, W2≤300)	FMVSS108 (White or amber)	N/R	N/R
Philippines	Unique (Parking Lamp: at a corner of the vehicle)	N/R	N/R	N/R	N/R
Singapore	Common (2)	Unique (H2≤1500, W1≤400)	Unique (White or amber*)	*: If lamp was combined with turn signal.	N/R
Chinese Taipei	N/R	Unique (H2≤2000)	SRRV34 (White, amber or light yellow)	N/R	N/R
Thailand	Common (2)	Unique (350≤H2≤2100, W1≤400)	Unique (White or yellow)	N/R	N/R
U. S. A.	Common (Parking Lamp:2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	FMVSS108 (White or amber)	N/R	N/R
ECE	Common (2)	ECE R48 (350≤H1≤1500, W1≤400, D1≤600)	ECE R48 (White)	ECE R48 (Up:15°Lo:15°Out:80°In:45°)	N/R

7. Rear Position Lamps (Tail lamps)

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	Common (2)	ADR R13 (350≤H1≤1500, W1≤400, D1≤600)	Common (Red)	ADRR13 (Up:15°Lo:15°Out:80°In:45°)	N/R
Brunei	Unique (1)	Unique (H2≤1050)	Common (Red)	N/R	N/R
Canada	Common (2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	Common (Red)	FMVSS108 (Lens area of at least 12.5 cm² at 45° R&L)	N/R
Chile					
China	Unique (2 or 4)	Unique (350<H1<1500, W1<400, D1>600)	Common (Red)	ECE R48 (Up:15°Lo:15°Out:80°In:45°)	N/R
Hong Kong	Common (2)	Unique (380≤H1≤1100, W1≤400)	Common (Red)	N/R	N/R
Indonesia	Common (2)	Unique (H1≤1250, W1≤400)	Common (Red)	N/R	N/R
Japan	Common (2)	SRRV37 (350≤H1≤2100, W1≤400)	Common (Red)	N/R	N/R
Korea	Common (2)	Unique (350≤H2≤2000)	Common (Red)	N/R	N/R
Malaysia		Unique (H2≤1050, No parts of vehicle extends longitudinally more than 1800 beyond the lamp)	Common (Red)	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	Common (2)	Unique (H2≤1500, as far apart as practicable)	Common (Red)	ECE R48 (Up:15°Lo:15°Out:80°In:45°)	N/R
Papua New Guinea	Unique (at least 2)	Unique (H2≤1500, W2≤300)	Common (Red)	N/R	N/R
Philippines	Unique	N/R	N/R	N/R	N/R

	(at a corner of the vehicle)				
Singapore	Common (2)	Unique (H2≤1500, W1≤400)	Common (Red)	N/R	N/R
Chinese Taipei		Unique (H2≤2000, W1≤400, D1≤¼ of the vehicle width)	Common (Red)	N/R	N/R
Thailand	Unique (2 or 4 or 6) in case of the width > 2100	Unique (350≤H2≤2100, W1≤400)	Common (Red)	N/R	N/R
U. S. A.	Common (2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	Common (Red)	FMVSS108 (Lens area of at least 12.5 cm² at 45° R&L)	N/R
ECE	Common (2)	ECE R48 (350≤H1≤1500, W1≤400, D1≤600)	Common (Red)	ECE R48 (Up:15°Lo:15°Out:80°In:45°)	N/R

8. Stop Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	Common (2)	ADR R13 (350≤H1≤1500, D1≤600)	Common (Red)	ADRR13 (Up:15°Lo:15°Out:45°In:45°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	Common (2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	Common (Red)	FMVSS108 (Lens area of at least 12.5 cm² at 45° R&L)	N/R
Chile					
China	Unique (2 or 4)	Unique (H1<1500, W1<400, D1>600)	Common (Red)	ECE R48 (Up:15°Lo:15°Out:45°In:45°)	N/R
Hong Kong	Common (2)	Unique (400≤H1≤1500, W1≤400, Distance between lamp and any lamp of other side≥600)	Common (Red)	ECE R48 (Up:15°Lo:15°Out:45°In:45°)	N/R
Indonesia	Common (2)	Unique (H1≤1250)	Common (Red)	N/R	N/R
Japan	Common (2)	SRRV39 (350≤H1≤2100, W1≤400)	Common (Red)	SRRV39 (Visible from a point at any height of 2.5m or less above the ground at a distance of 10m to the rear)	N/R
Korea	Common (2)	Unique (350≤H2≤2000)	Common (Red)	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	Unique (2 or 4)	Unique (H2≤1500)	Common (Red)	Unique (Up:15°, Lo:15°, RH:80°, LH:45°)	N/R
Papua New Guinea	Common (2)	Unique (H2≤1500)	Common (Red)	N/R	N/R
Philippines	Unique (at least 1)	N/R	Common (Red)	N/R	N/R

Singapore	Common (2)	Unique (400≤H2≤1000, W1≤400)	Common (Red)	N/R	N/R
Chinese Taipei	N/R	Unique (H2≤2000, W1≤400, D1≤¼ of the vehicle width)	Common (Red)	N/R	N/R
Thailand	Unique (2 or 4)	Unique (350≤H2≤2100, W1≤400)	Common (Red)	N/R	N/R
U. S. A.	Common (2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	Common (Red)	FMVSS108 (Lens area of at least 12.5 cm² at 45° R&L)	N/R
ECE	Common (2)	ECE R48 (350≤H1≤1500, W1≤400, D1≤600)	Common (Red)	ECE R48 (Up:15°Lo:15°Out:45°In:45°)	N/R

9. High Mount Stop Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (1)	ADR R60 (H1≥152 below the rear window for convertibles, 77 for other)	Common (Red)	ADRR13 (Up:10°Lo:5°RH:10°LH:10°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	FMVSS108 (1)	FMVSS108 (H1≥153 below the rear window for convertibles, 77 for other)	Common (Red)	FMVSS108 (Up:10°Lo:5°RH:45°LH:45°)	N/R
Chile					
China	N/R	N/R	N/R	N/R	N/R
Hong Kong	N/R	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R	N/R
Japan	SRRV39-2 (Optional:1)	SRRV39-2 (H1≥850 or 150 below the rear window, and H1≥above the top of the stop lamps)	Common (Red)	SRRV39 (Visible from a point at any height of 2.5m or less above the ground at a distance of 10m to the rear)	N/R
Korea	SRRV39-2 (Optional:1)	Unique (on the vertical center line and higher than the stop lamps of the each side)	Common (Red)	Unique (visible from 45 degrees)	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	Unique (1 or more)	FMVSS108 (H1≥153 below the rear window for convertibles, 77 for other)	Common (Red)	N/R	N/R
Papua New Guinea	N/R	N/R	N/R	N/R	N/R

Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	FMVSS108 (1)	Unique (be fitted above the stop lamps)	Common (Red)	N/R	N/R
Thailand	SRRV39-2 (Optional:1)	Unique (H2≥350)	Common (Red)	N/R	N/R
U. S. A.	FMVSS108 (1)	FMVSS108 (H1≥153 below the rear window for convertibles, 77 for other)	Common (Red)	FMVSS108 (Up:0°Lo:0°RH:45°LH:45°)	N/R
ECE	ECE R48 (1)	ECE R48 (H1≥150 below the rear window or 850 above the ground)	Common (Red)	ECE R48 (Up:10°Lo:5°LH:10°RH:10°)	N/R

10. Turn Signal Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Front:2, Rear :2, Side :2)	ADR R13 (W1≤400, D1≥600, 500≤H1≤1500 for side lamp, 350≤H1≤1500 for front & rear, Distance between front end and light emitting surface≥1800)	ADR R13 (Amber)	ADR R13 (Front & rear: Up:15°Lo:15°Out:80°In:45°) (Side: Up:15°Lo:15°Out:60°In:45°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	FMVSS108 (Front:2, Rear:2)	FMVSS108 (381≤H2≤2108, as far apart as practicable)	FMVSS108 (Front: Amber (Rear: Amber or red)	FMVSS108 (Lens area of at least 12.5cm² measured at 45 deg. to the longitudinal axis)	N/R
Chile					
China	Unique (Front:2, Side & Rear: 2 or 4)	Unique (Front & Rear:350<H1<1500, W1<400, D1>600, Distance between front turn signal and Lo-headlamp>40 or Intensity≥400cd) (Side:500<H1<1500, Distance between front turn signal and front of vehicle<1800)	SRRV41 (Amber)	Unique (Front & rear: Up:15°Lo:15°Out:80°In:45°) (Side: Up:15°Lo:15°Out:60°In:45°) (Dead angle of visibility to the rear ≤45)	N/R
Hong Kong	N/R	Unique (430≤H1≤2250, Horizontal distance between bottom edge of front window and lamp≤1800)	Unique (Front: white or amber, Rear: red or amber)	N/R	N/R
Indonesia	FMVSS108 (Front:2, Rear:2)	Unique (H2≤1250)	Unique (Dark yellow)	N/R	N/R
Japan	SRRV41 (Front, rear & side: at least one each side)	SRRV41 (Front & Rear:350≤H1≤2100, W1≤400, D1≥600) (Side:350≤H1≤2300)	SRRV41 (Amber)	SRRV41 (visible from a distance 30m to the front and to the rear)	N/R

Korea	FMVSS108 (Front:2, Rear:2)	Unique (350≤H2≤2000)	Unique (Yellow or amber)	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	FMVSS108 (Front:2, Rear:2)	Unique (H2≤1500)	Unique (Front: white or amber, Rear: red or amber)	Unique (Up:15°Lo:15°Out:80°In:45°)	N/R
Papua New Guinea	FMVSS108 (Front:2, Rear:2)	Unique (H2≤1500)	Unique (Front: white or amber, Rear: amber)	N/R	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	FMVSS108 (Front:2, Rear:2)	Unique (H1≤1500, W1≤400)	Unique (Front: white or amber, Rear: red or amber)	N/R	N/R
Chinese Taipei	N/R	Unique (H2≤2300, D1≤1/2 of the vehicle width)	Unique (Front:orange or yellow, Rear: orange, yellow or red)	N/R	N/R
Thailand	Unique (Front:2, Rear:2 or 4 or 6 in case of the width >2100) optional Front side : 1/side Rear side : 1/side In case of the vehicle length >7500, 1 between F&R side	Unique (350≤H2≤2100, W1≤400) 350≤H2≤2100	Unique (Front: Yellow Rear: Red or yellow) Side : yellow	N/R	N/R

U. S. A.	FMVSS108 (Front:2, Rear:2)	FMVSS108 (381≤H2≤2108, as far apart as practicable)	FMVSS108 (Front: Amber Rear: Amber or red)	FMVSS108 (Lens area of at least 12.5cm² measured at 45 deg. to the longitudinal axis)	N/R
ECE	ECE R48 (Front:2, Rear:2, Side:2)	ECE R48 (350≤H1≤1500, W1≤400, D1≥600)	ECE R48 (Amber)	ECE R48 (Front & Rear:Up:15°Lo:15°Out:80°In:45°) (Side: Up:15°Lo:15°Out:60°In:45°)	N/R

11. Backup Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	Common (1 or 2)	ADR R13 (250≤H1≤1200)	Common (White)	ADR R13 (Up:15°Lo:5°RH:45°LH:45°) (If there are two, Out:45°In:30°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	Common (1 or 2)		Common (White)	FMVSS108 (Center of lens shall be visible from 2 to 6 ft above the horizontal plane at 3 ft rear and extending 3 ft beyond each side)	N/R
Chile					
China	Common (1 or 2)	Unique (250<H1<1200)	Common (White)	ECE R48 (Up:15°Lo:5°RH:45°LH:45°) (If there are two, Out:45°In:30°)	N/R
Hong Kong	Common (1 or 2)	N/R	Unique (White or pale yellow)	N/R	N/R
Indonesia	Unique (1 or more)	Unique (H2≤1250)	Unique (White or light yellow)	N/R	N/R
Japan	Common (1 or 2)	N/R	Common (White)	N/R	N/R
Korea	Common (1 or 2)	Unique (250≤H2≤1200)	Unique (White or Yellow)	FMVSS108 (Center of lens shall be visible from 2 to 6 ft	N/R

				above the horizontal plane at 3 ft rear and extending 3 ft beyond each side)	
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	Common (1 or 2)	N/R	Common (White)	N/R	N/R
Papua New Guinea	Common (1 or 2)	N/R	Unique (Amber)	N/R	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	Common (1 or 2)	Unique (H2≤1200)	Common (White)	N/R	N/R
Thailand	Common (1 or 2)	Unique (250≤H2≤2100)	Common (White)	N/R	N/R
U. S. A.	Common (1 or 2)	N/R	Common (White)	FMVSS108 (Center of lens shall be visible from 2 to 6 ft above the horizontal plane at 3 ft rear and extending 3 ft beyond each side)	N/R
ECE	Common (1 or 2)	ECE R48 (250≤H1≤1200)	Common (White)	ECE R48 (Up:15°Lo:5°RH:45°LH:45°) (If there are two, Out:45°In:30°)	N/R

12. Reflex Reflectors

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Colour	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Front: optional-2, Rear: mandatory-≥2, Side: optional)	ADR R13 (Front & rear: W1≤400, D1≥600, 350≤H1≤900) (Side:350≤H1≤1500, L1≤1000 for rearmost reflector, on the middle third of the vehicle and L1 ≤3000 for foremost reflector)	ADR R13 (Front: Amber, Rear: Red, Side: Amber)	ADR R13 (Front & rear: Up:15°Lo:15°Out:30°In:30°) (Side:Up:15°Lo:15° Front:45°Rear: 45°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	FMVSS108 (Front side: 2, Rear: 2, Rear side: 2)	FMVSS108 (381≤H2≤, as far apart as practicable)	FMVSS108 (Front: Amber, Rear: Red, Rear side: Red)	N/R	N/R
Chile					
China	Unique (Front:optional-2, Front side: optional-2, Rear side: optional-2, Rear: mandatory-2 or 4)	Unique (Front & Rear: 350<H1<900, W1<400, D1>600) (Side: 350<H1<900, D1<3000, Distance between rearmost reflector and rear of vehicle<1000)	Unique (Front: Colour of receiving light, Side: Amber, Rear: Red)	Unique (Front & rear: Up:15°Lo:15°Out:20°In:20°) (Side:Up:15°Lo:15° Front:20°Rear:20°)	N/R
Hong Kong	Unique (2)	Unique (380≤H1≤1100, W1≤400, D1≥530)	SRRV38 (Red)	N/R	N/R
Indonesia	Unique (2)	Unique (W1≤400, at the back of vehicle)	N/R	N/R	N/R
Japan	SRRV38 (Rear: mandatory)	SRRV38 (250≤H1≤1500, W1≤400, D1≥600)	SRRV38 (Red)	N/R	N/R

Korea	Unique (2)	Unique (350≤H2≤1500)	SRRV38 (Red)	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	Unique (Rear: 2 or more)	Unique (H2≤1500)	SRRV38 (Red)	N/R	N/R
Papua New Guinea	Unique (Rear: 2 or more)	Unique (As nearly as practicable towards the rear corners of the vehicle)	SRRV38 (Red)	N/R	N/R
Philippines	Unique (Front and Rear)	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	N/R	N/R	N/R
Thailand	Unique (2 or 4)	Unique (400≤H2≤1400, W1≤400)	N/R	N/R	N/R
U. S. A.	FMVSS108 (Front side: 2, Rear: 2, Rear side: 2)	FMVSS108 (381≤H2≤1524, as far apart as practicable)	FMVSS108 (Front: Amber Rear: Red, Rear side: Red)	FMVSS108	N/R
ECE	ECE R48 (Front: mandatory-2, Rear: mandatory-2, Side: optional)	ECE R48 (250≤H1≤900, W1≤400, D1≥600)	ECE R48 (Front: Amber Rear: Red, Side: Amber)	ECE R48 (Front & rear: Up:15°Lo:15°Out:30°In:30°) (Side: Up:15°Lo:15° Front:45°Rear:45°)	N/R

13. License Plate Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Mandatory)	ADR R13 (Illuminate the site of registration plate)	Common (White)	ADR R13 (Up:5°Lo:5°RH:30°LH:30°)	N/R
Brunei	FMVSS108 (1)	N/R	Common (White)	N/R	N/R
Canada	FMVSS108 (1)	FMVSS108 (Be illuminated from the top or sides)	Common (White)	N/R	N/R
Chile					
China	Unique (1 or 2)	Unique (The angle of the light on the plate shall not exceed 82°at any point)	Common (White)	N/R	N/R
Hong Kong	SRRV36 (Mandatory)	N/R	N/R	N/R	N/R
Indonesia	Unique (1 or more)	N/R	N/R	N/R	N/R
Japan	SRRV36 (Mandatory)	N/R	Common (White)	N/R	N/R
Korea	N/R	N/R	Common (White)	Unique (The incident angle between the outermost edge of the lamp and the farthest point of the license plate≥8 degrees)	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	SRRV36 (Mandatory)	N/R	Common (White)	N/R	N/R
Papua New Guinea	FMVSS108 (1)	N/R	Common (White)	N/R	N/R

Philippines	FMVSS108 (1)	N/R	Common (White)	N/R	N/R
Singapore	Unique (1 or 2)	N/R	Common (White)	N/R	N/R
Chinese Taipei	SRRV36 (Mandatory)	Unique (To illuminate the plate from top, bottom or sides)	Common (White)	N/R	N/R
Thailand	Unique (1 or 2)	Unique (Be fitted above, below or on either side of the rear license plate)	Common (White)	N/R	N/R
U. S. A.	FMVSS108 (1)	FMVSS108 (Be illuminated from the top or sides)	Common (White)	N/R	N/R
ECE	ECE R48 (Mandatory)	ECE R48 (Illuminate the site of the registration plate)	Common (White)	ECE R48 (Up:15°, Lo:5°, RH:45°, LH:45°)	N/R

14. Side Marker Lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Front: Optional-2 Rear: Optional-2)	ADR R13 (600≤H1≤1500)	ADR R13 (Front: Amber Rear: Red)	Unique (Up:10°Lo:10° Front:45°Rear:45°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	FMVSS108 (Front: 2, Rear: 2)	FMVSS108 (H2≥381, As far to the front/rear as practicable)	FMVSS108 (Front: Amber Rear: Red)	N/R	N/R
Chile					
China	N/R	N/R	N/R	N/R	N/R
Hong Kong	N/R	N/R	N/R	N/R	N/R
Indonesia	FMVSS108 (Front: 2, Rear: 2)	Unique (Be installed on the front upper left and right sides, and on the rear upper left and right sides)	Unique (Front: White or pale yellow, Rear: Red)	N/R	N/R
Japan	N/R	N/R	N/R	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	N/R	N/R	N/R	N/R	N/R
Papua New Guinea	N/R	N/R	Unique (White or amber)	N/R	N/R
Philippines	N/R	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R

Chinese Taipei	N/R	N/R	N/R	N/R	N/R
Thailand	ECE R48 (Front:Optional-2 Rear:Optional-2 Side : Optional 2) In case of the vehicle length >7500	Unique (350≤H2≤2100)	Unique (Yellow or red)	N/R	N/R
U. S. A.	FMVSS108 (Front: 2, Rear: 2)	FMVSS108 (H2≥381, As far to the front/rear as practicable)	FMVSS108 (Front: Amber Rear: Red)	N/R	N/R
ECE	ECE R48 (Front:Optional-2 Rear:Optional-2)	ECE R48 (250≤H1≤1500, At least one lamp shall be fitted to the middle third of the vehicle., The foremost(rearmost) side marker being not further than 3(1) m from the front(rear) of the vehicle., The distance between two adjacent side marker lamp shall not exceed 3 m.)	ECE R48 (Front: Amber Rear: Amber or red)	ECE R48 (Up:10°Lo:10° Front:45°Rear:45°)	N/R

15. Parking lamps

Economy	B-a Equipment	B-b Installation Dimension(mm)	C-a Color	C-b Visibility	E Reference Std. Alt.Regulation
Australia	ADR R13 (Front:Optional-2, Rear:Optional-2, Side: Optional- 1 on each side)	ADR R13 (350≤H1≤1500, W1≤400)	ADR R13 (Front: White, Rear: Red or Amber)	ADRR13 (Up:15°Lo:15°Out:45°In:45°)	N/R
Brunei	N/R	N/R	N/R	N/R	N/R
Canada	FMVSS108 (Front:2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	FMVSS108 (White or amber)	N/R	N/R
Chile					
China	Unique (Optional:2)	Unique (350<H1<1500, W1<400, D1>600)	Unique (Front: White, Rear: Red or Amber)	ECE R48 (Up:15°Lo:15°Out:45°In:45°)	N/R
Hong Kong	N/R	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R	N/R
Japan	SRRV37 (Front:Optional-2, Rear:Optional-2)	SRRV37 (W1≤400)	SRRV37 (Front: White, Amber or Selective yellow, Rear: Red)	N/R	N/R
Korea	N/R	N/R	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R	N/R	N/R
Mexico	N/R	N/R	N/R	N/R	N/R
New Zealand	N/R	N/R	N/R	N/R	N/R
Papua New Guinea	N/R	N/R	N/R	N/R	N/R

Philippines	Unique (at a corner of the vehicle)	N/R	N/R	N/R	N/R
Singapore	N/R	N/R	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	N/R	N/R	N/R
Thailand	N/R	N/R	N/R	N/R	N/R
U. S. A.	FMVSS108 (Front:2)	FMVSS108 (381≤H2≤1829, as far apart as practicable)	FMVSS108 (White or amber)	N/R	N/R
ECE	ECE R48 (Front:2, Rear:2, side:2)	ECE R48 (350≤H1≤1500, W1≤400)	ECE R48 (Front: White, Rear: Red or Amber)	ECE R48 (Up:15°Lo:15°Out:45°In:45°)	N/R

Economy: Australia
Title of Standard: Australian Design Rule 13/00

1. Headlamps

A.	Application:	Passenger cars	
B-a	Equipment:		
	Main-beam:	Two, four or six, at least one pair of lamps	
	Dipped-beam:	Two	
B-b	Installation:	Main-beam:	
	In width:	The outer edges of the illuminating surface must in no case be closer to the extreme outer edge of the vehicle than the outer edges of the dipped-beam headlamps.	
	In length:	The light emitted does not cause discomfort to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.	
	Dipped-beam:		
	In width:	The edge of the illuminating surface which is farthest from the vehicle's median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle. The inner edge of the illuminating surfaces shall be not less than 600 mm apart.	
	In height:	Not less than 500 mm and not more than 1,200 mm above the ground.	
	In length:	The light emitted does not cause discomfort to the driver either directly or indirectly through the rear-view mirrors and/or other reflecting surfaces of the vehicle.	
C-a	Color:	Main-beam:	White
		Dipped-beam:	White
C-b	Visibility:		
	Main-beam:	The visibility of the illuminating surface must be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5 degrees with the axis of reference of the headlamp. The origin of the angles of geometric visibility is the perimeter of the projection of the illuminating surface on a transverse plane tangent to the foremost part of the lens of the headlamp.	
	Dipped-beam:	15 degrees upwards and 10 degrees downwards 45 degrees outwards and 10 degrees inwards	

2. Daytime Running Lamps

A.	Application:	Passenger cars
B-a	Equipment:	(Optional) Two
B-b	Installation:	
	In width:	That point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm.

	In height:	Not less than 500 mm not more than 1,500 mm.
C-a	Color:	White
C-b	Visibility:	45 degrees inwards and 80 degrees outwards. 15 degrees above and below the horizontal.

3. Front Fog Lamps

A.	Application:	Passenger cars
B-a	Equipment:	(Optional) Two
B-b	Installation:	
	In width:	That point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal shall not be more than 400 mm from the extreme outer edge of the vehicle.
	In height:	Not less than 250 mm above the ground. No point on the apparent surface in the direction of the reference axis must be higher than the highest point on the apparent surface in the direction of the reference axis of the dipped-beam headlamp.
C-a	Color:	White
C-b	Visibility:	5 degrees upwards and 5 degrees downwards 5 degrees outwards and 10 degrees inwards

4. Rear Fog Lamps

A.	Application:	Passenger cars
B-a	Equipment:	(Optional) One or two
B-b	Installation:	
	In width:	If there is only one rear fog-lamp, it must be on the opposite side of the median longitudinal plane of the vehicle to the direction of traffic prescribed in the country of registration, the centre of reference may also be situated on the median longitudinal plane of the vehicle. In all case (single or two lamps), the distance between the illuminating surface of the rear fog lamp and that of the stop lamp shall be not less than 100 mm.
	In height:	Not less than 250 mm nor more than 1,000 mm above the ground.
C-a	Color:	Red
C-b	Visibility:	5 degrees upwards and 5 degrees downwards 25 degrees to right and to left

5. Cornering Lamps

A.	Application:	Passenger cars
B-a	Equipment:	(Optional) Two
B-b	Installation:	
	In width:	One on each side of the vehicle.
	In height:	No higher than the dipped-beam.
	In length:	The outermost edge of the illuminating surface of a cornering lamp must be within 2 m of the front of the vehicle.
C-a	Color:	White or amber
C-b	Visibility:	The main photometric axis must not strike the road surface.

6. Front Position Lamps (Parking Lamp)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	
	In width:	That point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm.
	In height:	Not less than 350 mm not more than 1,500 mm (2,100 mm, if the shape of the bodywork makes it impossible).
C-a	Color:	White
C-b	Visibility:	
	Horizontal angle:	45 degrees inwards and 80 degrees outwards.
	Vertical angle:	15 degrees above and below the horizontal (5 degrees, in the case of lamps less than 750 mm).

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	
	In width:	That point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm (400 mm, if the overall width of the vehicle is less than 1,300 mm).
	In height:	Not less than 350 mm not more than 1,500 mm.
C-a	Color:	Red
C-b	Visibility:	
	Horizontal :	45 degrees inwards and 80 degrees outwards.
	Vertical:	15 degrees above and below the horizontal. (5 degrees in the case of lamps less than 750 mm above the ground).

8. Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	
	In width:	Not less than 600 mm apart. This distance may be reduced to 400 mm if the overall width of the vehicle is less than 1,300 mm.
	In height:	Not less than 350 mm nor more than 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm)
C-a	Color:	Red
C-b	Visibility:	
	Horizontal:	45 degrees outwards and inwards

	Vertical:	15 degrees above and below the horizontal (5 degrees, if the height of the lamp is less than 750 mm)

9. High Mount Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One
B-b	Installation:	
	In width:	On the vehicle's median longitudinal plane.
	In height:	At any position including on the glazing, except that no portion of the lens must be lower than the bottom edge of the rear window by more than 152 mm for convertibles, or 77 mm for other vehicles.
C-a	Color:	Red
C-b	Visibility:	
	Horizontal:	10 degrees to the left and to the right of the longitudinal axis of the vehicle
	Vertical:	10 degrees above and 5 degrees below the horizontal

10. Turn Signal Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Front:	Two
		Rear:	Two
		Side:	Two
B-b	Installation:		
	In width:	The edge of the apparent surface in the direction of the reference axis farthest from the median longitudinal plane of the vehicle must not be more than 400 mm from the extreme outer edge of the vehicle. The distance between the inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm. Where the vertical distance between the rear direction indicator lamp and the corresponding rear position (side) lamp is not more than 300 mm, the distance between the extreme outer edge of the vehicle and the outer edge of the illuminating surface of the rear direction indicator lamp must not exceed, by more than 50 mm the distance between the extreme outer edge of the vehicle and the outer edge of the illuminating surface of the corresponding rear position (side) lamp.	
	In height:	The light emitting surface of the side direction indicator lamps must not be less than 500 mm measured from the lowest point or more than 1,500 mm measured from the highest point. The height of front and rear direction-indicator lamps must not be less than 350 mm or more than 1,500 mm.	
	In length:	The distance between the light emitting surface of the side direction lamp and the transverse plane which marks the forward boundary of the vehicle's overall length, shall not exceed 1,800 mm (2,500 mm, if the structure of the vehicle makes it impossible).	
C-a	Color:	Front:	Amber
		Rear:	Amber
C-b	Visibility:		
	Horizontal:	80 degrees outwards and 45 degrees inwards for the front and rear direction indicator lamp.	

60 degrees outwards for the side direction lamp(*1).
Vertical: 15 degrees above and below the horizontal
(5 degrees if the lamps are less than 750 mm above the ground)
(*1): The value of 5 degrees for the dead angle of visibility to the rear of the side direction indicator is upper limit.

11. Backup Lamps

A. Application: Passenger cars
B-a Equipment: One or two
B-b Installation:
In height: Not less than 250 mm nor more than 1,200 mm above the ground.
C-a Color: White
C-b Visibility: 15 degrees upwards and 5 degrees downwards
45 degrees to right and toleft if there is only one light,
45 degrees outwards and 30 degrees inwards if there are two.

12. Reflex Reflectors

A. Application: Passenger cars
B-a Equipment: Front: (Optional) Two
Rear: (mandatory) Two
Side: (Optional)
B-b Installation:
Front and rear:
In width: That point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The inner edge of the retro reflector shall not be less than 600 mm apart (400 mm, if the overall width of the vehicle is less than 1,300 mm).
In height: not less than 350 mm nor more than 900 mm (1,500 mm, if the structure of
the vehicle makes it impossible).
Side:
In width: N/R
In height: not less than 350 mm nor more than 900 mm (1,500 mm, if the structure of
the vehicle makes it impossible).
In length: at least one side retro-reflector must be fitted to the middle third of the vehicle, the foremost side retro-reflector being not further than 3 m from the front. The distance between the rearmost side retro-reflector and the rear of the vehicle shall not exceed 1 m.
C-a Color: Front: Amber
Rear: Red
Side: Amber
C-b Visibility:
Front and rear:
Horizontal: 30 degrees inwards and outwards.
Vertical: 15 degrees above and below the horizontal.

(5 degrees, in case of a retro-reflector less than 750 mm above the ground).

Side:
Horizontal: 45 degrees to the front and to the rear.
Vertical: 15 degrees above and below the horizontal.
(5 degrees, in case of a retro-reflector less than 750 mm above the ground).

13. License Plate Lamp

A. Application: Passenger cars
B-a Equipment: N/R
B-b Installation: The device illuminates the site of the registration plate.
C-a Color: White
C-b Visibility:
Horizontal: 30 degrees to either side.
Vertical: 5 degrees above and below the horizontal

14. Side Marker Lamps

A. Application: Passenger cars
B-a Equipment: Front: (Optional) Two
Rear: (Optional) Two
B-b Installation:
In width: On the side of the vehicle
In height: Not less than 350 mm nor more than 1,500 mm.
In length: Towards the front and towards the rear.
C-a Color: Front: Amber
Rear: Red
C-b Visibility:
Horizontal: 45 degrees to the front and to the rear.
Vertical: 10 degrees above and below the horizontal

15. Parking Lamps

A. Application: Passenger cars
B-a Equipment: (Optional) Two lamps at the front and two lamps at the rear, or one lamps on each side.
B-b Installation:
In width: That point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane of the shall not be more than 400 mm from the extreme outer edge of the vehicle. If there are two lamps, they shall be on the sides of the vehicle.
In height: Not less than 350 mm or more than 1,500 mm.
C-a Color: Front: White
Rear: Red or amber(if it is incorporated in the turn signal lamps or in the side-marker lamps)
C-b Visibility:
Horizontal: 45 degrees outwards, forwards and rearwards.
Vertical: 15 degrees above and below the horizontal
(5 degrees, if height of the lamp is less than 750 mm).

Economy: Brunei Darussalam

Title of Standard: The Road Traffic Regulations 104, 108, 109, 110, 111

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	N/R
B-b	Installation:	
	In height:	A lamp shall not be mounted higher than 5 feet from the ground.
	In width:	Lamps shall be fixed that no part extends laterally on the same side as the lamp more than 12 inches beyond the centre of the lamp.
C-a	Color:	White
C-b	Visibility:	A white light shall be visible from a reasonable distance.

2. Daytime Running Lamps N/R

3. Front Fog lamps N/R

4. Rear Fog lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	Lamps shall be fixed on opposite sides of the vehicle at the same height from the ground.
C-a	Color:	N/R
C-b	Visibility:	N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	Lamp shall be fixed not exceeding 3 feet 6 inches from the ground.
C-a	Color:	Red
C-b	Visibility:	A red light shall be visible from a reasonable distance.

8. Stop Lamps N/R

9. High Mount Stop Lamps N/R

10. Turn Signal Lamps N/R

11. Backup Lamps N/R

12. Reflex Reflectors N/R

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	One
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps N/R

15. Parking Lamps N/R

Economy: Canada
Title of Standard: Canadian Motor Vehicle Safety Standard No. 108

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	Two or four
B-b	Installation:	The height above the road surface measured from the center of the headlamp shall not be less than 22 inches nor more than 54 inches. The headlamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	White
C-b	Visibility:	N/R

2. Daytime Running Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two or four (if optically combined with upper beams of the headlamps)
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 12 inches nor more than 83 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	White to yellow
C-b	Visibility:	The minimum unobstructed effective projected area shall be visible from any point contained within the solid angle bounded by vertical planes 20 degrees to the left and right of, and horizontal planes 10 degrees above and below, the H-V axis of the lamp.

3. Front Fog Lamps N/R

4. Rear Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 72 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	Red
C-b	Visibility:	The lamp must provide an unobstructed projected illuminated area of outer lens surface at least 2 square inches in extent measured at 45 degrees to the longitudinal axis of the vehicle.

8. Stop Lamps

A. Application: Passenger cars
B-a Equipment: Two
B-b Installation: The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 72 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a Color: Red
C-b Visibility: The lamp must provide an unobstructed projected illuminated area of outer

lens surface at least 2 square inches in extent measured at 45 degrees to the longitudinal axis of the vehicle.

9. High Mount Stop Lamps

A. Application: Passenger cars
B-a Equipment: One
B-b Installation: The lamps shall be mounted on the vertical center line. No portion of the lens shall be lower than 6 inches below the rear window on convertible, or 3 inches on other passenger cars.
C-a Color: Red
C-b Visibility: The lamp shall be visible from any point contained within the solid angle bounded be vertical planes 45 degrees to the left and right of, and horizontal planes 10 degrees above and 5 degrees below, the H-V axis of the lamp.

10. Turn Signal Lamps

A. Application: Passenger cars
B-a Equipment: Front: Two
Rear: Two
B-b Installation: The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 83 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a Color: Front: Amber
Rear: Amber or red
C-b Visibility: The lamp must provide an unobstructed projected illuminated area of outer

lens surface at least 12.5 square centimeters in extent measured at 45 degrees to the longitudinal axis of the vehicle.

11. Backup Lamps

A. Application: Passenger cars
B-a Equipment: One or two
B-b Installation: N/R
C-a Color: White
C-b Visibility: The optical center of the lens surface shall be visible from any eye point elevation from two to six feet above the horizontal plane on which the vehicle is standing, and from any position in the area rearward of a vertical plane, perpendicular to the longitudinal axis of the vehicle tree

feet to the rear of the vehicle, and extending three feet beyond each side of the vehicle.

12. Reflex Reflectors

A.	Application:	Passenger cars	
B-a	Equipment:	Front side:	Two
		Rear:	Two
		Rear side:	Two
B-b	Installation:		
	Rear:	The reflector shall be mounted on each side of the vertical center line at the same height and as far apart as practicable.	
	Front side and Rear side:	The reflector shall be mounted as far to the front as practicable, and as far to the rear as practicable.	
C-a	Color:	Front side:	Amber
		Rear:	Red
		Rear side:	Red
C-b	Visibility:	N/R	

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	One
B-b	Installation:	The rear license plate shall be illuminated from the top or sides.
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Front:	Two
		Rear:	Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches. The amber lamp shall be mounted as far to the front as practicable. The red lamp shall be mounted as far to the rear as practicable.	
C-a	Color:	Front:	Amber
		Rear:	Red
C-b	Visibility:	N/R	

15. Parking Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 72 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	White or amber
C-b	Visibility:	N/R

Economy: Chile
Title of Standard: No regulation

Economy: China
Title of Standard: 4785 - 84

1. Headlamps

A.	Application:	Passenger cars		
B-a	Equipment:	Low beam:	Two (mandatory)	
		High beam:	Two or four (mandatory)	
B-b	Installation:			
	Low beam:	Maximum height (H1)	<1200 mm, recommended<800 mm	
		Minimum height (H2)	>500 mm	
		Width position (E)	<400 mm and <E of high beam	
		Distance between lamps (D)	>600 mm, or 400 mm if overall width is less than 1300 mm	
	High beam:	Width position (E)	E>E of low beam	
C-a	Color:	White or yellow		
C-b	Visibility:			
	Minimum angles:	Low beam:	Up 15 º Lo 10 º Out 45 º In 10 º	
		High beam:	Up 5 º Lo 5 º Out 5 º In 5 º	

2. Daytime Running Lamps N/R

3. Front Fog Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Two (mandatory for foggy zone)	
B-b	Installation:		
	Maximum height (H1):	No point on the illuminating surface shall be higher than the highest point of the illuminating surface of the low beam headlamp.	
	Minimum height (H2)	>250 mm	
	Width position (E)	<400 mm	
C-a	Color:	White or yellow	
C-b	Visibility:	Minimum angles:	Up 5 º Lo 5 º Out 45 º In 10 º

4. Rear Fog Lamps

A.	Application:		
B-a	Equipment:	One or two (optional)	
B-b	Installation:		
	Maximum height (H1)	<1000 mm	
	Minimum height (H2)	>250 mm If there is only one rear fog lamp, it shall be on the left side. The distance between the rear fog lamp and the stop lamp shall be greater than 100 mm.	
C-a	Color:	Red	
C-b	Visibility:	Minimum angles:	Up 5 º Lo 5 º Out 25 º In 25 º

5. Cornering Lamps N/R

6. Front Position Lamps (Parking Lams)

A. Application: Passenger cars
B-a Equipment: Two or four (mandatory)
B-b Installation:

Maximum height (H1)	<1500 mm
Minimum height (H2)	>350 mm
Width position (E)	<400 mm
Distance between lamps (D)	>600 mm, or 400 mm if overall width is less than 1300 mm

C-a Color: White, yellow or white goruped with yellow is permitted if front position lamp shall be grouped with yellow headlamp
C-b Visibility: Minimum angles Up 15 º Lo 15 º (5 º, if H2<750 mm) Out 80 º In 45 º

7. Rear Position Lams (Tail Lamps)

A. Application: Passenger cars
B-a Equipment: Two or four (mandatory)
B-b Installation:

Maximum height (H1)	<1500 mm
Minimum height (H2)	>350 mm
Width position (E)	<400 mm
Distance between lamps (D)	>600 mm, or 400 mm if overall width is less than 1300 mm

C-a Color: Red
C-b Visibility: Minimum angles Up 15 º Lo 15 º (5 º, if H2<750 mm) Out 80 º In 45 º

8. Stop Lamps

A. Application: Passenger cars
B-a Equipment: Two or four (mandatory)
B-b Installation:

Maximum height (H1)	<1500 mm
Width position (E)	<400 mm
Distance between lamps (D)	>600 mm, or 400 mm if overall width is less than 1300 mm

C-a Color: Red
C-b Visibility: Minimum angles Up 15 º Lo 15 º (5 º, if H2<750 mm) Out 45º In 45 º

9. High Mount Stop Lamp N/R

10. Turn Signal Lamps

A. Application: Passenger cars
B-a Equipment:

Front:	Two (mandatory)
Side:	Two or four (mandatory)
Rear:	Two or four (mandatory)

B-b Installation:

Front and Rear:

Maximum height (H1)	<1500 mm
Minimum height (H2)	>350 mm
Width position (E)	<400 mm
Distance between lamps (D)	>600 mm, or 400 mm if overall width is less than 1300 mm. The distance between the front turn signal lamp and the low beam headlamps (including fog lamps) shall be greater than 40 mm. A short distance is permitted if the luminous intensity in the reference axis of the turn signal lamps is equal to at least 400 cd.

Side:

Maximum height (H1)	<1500 mm
Minimum height (H2)	>500 mm

The distance between the rearmost turn signal lamp and the front of the vehicle may not exceed 1800 mm.

C-a Color: Amber

C-b Visibility:

Front and Rear: Minimum angles Up 15 º Lo 15 º (5 º, if H2<750 mm) Out 80 º In 45 º

Side: Minimum angles Up 15 º Lo 15 º (5 º, if H2<750 mm) Out 60 º

Dead angle of visibility to the rear of the side turn signal (upper limit) 45 º

11. Backup Lamps

A. Application: Passenger cars

B-a Equipment: One or two (mandatory)

B-b Installation:

Maximum height (H1)	<1200 mm
Minimum height (H2)	>250 mm

C-a Color: White

C-b Visibility: Minimum angles Up 15 º Lo 5 º Out 45 º In 45 º(or 30 ºif there are two)

12. Reflex Reflectors

A. Application: Passenger cars

B-a Equipment:

Front:	Two (optional)
Side	Front-two (optional), Rear-two (optional)
Rear	Two or four (Mandatory)

B-b Installation:

Front and Rear:

Maximum height (H1)	<900 mm
Minimum height (H2)	>350 mm
Width position (E)	<400 mm
Distance between lamps (D)	>600 mm, or 400 mm if overall width is less than 1300 mm

Side:

Maximum height (H1)	<900 mm
Minimum height (H2)	>350 mm
Distance between lamps (D)	<3000 mm

The distance between the rearmost reflex- reflector and the rear of the vehicle may not exceed 1000 mm.

C-a Color: Front: The colour of receiving light

		Side:	Amber	
		Rear:	Red	
C-b	Visibility:			
	Front and Rear:	Minimum angles	Up 15 º	Lo 15 º(5 º if H2<750 mm)
			Out 20 º	In 20 º
	Side:	Minimum angles	Up 15 º	Lo 15 º(5 º if H2<750 mm)
			Forward 20 º	Rearward 20 º

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	One or more (mandatory)
B-b	Installation:	The manufacturer of the device shall specify the position. The angle of incidence of the light on the surface of the plate shall not exceed 82 º at any point on the surface.
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps

A.	Application:	Passenger cars		
B-a	Equipment:	Front:	Two (optional)	
		Rear:	Two (optional)	
B-b	Installation:			
	Front:	Maximum height (H1)	<1500 mm	
		Minimum height (H2)	>350 mm	
		Distance between lamps (D)	<3000 mm	
	Rear:	The distance between the rearmost side marker lamp and the rear of the vehicle may not exceed 1000 mm.		
C-a	Color:	Light amber		
C-b	Visibility:	Minimum angles	Up 15 º	Lo 15 º(5 ºif H2<750 mm)
			Out 45 º	In5 º

15. Parking Lamp

A.	Application:	Passenger cars		
B-a	Equipment:	Two (optional)		
B-b	Installation:	Maximum height (H1)	<1500 mm	
		Minimum height (H2)	>350 mm	
		Width position (E)	<400 mm	
C-a	Color:	Front:	White	
		Rear:	Red, amber (if grouped with side signal lamps)	
C-b	Visibility:	Minimum angles	Up 15 º	Lo 15 º (5 º if H2<750 mm)
			Out 45 º	In 45 º

Economy: Hong Kong
Title of Standard: Road Traffic Ordinance 89 - 117

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	Two or four
B-b	Installation:	No part of its illuminated area is less than 600 mm from any part of the illuminated area of any such headlamp on the other side. The outermost part of the illuminated area of the headlamp is not more than 400 mm from the outermost part of the vehicle on the side on which the headlamp is placed.
C-a	Color:	White or yellow
C-b	Visibility:	N/R

2. Daytime Running Lamps	N/R
3. Front Fog-lamps	N/R
4. Rear Fog-lamps	N/R
5. Cornering Lamps	N/R

6. Front Position Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The highest part of the illuminated area of the lamp is not more than 1.7 m from the ground.
C-a	Color:	White
C-b	Visibility:	N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The highest part of the illuminated area of the lamp is not more than 1.1 m from the ground (the lowest part is not less than 380 mm). The outermost part of the illuminated area of the lamp is not more than 400 mm from the outermost part of the vehicle on the side on which the lamp is placed.
C-a	Color:	Red
C-b	Visibility:	N/R

8. Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The highest part of the illuminated area of the lamp is not more than 1.5 m from the ground (the lowest part is not less than 400 mm). The outermost part of the illuminated area of the lamp is not more than 400 mm from the outermost part of the vehicle on the side on which the lamp is placed.

No part of its illuminated area is less than 600 mm from any part of the illuminated area of any such headlamp on the other side.

C-a Color: Red

C-b Visibility: Horizontal angle: 15 degrees upwards and downwards
Vertical angle: 45 degrees to the left and to the right

9. High Mount Stop Lamps N/R

10. Turn Signal Lamps

A. Application: Passenger cars
B-a Equipment: Front and Rear
B-b Installation: Not less than 430 mm and nor more than 2.25 m
C-a Color: Front: Amber or white
Rear: Amber
C-b Visibility: N/R

11. Backup Lamps

A. Application: Passenger cars
B-a Equipment: Not more than two
B-b Installation: N/R
C-a Color: White or pale yellow
C-b Visibility: N/R

12. Reflex Reflectors

A. Application: Passenger cars
B-a Equipment: Two
B-b Installation: The highest part of the reflector is not more than 1.1 m from the ground (the lowest part is not less than 380 mm).
No part of reflector area is less than 530 mm from any part of the reflector on the other side.
The outermost part of the reflector is not more than 400 mm from the outermost part of the vehicle on the side on which the reflector is placed.
C-a Color: Red
C-b Visibility: N/R

13. License Plate Lamp

A. Application: Passenger cars
B-a Equipment: Mandatory
B-b Installation: N/R
C-a Color: N/R
C-b Visibility: N/R

14. Side Marker Lamps N/R

15. Parking Lamps N/R

Economy: Indonesia
Title of Standard: R.44/93

1. Headlamps

A. Application: Passenger cars
B-a Equipment: Two
B-b Installation: The outermost edge of the cover of headlights shall be fitted at height of no more than 1,250 mm and at a distance not exceeding the outermost side of the vehicle by more than 400 mm.
C-a Color: White or light yellow
C-b Visibility: N/R

2. Daytime Running Lamps N/R

3. Front Fog Lamps N/R

4. Rear Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps

A. Application: Passenger cars
B-a Equipment: Two
B-b Installation: Lamp shall be fitted at a height not exceeding 1,250 mm and at a distance not exceeding the outermost edge of the vehicle by more than 400 mm.
C-a Color: White or light yellow
C-b Visibility: N/R

7. Rear Position Lamps (Tail Lamps)

A. Application: Passenger cars
B-a Equipment: Two
B-b Installation: Lamp shall be fitted at a height not exceeding 1,250 mm and at a distance not exceeding the outermost edge of the vehicle by more than 400 mm.
C-a Color: Red
C-b Visibility: Light shall be visible at night from a distance of at least 300m.

8. Stop Lamps

A. Application: Passenger cars
B-a Equipment: Two
B-b Installation: Lamp shall be fitted at a height not exceeding 1,250 mm on the rear left and right sides.
C-a Color: Red
C-b Visibility: N/R

9. High Mount Stop Lamps N/R

10. Turn Signal Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Front; Two
		Rear; Two
B-b	Installation:	Lamp shall be fitted at a height not exceeding 1,250 mm on the left and right
		sides at the front and rear.
C-a	Color:	Dark yellow
C-b	Visibility:	N/R

11. Backup Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One or more
B-b	Installation:	Lamp shall be fitted at a height not exceeding 1,250 mm.
C-a	Color:	White or light yellow
C-b	Visibility:	N/R

12. Reflex Reflectors

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The reflectors shall be installed at the back of a vehicle. The edge of the outermost surface may not exceed the outermost edge of the vehicle by more than 400 mm.
C-a	Color:	N/R
C-b	Visibility:	N/R

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	One or more
B-b	Installation:	N/R
C-a	Color:	N/R
C-b	Visibility:	The light shall be installed properly so that they can light up the license plate
		and can be read from a distance of at least 50 m from the rear.

14. Side Marker Lamps

A.	Application:	Motor vehicles with a width of more than 2,100mm
B-a	Equipment:	Front; two
		Rear; two
B-b	Installation:	The side lights shall be installed on the front upper left and upper right sides, and installed at the rear upper left and upper right sides.

C-a	Color:	Front;	white or pale yellow
		Rear;	Red
C-b	Visibility:	N/R	

Economy: Japan
Title of Standard: Safety Regulations for Road Vehicles, Article No. 32 - 42

1. Headlamps

A. Application: Passenger cars
B-a Equipment: High beam: Two or four
Low beam: Two
B-b Installation: The lamp center shall be located not higher than 1200 mm above the ground.
The outermost edge of the illuminating surface shall be mounted within 400 mm from the outermost edge of the vehicle.
No portion of the lens shall be lower than 500 mm from the ground.
C-a Color: White or selective yellow
C-b Visibility: N/R

2. Daytime Running Lamps N/R

3. Front Fog Lamps

A. Application: Passenger cars
B-a Equipment: (Optional) Three or more lamps may not be lit at the same time.
B-b Installation: The uppermost edge of the illuminating surface shall not be higher than the level of that of the headlamp and be lower than 800 mm from the ground.
No portion of the lens shall be lower than 250 mm from the ground.
C-a Color: White or selective yellow
C-b Visibility: N/R

4. Rear Fog Lamps

A. Application: Passenger cars
B-a Equipment: (Optional) Two or less
B-b Installation: The lamp center shall be located not higher than 1000 mm above the ground.
No portion of the lens shall be lower than 250 mm from the ground.
The distance between the illuminating surface of the fog lamp and that of the stop lamp shall be greater than 100 mm.
C-a Color: Red
C-b Visibility: N/R

5. Cornering Lamps

A. Application: Passenger cars
B-a Equipment: (Optional) Two
B-b Installation: The uppermost edge of the illuminating surface shall not be higher than the level of that of the headlamp.
C-a Color: White or selective yellow

C-b Visibility: N/R

6. Front Position Lamps

A. Application: Passenger cars
B-a Equipment: Two
B-b Installation: The lamp center shall be located not higher than 2100 mm above the ground.
The outermost edge of the illuminating surface shall be mounted within
400
mm from the outermost edge of the vehicle.
No portion of the lens shall be lower than 350 mm from the ground.
C-a Color: White, selective yellow or amber
C-b Visibility: N/R

7. Rear Position Lamps (Tail Lamps)

A. Application: Passenger cars
B-a Equipment: Each side at rear
B-b Installation: The lamp center shall be located not higher than 2100 mm above the ground.
The outermost edge of the illuminating surface shall be mounted within
400 mm from the outermost edge of the vehicle.
No portion of the lens shall be lower than 350 mm from the ground.
C-a Color: Red
C-b Visibility: N/R

8. Stop Lamps

A. Application: Passenger cars
B-a Equipment: Each side at rear
B-b Installation: The lamp center shall be located not higher than 2100 mm above the ground.
The outermost edge of the illuminating surface shall be mounted within
400 mm from the outermost edge of the vehicle.
No portion of the lens shall be lower than 350 mm from the ground.
C-a Color: Red
C-b Visibility: The illuminating surface shall be visible from a point at any height of
2.5 m or less above the ground at a distance of 10 m to the rear.

9. High Mount Stop Lamps

A. Application: Passenger cars
B-a Equipment: (Optional) One
B-b Installation: The lamp shall be located on the vertical center line.
No portion of the lens shall be lower than 850 mm above the ground or
150
mm below the rear window, and be located above the top of the stop
lamps.
C-a Color: Red
C-b Visibility: The illuminating surface shall be visible from a point at any height of
2.5 m or less above the ground at a distance of 10 m to the rear.

10. Turn Signal Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Front: At least one each side Rear: At least one each side
B-b	Installation:	The lamp center shall be located not higher than 2100 mm above the ground. The outermost edge of the illuminating surface shall be mounted within 400 mm from the outermost edge of the vehicle. The distance between the innermost edge of the lamps of the each sides shall be greater than 600 mm (400 mm, in the case of passenger cars with a width of 1300 mm or less). No portion of the lens shall be lower than 350 mm from the ground.
C-a	Color:	Amber
C-b	Visibility:	The illuminating surface shall be visible from a distance of 30 m to the front and to the rear.

11. Backup Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One or two
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	N/R

12. Reflex Reflectors

A.	Application:	Passenger cars
B-a	Equipment:	Rear
B-b	Installation:	The lamp center shall be located not higher than 1500 cm above the ground. The outermost edge of the illuminating surface shall be mounted within 400 mm from the outermost edge of the vehicle. No portion of the lens shall be lower than 250 mm from the ground.
C-a	Color:	Red
C-b	Visibility:	N/R

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	(Mandatory)
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps N/R

15. Parking Lamp

A.	Application:	Passenger cars	
B-a	Equipment:	(Optional) Front:	Each side
		(Optional) Rear:	Each side
B-b	Installation:	The outermost edge of the illuminating surface shall be mounted within 400 mm from the outermost edge of the vehicle.	
C-a	Color:	Front:	White, selective yellow or amber
		Rear :	Red
C-b	Visibility:	N/R	

Economy: Korea
Title of Standard: The Motor Vehicle Safety Standards: Article 38 - 49

1. Headlamps

A.	Application:	All vehicles except trailer
B-a	Equipment:	Two or four
B-b	Installation:	The center of lamp shall be located not less than 50 cm but not more than 120 cm above the ground.
C-a	Color:	White or yellow
C-b	Visibility:	Observation angle

High beam:	Up	5º	Down	5º	In	5º	Out	5º
Low beam:	Up	15º	Down	10º	In	10º	Out	45º

2. Daytime Running Lamps N/R

3. Front Fog Lamps Optional

4. Rear Fog Lamps Optional

5. Cornering Lamps N/R

6. Front Position Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The lamp center shall be mounted not less than 35 cm but not more than 200 cm above the ground. The outermost edge shall be mounted within 40 cm from the outermost edge of the vehicle. If the headlamps are installed within 65 cm from the outermost edges of the vehicle, the lamps may not be installed.
C-a	Color:	White, yellow or amber
C-b	Visibility:	Same as FMVSS 108

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The lamp center shall be mounted not les than 35 cm but not more than 200 cm above the ground.
C-a	Color:	Red
C-b	Visibility:	N/R

8. Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two

B-b Installation: The lamp center shall be mounted not les than 35 cm but not more than 200
cm above the ground.
C-a Color: Red
C-b Visibility: Same as FMVSS 108

9. High Mount Stop Lamp

A. Application: Passenger cars
B-a Equipment: One or two (optional)
B-b Installation: The lamp shall be located on the vertical center line of a vehicle and installed higher than the stop lamps of each side.
C-a Color: Red
C-b Visibility: The luminous area shall be visible from 45 degrees.

10. Turn Signal Lamps

A. Application: Passenger cars
B-a Equipment: Four (2 front / 2 rear)
B-b Installation: The lamp center shall be mounted not less than 35 cm but not more than 200
cm above the ground.
C-a Color: Yellow or amber
C-b Visibility: Same as FMVSS 108

10.1 Hazard Waning Signal Lamps

A. Application: Passenger car
B-a Equipment: Four (2 front / 2 rear)
The requirements of the turn signal shall be applicable to the hazard warning signal.
C-a Color: N/R
C-b Visibility: Same as FMVSS 108

11. Backup Lamps

A. Application: Passenger car
B-a Equipment: Not more than two
B-b Installation: The lamp center shall be located not less than 25 cm but not more than 120
cm above the ground.
C-a Color: White or yellow
C-b Visibility: The observation mark shall be visible from eye point elevation at least 60 cm to 180 cm and from any position in the area 90 cm to the rear and extending 90 cm beyond each side of the vehicle.

12. Reflex Reflectors

A. Application: Passenger car
B-a Equipment: Rear: Two

B-b Installation: The reflectors center shall be mounted not less than 35 cm but not more than
150 cm above the ground.
C-a Color: Red
C-b Visibility: N/R

13. License Plate Lamp

A. Application: Passenger car
B-a Equipment: Mandatory
B-b Installation: N/R
C-a Color: White
C-b Visibility: The incident angle between the outermost edge of the lamp and the farthest
point of the license plate shall be not less than 8 degrees.

14. Side Marker Lamps N/R

15. Parking Lamp N/R

Economy: Malaysia
Title of Standard: Road Transport Rules 98

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	A lamp shall not be mounted higher than 5 feet from the ground. Lamps shall be fixed that no part extends laterally on the same side as the lamp more than 12 inches beyond the centre of the lamp at the same height.
C-a	Color:	White
C-b	Visibility:	N/R

2. Daytime Running Lamps N/R

3. Front Fog-lamps N/R

4. Rear Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	N/R
B-b	Installation:	Lamp shall be fixed not exceeding 3 feet 6 inches from the ground, and no part of the vehicle extend longitudinally more than 6 feet beyond such lamp.
C-a	Color:	Red
C-b	Visibility:	N/R

8. Stop Lamps N/R

9. High Mount Stop Lamp N/R

10. Turn Signal Lamps N/R

11. Backup Lamps N/R

12. Reflex Reflectors N/R

13. License Plate Lamp N/R

14. Side Marker Lamps N/R

15. Parking Lamps N/R

Economy: Mexico
Title of Standard: No regulation

Economy: New Zealand
Title of Standard:

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	Two or four
B-b	Installation:	N/R
C-a	Color:	White or amber
C-b	Visibility:	N/R

2. Daytime Running Lamps N/R

3. Front Fog Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two (optional)
B-b	Installation:	N/R
C-a	Color:	White or amber
C-b	Visibility:	N/R

4. Rear Fog Lamps N/R

5. Cornering Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two (optional)
B-b	Installation:	The lamps shall not be mounted higher than the head lamps and be permanently dipped.
C-a	Color:	White or amber
C-b	Visibility:	N/R

6. Front Position Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The lamp center shall be located not more than 1.5 m from the ground.
C-a	Color:	White or amber
C-b	Visibility:	Minimum angles: Up 15º Lo 15º In 45º Out 80º

7. Rear Position Lamp (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The lamp center shall be located not more than 1.5 m from the ground on each side of the vertical centerline, at the same height, and as far as apart as practicable.
C-a	Color:	Red
C-b	Visibility:	Minimum angles: Up 15º Lo 15º In 45º Out 80º

8. Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two or four
B-b	Installation:	The lamp center shall be located not more than 1.5 m from the ground.
C-a	Color:	Red
C-b	Visibility:	Minimum angles: Up 15º Lo 15º In 45º Out 80º

9. High Mount Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One or more
B-b	Installation:	No portion of the lens shall be lower than 152 mm below the rear window on convertibles, or 77 mm on other passenger cars.
C-a	Color:	Red
C-b	Visibility:	N/R

10. Turn Signal Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Front:	Two
		Rear:	Two
B-b	Installation:	The lamp center shall be located not more than 1.5 m from the ground.	
C-a	Color:	Front:	White or amber
		Rear:	Red or amber
C-b	Visibility:	Minimum angles:	Up 15º Lo 15º In 45º Out 80º

11. Backup Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Not more than two
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	N/R

12. Reflex Reflectors

A.	Application:	Passenger cars
B-a	Equipment:	Rear: Two or more
B-b	Installation:	The lamp center shall be located not more than 1.5 m from the ground.
C-a	Color:	Red
C-b	Visibility:	N/R

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	N/R
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps	N/R
15. Parking Lamp	N/R

Economy: Papua New Guinea
Title of Standard: Motor Traffic Act - Chapter 243

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The distance between the center of the vehicle and lamp shall not be less than 600 mm apart.
C-a	Color:	White
C-b	Visibility:	N/R

2. Daytime Running Lamps N/R

3. Front Fog-lamps N/R

4. Rear Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The vertical center line of lamp shall not exceed 300 mm from the outer extremity of a motor vehicle. A lamp shall not be mounted higher than 1.5 m from the ground.
C-a	Color:	White or amber
C-b	Visibility:	N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two or more
B-b	Installation:	Tail lamps shall be mounted one each side of the center line at the rear, and not be more than 300 mm from the outer extremity of the vehicle, and be mounted no higher than 1.5 m from the ground
C-a	Color:	Red
C-b	Visibility:	A red light shall be visible from a distance of 200 m.

8. Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	Lamp shall be mounted no higher than 1.5m from the ground.
C-a	Color:	Red
C-b	Visibility:	N/R

9. High Mount stop Lamps N/R

10. Turn Signal Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Front;	two
		Rear;	two
B-b	Installation:	Lamps shall be mounted no higher than 1.5 m from the ground.	
C-a	Color:	Front;	white or amber
		Rear;	amber
C-b	Visibility:	N/R	

11. Backup Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Motor vehicle may be equipped with not more than two lamps
B-b	Installation:	N/R
C-a	Color:	amber
C-b	Visibility:	N/R

12. Reflex Reflectors

A.	Application:	Passenger cars	
B-a	Equipment:	Rear;	two or more
B-b	Installation:	As nearly as practicable towards the rear corners of the vehicle	
C-a	Color:	Red	
C-b	Visibility:	N/R	

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	One
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps

A.	Application:	Passenger cars
B-a	Equipment:	N/R
B-b	Installation:	N/R
C-a	Color:	White or amber
C-b	Visibility:	N/R

15. Parking Lamps N/R

Economy: Philippines
Title of Standard: S14 f-AO

1. Headlamps

A. Application: Passenger car
B-a Equipment: Two
B-b Installation: N/R
C-a Color: White or yellow
C-b Visibility: N/R

2. Daytime Running Lamps N/R

3. Front Fog Lamps N/R

4. Rear Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps N/R

7. Rear Position Lamps (Tail Lamps) N/R

8. Stop Lamps

A. Application: Passenger car
B-a Equipment: At least one
B-b Installation: N/R
C-a Color: Red
C-b Visibility: N/R

9. High Mount Stop Lamp N/R

10. Turn Signal Lamps N/R

11. Backup Lamps N/R

12. Reflex Reflectors

A. Application: Passenger car
B-a Equipment: Every motor vehicle shall be provided at all times with built-in reflectors or other similar warning devices at its front and back.
B-b Installation: N/R
C-a Color: N/R
C-b Visibility: N/R

13. License Plate Lamp

A. Application: Passenger car

B-a Equipment: One
B-b Installation: N/R
C-a Color: White
C-b Visibility: N/R

14. Side Marker Lamps N/R

15. Parking Lamps

A. Application: Passenger car
B-a Equipment: The parking lights or flares shall be displayed at a corner of the vehicle.
B-b Installation: N/R
C-a Color: N/R
C-b Visibility: N/R

Economy: Singapore
Title of Standard: The Motor Vehicles (Construction and Use) Rules, 1974

1. Headlamps

A.	Application:	Passenger car
B-a	Equipment:	Two
B-b	Installation:	The lamp center shall be mounted no higher than 1.5 m from the ground. The lamps shall be fitted not more than 400 mm from the outermost part of the illuminated surface to the outermost part of the vehicle.
C-a	Color:	White
C-b	Visibility:	N/R

2. Daytime Running Lamps N/R

3. Front Fog Lamps N/R

4. Front Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps

A.	Application:	Passenger car
B-a	Equipment:	Two
B-b	Installation:	The lamp center shall be mounted no higher than 1.5 m from the ground. The lamps shall be fitted not more than 400 mm from the outermost part of the illuminated surface to the outermost part of the vehicle.
C-a	Color:	White or amber (if lamp was combined with turn signal lamp)
C-b	Visibility:	N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger car
B-a	Equipment:	Two
B-b	Installation:	The lamp center shall be mounted no higher than 1.5 m from the ground. The lamps shall be fitted not more than 400 mm from the outermost part of the illuminated surface to the outermost part of the vehicle.
C-a	Color:	Red
C-b	Visibility:	N/R

8. Stop Lamps

A.	Application:	Passenger car
B-a	Equipment:	Two
B-b	Installation:	No part of the illuminated area shall be less than 0.4 m or more than 1 m above the ground. The lamps shall be fitted not more than 400 mm from the outermost part of the illuminated surface to the outermost part of the vehicle.
C-a	Color:	Red

C-b Visibility: N/R

9. High Mount Stop Lamp N/R

10. Turn Signal Lamps

A.	Application:	Passenger car	
B-a	Equipment:	Front:	Two
		Rear:	Two
B-b	Installation:		
	Front:	The illuminated area shall be mounted no higher than 1.5 m from the ground.	
		The lamps shall be fitted not more than 400 mm from the outermost part of the illuminated surface to the outermost part of the vehicle.	
C-a	Color:	Amber (if it shows only to the front and rear)	
		Amber or white (if it shows only to the front)	
		Amber or red (if it shows only to the rear)	
C-b	Visibility:	N/R	

11. Backup Lamps N/R

12. Reflex Reflectors N/R

13. License Plate Lamp

A.	Application:	Passenger car
B-a	Equipment:	One or two
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps N/R

15. Parking Lamp N/R

Economy: Chinese Taipei
Title of Standard: Road Traffic Safety Standard, Annex 7

1. Headlamps

A.	Application:	Passenger car
B-a	Equipment:	Two or four
B-b	Installation:	The center of lamp shall be located not more than 1.4 m above the ground. The outermost edge of the lamp shall be mounted within 400 mm from the outermost edge of the vehicle.
C-a	Color:	White or pale light yellow
C-b	Visibility:	N/R

2. Daytime Running Lamps N/R

3. Front Fog Lamps

A.	Application:	Passenger car
B-a	Equipment:	Two (optional)
B-b	Installation:	The fog lamp shall be fitted below the headlamp.
C-a	Color:	White, yellow or pale light yellow
C-b	Visibility:	N/R

4. Rear Fog Lamps

A.	Application:	Passenger car	
B-a	Equipment:	Rear:	One or two (optional)
B-b	Installation:	The fog lamp shall be fitted below the headlamp.	
C-a	Color:	Rear:	Red
C-b	Visibility:	N/R	

5. Cornering Lamps N/R

6. Front Position Lamps

A.	Application:	Passenger car
B-a	Equipment:	N/R
B-b	Installation:	The center of lamp shall be located not more than 2.0 m above the ground.
C-a	Color:	White, light yellow, amber or red
C-b	Visibility:	N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger car
B-a	Equipment:	N/R
B-b	Installation:	The center of lamp shall be located not more than 2.0 m above the ground. The distance between the tail lamps of the each sides shall be greater than 1/4 of the vehicle width. The outermost edge of the lamp shall be mounted within 400 mm from the outermost edge of the vehicle.

C-a Color: Red
C-b Visibility: N/R

8. Stop Lamps

A. Application: Passenger car
B-a Equipment: N/R
B-b Installation: The center of lamp shall be located not more than 2.0 m above the ground.
The distance between the stop lamps of the each sides hall be greater than 1/4 of the vehicle width.
The outermost edge of the lamp shall be mounted within 400 mm from the outermost edge of the vehicle.
C-a Color: Red
C-b Visibility: N/R

9. High Mount Stop Lamps

A. Application: Passenger cars
B-a Equipment: One
B-b Installation: The high mount stop lamp shall be fitted above the stop lamp.
C-a Color: Red
C-b Visibility: N/R

10. Turn Signal Lamps

A. Application: Passenger car
B-a Equipment: N/R
B-b Installation: The center of lamp shall be located not more than 2.3 m above the ground.
The distance between the turn signal lamps of the each sides shall be greater than 1/2 of the vehicle width.
C-a Color: Front: Orange or yellow
Rear: Orange, yellow or red
C-b Visibility: N/R

10.1 Hazard Warning Lamps

A. Application: Passenger car
B-a Equipment: N/R
B-b Installation: The centers of lamp shall be located not more than 2.3 m above the ground.
The distance between the turn signal lamps of the each sides shall be greater than 1/2 of the vehicle width.
C-a Color: Front: Orange or yellow
Rear: Red
C-b Visibility: N/R

11. Backup Lamps

A. Application: Passenger car
B-a Equipment: One or two
B-b Installation: The center of lamp shall be located not more than 1.2 m above the ground.

C-a Color: White
C-b Visibility: N/R

12. Reflex Reflectors N/R

13. License Plate Lamp

A. Application: Passenger car
B-a Equipment: N/R
B-b Installation: To illuminate the plate from top, bottom or sides.
C-a Color: White
C-b Visibility: N/R

14. Side Marker Lamps N/R

15. Parking Lamp N/R

Economy: Thailand
Title of Standard: Item No. 16 Vehicle Lighting Installation
Ministerial Regulation No. 22

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	Two or four high beam head lamps and two low beam head lamps
B-b	Installation:	
	High beam;	The lamp shall be fixed at a height of not more than 1.35 m nor less than 40 cm from the ground.
	Low beam;	The lamp shall be fixed at a height of not more than 1.35 m nor less than 40 cm from the ground and not more than 40 cm from the outer edge of the vehicle.
C-a	Color:	White or yellow
C-b	Visibility:	N/R

2. Daytime Running Lamps N/R

3. Front Fog lamps

A.	Application:	Passenger cars
B-a	Equipment:	(Optional) Not more than two
B-b	Installation:	The lamps can be fitted at a height not less than 25cm from the ground below the low beam head lamps.
C-a	Color:	White or yellow
C-b	Visibility:	The focus of the illuminated area of the fog light shall not be less than 2 degree below the horizontal line from the lamp.

4. Rear Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The lamps shall not exceed 40 cm from the outer edge of the vehicle and at a height of not more than 2.10 m nor less than 35 cm from the ground.
C-a	Color:	White or yellow
C-b	Visibility:	N/R

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two or four or six in case of the vehicle width more than 2.10m

B-b Installation: The lamps shall be fitted at a height of not more than 2.10 m nor less than 35
cm from the ground.
The outermost lamp shall be not exceeding 40 cm from the outer edge of the vehicle.
C-a Color: Red
C-b Visibility: N/R

8. Stop Lamps

A. Application: Passenger cars
B-a Equipment: Two or four
B-b Installation: The lamps shall be fitted at a height of not more than 2.10 m nor less than 35 cm from the ground.
The outermost lamp shall be not exceeding 40 cm from the outer edge of the vehicle.
C-a Color: Red
C-b Visibility: N/R

9. High Mount Stop Lamp

A. Application: Passenger cars
B-a Equipment: One (Optional)
B-b Installation: The lamp shall be fitted at a height of not less than 35 cm from the ground.
C-a Color: Red
C-b Visibility: N/R

10. Turn Signal Lamps

A. Application: Passenger cars
B-a Equipment: Front; Two
Rear; Two or four or six in case of the vehicle width > 2.10m

B-b Installation: The outermost lamp shall not be exceeding 40 cm from the edge of the vehicle.
The lowest lamp shall be fitted at a height of not more than 2.10 m nor less than 35 cm from the ground.
C-a Color: Front; Side Yellow
Rear; Red or yellow
C-b Visibility: N/R

11. Backup Lamps

A. Application: Passenger cars
B-a Equipment: Not more than two
B-b Installation: The lamp shall be fitted at a height of not more than 2.10 m nor less than 25
cm from the ground.
C-a Color: White

C-b Visibility: N/R

12. Reflex Reflectors

A. Application: Passenger cars
B-a Equipment: Two or four
B-b Installation: The reflector shall be fitted at a height of not more than 1.40 m nor less than
40 cm from the ground.
The outermost reflector shall not be exceeding 40 cm from the edge of the vehicle.
C-a Color: Red
C-b Visibility: Can see ≥ 1.50m in night time

13. License Plate Lamp

A. Application: Passenger cars
B-a Equipment: One or two
B-b Installation: The lamp shall be fitted above, below or on either side of the rear plate.
C-a Color: White
C-b Visibility: N/R

14. Side Marker Lamps

A. Application: Passenger cars
B-a Equipment: Front; Two(Optional)
Rear; Two(Optional)
Side ; Two(Optional) in case of the vehicle length more than 7.5m

B-b Installation: The lamp shall be fitted at a height of not more than 2.10 m nor less than 35
cm from the ground.
C-a Color: Yellow or red(in case the beam of the lamps directs rearwards)
C-b Visibility: N/R

15. Parking Lamps N/R

Economy: USA
Title of Standard: Federal Motor Vehicle Safety Standard No. 108

1. Headlamps

A.	Application:	Passenger cars
B-a	Equipment:	Two or four
B-b	Installation:	The height above the road surface measured from the center of the headlamp shall not be less than 22 inches nor more than 54 inches. The headlamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	White
C-b	Visibility:	N/R

2. Daytime Running Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	(Optional) Two	
B-b	Installation:	Headlamp (low):	Not less than 22" nor more than 54"
		Headlamp High):	Not more than 34"
		Turn signal:	Not less than 15" nor more than 83"
		Individual:	Not more than 42"
C-a	Color:	White	
C-b	Visibility:	N/R	

3. Front Fog Lamps N/R

4. Rear Fog Lamps N/R

5. Cornering Lamps N/R

6. Front Position Lamps N/R (Refer to Parking Lamps)

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 72 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	Red
C-b	Visibility:	The lamp must provide an unobstructed projected illuminated area of outer lens surface at least 2 square inches in extent measured at 45 degrees to the longitudinal axis of the vehicle.

8. Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 72 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	Red
C-b	Visibility:	The lamp must provide an unobstructed projected illuminated area of outer lens surface at least 2 square inches in extent measured at 45 degrees to the longitudinal axis of the vehicle.

9. High Mount Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One
B-b	Installation:	The lamps shall be mounted on the vertical center line. No portion of the lens shall be lower than 6 inches below the rear window on convertible, or 3 inches on other passenger cars.
C-a	Color:	Red
C-b	Visibility:	The lamp shall have a signal visible to the rear through a horizontal angle from 45 degrees to 45 degrees to the right of the longitudinal axis of the vehicle.

10. Turn Signal Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Front: Two Rear: Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 83 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	Front: Amber Rear: Amber or red
C-b	Visibility:	The lamp must provide an unobstructed projected illuminated area of outer lens surface at least 12.5 square centimeters in extent measured at 45 degrees to the longitudinal axis of the vehicle.

11. Backup Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One or two
B-b	Installation:	N/R
C-a	Color:	White
C-b	Visibility:	The optical center of the lens surface shall be visible from any eye point elevation from two to six feet above the horizontal plane on which the vehicle is standing, and from any position in the area rearward of a vertical plane, perpendicular to the longitudinal axis of the vehicle tree

feet to the rear of the vehicle, and extending three feet beyond each side of the vehicle

12. Reflex Reflectors

A.	Application:	Passenger cars	
B-a	Equipment:	Front side:	Two
		Rear:	Two
		Rear side:	Two
B-b	Installation:		
	Rear:	The reflector shall be mounted on each side of the vertical center line at the same height and as far apart as practicable.	
	F & R side:	The reflector shall be mounted as far to the front as practicable, and as far to the rear as practicable.	
C-a	Color:	Front side:	Amber
		Rear & Rear side:	Red
C-b	Visibility:	N/R	

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	One
B-b	Installation:	The rear license plate shall be illuminated from the top or sides.
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps N/R

A.	Application:	Passenger cars	
B-a	Equipment:	Front:	Two
		Rear:	Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches. The amber lamp shall be mounted as far to the front as practicable. The red lamp shall be mounted as far to the rear as practicable.	
C-a	Color:	Front: Amber	
		Rear: Red	
C-b	Visibility:	N/R	

15. Parking Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	The height above the road surface measured from the center of the lamp shall not be less than 15 inches nor more than 72 inches. The lamps shall be mounted at the same height and as far apart as practicable.
C-a	Color:	White or amber
C-b	Visibility:	N/R

Economy: ECE

Title of Standard: ECE No. 48

1. Headlamps

A.	Application:	Passenger cars	
B-a	Equipment:	Main-beam:	Two or four
		Dipped-beam:	Two
B-b	Installation:		
	Main-beam:	N/R	
	Dipped-beam:		
	In width:	the edge of the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall be not more than 400 mm from the extreme outer edge of the vehicle. The inner edge of the apparent surfaces in the direction of the reference axis shall be not less than 600 mm apart. This distance may be reduced to 400 mm where the overall width of the vehicle is less than 1,300 mm.	
	In height:	not less than 500 mm and not more than 1,200 mm above the ground.	
C-a	Color:	Main-beam:	White
		Dipped-beam:	White
C-b	Visibility:		
	Main-beam:	The visibility of the illuminating surface must be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5 degrees with the axis of reference of the headlamp. The origin of the angles of geometric visibility is the perimeter of the projection of the illuminating surface on a transverse plane tangent to the foremost part of the lens of the headlamp.	
	Dipped-beam:	15 degrees upwards and 10 degrees downwards 45 degrees outwards and 10 degrees inwards	

2. Daytime Running Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	(Optional) Two	
B-b	Installation:		
	In width:	that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm (400 mm, if the overall width of the vehicle is less than 1,300 mm).	
	In height:	not less than 250 mm not more than 1,500 mm.	
C-a	Color:	White	
C-b	Visibility:	Horizontal:	20 degrees outwards and 20 degrees inwards.
		Vertical:	10 degrees upwards and 10 degrees downwards.

3. Front Fog Lamps

A.	Application:	Passenger cars
B-a	Equipment:	(Optional) Two
B-b	Installation:	
	In width:	that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal shall not be more than 400 mm from the extreme outer edge of the vehicle.
	In height:	not less than 250 mm above the ground. No point on the apparent surface in the direction of the reference axis must be higher than the highest point on the apparent surface in the direction of the reference axis of the dipped-beam headlamp.
C-a	Color:	White
C-b	Visibility:	5 degrees upwards and 5 degrees downwards 45 degrees outwards and 10 degrees inwards

4. Rear Fog Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One or two
B-b	Installation:	
	In width:	if there is only one rear fog-lamp, it must be on the opposite side of the median longitudinal plane of the vehicle to the direction of traffic prescribed in the country of registration, the centre of reference may also be situated on the median longitudinal plane of the vehicle.
	In height:	not less than 250 mm nor more than 1,000 mm above the ground.
C-a	Color:	Red
C-b	Visibility:	5 degrees upwards and 5 degrees downwards 25 degrees to right and to left

5. Cornering Lamps N/R

6. Front Position Lamps

A.	Application:	Passenger cars
B-a	Equipment:	Two
B-b	Installation:	
	In width:	that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm (400 mm, if the overall width of the vehicle is less than 1,300 mm).
	In height:	not less than 350 mm not more than 1,500 mm.
C-a	Color:	White
C-b	Visibility:	Horizontal angle: 45 degrees inwards and 80 degrees outwards. Vertical angle: 15 degrees above and below the horizontal.

The vertical angle below the horizontal may be reduced to 5 degrees in the case of lamps less than 750 mm above the ground.

7. Rear Position Lamps (Tail Lamps)

A.	Application:	Passenger cars	
B-a	Equipment:	Two	
B-b	Installation:		
	In width:	that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The distance between inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm (400 mm, if the overall width of the vehicle is less than 1,300 mm).	
	In height:	not less than 350 mm not more than 1,500 mm.	
C-a	Color:	Red	
C-b	Visibility:	Horizontal :	45 degrees inwards and 80 degrees outwards.
		Vertical:	15 degrees above and below the horizontal. (5 degrees in the case of lamps less than 750 mm above the ground).

8. Stop Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Two	
B-b	Installation:		
	In width:	not less than 600 mm apart. This distance may be reduced to 400 mm if the overall width of the vehicle is less than 1,300 mm.	
	In height:	not less than 350 mm nor more than 1,500 mm (2,100 mm if the shape of the bodywork makes it impossible to keep within 1,500 mm)	
C-a	Color:	Red	
C-b	Visibility:	Horizontal angle:	45 degrees to the left and to the right of the longitudinal axis of the vehicle
		Vertical angle:	15 degrees. above and below the horizontal (5 deg., if the height of the lamp is less than 750 mm)

9. High Mount Stop Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One
B-b	Installation:	
	In width:	the center of reference shall be situated on the median longitudinal plane of the vehicle.
	In height:	the horizontal plane tangential to the lower edge of the apparent surface

shall either not be more than 150 mm below the horizontal plane tangential to the lower edge of the exposed surface of the glass, or not be less than 850 mm above the ground.

C-a	Color:	Red	
C-b	Visibility:	Horizontal angle:	10 degrees to the left and to the right of the longitudinal axis of the vehicle
		Vertical angle:	10 degrees above and 5 deg. below the horizontal

10. Turn Signal Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Front:	Two
		Rear:	Two
		Side:	Two
B-b	Installation:		
	In width:	the edge of the apparent surface in the direction of the reference axis farthest	
		from the median longitudinal plane of the vehicle must not be more than 400 mm from the extreme outer edge of the vehicle.	
		The distance between the inner edges of the two apparent surfaces in the direction of the reference axis shall not be less than 600 mm.	
		This distance may be reduced to 400 mmm where the overall width of the vehicle is less than 1,300 mm.	
	In height:	the height of the lamps shall not be less than 350 mm or more than 1,500 mm.	
C-a	Color:	Front:	Amber
		Rear:	Amber
C-b	Visibility:	Horizontal:	80 degrees outwards and 45 degrees inwards for the front and rear direction indicator lamp.
			60 degrees outwards for the side direction lamp(*1).
	Vertical:	15 degrees above and below the horizontal	
		(5 degrees if the lamps are less than 750 mm above the ground)	
		(*1): The value of 5 degrees for the dead angle of visibility to the rear of the side direction indicator is upper limit.	

11. Backup Lamps

A.	Application:	Passenger cars
B-a	Equipment:	One or two
B-b	Installation:	
	In height:	not less than 250 mm nor more than 1,200 mm above the ground.
C-a	Color:	White
C-b	Visibility:	15 degrees upwards and 5 degrees downwards
		45 degrees to right and to left if there is only one light,
		45 degrees outwards and 30 degrees inwards if there are two.
		In case of fog lamps approved to Regulation No. 19:
		5 degrees upwards and downwards
		45 degrees outwards and inwards if there is only one lamp
		45 degrees outwards and 10 degrees inwards if there are two lamp

12. Reflex Reflectors

A.	Application:	Passenger cars	
B-a	Equipment:	Front:	(mandatory) Two
		Rear:	(mandatory) Two
		Side:	(Optional)
B-b	Installation:		
	Front and rear:		
	In width:	that point on the illuminating surface which is farthest from the vehicle's median longitudinal plane shall not be more than 400 mm from the extreme outer edge of the vehicle. The inner edge of the retro reflector shall not be less than 600 mm apart (400 mm, if the overall width of the vehicle is less than 1,300 mm).	
	In height:	not less than 250 mm nor more than 900 mm.	
	Side:		
	In height:	not less than 250 mm nor more than 900 mm.	
	In length:	at least one side retro-reflector must be fitted to the middle third of the vehicle, the foremost side retro-reflector being not further than 3 m from the front. The distance between two adjacent side retro-reflectors shall not exceed 3 m. The distance between the rearmost side retro-reflector and the rear of the vehicle shall not exceed 1 m.	
C-a	Color:	Front:	Amber
		Rear:	Red
		Side:	Amber (the rearmost side retro-reflector can be red if it has part of the other lamp)
C-b	Visibility:		
	Front and rear:	Horizontal angle:	30 degrees inwards and outwards.
		Vertical angle:	15 degrees above and below the horizontal. (5 degrees, in case of a retro-reflector less than 750 mm above the ground).
	Side:	Horizontal angle:	45 degrees to the front and to the rear.
		Vertical angle:	15 degrees above and below the horizontal. (5 degrees, in case of a retro-reflector less than 750 mm above the ground).

13. License Plate Lamp

A.	Application:	Passenger cars
B-a	Equipment:	N/R
B-b	Installation:	The device illuminates the site of the registration plate.
C-a	Color:	White
C-b	Visibility:	N/R

14. Side Marker Lamps

A.	Application:	Passenger cars	
B-a	Equipment:	Front:	(Optional) Two
		Rear:	(Optional) Two
B-b	Installation:		

	In height:	not less than 250 mm nor more than 1,500 mm.	
	In length:	at least one side marker lamp must be fitted to the middle third of the vehicle, the foremost side marker lamp being not further than 3 m from the front. The distance between two adjacent side marker lamp shall not exceed 3 m. The distance between the rearmost side marker lamp and the rear of the vehicle shall not exceed 1 m.	
C-a	Color:	Front:	Amber
		Rear:	Amber or Red(if it is incorporated with the rear position lamp, the stop lamp)
C-b	Visibility:	Horizontal angle:	45 degrees to the front and to the rear.
		Vertical angle:	10 degrees above and below the horizontal (5 degrees, in case of a side marker lamp less than 750 mm above the ground)

15. Parking Lamp

A.	Application:	Passenger cars	
B-a	Equipment:	two lamps at the front and two lamps at the rear, or one lamps on each side.	
B-b	Installation:		
	In width:	that point on the apparent surface in the direction of the reference axis which is farthest from the vehicle's median longitudinal plane of the shall not be more than 400 mm from the extreme outer edge of the vehicle. If there are two lamps, they shall be on the sides of the vehicle.	
	In height:	not less than 350 mm or more than 1,500 mm.	
C-a	Color:	Front:	White
		Rear:	Red or amber(if it is incorporated in the turn signal lamps or in the side-marker lamps)
C-b	Visibility:	Horizontal:	45 degrees outwards, forwards and rearwards.
		Vertical:	15 degrees above and below the horizontal (5 degrees, if height of the lamp is less than 750 mm).

ITEM 97-17

Headlamps

APEC Regulation Analysis Findings
Item No. 97-17: Headlamp

1. Australia is equivalent to FMVSS.
2. China and Korea are equivalent to the current ECE, but also include items complying with the former ECE.
3. In addition to its own regulation for headlamps, New Zealand accepts the corresponding regulations of Australia, Japan(including JIS), U.S., ECE and EEC as alternatives.
4. In addition to its own headlamp regulation, Australia recognizes the corresponding regulations of Australia, Japan(including JIS), U.S., ECE and EEC as alternatives.
5. Only Canada and U.S. set forth a marking requirement.
6. Other member economies have very few requirements for headlamps.
7. A comparison of specific requirements is as follows:

(1) Member economies--other than Australia, Canada, China, Japan, Korea, U.S., (and ECE)--do not separate running beam and passing beam requirements.

(2) Light Beam Distribution (C-a-1)
Australia, Canada, China, Japan, Korea, U.S., and ECE establish specific light distribution values. Regarding passing beams, Canada adopts U.S.-type requirements, while China and Korea the ECE-type.
Australia, Brunei, Hong Kong, Malaysia, New Zealand, Papua New Guinea, Singapore, Taiwan, and Thailand lack the specification of a maximum luminous intensity. However, New Zealand can specify luminous intensity, using alternative regulations.

(3) Beam Color (C-a-2)
If the color of headlamp beams is white, it is accepted by all member economies. Brunei, Canada, Malaysia, Papua New Guinea, Singapore, U.S., and ECE accept only white headlamp beams.

(4) Luminous Area (C-a-3)
Only Singapore specifies the luminous areas of headlamps. Hong Kong specifies that the right and left headlamps be the same in size. Many member economies require that the right and left headlamps be installed in symmetrical positions.

(5) Bulb Wattage (C-a-4)
Australia, Canada, China, U.S., Korea and ECE specify headlamp bulbs that can be used. Hong Kong and Singapore requires bulbs of 30W or more.

(6) Mechanical Requirements (C-a-5)
Canada and U.S. set forth requirements concerning the durability of headlamps. This is not the case for Brunei, Indonesia, Korea, New Zealand, Papua New Guinea, Singapore, Taiwan, and Thailand. Other member economies have durability requirements although not very specific.

(7) Visibility (C-b-1)
Australia, China, Hong Kong, Korea, Malaysia, and ECE adopt visible angle requirements, but the requirements of Hong Kong and Malaysia are not specific.

ITEM No. 97-17 (High Beam)Headlamp

«A : Application»→Passenger Car

Country	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area
Australia	ADR 46/00 (I max. : 30,000 to 150,000 cd)	ADR 46/00 and 13/00 (White)	N/R
Brunei	N/R	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Canada	Unique (H-V : 40,000 to 75,000 cd, See TSD 108, Similar to FMVSS 108)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Chile			
China	ECE R1, 2, 8 and 20	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Chinese Taipei	N/R	Unique (White, All headlamps same color, Lens should be colorless)	N/R
Hong Kong	N/R	SRRV 32	Unique (Same area emitted)
Indonesia	Unique (Min. 12,000 cd, Light up at 100 m front road)	Unique (White or pale yellow)	N/R
Japan	SRRV 32 (Max. 225,000 cd, Light up at 100 m front road)	SRRV 32 (White or selective yellow, All headlamps same color)	N/R
Korea	Unique (I max. : 30, 000 to 112,500 cd, Similar to ECE R20)	Unique (White or yellow, Identical on both side)	N/R
Malaysia	N/R	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Mexico			
New Zealand	Unique (Light up at least 50 m front of vehicle)	Unique (White or Amber)	N/R
Papua New Guinea	N/R	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Philippines	Unique (Min. 10,000 cd, Light up at 100 m front road)	Unique (White or yellow)	N/R
Singapore	Unique (Visible from a reasonable beam)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	Unique (Circular : Min. 50 mm diameter, Others : Min. 50 diameter and Min. 20 mm diameter inscribed therein)
Thailand	N/R	Unique (White or yellow, All headlamps same color)	N/R
USA	FMVSS 108 (H-V : 40,000 to 75,000 cd)	FMVSS 108 (White)	N/R
ECE	ECE R8, 20 and 98 etc. (R20 I max. : 30,000 to 150,000 cd)	ECE R8, 20, 98 and 48 etc. (White)	N/R

Country	C-a-4 Bulb Wattage	C-a-5 Mechanical
Australia	ADR 46/00 and 51/00 (H4 : 12V 60/55W)	ADR 46/00 (Vibration and Heat)
Brunei	N/R	N/R
Canada	ADR 46/00 and 51/00 FMVSS 108 ECE R20 and R37	FMVSS 108
Chile		
China	ADR 46/00 and 51/00 FMVSS 108 ECE R20 and R37	SRRV 32
Chinese Taipei	N/R	N/R
Hong Kong	Unique (Min. 30 W)	SRRV 32
Indonesia	N/R	SRRV 32
Japan	N/R	SRRV 32 (General)
Korea	ADR 46/00 and 51/00 FMVSS 108 ECE R20 and R37	N/R
Malaysia	N/R	SRRV 32
Mexico		
New Zealand	N/R	N/R
Papua New Guinea	N/R	N/R
Philippines	N/R	SRRV 32
Singapore	Unique (Min. 30 W)	N/R
Thailand	N/R	N/R
USA	FMVSS 108 (HB2 : 12V 60/55W)	FMVSS 108 (Abrasion, Chemical resistance, Corrosion, Dust, Temp. cycle, Internal heat, Humidity, Vibration, Sealing, Aiming adjustment, VHAD, Inward force, Torque deflection)
ECE	ECE R37 (H4 : 12V 60/55W)	ECE R8, R20 etc. (Vibration, Heat, and Plastic lens material)

Country	C-b Position	C-b-1 Visibility
Australia	ADR 13/00 (2, 4 or 6, Front of vehicle, Width : Not more than outermost edge of low beam)	ADR 13/00 (5 dig. U to 5 dig. D and 5 dig. L to 5 dig. R)
Brunei	Unique (Front of vehicle, Height : Max. 1.524 m, Same height, Width : Each side of vehicle center)	N/R
Canada	Unique (Front of vehicle, Height : 0.56 to 1.37 m, Same height, Width : Each side of vehicle center)	N/R
Chile		
China	Unique (2 or 4, Front of vehicle, Width : Less than width for low beam)	ADR 13/00 ECE R48
Chinese Taipei	Unique (2 or 4, Height : Max. 1.4 m, Width : Max. 0.4 m from vehicle edge, Symmetrically position)	N/R
Hong Kong	Unique (Front of vehicle, Height : Min. 0.6 m, Width : Max. 0.4 m from vehicle edge, Each side mounting)	Unique (From reasonable distance)
Indonesia	Unique (Even total number, Front of vehicle, Height : Max. 1.25 m, Width : Close to low beam)	N/R
Japan	SRRV 32 (2 or 4, Width : Symmetrically vehicle center)	N/R
Korea	Unique (Height : 0.5 to 1.2 m, Width : Symmetrically position)	ADR 13/00 ECE R48
Malaysia	Unique (Front of vehicle, Height : Max. 5 feet, Same height, Width : Min. space 12 inch for inner edge)	Unique (Reasonable distance)
Mexico		
New Zealand	Unique (2 or 4, Height : Same height, Width : Each side mounting, Equidistance from vehicle center)	N/R
Papua New Guinea	Unique (2 or 4, Height : Same height, Width : Each side mounting, Equidistance from vehicle center)	N/R
Philippines	Unique (2 or 4, Front of vehicle, Height : Max. 1.2 m, Width : Each side and symmetrically mounting)	N/R
Singapore	Unique (Matched pair of vehicle, Front of vehicle, Height : Max. 1.5 m, Width : Max. 0.4 m from outermost part of vehicle)	N/R
Thailand	Unique (2, Height : 0.4 to 1.35 m, Each side, Same level + height (Optional)	N/R
USA	FMVSS 108 (Front of vehicle, Height : 0.559 to 1.732 m, Same height, Width : Each side of the vehicle center)	N/R
ECE	ECE R48 (2 or 4, Front of vehicle)	ECE R48 (5 dig. U to 5 dig. D and 5 dig. L to 5 dig. R)

Country	C-b-2 Connection	D Markings	E Reference Standards Alternative Regulation
Australia	ADR 13/00 (High beam shall be switched off when low beam switched on)	N/R	ADR 46/00 (ECE R1, R5, R8, R20 and R31 JIS D5500 SAE J579c L/R reversed)
Brunei	N/R	N/R	N/A
Canada	N/R	Unique (DOT, Tradename/mark/number, Bulb category, Voltage, location of aiming pads)	Unique (CMVSS 108-1 ECE R8, R20, R31)
Chile			
China	ADR 13/00, ECE R48	N/R	N/A
Chinese Taipei	N/R	N/R	N/A
Hong Kong	ADR 13/00 ECE R48	Rated wattage	N/A
Indonesia	N/R	N/R	N/A
Japan	N/R	N/R	N/A
Korea	N/R	N/R	N/A
Malaysia	Unique (The beam of light emitted can be extinguished at the will of the driver by operation of a device, etc.)	N/R	N/A
Mexico			
New Zealand	N/R	N/R	Unique (ECE R1, R2, R5, R8, R20 and R31 76/761/EEC FMVSS 108 ADR 46/00 SRRV 32 JIS D5500)
Papua New Guinea	Unique (Equal light output, etc.)	N/R	N/A
Philippines	Unique (All headlamp lighted at the same time)	N/R	N/A
Singapore	Unique (Same light at other front lamp)	N/R	N/A
Thailand	Unique (At the same time as the rear lamps)	N/R	N/A
USA	N/R	FMVSS 108 (DOT, Tradename/mark/number, Bulb category, Voltage, location of aiming pads, Optical axis mark, Visual/Optical aiming mark)	N/A
ECE	ECE R48 (High beam shall be switched off when low beam switched on)	ECE R8, R20 etc. (Approval mark, Tradename/number, Bulb category, 12V lamp mark, etc.)	N/A

ITEM No. 97-17 (High Beam)Headlamp

«A : Application»→Passenger Car

Country	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area
Australia	ADR 46/00 (See S46.3.2)	ADR 46/00 and 13/00 (White)	N/R
Brunei	N/R	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Canada	Unique (See TSD No. 108 Fig. 26)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Chile			
China	Unique (See GB 4599-94, Fig. 3 or 4)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Chinese Taipei	N/R	Unique (White, All headlamps same color, Lens should be colorless)	N/R
Hong Kong	N/R	SRRV 32	Unique (Same area emitted)
Indonesia	Unique (Light up at least 40 m ahead)	Unique (White or pale yellow)	N/R
Japan	SRRV 32 (Shall not emit glare, Light up at least 40 m ahead)	SRRV 32 (White or selective yellow, All headlamps same color)	N/R
Korea	Unique (See table)	Unique (White or yellow, Identical on both side)	N/R
Malaysia	Unique (Light emitted is permanently deflected downwards, Incapable of dazzling any person)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Mexico			
New Zealand	Unique (Light up at least 50 m front of vehicle)	Unique (White or Amber)	N/R
Papua New Guinea	Unique (Light up at least 50 m front of vehicle)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Philippines	Unique (Min. 10,000 cd, Light up at 100 m front road)	Unique (White or yellow)	N/R
Singapore	Unique (Visible from a reasonable beam)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	Unique (Circular : Min. 50 mm diameter, Others : Min. 50 diameter and Min. 20 mm diameter inscribed therein)
Thailand	N/R	Unique (White or yellow, All headlamps same color)	N/R
USA	FMVSS 108 (See Fig. 26)	FMVSS 108 (White)	N/R
ECE	ECE R8, R20, R98 etc. (Annex 4 A to C, or Annex 3 A to C etc.)	ECE R8, 20, 98 and 48 etc. (White)	N/R

Country	C-a-4 Bulb Wattage	C-a-5 Mechanical
Australia	ADR 46/00 and 51/00 (H4 : 12V 60/55W)	ADR 46/00 (Vibration and Heat)
Brunei	N/R	N/R
Canada	ADR 46/00 and 51/00 FMVSS 108 ECE R20 and R37	FMVSS 108
Chile		
China	ADR 46/00 and 51/00 FMVSS 108 ECE R20 and R37	SRRV 32
Chinese Taipei	N/R	N/R
Hong Kong	Unique (Min. 30 W)	SRRV 32
Indonesia	N/R	SRRV 32
Japan	N/R	SRRV 32 (General)
Korea	N/R	N/R
Malaysia	N/R	SRRV 32
Mexico		
New Zealand	N/R	N/R
Papua New Guinea	N/R	N/R
Philippines	N/R	SRRV 32
Singapore	Unique (Min. 30 W)	N/R
Thailand	N/R	N/R
USA	FMVSS 108 (HB2 : 12V 60/55W)	FMVSS 108 (Abrasion, Chemical resistance, Corrosion, Dust, Temp. cycle, Internal heat, Humidity, Vibration, Sealing, Aiming adjustment, VHAD, Inward force, Torque deflection)
ECE	ECE R37 (H4 : 12V 60/55W)	ECE R8, R20 etc. (Vibration, Heat, and Plastic lens material)

Country	C-b Position	C-b-1 Visibility
Australia	ADR 13/00 (2, Front of vehicle, Height : 0.5 to 1.2 m, Width : Max. 0.4 m outer most edge of vehicle, Min. 0.6 m inner edge of each side low beam)	ADR 13/00 (15 dig. U to 10 dig. D and 10 dig. Inside to 45 dig. Outside)
Brunei	Unique (Front of vehicle, Height : Max. 1.524 m, Same height, Width : Each side of vehicle center)	N/R
Canada	Unique (Front of vehicle, Height : 0.56 to 1.37 m, Same height, Width : Each side of vehicle center)	N/R
Chile		
China	Unique (2, Front of vehicle, Height : 0.5 to 1.2 m, Width : Max. 0.4 m outer edge of vehicle, Min. 0.6 m inner edge of each side low beam)	ADR 13/00 ECE R48
Chinese Taipei	Unique (2 or 4, Height : Max. 1.4 m, Width : Max. 0.4 m from vehicle edge, Symmetrically position)	N/R
Hong Kong	Unique (Front of vehicle, Height : Min. 0.6 m, Width : Max. 0.4 m from vehicle edge, Each side mounting)	Unique (From reasonable distance)
Indonesia	Unique (2, Front of vehicle, Height : Max. 1.25 m, Width : Max. 0.4 m outermost side of vehicle)	N/R
Japan	SRRV 32 (2, Front of vehicle, Height : 0.5 to 1.2 m, Width : Max. 0.4 m outermost side of vehicle, Symmetrically vehicle center)	N/R
Korea	Unique (Height : 0.5 to 1.2 m, Width : Symmetrically position)	ADR 13/00 ECE R48
Malaysia	Unique (Front of vehicle, Height : Max. 5 feet, Same height, Width : Min. 12 inch beyond the center of such lamp)	Unique (Reasonable distance)
Mexico		
New Zealand	Unique (2 or 4, Height : Same height, Width : Each side mounting, Equidistant from vehicle center)	N/R
Papua New Guinea	Unique (2 or 4, Height : Same height mounting, Width : Equidistant from vehicle center)	N/R
Philippines	Unique (2 or 4, Front of vehicle, Height : Max. 1.2 m, Width : Each side mounting, Symmetrically position)	N/R
Singapore	Unique (Matched pair of vehicle, Front of vehicle, Height : Max. 1.5 m, Width : Max. 0.4 m outermost part of vehicle)	N/R
Thailand	Unique (2, Height : 0.4 to 1.35 m, Each side same level, Width : Max. 0.4 m outermost part of vehicle)	N/R
USA	FMVSS No. 108 (Front of vehicle, Height : 0.559 to 1.372 m, Same height mounting, Width : Each side of the vehicle center)	N/R
ECE	ECE R48 (2, Front of vehicle, Height : 0.5 to 1.2 m, Same height mounting, Width : Max. 0.4 m outer most edge of vehicle, Min. 0.6 m inner edge of each side low beam)	ECE R48 (15 dig. U to 10 dig. D and 10 dig. Inside to 45 dig. Outside)

Country	C-b-2 Connection	D Markings	E Reference Standards Alternative Regulation
Australia	ADR 13/00 (High beam shall be switched off when low beam switched on)	N/R	ADR 46/00 (ECE R1, R5, R8, R20 and R31 JIS D5500 SAE J579c L/R reversed)
Brunei	N/R	N/R	N/A
Canada	N/R	Unique (DOT, Tradename/mark/number, Bulb category, Voltage, location of aiming pads)	Unique (CMVSS 108-1 ECE R8, R20, R31)
Chile			
China	ADR 13/00 ECE R48	N/R	N/A
Chinese Taipei	N/R	N/R	N/A
Hong Kong	ADR 13/00 ECE R48	Rated wattage	N/A
Indonesia	N/R	N/R	N/A
Japan	N/R	N/R	N/A
Korea	N/R	N/R	N/A
Malaysia	Unique (The beam of light emitted can be extinguished at the will of the driver by operation of a device, etc.)	N/R	N/A
Mexico			
New Zealand	N/R	N/R	Unique (ECE R1, R2, R5, R8, R20 and R31 76/761/EEC FMVSS 108 ADR 46/00 SRRV 32 JIS D5500)
Papua New Guinea	Unique (Equal light output, etc.)	N/R	N/A
Philippines	Unique (All headlamp lighted at the same time)	N/R	N/A
Singapore	Unique (Same light at other front lamp)	N/R	N/A
Thailand	Unique (At the same time as the rear lamps)	N/R	N/A
USA	N/R	FMVSS 108 (DOT, Tradename/mark/number, Bulb category, Voltage, location of aiming pads, Optical axis mark, Visual/Optical aiming mark)	N/A
ECE	ECE R48 (High beam shall be switched off when low beam switched on)	ECE R8, R20 etc. (Approval mark, Tradename/number, Bulb category, 12V lamp mark, etc.)	N/A

ITEM No. 97-17 (Low Beam)Headlamp

«A : Application»→Passenger Car

Country	C-a-1 Photometry	C-a-2 Color	C-a-3 Luminous Area
Australia	ADR 46/00 (See S46.3.2)	ADR 46/00 and 13/00 (White)	N/R
Brunei	N/R	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Canada	Unique (See TSD No. 108 Fig. 26)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Chile			
China	Unique (See GB 4599-94, Fig. 3 or 4)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Chinese Taipei	N/R	Unique (White, All headlamps same color, Lens should be colorless)	N/R
Hong Kong	N/R	SRRV 32	Unique (Same area emitted)
Indonesia	Unique (Light up at least 40 m ahead)	Unique (White or pale yellow)	N/R
Japan	SRRV 32 (Shall not emit glare, Light up at least 40 m ahead)	SRRV 32 (White or selective yellow, All headlamps same color)	N/R
Korea	Unique (See table)	Unique (White or yellow, Identical on both side)	N/R
Malaysia	Unique (Light emitted is permanently deflected downwards, Incapable of dazzling any person)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Mexico			
New Zealand	Unique (Light up at least 50 m front of vehicle)	Unique (White or Amber)	N/R
Papua New Guinea	Unique (Light up at least 50 m front of vehicle)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	N/R
Philippines	Unique (Min. 10,000 cd, Light up at 100 m front road)	Unique (White or yellow)	N/R
Singapore	Unique (Visible from a reasonable beam)	ADR 46/00 and 13/00 FMVSS 108 ECE R8, 20, 98 and 48 etc.	Unique (Circular : Min. 50 mm diameter, Others : Min. 50 diameter and Min. 20 mm diameter inscribed therein)
Thailand	N/R	Unique (White or yellow, All headlamps same color)	N/R
USA	FMVSS 108 (See Fig. 26)	FMVSS 108 (White)	N/R
ECE	ECE R8, R20, R98 etc. (Annex 4 A to C, or Annex 3 A to C etc.)	ECE R8, 20, 98 and 48 etc. (White)	N/R

ITEM No. 97-17 (Low Beam)Headlamp

Country	C-a-4 Bulb Wattage	C-a-5 Mechanical
Australia	ADR 46/00 and 51/00 (H4 : 12V 60/55W)	ADR 46/00 (Vibration and Heat)
Brunei	N/R	N/R
Canada	ADR 46/00 and 51/00 FMVSS 108 ECE R20 and R37	FMVSS 108
Chile		
China	ADR 46/00 and 51/00 FMVSS 108 ECE R20 and R37	SRRV 32
Chinese Taipei	N/R	N/R
Hong Kong	Unique (Min. 30 W)	SRRV 32
Indonesia	N/R	SRRV 32
Japan	N/R	SRRV 32 (General)
Korea	N/R	N/R
Malaysia	N/R	SRRV 32
Mexico		
New Zealand	N/R	N/R
Papua New Guinea	N/R	N/R
Philippines	N/R	SRRV 32
Singapore	Unique (Min. 30 W)	N/R
Thailand	N/R	N/R
USA	FMVSS 108 (HB2 : 12V 60/55W)	FMVSS 108 (Abrasion, Chemical resistance, Corrosion, Dust, Temp. cycle, Internal heat, Humidity, Vibration, Sealing, Aiming adjustment, VHAD, Inward force, Torque deflection)
ECE	ECE R37 (H4 : 12V 60/55W)	ECE R8, R20 etc. (Vibration, Heat, and Plastic lens material)

ITEM No. 97-17 (Low Beam)Headlamp

Country	C-b Position	C-b-1 Visibility
Australia	ADR 13/00 (2, Front of vehicle, Height : 0.5 to 1.2 m, Width : Max. 0.4 m outer most edge of vehicle, Min. 0.6 m inner edge of each side low beam)	ADR 13/00 (15 dig. U to 10 dig. D and 10 dig. Inside to 45 dig. Outside)
Brunei	Unique (Front of vehicle, Height : Max. 1.524 m, Same height, Width : Each side of vehicle center)	N/R
Canada	Unique (Front of vehicle, Height : 0.56 to 1.37 m, Same height, Width : Each side of vehicle center)	N/R
Chile		
China	Unique (2, Front of vehicle, Height : 0.5 to 1.2 m, Width : Max. 0.4 m outer edge of vehicle, Min. 0.6 m inner edge of each side low beam)	ADR 13/00 ECE R48
Chinese Taipei	Unique (2 or 4, Height : Max. 1.4 m, Width : Max. 0.4 m from vehicle edge, Symmetrically position)	N/R
Hong Kong	Unique (Front of vehicle, Height : Min. 0.6 m, Width : Max. 0.4 m from vehicle edge, Each side mounting)	Unique (From reasonable distance)
Indonesia	Unique (2, Front of vehicle, Height : Max. 1.25 m, Width : Max. 0.4 m outermost side of vehicle)	N/R
Japan	SRRV 32 (2, Front of vehicle, Height : 0.5 to 1.2 m, Width : Max. 0.4 m outermost side of vehicle, Symmetrically vehicle center)	N/R
Korea	Unique (Height : 0.5 to 1.2 m, Width : Symmetrically position)	ADR 13/00 ECE R48
Malaysia	Unique (Front of vehicle, Height : Max. 5 feet, Same height, Width : Min. 12 inch beyond the center of such lamp)	Unique (Reasonable distance)
Mexico		
New Zealand	Unique (2 or 4, Height : Same height, Width : Each side mounting, Equidistant from vehicle center)	N/R
Papua New Guinea	Unique (2 or 4, Height : Same height mounting, Width : Equidistant from vehicle center)	N/R
Philippines	Unique (2 or 4, Front of vehicle, Height : Max. 1.2 m, Width : Each side mounting, Symmetrically position)	N/R
Singapore	Unique (Matched pair of vehicle, Front of vehicle, Height : Max. 1.5 m, Width : Max. 0.4 m outermost part of vehicle)	N/R
Thailand	Unique (2, Height : 0.4 to 1.35 m, Each side same level, Width : Max. 0.4 m outermost part of vehicle)	N/R
USA	FMVSS No. 108 (Front of vehicle, Height : 0.559 to 1.372 m, Same height mounting, Width : Each side of the vehicle center)	N/R
ECE	ECE R48 (2, Front of vehicle, Height : 0.5 to 1.2 m, Same height mounting, Width : Max. 0.4 m outer most edge of vehicle, Min. 0.6 m inner edge of each side low beam)	ECE R48 (15 dig. U to 10 dig. D and 10 dig. Inside to 45 dig. Outside)

ITEM No. 97-17 (Low Beam)Headlamp

Country	C-b-2 Connection	D Markings	E Reference Standards Alternative Regulation
Australia	ADR 13/00 (High beam shall be switched off when low beam switched on)	N/R	ADR 46/00 (ECE R1, R5, R8, R20 and R31 JIS D5500 SAE J579c L/R reversed)
Brunei	N/R	N/R	N/A
Canada	N/R	Unique (DOT, Tradename/mark/number, Bulb category, Voltage, location of aiming pads)	Unique (CMVSS 108-1 ECE R8, R20, R31)
Chile			
China	ADR 13/00 ECE R48	N/R	N/A
Chinese Taipei	N/R	N/R	N/A
Hong Kong	ADR 13/00 ECE R48	Rated wattage	N/A
Indonesia	N/R	N/R	N/A
Japan	N/R	N/R	N/A
Korea	N/R	N/R	N/A
Malaysia	Unique (The beam of light emitted can be extinguished at the will of the driver by operation of a device, etc.)	N/R	N/A
Mexico			
New Zealand	N/R	N/R	Unique (ECE R1, R2, R5, R8, R20 and R31 76/761/EEC FMVSS 108 ADR 46/00 SRRV 32 JIS D5500)
Papua New Guinea	Unique (Equal light output, etc.)	N/R	N/A
Philippines	Unique (All headlamp lighted at the same time)	N/R	N/A
Singapore	Unique (Same light at other front lamp)	N/R	N/A
Thailand	Unique (At the same time as the rear lamps)	N/R	N/A
USA	N/R	FMVSS 108 (DOT, Tradename/mark/number, Bulb category, Voltage, location of aiming pads, Optical axis mark, Visual/Optical aiming mark)	N/A
ECE	ECE R48 (High beam shall be switched off when low beam switched on)	ECE R8, R20 etc. (Approval mark, Tradename/number, Bulb category, 12V lamp mark, etc.)	N/A

Country :

Australia

Title of Standard :

3rd Australia Design Rule 46/00

A : Application :

Passenger car

C-a-1 : Photometry :

Bulb category	Note
H1, H2, H3, HB3, HB4, H7, H8	Single filament type
H4	Double filament type

3rd ADR 46/00		
Unit: lx		
Lefthand Traffic High Beam		
Test Point	Max.	Min.
		0.8*Emax
E max	240.0	48.0
	16*75L	
1.125m TO THE LEFT		24.0
1.125m TO THE RIGHT		24.0
2.25m TO THE LEFT		6.0
2.25m TO THE RIGHT		6.0
Lefthand Traffic Low Beam		
Test Point	Max.	Min.
B50R	0.40	
75L		12.00
75R	12.00	
50R	15.00	
50L		12.00
50V		6.00
25R		2.00
25L		2.00
Zone 1	2*E50L	
Zone 3	0.70	
Zone 4		3.00

Note : For location of test points, please refer to 3rd ADR 46/00 Section 46.3.2

C-a-2 : Color :

White

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

3rd ADR 51/00

C-a-5 : Mechanical :

Vibration

Test of stability of photometric performance (Clean headlamp)

Test of stability of photometric performance (Dirty headlamp)

Test for change in vertical position of the cut-off line under the influence of heat

C-b : Position :

3rd ADR 13/00

High-beam :

Two, four or six

On the front

Not more than outermost edge of low beam

Low-beam :

Two

On the front

Width : Not more than 400 mm from the extreme outer edge of the vehicle

Not less than 600 mm apart from inner edges of apparent surface in the direction of the reference axes

Height : Not less than 500 mm and not more than 1,200 mm above the ground

C-b-1 : Visibility :

High-beam :

Horizontal : 5 dig. inboard and 5 dig. outboard form reference center

Vertical : 5 dig. above and 5 dig. below form reference center

Low-beam

Horizontal : 10 dig. inboard and 45 dig. outboard form reference center

Vertical : 15 dig. above and 10 dig. below form reference center

C-b-2 : Electrical Connection :

For changing over from the high-beam to the low-beam all high-beam headlamps shall be switched off simultaneously

The low-beams may remain switched on at the same time as the high-beam

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

ECE Uniform Regulation No. 1-01

ECE Uniform Regulation No. 5-02

ECE Uniform Regulation No. 8-04

ECE Uniform Regulation No. 20-02

ECE Uniform Regulation No. 31-02

JIS D5500 1984 For asymmetric Class A, B1, B2

SAE J579c Dec78 (Reverse for photometric requirements right side and left side)

Country:

Brunei

Title of Standard:

The Road Traffic Enactment 1954 106 & 109

A : Application :

Motor Vehicle

C-a-1 : Photometry :

N/R

C-a-2 : Color :

White

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

N/R

C-b : Position :

On the front

Same height (Not More than 1,524 mm)

Each side of the vertical centerline

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

N/R

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Canada

Title of Standard :

CMVSS No. 108, No.108-1 & TSD No. 108

A : Application :

Motor Vehicle

C-a-1 : Photometry :

TSD No. 108 Fig. 26 For replaceable bulb headlamp

Four-Headlamp Systems (4) and Two-Headlamp Systems (2)

Light Source Type	HB1	HB2	HB3	HB4	HB5
HB1	Fig. 27(4, 2) or Fig. 15A (4) or Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)	Fig. 27(4, 2) or Fig. 15A (4) or Fig. 17A (2)
HB2	---	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)
HB3	---	---	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)
HB4	---	---	---	Fig. 15A (4) Fig. 17A (2)	Fig. 15A (4) Fig. 17A (2)
HB5	---	---	---	---	Fig. 27(4, 2) or Fig. 15A (4) or Fig. 17A (2)

Spec : TSD No. 108 Fig. 15A			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,500
1U	3L		5,000
1U	3R		5,000
H	V	70,000	40,000
H	3L		15,000
H	3R		15,000
H	6L		5,000
H	6R		5,000
H	9L		3,000
H	9R		3,000
H	12L		1,500
H	12R		1,500
1.5D	V		5,000
1.5D	9L		2,000
1.5D	9R		2,000
2.5D	V		2,500
2.5D	12L		1,000
2.5D	12R		1,000
4D	V	5,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	V	5,000	
H	4L		135
H	8L		64
0.5D	1.5L-L	3,000	
0.5D	1.5R	20,000	10,000
1D	6L		1,000
1.5D	2R		15,000
1.5D	9L		1,000
1.5D	9R		1,000
2D	15L		850
2D	15R		850
4D	V	7,000	
4D	4R	12,500	

Spec : TSD No. 108 Fig. 17A			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,500
1U	3L		5,000
1U	3R		5,000
H	V	75,000	40,000
H	3L		15,000
H	3R		15,000
H	6L		5,000
H	6R		5,000
H	9L		3,000
H	9R		3,000
H	12L		1,500
H	12R		1,500
1.5D	V		5,000
1.5D	9L		2,000
1.5D	9R		2,000
2.5D	V		2,500
2.5D	12L		1,000
2.5D	12R		1,000
4D	V	12,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	4L		135
H	8L		64
0.5D	1.5L-L	3,000	
0.5D	1.5R	20,000	10,000
1D	6L		1,000
1.5D	2R		15,000
1.5D	9L		1,000
1.5D	9R		1,000
2D	15L		850
2D	15R		850
4D	4R	12,500	

Spec : TSD No. 108 Fig. 27			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,000
1U	3L		2,000
1U	3R		2,000
H	V	75,000	20,000
H	3L		10,000
H	3R		10,000
H	6L		3,250
H	6R		3,250
H	9L		1,500
H	9R		1,500
H	12L		750
H	12R		750
1.5D	V		5,000
1.5D	9L		1,500
1.5D	9R		1,500
2.5D	V		2,500
2.5D	12L		750
2.5D	12R		750
4D	V	5,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	4L		135
H	8L		64
0.5D	1.5L-L	2,500	
0.5D	1.5R	20,000	8,000
1D	6L		750
1.5D	2R		15,000
1.5D	9L		750
1.5D	9R		750
2D	15L		700
2D	15R		700
4D	4R	12,500	

Spec : TSD No. 108 Fig. 28					
Unit : cd					
High Beam					
		1A1, 1C1, 1G1		2A1, 2C1, 2G1	
Test Point		Max.	Min.	Max.	Min.
2U	V		750		750
1U	3L		3,000		2,000
1U	3R		3,000		2,000
H	V	60,000	18,000	15,000	7,000
H	3L		12,000		3,000
H	3R		12,000		3,000
H	6L		3,000		2,000
H	6R		3,000		2,000
H	9L		2,000		1,000
H	9R		2,000		1,000
H	12L		750		750
H	12R		750		750
1.5D	V		3,000		2,000
1.5D	9L		1,250		750
1.5D	9R		1,250		750
2.5D	V		1,500		1,000
2.5D	12L		600		400
2.5D	12R		600		400
4D	V	5,000		2,500	
Low Beam					
		2A1, 2C1, 2G1			
Test Point		Max.		Min.	
10U-90U		125			
4U	8L			64	
4U	8R			64	
2U	4L			135	
1.5U	1R-3R			200	
1.5U	1R-R	1,400			
1U	1.5L-L	700			
0.5U	1.5L-L	1,000			
0.5U	1R-3R	2,700		500	
H	4L			135	
H	8L			64	
0.5D	1.5L-L	2,500			
0.5D	1.5R	20,000		8,000	
1D	6L			750	
1.5D	2R			15,000	
1.5D	9L			750	
1.5D	9R			750	
2D	15L			7,00	
2D	15R			7,00	
4D	4R	12,500			

Fig. 28 For sealed beam headlamp

C-a-2 : Color :

White

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

S7.3 For sealed beam

S7.7 For replaceable light sources

C-a-5 : Mechanical :

S8	Abrasion (Only for plastic lens)
	Chemical resistance (Only for plastic lens)
	Corrosion (Incl. Connector)
	Dust
	Temperature cycle
	Internal heat
	Humidity
	Vibration
	Sealing
S7.8	Aiming adjustment
	VHAD
	Inward force
	Torque deflection

C-b : Position :

On the front

Same height (Not less than 560 mm nor more than 1,370 mm)

Each side of the vertical centerline

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

N/R

D : Marking :

"DOT" mark

Tradename and / or Trademark

Tradenumber

Voltage

Replaceable bulb category

Location of aiming pads

E : Reference Standards Alternative Regulation :

CMVSS No.108.1

ECE Uniform Regulation No. 8

ECE Uniform Regulation No. 20

ECE Uniform Regulation No. 31

Country :

China

Title of Standard :

GB4599-94

A : Application :

Motor Vehicle

C-a-1 : Photometry :

Bulb Category	Photometric test	
	High-beam	Low-beam
R2, H1, H2, H3 & H4	Fig. 3	Fig. 4

GB4599-94 (*1)						
Unit: lx						
Incandescent Filament Headlamp				Halogen Filament Headlamp		
High Beam				High Beam		
Test Point	Max.	Min.		Test Point	Max.	Min.
H-V		0.9*Emax		H-V		0.8*Emax
E max		32.0		E max	240.0	48.0
					16*75L (*2)	
1.125m TO THE LEFT		16.0		1.125m TO THE LEFT		24.0
1.125m TO THE RIGHT		16.0		1.125m TO THE RIGHT		24.0
2.25m TO THE LEFT		40		2.25m TO THE LEFT		6.0
2.25m TO THE RIGHT		4.0		2.25m TO THE RIGHT		6.0
Low Beam				Low Beam		
Test Point	Max.	Min.		Test Point	Max.	Min.
B50L	0.3			B50R	0.3 (0.4) (*3)	
75R		6.0		75L		12.00
75L				75R	12.00	
50L				50R	15.00	
50R		6.0		50L		12.00
50V				50V		6.00
25R		1.5		25R		2.00
25L		1.5		25L		2.00
Zone 1	20			Zone 1	2*E50L	
Zone 3	0.70			Zone 3	0.70	
Zone 4		2.0		Zone 4		3.00

*1 : For location of test points, please refer to GB4599-94 Fig. 1

*2 : In the case of the filament lamp with double filaments, maximum intensity of high beam shall be less than 16 times of intensity at 75R of low beam.

*3 : Single beam is 0.3 lx and double beam is 0.4 lx

C-a-2 : Color :

White or yellow

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

Bulb category	R2		H1		H2		H3		H4	
Rated Voltage	12	24	12	24	12	24	12	24	12	24
Rated Wattage (Main/Sub)	45/40	55/50	55	70	55	70	55	70	60/55	75/70

C-a-5 : Mechanical :

Vibration

C-b : Position :

GB4785-84

High-beam :

Two or four

On the front

Width : Less than width for Low-beam.

Low-beam :

Two

On the front

Width : Not more than 400 mm from the extreme outer edge of the vehicle

Not less than 600 mm inner edge of each side low-beam

Height : Not less than 500 mm and not more than 1,200 mm above the ground

C-b-1 : Visibility :

High-beam :

Horizontal : 5 dig. inboard and 5 dig. outboard form reference center

Vertical : 5 dig. above and 5 dig. below form reference center

Low-beam

Horizontal : 10 dig. inboard and 45 dig. outboard form reference center

Vertical : 15 dig. above and 10 dig. below form reference center

C-b-2 : Electrical Connection :

For changing over from the high-beam to the low-beam all high-beam headlamps shall be switched off simultaneously

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Hong Kong

Title of Standard :

Road Traffic Regulations PART VII 96

A : Application :

All Motor Vehicle

C-a-1 : Photometry :

N/R

C-a-2 : Color :

White or Yellow

Both headlamps in the pair shall, when lit, emit beams of light of the same color.

C-a-3 : Luminous Area :

Both headlamps in the pair shall have the same area and shape when illuminated.

C-a-4 : Bulb Wattage :

More than 30 W

C-a-5 : Mechanical :

Every headlamp shall be securely fixed to the vehicle.

Every headlamp shall be so constructed and maintained that the direction of the beam of light emitted therefrom can be adjusted whilst the vehicle is stationary so that the headlamp when lit emits the type of beam which it is required to be capable of emitting by this Part; and

Every headlamp shall be kept in a clean and efficient condition.

C-b : Position :

Every headlamp shall be so positioned on one side of the vehicle that-no part of its illuminated area is less than 600 mm from any part of the illuminated area of any such headlamp on the other side; and the outermost part of the illuminated area of the headlamp is not more than 400 mm from the outermost part of the vehicle on the side on which the headlamp is placed.

C-b-1 : Visibility :

Visible from a reasonable distance

C-b-2 : Electrical Connection :

Both headlamps in the pair shall have their wiring arranged so that-if they can emit either high beams or low beams, the beams which they can emit can only be switched of or off together; if they can emit both high beams and low beams, the low beams can only be switched on or off together and the high beams can only be switched on or off together;

D : Marking :

Sealed beam lamp shall be indelibly marked with the rated wattage thereof in a readily legible manner.

E : Reference Standards Alternative Regulation :

N/A

Country :

Indonesia

Title of Standard :

Government Regulation No. 44 Chapter II Paragraph 10 Article 29 to 31

A : Application :

Motor Vehicle

C-a-1 : Photometry :

High beam :

Minimum 12,000 cd.

Lighting up the road at night in clear weather, over at least

100 m in the case of motor vehicle s designed for speeds exceeding 100 km/h

Low beam :

Lighting up the road at night in clear weather up to at least 40 m ahead of the vehicle

C-a-2 : Color :

White or Pale light yellow

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

N/R

C-b : Position :

High beam :

Front part of the vehicle

Number : Even total number on the vehicle

Height : Not exceeding 1.25 m

Width : May not be closer to the outermost edge of the vehicle than the outermost edge of the surface covered by the low beam headlamps.

Low beam :

Front part of the vehicle

Number : Total 2 pieces on the vehicle

Height : Not more than 1.25 m

Width : At a distance not exceeding the outermost side of the vehicle by more than 0.4 m.

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

N/R

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Japan

Title of Standard :

Safety Regulations for Road Vehicles/Article 32

A : Application :

All Motor Vehicles

C-a-1 : Photometry :

High beam headlamp shall have enough performance to see an obstacle on the road at a distance of 100 m.

Maximum intensity of High beam headlamp when all headlamps are lit simultaneously, shall be less than 225,000 cd

Low beam headlamp shall not emit glare which may disturb other road users, and shall have enough performance to see an obstacle on the road at a distance of 40 m.

C-a-2 : Color :

White or Selective Yellow, and identical on both sides

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

Headlamp shall be mounted so that the aim may not be readily disturbed by vibration and shocks.

C-b : Position :

2 or 4 High beam headlamps and 2 Low beam headlamps shall be mounted symmetrically.

The outermost edge of the illuminating surface of Low beam headlamp shall be within 400 mm of the extreme outer part of the vehicle.

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

N/R

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Korea

Title of Standard :

The Regulations of the Motor Vehicle Safety Standards /Article 38 & 106

A : Application :

All Motor Vehicles

C-a-1 : Photometry :

Luminosity Standard of Headlamp

Category	Test Point and Test zone (millimeter)	Luminous Intensity (candela)	
		Halogen Lamp	Filament Lamps
High Beam	H-V	80 % or more of the maximum luminous intensity	90 % or more of the maximum luminous intensity
	H to 1125L	15,000 or more	10,000 or more
	H to 1125R	15,000 or more	10,000 or more
	H-1125L to 2250L	3,750 or more	2,500 or more
	H-1125R to 2250R	3,750 or more	2,500 or more
	Maximum luminous intensity	30,000 or more but 112,500 or less	20,000 or more but 112,500 or less
Low Beam	250U-1500 L	250 or less	188 or less
	250D-500R	7,500 or more	3,750 or more
	250D-1500L	7,500 or less	-
	375D-1500L	9,375 or less	-
	375D-750R	7,500 or more	3,750 or less
	375D-V	3,750 or more	-
	750D-3960L, 3960R	1,250 or more	938 or more
	Zone A (above the cut-off line 3960L to 3960R)	438 or less	438 or less
	Zone B (2250L to 2250R and 375D to 750D)	1,875 or more	1,250 or more
	Zone C (below the 750D, 3960L to 3960R)	2*(the luminous intensity at 375D-750R) or less	12,500 or less

Note:

1. The test screen shall be located 25 meters from the source of the lighting system.
2. ”V” means the intersecting line between the plane containing the source of lighting system perpendicular to both the ground and test screen.
3. “H” means the intersecting line between the horizontal plane containing the source of lighting system and the test screen.
4. “Test point” means the point at which the luminous intensity is measured on the screen and is specified by the distances in millimeters from the H and V axis. U and D designate the

distances upward and downward respectively from the H axis. L and R designate the distances leftward and rightward respectively from the V axis.

5. In the case of the boundary of the overlapped measurement area, the higher intensity requirement of the two is applied.
6. The low beam shall be capable of forming a clear cut-off line.

C-a-2 : Color :

White or Yellow, and identical on both sides

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

Bulb Category	R2			H1			H2		
Rated Voltage	6V	12V	24V	6V	12V	24V	6V	12V	24V
Rated Wattage (Main/Sub)	45/40W	45/40W	55/50W	55W	55W	70W	55 W	55 W	70 W

Bulb Category	H3			H4			H7		
Rated Voltage	6V	12V	24V	6V	12V	24V	6V	12V	24V
Rated Wattage (Main/Sub)	55W	55W	70W	35/35W	35/35W 60/55W	75/70W	–	55 W	–

Bulb Category	HB2			HB3			HB4		
Rated Voltage	6V	12V	24V	6V	12V	24V	6V	12V	24V
Rated Wattage (Main/Sub)	–	72/65W	–	–	60W	–	–	51 W	–

C-a-5 : Mechanical :

N/R

C-b : Position :

The centers of lamps shall be symmetrical about the center line of a vehicle and located not less than 50 cm but not more than 120 cm above the ground when the vehicle is in the unloaded state.

C-b-1 : Visibility :

When the headlamp is activated, the lens of the driving and low beam shall not be covered by any other parts of the body when observed from the angles as specified in the following table. In this case, the observation angle of the low beam lens shall be applicable if one lens is used for both a driving and a low

beams.

Classification	Observation Angle (degree)			
	Up	Down	In	Out
High Beam	5	5	5	5
Low Beam	15	10	10	45

C-b-2 : Electrical Connection :

N/R

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Malaysia

Title of Standard :

Road Transport Rules 96 & 99

A : Application :

Motor Vehicle

C-a-1 : Photometry :

The beam of light emitted is permanently deflected downwards to such an extent that it is at all times incapable of dazzling any person, standing on the same horizontal plane as the vehicle at a distance of 25 feet or more from the lamp, whose eye level is not less than 3 feet 6 inches above that plane.

C-a-2 : Color :

White

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

Every lamp carried and used on a motor vehicle shall at all times during such use be in effective working condition.

C-b : Position :

Every obligatory lamp showing white light to the front is so fixed that the center of the lamp is at a height not exceeding 5 feet above the surface of the road on which the vehicle is used and no part of the vehicle, exclusive of the driving mirror or any direction indicator when in operation, projects laterally more than 12 inched beyond the center of such lamp.

Any two obligatory lamps showing white lights to the front are so fixed that they are on opposite sides of the vehicle, and at the same height above the surface of the road.

C-b-1 : Visibility :

Visible from a reasonable distance

C-b-2 : Electrical Connection :

The beam of light emitted can be extinguished at the will of the driver by the operation of a device which at the same time caused a beam of light to be emitted from the lamp.

The beam of light emitted can be extinguished at the will of the driver by the operation of a device which at the same time either deflects a beam of light from another lamp downwards and to the left of the vehicle, in such manner as to render it incapable of dazzling any such person in the circumstances

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

New Zealand

Title of Standard :

Transport (Vehicle Standards) Regulations 1990 15. Headlamps

A : Application :

Every Motor Vehicle

C-a-1 : Photometry :

Headlamps shall display a beam of beams of light of sufficient power, when the lamps are in the dipped position, to enable substantial dark objects and the nature of the road surface at a distance of at least 50 m directly in front of the vehicle to be clearly visible during hours of darkness under normal driving conditions to a driver of normal vision.

C-a-2 : Color :

White or Amber

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

N/R

C-b : Position :

2 but not more than 2 headlamps attached thereto; or dual headlamp systems comprising 4 headlamps in sets of 2 each, one set located on each side of the vehicle and each set of headlamps being equidistant from the center line of the vehicle and at an equal height from the ground.

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

N/R

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

ECE Regulation No.1&2, No.5, No.8, No.20, No.31

EEC Directive 76/761

FMVSS No.108

ADR No.46/00

Safety Regulations for Road Vehicles Art 32 (Japan)

JIS D5500

Country :

Papua New Guinea

Title of Standard :

Motor Traffic Regulation made under Motor Traffic Act - Chapter 243

Regulation No. 95 Headlamps

A : Application :

Motor Vehicle

C-a-1 : Photometry :

High beam

Low beam :

Substantial dared objects. and

The nature of the road surface, at a distance of at least 50 m and directly in front of the vehicle, to be clearly visible during the nighttime.

The center line of the beam of light descends at a rate of not less than 0.1 m in 3 m. or

The top of the high intensity zone, measured at 3 m from the headlamp, lies not less than 0.05 m below a horizontal plane passing through the center of the headlamp.

C-a-2 : Color :

White

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

N/R

C-b : Position :

Number :

At least 2 headlamps or

Dual headlamp system (comprising 4 headlamps in 2 sets)

Height :

Equal height from the ground

Width :

Equidistant from vehicle center

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

Approximately equal light output

In case of a dual system headlamps, one of light in each set is extinguished and the other lights assume a low beam position.

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Philippines

Title of Standard :

REPUBLIC ACT No.4136 S34c

New Motor Vehicle Inspection System and Promulgating the Rules and Regulations

A : Application :

Motor Vehicle

C-a-1 : Photometry :

The driver to discern any obstacle on the road at a distance of 100 m to the front at night.

Direction of beams may be tilted downwards

Headlamp Type	Luminous Intensity
4 lamp type	10,000 cd or more
2 lamp type	10,000 cd or more

C-a-2 : Color :

White or Yellow

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

Resistance to vibration, Impact, etc.

C-b : Position :

Each side at the front of vehicle

Height :

Same level

Not more than 1.2 m from the ground

Width :

Symmetrically to the center line of the vehicle

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

All headlamp lighted at the same time

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Singapore

Title of Standard :

Road Traffic (Motor Vehicles, Lighting) Rules Chapter 276 L 15 to 21 and The Schedule

A : Application :

Motor vehicle

C-a-1 : Photometry :

High beam and Low beam

Visible from a reasonable beams

C-a-2 : Color :

White light

C-a-3 : Luminous Area :

Circular :

Not less than 50 mm in diameter

Not circular :

Not less than the area of a circle of 50 mm in diameter and of such a shape that a circle of 20 mm in diameter may be inscribed therein.

C-a-4 : Bulb Wattage :

Not less than 30 watts

C-a-5 : Mechanical :

N/R

C-b : Position :

Number : A matched pair of the vehicle

Height : Not more than 1.5 m from the ground

Width : Not more than 400 mm from the outermost part of the illuminated surface to the outermost part of the vehicle

Front of the vehicle

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

The light emitted from a front lamp shall be either a diffused light or a low beam

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Chinese Taipei

Title of Standard :

Road Traffic Safety Regulations Annex 7. (Inspection Regulation for Various Type of Vehicle Light)

A : Application :

Motor vehicle

C-a-1 : Photometry :

N/R

C-a-2 : Color :

White or Pale yellow

All headlamps same color (Headlamp lens should be colorless)

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

N/R

C-b : Position :

Symmetric fitting on the vehicle

Number : 2 bulb type or 4 bulb type

Height : Not more than 1.4 m from ground to headlamp center

Width : Within 0.4 m from outside of vehicle body to outside rim of headlamp

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

N/R

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :

Thailand

Title of Standard :

Ministerial Regulations No. 22 (B. E. 2537) No. 2 (1) (a) and (b)

A : Application :

Passenger car

C-a-1 : Photometry :

N/R

C-a-2 : Color :

White or Yellow

All lamp same color light

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

N/R

C-a-5 : Mechanical :

N/R

C-b : Position :

High beam :

Number : 2 high beam headlamps + 2 high beam head lamps (Optional)

Height : Not more than 1.35 m nor less than 0.4 m from the road

Same level on the left and right side at the front of the vehicle

Low beam :

Number : 2 low beam headlamps

Height : Not more than 1.35 m nor less than 0.4 m from the road

width : Not more than 0.4 m from the outer edge of the vehicle

Same level on the left and right side at the front of the vehicle

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

At the same time as the rear lamps (except for high beam headlamps being flashed for a moment)

D : Marking :

N/R

E : Reference Standards Alternative Regulation :

N/A

Country :
USA

Title of Standard :
FMVSS No. 108

A : Application :
Motor vehicle

C-a-1 : Photometry :

Fig. 26 For replaceable bulb headlamp

	Any dual filament type other than HB2 used alone or with another dual filament type other than HB2 filed in Docket No. 93-11	HB2 or any single filament type used alone or with any other signal or dual filament type, filed in Docket No. 93-11
Four-headlamp systems	Fig. 27-1 or 27-2 Fig. 15-1 or 15-2	Fig. 15-1 or 15-2
Two-headlamp systems	Fig. 27-1 or 27-2 Fig. 17-1 or 17-2	Fig. 17-1 or 17-2

Note :
Headlamp for fig. XX-1's shall be equipped with mechanical aiming adjustment systems
Headlamp for fig. XX-2's shall be equipped with visual / optical aiming adjustment systems

Spec : FMVSS 108 Fig. 15-1			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,500
1U	3L		5,000
1U	3R		5,000
H	V	70,000	40,000
H	3L		15,000
H	3R		15,000
H	6L		5,000
H	6R		5,000
H	9L		3,000
H	9R		3,000
H	12L		1,500
H	12R		1,500
1.5D	V		5,000
1.5D	9L		2,000
1.5D	9R		2,000
2.5D	V		2,500
2.5D	12L		1,000
2.5D	12R		1,000
4D	V	5,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	V	5,000	
H	4L		135
H	8L		64
0.5D	1.5L-L	3,000	
0.5D	1.5R	20,000	10,000
0.6D	1.3R		
0.86D	V		
0.86D	3.5L		
1D	6L		1,000
1.5D	2R		15,000
1.5D	9L		1,000
1.5D	9R		1,000
2D	9L		
2D	9R		
2D	15L		850
2D	15R		850
4D	V	7,000	
4D	4R	12,500	
4D	20L		
4D	20R		

Spec : FMVSS 108 Fig. 15-2			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,500
1U	3L		5,000
1U	3R		5,000
H	V	70,000	40,000
H	3L		15,000
H	3R		15,000
H	6L		5,000
H	6R		5,000
H	9L		3,000
H	9R		3,000
H	12L		1,500
H	12R		1,500
1.5D	V		5,000
1.5D	9L		2,000
1.5D	9R		2,000
2.5D	V		2,500
2.5D	12L		1,000
2.5D	12R		1,000
4D	V	5,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	V	5,000	
H	4L		135
H	8L		64
0.5D	1.5L-L		
0.5D	1.5R		
0.6D	1.3R		10,000
0.86D	V		4,500
0.86D	3.5L	12,000	1,800
1D	6L		
1.5D	2R		15,000
1.5D	9L		
1.5D	9R		
2D	9L		1,250
2D	9R		1,250
2D	15L		1,000
2D	15R		1,000
4D	V	10,000	
4D	4R	12,500	
4D	20L		300
4D	20R		300

Spec : FMVSS 108 Fig. 17-1			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,500
1U	3L		5,000
1U	3R		5,000
H	V	75,000	40,000
H	3L		15,000
H	3R		15,000
H	6L		5,000
H	6R		5,000
H	9L		3,000
H	9R		3,000
H	12L		1,500
H	12R		1,500
1.5D	V		5,000
1.5D	9L		2,000
1.5D	9R		2,000
2.5D	V		2,500
2.5D	12L		1,000
2.5D	12R		1,000
4D	V	12,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	V		
H	4L		135
H	8L		64
0.5D	1.5L-L	3,000	
0.5D	1.5R	20,000	10,000
0.6D	1.3R		
0.86D	V		
0.86D	3.5L		
1D	6L		1,000
1.5D	2R		15,000
1.5D	9L		1,000
1.5D	9R		1,000
2D	9L		
2D	9R		
2D	15L		850
2D	15R		850
4D	V		
4D	4R	12,500	
4D	20L		
4D	20R		

Spec : FMVSS 108 Fig. 17-2			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,500
1U	3L		5,000
1U	3R		5,000
H	V	75,000	40,000
H	3L		15,000
H	3R		15,000
H	6L		5,000
H	6R		5,000
H	9L		3,000
H	9R		3,000
H	12L		1,500
H	12R		1,500
1.5D	V		5,000
1.5D	9L		2,000
1.5D	9R		2,000
2.5D	V		2,500
2.5D	12L		1,000
2.5D	12R		1,000
4D	V	12,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	V		
H	4L		135
H	8L		64
0.5D	1.5L-L		
0.5D	1.5R		
0.6D	1.3R		10,000
0.86D	V		4,500
0.86D	3.5L	12,000	1,800
1D	6L		
1.5D	2R		15,000
1.5D	9L		
1.5D	9R		
2D	9L		1,250
2D	9R		1,250
2D	15L		1,000
2D	15R		1,000
4D	V		
4D	4R	12,500	
4D	20L		300
4D	20R		300

Spec : FMVSS 108 Fig. 27-1			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,000
1U	3L		2,000
1U	3R		2,000
H	V	75,000	20,000
H	3L		10,000
H	3R		10,000
H	6L		3,250
H	6R		3,250
H	9L		1,500
H	9R		1,500
H	12L		750
H	12R		750
1.5D	V		5,000
1.5D	9L		1,500
1.5D	9R		1,500
2.5D	V		2,500
2.5D	12L		750
2.5D	12R		750
4D	V	5,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	V		
H	4L		135
H	8L		64
0.5D	1.5L-L	2,500	
0.5D	1.5R	20,000	8,000
0.6D	1.3R		
0.86D	V		
0.86D	3.5L		
1D	6L		750
1.5D	2R		15,000
1.5D	9L		750
1.5D	9R		750
2D	9L		
2D	9R		
2D	15L		700
2D	15R		700
4D	V		
4D	4R	12,500	
4D	20L		
4D	20R		

Spec : FMVSS 108 Fig. 27-2			
Unit : cd			
High Beam			
Test Point		Max.	Min.
2U	V		1,000
1U	3L		2,000
1U	3R		2,000
H	V	75,000	20,000
H	3L		10,000
H	3R		10,000
H	6L		3,250
H	6R		3,250
H	9L		1,500
H	9R		1,500
H	12L		750
H	12R		750
1.5D	V		5,000
1.5D	9L		1,500
1.5D	9R		1,500
2.5D	V		2,500
2.5D	12L		750
2.5D	12R		750
4D	V	5,000	
Low Beam			
Test Point		Max.	Min.
10U-90U		125	
4U	8L		64
4U	8R		64
2U	4L		135
1.5U	1R-3R		200
1.5U	1R-R	1,400	
1U	1.5L-L	700	
0.5U	1.5L-L	1,000	
0.5U	1R-3R	2,700	500
H	V		
H	4L		135
H	8L		64
0.5D	1.5L-L		
0.5D	1.5R		
0.6D	1.3R		10,000
0.86D	V		4,500
0.86D	3.5L	12,000	1,800
1D	6L		
1.5D	2R		15,000
1.5D	9L		
1.5D	9R		
2D	9L		1,250
2D	9R		1,250
2D	15L		1,000
2D	15R		1,000
4D	V		
4D	4R	12,500	
4D	20L		300
4D	20R		300

Fig. 28 For sealed beam headlamp

Mechanical aiming adjustment systems	Fig. 28-1
Visual / optical aiming adjustment systems	Fig. 28-2

Spec : FMVSS 108 Fig. 28-1					
Unit : cd					
High Beam					
		1A1, 1C1, 1G1		2A1, 2C1, 2G1	
Test Point		Max.	Min.	Max.	Min.
2U	V		750		750
1U	3L		3,000		2,000
1U	3R		3,000		2,000
H	V	60,000	18,000	15,000	7,000
H	3L		12,000		3,000
H	3R		12,000		3,000
H	6L		3,000		2,000
H	6R		3,000		2,000
H	9L		2,000		1,000
H	9R		2,000		1,000
H	12L		750		750
H	12R		750		750
1.5D	V		3,000		2,000
1.5D	9L		1,250		750
1.5D	9R		1,250		750
2.5D	V		1,500		1,000
2.5D	12L		600		400
2.5D	12R		600		400
4D	V	5,000		2,500	
Low Beam					
		1A1, 1C1, 1G1		2A1, 2C1, 2G1	
Test Point		Max.	Min.	Max.	Min.
10U-90U				125	
4U	8L				64
4U	8R				64
2U	4L				135
1.5U	1R-3R				200
1.5U	1R-R			1,400	
1U	1.5L-L			700	
0.5U	1.5L-L			1,000	
0.5U	1R-3R			2,700	500
H	V				
H	4L				135
H	8L				64
0.5D	1.5L-L			2,500	
0.5D	1.5R			20,000	8,000
0.6D	1.3R				
0.86D	V				
0.86D	3.5L				
1D	6L				750
1.5D	2R				15,000
1.5D	9L				750
1.5D	9R				750
2D	9L				
2D	9R				
2D	15L				700
2D	15R				700
4D	V				
4D	4R			12,500	
4D	20L				
4D	20R				

Spec : FMVSS 108 Fig. 28-2					
Unit : cd					
High Beam					
		1A1, 1C1, 1G1		2A1, 2C1, 2G1	
Test Point		Max.	Min.	Max.	Min.
2U	V		750		750
1U	3L		3,000		2,000
1U	3R		3,000		2,000
H	V	60,000	18,000	15,000	7,000
H	3L		12,000		3,000
H	3R		12,000		3,000
H	6L		3,000		2,000
H	6R		3,000		2,000
H	9L		2,000		1,000
H	9R		2,000		1,000
H	12L		750		750
H	12R		750		750
1.5D	V		3,000		2,000
1.5D	9L		1,250		750
1.5D	9R		1,250		750
2.5D	V		1,500		1,000
2.5D	12L		600		400
2.5D	12R		600		400
4D	V	5,000		2,500	
Low Beam					
		1A1, 1C1, 1G1		2A1, 2C1, 2G1	
Test Point		Max.	Min.	Max.	Min.
10U-90U				125	
4U	8L				64
4U	8R				64
2U	4L				135
1.5U	1R-3R				200
1.5U	1R-R			1,400	
1U	1.5L-L			700	
0.5U	1.5L-L			1,000	
0.5U	1R-3R			2,700	500
H	V				
H	4L				135
H	8L				64
0.5D	1.5L-L				
0.5D	1.5R				
0.6D	1.3R				10,000
0.86D	V				4,500
0.86D	3.5L			12,000	1,800
1D	6L				
1.5D	2R				15,000
1.5D	9L				
1.5D	9R				
2D	9L				1,250
2D	9R				1,250
2D	15L				1,000
2D	15R				1,000
4D	V				
4D	4R			12,500	
4D	20L				300
4D	20R				300

C-a-2 : Color :

White

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

S7.3 for sealed beam

Docket No. 93-11 for replaceable bulb

C-a-5 : Mechanical :

S8	Abrasion (Only for plastic lens)
	Chemical resistance (Only for plastic lens)
	Corrosion (Incl. Connector)
	Dust
	Temperature cycle
	Internal heat
	Humidity
	Vibration
	Sealing
S7.8	Aiming adjustment
	VHAD
	Inward force
	Torque deflection

C-b : Position :

On the front

Height :Same height (Not less than 55.9 cm nor more than 137.2 cm)

Each side of the vertical centerline

C-b-1 : Visibility :

N/R

C-b-2 : Electrical Connection :

N/R

D : Marking

"DOT" mark

Tradename and / or Trademark

Tradenumber

Voltage

Replaceable bulb category (except "HB1")

Optical axis mark

Location of aiming pads

Visual / Optical aiming mark

E : Reference Standards Alternative Regulation

N/A

Country :

ECE

Title of Standard :

ECE Uniform Regulation No. 8-04, 20-02 & 98

A Application :

Motor vehicle

C-a-1 : Photometry :

ECE Uniform Regulation No.	Bulb category	Note
No. 8-04	H1, H2, H3, HB3, HB4, H7, H8	Single filament type
No. 20-02	H4	Double filament type
No. 98	D1S, D2S, D2R	Gas-Discharge light sources

ECE No. 8-04 or ECE No. 20-02						
Unit: lx						
Righthand Traffic High Beam				Lefthand Traffic High Beam		
Test Point	Max	Min		Test Point	Max	Min
H-V		0.8*Emax		H-V		0.8*Emax
E max	240.0	48.0		E max	240.0	48.0
	16*75R				16*75L	
1.125m TO THE LEFT		24.0		1.125m TO THE LEFT		24.0
1.125m TO THE RIGHT		24.0		1.125m TO THE RIGHT		24.0
2.25m TO THE LEFT		6.0		2.25m TO THE LEFT		6.0
2.25m TO THE RIGHT		6.0		2.25m TO THE RIGHT		6.0
Righthand Traffic Low Beam				Lefthand Traffic Low Beam		
Test Point	Max	Min		Test Point	Max	Min
B50L	0.40			B50R	0.40	
75R		12.00		75L		12.00
75L	12.00			75R	12.00	
50L	15.00			50R	15.00	
50R		12.00		50L		12.00
50V		6.00		50V		6.00
25R		2.00		25R		2.00
25L		2.00		25L		2.00
Zone 1	2*E50R			Zone 1	2*E50L	
Zone 3	0.70			Zone 3	0.70	
Zone 4		3.00		Zone 4		3.00
POINT 1	0.7	0.1		POINT 1	0.7	0.1
POINT 2	0.7	0.1		POINT 2	0.7	0.1
POINT 3	0.7	0.1		POINT 3	0.7	0.1
POINT 4	0.7	0.2		POINT 4	0.7	0.2
POINT 5	0.7	0.2		POINT 5	0.7	0.2
POINT 6	0.7	0.2		POINT 6	0.7	0.2
POINT 7	0.7	0.1		POINT 7	0.7	0.1
POINT 8	0.7	0.2		POINT 8	0.7	0.2

Note : For location of test points, please refer to ECE Regulation Annex 4 A to C

ECE No. 98

Unit : lx

Righthand Traffic High Beam			
Test Point		Max	Min
H-V			0.8*Emax
E max		240.0	48.0
		16*75R	
1.125m TO THE LEFT			24.0
1.125m TO THE RIGHT			24.0
2.25m TO THE LEFT			6.0
2.25m TO THE RIGHT			6.0

Lefthand Traffic High Beam			
Test Point		Max	Min
H-V			0.8*Emax
E max		240.0	48.0
		16*75R	
1.125m TO THE LEFT			24.0
1.125m TO THE RIGHT			24.0
2.25m TO THE LEFT			6.0
2.25m TO THE RIGHT			6.0

Righthand Traffic Low Beam			
Test Point		Max	Min
	On and above line H/H2, or On and above line H/H3/H4	1	
1	H-V	1	
2	B50L	0.5	
3	75R		20
4	50L	25	
5	25L1	30	
6	50V		12
7	50R		20
8	25L2		4
9	25R1		4
10	25L3		2
11	25R2		2
12	15L		1
13	15R		1
14			0.1
15			0.1
16			0.1
17			2
18			0.2
19			0.2
20			0.1
21			0.2
A to B	Segment I		6
C to D	Segment II	6	
E to F	Segment III and under	20	
	E max R	70	
	E max L	50	

Lefthand Traffic Low Beam			
Test Point		Max	Min
	On and above line H/H2, or On and above line H/H3/H4	1	
1	H-V	1	
2	B50R	0.5	
3	75L		20
4	50R	25	
5	25R1	30	
6	50V		12
7	50L		20
8	25R2		4
9	25L1		4
10	25R3		2
11	25L2		2
12	15R		1
13	15L		1
14			0.1
15			0.1
16			0.1
17			0.2
18			0.2
19			0.2
20			0.1
21			0.2
A to B	Segment I		6
C to D	Segment II	6	
E to F	Segment III and under	20	
	E max L	70	
	E max R	50	

Note : For location of test points, please refer to ECE Regulation Annex 3 A to C

C-a-2 : Color :

White

C-a-3 : Luminous Area :

N/R

C-a-4 : Bulb Wattage :

See ECE Reg. No. 37-03

C-a-5 : Mechanical :

Vibration

Test of stability of photometric performance (Clean headlamp)

Test of stability of photometric performance (Dirty headlamp)

Test for change in vertical position of the cut-off line under the influence of heat

Test of resistance to mechanical deterioration (Only for plastic lens)

Test for adherence of coating (Only for plastic lens)

C-b : Position :

ECE No. 48-01

High-beam :

Two or four

On the front

Low-beam :

Two

On the front

Width : Not more than 400 mm from the extreme outer edge of the vehicle

Not less than 600 mm apart from inner edges of apparent surface in the direction of the reference axes

Height : Not less than 500 mm and not more than 1,200 mm above the ground

C-b-1 : Visibility :

High-beam :

Horizontal : 5 dig. inboard and 5 dig. outboard form reference center

Vertical : 5 dig. above and 5 dig. below form reference center

Low-beam

Horizontal : 10 dig. inboard and 45 dig. outboard form reference center

Vertical : 15 dig. above and 10 dig. below form reference center

C-b-2 : Electrical Connection :

For changing over from the high-beam to the low-beam all high-beam headlamps shall be switched off simultaneously

The low-beams may remain switched on at the same time as the high-beam

D : Marking :

Approval mark

Tradename and / or Trademark

Initial downward inclination mark

Replaceable bulb category (example“H1”)

* (If designed only for 12V)

E : Reference Standards Alternative Regulation :

N/A

ITEM 97-18

Seat belts

APEC Regulation Analysis Findings
Item No.97-18: Seat Belt

1. The member economies can be divided into several groups according to the types of their requirements related to the construction and performance of seat belts.

Japan type -	Japan, China, Korea, Taiwan, Thailand
U.S. type -	U.S., Canada
Europe type -	Brunei, Singapore
Australian type -	Australia, New Zealand, Papua New Guinea
Other -	Hong Kong, Philippines, Mexico, Malaysia, Indonesia

No available regulation - Chile

2. A comparison of specific requirements is as follows:

A. Application

China, Japan, and ECE have application form requirements in relation to seat belts. Hong Kong sets forth different seat belt requirements according to registration dates.

B. Structure

All the member economies, except Singapore, require the furnishing of three-point seat belts in the front seat. (Singapore requires two or more fixation points.) Australia and U.S. do not permit in principle the use of three-point separation seat belts.

C. Performance

(1) Corrosion Resistance (C-a-1)

Australia, U.S., and ECE specify corrosion resistance as a general requirement.

(2) Temperature Resistance (C-a-2)

The U.S. stipulates temperature resistance as a general requirement.

(3) Flammability (C-a-3)

Japan and U.S. specify flammability as a general requirement.

(4) Webbing (C-a-4)

Thailand lacks a light resistance requirement but demands a xenon arc lamp test for color fastness to light. Australia and New Zealand require a carbon arc lamp test for light resistance. Other member economies specify a carbon arc lamp test, while ECE demands a xenon arc lamp test. Canada and U.S. lack energy absorption requirements for webbings. ECE exempts its abrasion resistance requirement for webbing length adjusters if the micro-slip requirement is met.

(5) Buckle (C-a-5)
Australia requires buckle release force of not more than 112N and other member economies a maximum of 120N to 140N. ECE demands not more than 60N.

(6) Length Adjuster (C-a-6)
Only Thailand requires length adjusting force of not more than 40N, while other member economies stipulate not more than 50N.

(7) Attachment Hardware
Only Thailand specify bolt strength to be at least 40 kN whether single or double bolts.

(8) Retractor (C-a-8) Thailand and ECE subject emergency locking retractors to a 45,000-cycle durability test, whereas other member economies require a 50,000-cycle durability test. Thailand sets forth a narrow range of retracting force, between 2N and 5N. Only Australia specify lock extrusion values according to retraction lengths.

(9) Load Limiter (C-a-9)
Canada, Korea, Taiwan, and U.S. provide requirements for load limiters.

(10) Assembly (C-a-10)
Concerning the displacement of a dynamic load on the dummy's thoracic region, Japan and ECE provide an escape clause applicable under certain conditions. The U.S. provides assembly requirements in its FMVSS 208. Australia and Japan has an escape clause for seat belt extension.

D. Label
Australia requires an ID mark indicating a trademark or the maker's name, the month and year of manufacture, and ID code. The U.S. demands the marking of the year of manufacture or import. ECE requires an ID mark showing the name, initials, trade name or trademark of the manufacturer. Taiwan and Thailand also lay down labeling requirements.

ITEM 97-18 SEAT BELTS

A: Appreciation Passenger vehicles

Member Economies	B-a-1; Structure	B-a-2; Webbing	B-a-3; Buckle	B-a-4; Adjustment Hardware	B-a-5; Slip Guide	B-a-6; Attachment Hardware	B-a-7; Retractor
Australia	ADR 4/02		ADR 4/02	ADR 4/02		ADR 4/02	ADR 4/02
Brunei	RTA Chapter 68(B.S.3254)						
Canada	CMVSS 209	CMVSS 209	CMVSS 209	CMVSS 209		CMVSS 209	CMVSS 209
Chile							
China	GB 14166-93	GB 14166-93	GB 14166-93	GB 14166-93		GB 14166-93	GB 14166-93
Hong Kong							
Indonesia	R.44/93						
Japan	SRRV 22-3	SRRV 22-3	SRRV 22-3	SRRV 22-3			SRRV 22-3
Korea	KMVSS 27						
Malaysia	MVR,378/1978						
Mexico							
New Zealand	VSR reg29						
Papua New Guinea	(ADR4/02)						
Philippines							
Singapore	(B.S.3254) (B.S.AU160a)						
Chinese Taipei	CNS-3792, D2102	CNS-3792, D2102	CNS-3792, D2102	CNS-3792, D2102		CNS-3792, D2102	CNS-3792,D2102
Thailand	TIS 721-2539	TIS 721-2539	TIS 721-2539	TIS 721-2539	TIS 721-2539	TIS 721-2539	TIS 721-2539
United States	FMVSS 209	FMVSS 209	FMVSS 209	FMVSS 209		FMVSS 209	FMVSS 209
ECE	ECE 16-04	ECE 16-04	ECE 16-04	ECE 16-04		ECE 16-04	ECE 16-04

Member Economies	C-a-1; Corrosion resistance	C-a-2; Temperature resistance	C-a-3; Flammability	C-a-4; Webbing (1) Width
Australia	ADR 4/02			ADR 4/02 (46 mm≤Width<76 mm)
Brunei				SRRV22-3, ECE R 16-04
Canada				FMVSS 209
Chile				
China				SRRV22-3, ECE R 16-04
Hong Kong				SRRV22-3, ECE R 16-04
Indonesia				
Japan			SRRV 22-3	SRRV22-3 (≥46 mm)
Korea				SRRV22-3, ECE R 16-04
Malaysia				SRRV22-3, ECE R 16-04
Mexico				
New Zealand				ADR 4/02
Papua New Guinea				
Philippines				
Singapore				SRRV22-3, ECE R 16-04
Chinese Taipei				SRRV22-3, ECE R 16-04
Thailand				SRRV22-3, ECE R 16-04
United States	FMVSS 209	FMVSS 209 (ASTM D 756-78)	FMVSS 302	FMVSS 209(≥1.8 inches)
ECE	ECE 16-04			ECE R 16-04(≥46 mm)

Member Economies	C-a-4; Webbing	
	(2) Breaking strength	(3) Elongation
Australia	ADR 4/02 (≥22 kN)	ADR 4/02 (5 %≤Elongation≤25 %)
Brunei	ECE R 16-04	
Canada	SRRV22-3, FMVSS 209	SRRV22-3, FMVSS 209
Chile		
China	SRRV22-3, FMVSS 209	SRRV22-3, FMVSS 209
Hong Kong	ECE R 16-04	
Indonesia		
Japan	SRRV22-3 (Lap≥26.7 kN Sash≥17.7 kN Lap-sash≥22.3 kN)	SRRV22-3 (Lap≤20 % Sash≤40 % Lap-sash≤30 %)
Korea	SRRV22-3, FMVSS 209	SRRV22-3, FMVSS 209
Malaysia	ECE R 16-04	
Mexico		
New Zealand	ADR 4/02	ADR 4/02
Papua New Guinea		
Philippines		
Singapore	ECE R 16-04	
Chinese Taipei	SRRV22-3, FMVSS 209	SRRV22-3, FMVSS 209
Thailand	SRRV22-3, FMVSS 209 (No requirement for Sash belt)	SRRV22-3 FMVSS 209 (No requirement for Sash belt)
United States	FMVSS 209 (Type1≥2720 kg Type2≥2270 kg (for pelvic) Type2≥1810 kg (for upper torso))	FMVSS 209 (Type1≤20 % Type2≤30 % (for pelvic) Type2≤40 % (for upper torso))
ECE	ECE R 16-04 (≥14.7 kN)	

Member Economies	C-a-4; Webbing	
	(4) Energy absorption	(5) Resistance to abrasion
Australia	ADR 4/02 (Hysteresis≥60 %)	ADR 4/02 (Hex bar≥80 % of dry breaking strength Component and/or Sash Guide≥75 % of dry breaking strength)
Brunei		Unique (Hex bar≥75 % of dry breaking strength)
Canada		FMVSS 209
Chile		
China	SRRV22-3	SRRV22-3
Hong Kong		Unique (Hex bar≥75 % of dry breaking strength)
Indonesia		
Japan	SRRV22-3 (Hysteresis: Lap≥50 % Sash≥60 % Lap-sash≥55 % Energy per meter: Lap≥539 N·m Sash≥1080 N·m Lap-sash≥784 N·m)	SRRV22-3 (Hex bar and/or adjusting device ≥60 % of dry breaking strength)
Korea	SRRV22-3	Unique (Hex bar≥75 % of dry breaking strength adjusting device≥75 % of minimum dry breaking strength)
Malaysia		Unique (Hex bar≥75 % of dry breaking strength)
Mexico		
New Zealand	ADR 4/02	ADR 4/02
Papua New Guinea		
Philippines		
Singapore		Unique (Hex bar≥75 % of dry breaking strength)
Chinese Taipei	SRRV22-3	Unique (Hex bar≥75 % of dry breaking strength adjusting device≥75 % of minimum dry breaking strength)
Thailand	SRRV22-3 (No requirement for Sash belt	Unique (Hex bar≥75 % of minimum dry breaking strength)
United States		FMVSS 209 (Hex bar and/or adjusting device ≥75 % of minimum dry breaking trength)
ECE		ECE R 16-04 (Component and/or Sash Guide ≥75 % of dry breaking strength)

Member Economies	C-a-4; Webbing		
	(6) Resistance to cold	(7) Resistance to heat	(8) Resistance to water
Australia			ADR 4/02 (Not required for Polyester)
Brunei	ECE R 16-04	ECE R 16-04	ECE R 16-04
Canada			
Chile			
China	SRRV22-3	SRRV22-3	SRRV22-3
Hong Kong	ECE R 16-04	ECE R 16-04	ECE R 16-04
Indonesia			
Japan	SRRV22-3 (≥60 % of dry breaking strength)	SRRV22-3 (≥60 % of dry breaking strength)	SRRV22-3 (≥60 % of dry breaking strength)
Korea	Unique (≥80 % of dry breaking strength)	Unique (≥80 % of dry breaking strength)	ECE R 16-04
Malaysia	ECE R 16-04	ECE R 16-04	ECE R 16-04
Mexico			
New Zealand			ADR 4/02 (Not required for Polyester)
Papua New Guinea			
Philippines			
Singapore	ECE R 16-04	ECE R 16-04	ECE R 16-04
Chinese Taipei	Unique (≥80 % of dry breaking strength)	Unique (≥80 % of dry breaking strength)	ECE R 16-04
Thailand		Unique (≥80 % of minimum dry breaking strength)	Unique (≥75 % of minimum dry breaking strength)
United States			
ECE	ECE R 16-04 (≥75 % of dry breaking strength)	ECE R 16-04 (≥75 % of dry breaking strength)	ECE R 16-04 (≥75 % of dry breaking strength)

Member Economies	C-a-4; Webbing		
	(9) Resistance to light	(10) Colorfastness to light	(11) Colorfastness to rubbing
Australia	ADR 4/02 (≥70 % of dry breaking strength after Ultraviolet Carbon Arc)	ADR 4/02 (≥6 after Ultraviolet Carbon Arc)	ADR 4/02 (≥Rating 4)
Brunei	Unique (≥75 % of dry breaking strength after Carbon Arc)		Unique (≥Rating 4)
Canada	SRRV22-3, FMVSS 209	FMVSS 209	Unique (≥Rating 3)
Chile			
China	SRRV22-3, FMVSS 209		
Hong Kong	Unique (≥75 % of dry breaking strength after Carbon Arc)		Unique (≥Rating 4)
Indonesia			
Japan	SRRV22-3 (≥60 % of dry breaking strength after Carbon Arc)		
Korea	SRRV22-3, FMVSS 209	FMVSS 209	Unique (≥Rating 3)
Malaysia	Unique (≥75 % of dry breaking strength after Carbon Arc)		
Mexico			
New Zealand	ADR 4/02	ADR 4/02	ADR 4/02
Papua New Guinea			
Philippines			
Singapore	Unique (≥75 % of dry breaking strength after Carbon Arc)		Unique (≥Rating 4)
Chinese Taipei	SRRV22-3, FMVSS 209	Unique (≥Rating 2)	Unique (≥Rating 3)
Thailand		Unique (≥Rating 2 after Xenon Arc)	Unique (≥Rating 2)
United States	FMVSS 209 (≥60 % of dry breaking strength after Carbon Arc)	FMVSS 209 (≥No.2 after Carbon Arc)	
ECE	ECE R 16-04 (≥75 % of dry breaking strength after Xenon Arc)		

Member Economies	C-a-4; Webbing
	(12) Colorfastness to perspiration
Australia	ADR 4/02 (≥Rating 4)
Brunei	Unique (≥Rating 4)
Canada	
Chile	
China	
Hong Kong	Unique (≥Rating 4)
Indonesia	
Japan	
Korea	Unique (Change in color≥Rating 3 Staining≥Rating 4)
Malaysia	
Mexico	
New Zealand	ADR 4/02
Papua New Guinea	
Philippines	
Singapore	Unique (≥Rating 4)
Chinese Taipei	Unique(Change in color≥Rating 3 Staining≥Rating 4)
Thailand	Unique (Change in color≥Rating 3 Staining≥Rating 3)
United States	
ECE	

Economy	C-a-5 Buckle		
	(1) Durability	(2) Compressibility	(3) Partial engagement
Australia	ADR4 (Operation force of spring - 80% or more, 50,000 cycles)	N/R	ADR4 (Not latch partially, Not release inadvertently)
Brunei	N/R	N/R	N/R
Canada	FMVSS 209	FMVSS 209	FMVSS 209
Chile			
China	SRRV 22-3	N/R	N/R
Hong Kong			
Indonesia			
Japan	SRRV 22-3 (No damage or excessive wear, 5,000 cycles)	N/R	N/R
Korea	SRRV 22-3	FMVSS 209	N/R
Malaysia	Unique (withstand repeated operation, 5000cycles)	N/R	ECE 16-04
Mexico			
New Zealand	ADR 4	N/R	ADR 4
Papua New Guinea			
Philippines			
Singapore	N/R	N/R	N/R
Chinese Taipei	SRRV 22-3	Unique (Not become loose under 1.8kN, Function normally)	N/R
Thailand	SRRV 22-3	N/R	N/R
U.S.A.	FMVSS 209 (Not fail, nor gall or wear, 200 cycles)	FMVSS 209 (Not release under 400lb.)	FMVSS 209 (Separate by 2.3kgf or less)
ECE	ECE 16-04(Withstand repeated operation, 5,500 cycles)	N/R	ECE 16-04 (Not latch partially)

Economy	C-a-5 Buckle (4) Releasing force
Australia	ADR4 (112N or less)
Brunei	Unique (120N or less)
Canada	FMVSS 209 SRRV 22-3
Chile	
China	SRRV 22-3 FMVSS 209
Hong Kong	
Indonesia	
Japan	SRRV 22-3(14kgf/137N or less)
Korea	SRRV 22-3 FMVSS 209
Malaysia	Unique (120N or less)
Mexico	
New Zealand	ADR 4
Papua New Guinea	
Philippines	
Singapore	Unique (120N or less)
Chinese Taipei	Unique (140N or less)
Thailand	Unique (140N or less)
U.S.A.	FMVSS 209(14kgf or less)
ECE	ECE 16-04 (Release by 6daN or less, Not release by 1daN or more)

Economy	C-a-6 Length adjuster		C-a-7 Attachment Hardware	
	(1)Adjusting force	(1) Tensile Strength of Bolt	(2) Tensile Strength of Attachment	(2)Tilt lock angle
Australia	Common(50N or less)	N/R	N/R	Common(30°or more)
Brunei	Common	N/R	N/R	N/R
Canada	Common	FMVSS209(Single type ≥ 22.5 kN Double type ≥ 40.0 kN)	FMVSS 209 (not move more than 2 mm)	Common
Chile				
China	Common	N/R	N/R	N/R
Hong Kong		N/R	N/R	
Indonesia		N/R	N/R	
Japan	Common(49N/5kgf or less)	N/R	N/R	N/R
Korea	Common	FMVSS 209(Single type ≥ 22.3 kN Double type ≥ 40.0 kN)	FMVSS 209 (not move more than 2 mm)	Common
Malaysia	N/R	N/R	N/R	N/R
Mexico		N/R	N/R	
New Zealand	Common	N/R	N/R	Common
Papua New Guinea		N/R	N/R	
Philippines		N/R	N/R	
Singapore	Common	N/R	N/R	N/R
Chinese Taipei	Common	FMVSS 209 (Single type ≥ 22.3 kN Double type ≥ 40.0 kN)	FMVSS 209 (not move more than 2 mm)	Common
Thailand	Unique(40N or less)	Unique (no less than 40 kN)	N/R	N/R
USA	Common (5kgf or less)	FMVSS 209 (Single type ≥ 22.3 kN Double type ≥ 40.0 kN)	FMVSS 209 (not move more than 2 mm)	Common (30°or more)
ECE	Common(5daN or less)	N/R	ECE 16/04(not less than 1,470 daN)	N/R

Economy	C-a-8 Retractor / Emergency Locking Retractor			
	(1) Retraction Force	(2) Lock Position	(3) Durability	(4) Tensile Strength
Australia	ADR 4/02 Type 4 2N≤RF≤10N Type 4N ≥0.7 daN(lap) 0.2 daN≤RF≤0.7 daN (upper torso)	ADR 4/02 Type 4 ≤5 m/s^2 ≤30 mm(150±5 mm) ≤80 mm(450±5 mm) ≤80 mm(760±5 mm) ≤25 mm(≤20 m/s^2) ≥12° Type 4N ≤50 mm(0.85 g) ≥50 mm(<1.0 g) 12°≤Angle≤40° ≥2.0 g	ADR 4/02 50,000 cycles	ADR 4/02 9kN
Brunei	N/R	N/R	N/R	N/R
Canada	FMVSS 209 ≥2.6N(pelvic) 0.9N≤RF≤4.9N (upper torso) 0.9N≤RF≤6.7N(both)	FMVSS 209 <25 mm(0.7 times) ≥50 mm(≤0.3 times) >15°	FMVSS 209 50,000 cycles (upper torso)	N/R
Chile				
China	SRRV 22-3	SRRV 22-3	SRRV 22-3	N/R
Hong Kong	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R

Economy	C-a-8 Retractor / Emergency Locking Retractor			
	(1) Retraction Force	(2) Lock Position	(3) Durability	(4) Tensile Strength
Japan	SRRV 22-3 ≥2.6N(lap) 1N≤RF≤7N(both)	SRRV 22-3 ≤25 mm(0.7G)>12° >50 mm(0.3G) ≤25 mm(0.7G) ≤50 mm(2.0G)	SRRV 22-3 50,000 cycles	N/R
Korea	SRRV 22-3	SRRV 22-3	SRRV 22-3	N/R
Malaysia	Unique ≥2.5N(lap) 2N≤RF≤5N(shoulder)	Unique 0.5g ≤25 mm(150±3 mm) ≤75 mm(450±3 mm) ≤75 mm(760±3 mm)	ECE 16/04	N/R
Mexico	N/R	N/R	N/R	N/R
New Zealand	ADR 4/02	ADR 4/02	ADR 4/02	ADR 4/02
Papua New Guinea	N/R	N/R	N/R	N/R
Philippines	N/R	N/R	N/R	N/R
Singapore	BS AU 160a or BS 3254 ≥7N(lap) 2N≤RF≤10N (upper torso)	BS AU 160a or BS 3254 ≤0.5 g	BS AU 160a or BS 3254 50,000 cycles	N/R
Chinese Taipei	SRRV 22-3	SRRV 22-3	SRRV 22-3	N/R
Thailand	Unique ≥2.6N(2 point belt) 2N≤RF≤5N(3 point belt)	SRRV 22-3 >50 mm(2.9 m/s^2) <50 mm(19.6 m/s^2) ≤25 mm(6.9 m/s^2) ≥12°	SRRV 22-3 45,000 cycles	SRRV 22-3 11.1 kN(2 point belt) 6.7 kN(3 point belt)
U.S.A.	FMVSS 209 ≥0.6 pound(pelvic) 0.2pound≤RF≤1.1pounds	FMVSS 209 <1 inch(0.7 g) ≥2 inches(≤0.3 g)	FMVSS 209 50,000 cycles (upper torso)	N/R

	(upper torso) 0.2pound≤RF≤1.5pounds (both)	≥15°		
ECE	ECE 16/04 ≥0.7 daN(lap) ≥0.2 daN(upper torso)	ECE 16/04 <u>Type 4</u> ≤50 mm(0.45 g) >50 mm(<0.8 g) 12°<Angle<27° <u>Type 4N</u> ≤50 mm(0.85 g) >50 mm(<1.0 g) 12°<Angle<40° ≥2.0 g	ECE 16/04 45,000 cycles	ECE 16/04 980 daN

Economy	C-a-8 Retractor / Automatic Locking Retractor			
	(1) Retraction Force	(2) Lock Position	(3) Durability	(4) Tensile Strength
Australia	ADR 4/02 2N≤RF≤10N	ADR 4/02 ≤30 mm	ADR 4/02 10,000 cycles	ADR 4/02 ≥9kN
Brunei	N/R	N/R	N/R	N/R
Canada	FMVSS 209 ≥2.6N(pelvic) 2N≤RF≤4.9N(upper torso)	FMVSS 209 ≤25 mm	FMVSS 209 10,000 cycles(pelvic)	N/R
Chile				
China	SRRV 22-3	SRRV 22-3	SRRV 22-3	N/R
Hong Kong	N/R	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R	N/R
Japan	SRRV 22-3 ≥2.6N(lap) 1N≤RF≤7N(both)	SRRV 22-3 ≤25 mm	SRRV 22-3 10,000 cycles	N/R
Korea	SRRV 22-3	SRRV 22-3	SRRV 22-3	N/R
Malaysia	Unique ≥2.6N(lap) 2N≤RF≤5N(shoulder)	SRRV 22-3	SRRV 22-3	N/R
Mexico	N/R	N/R	N/R	N/R
New Zealand	ADR 4/02	ADR 4/02	ADR 4/02	ADR 4/02
Papua New Guinea	N/R	N/R	N/R	N/R
Philippines	N/R	N/R	N/R	N/R
Economy	C-a-8 Retractor / Automatic Locking Retractor			
	(1) Retraction Force	(2) Lock Position	(3) Durability	(4) Tensile Strength
Singapore	BS AU 160a or BS 3254	BS AU 160a or BS 3254	BS AU 160a or BS 3254	

	≥7 N(lap) 2 N≤RF≤10 N (upper torso)	≤25 mm	10,000 cycles	N/R
Chinese Taipei	SRRV 22-3	SRRV 22-3	SRRV 22-3	N/R
Thailand	Unique 2.5N≤RF≤5N	SRRV 22-3	SRRV 22-3	TIS 721-2539
U.S.A.	FMVSS 209 ≥0.6 pound(pelvic) 0.45pound≤RF≤1.1pounds (upper torso)	FMVSS 209 <1 inch	FMVSS 209 10,000 cycles(pelvic)	N/R
ECE	ECE 16/04 ≥0.7 daN(pelvic) 0.2 daN≤RF≤0.7 daN (upper torso)	ECE 16/04 <30 mm	ECE 16/04 10,000 cycles	ECE 16/04

Economy	C-a-9 Load limiter	C-a-10	
		(1) Breaking strength	(2) Elongation
Australia	N/R	ADR4 (17.8±0.4kN)	ADR4 (Lap 180mm, Other 260mm)
Brunei	N/R	Unique (18.0kN)	N/R
Canada	FMVSS 209	FMVSS 209	FMVSS 209, SRRV 22-3
Chile			
China	N/R	SRRV 22-3	SRRV 22-3, FMVSS 209
Hong Kong			
Indonesia			
Japan	N/R	SRRV 22-3 (Lap 22.3kN, Shoulder 17.7kN, Continuous 26.7kN)	SRRV 22-3 (Lap 180mm, Shoulder and Continuous 250mm)
Korea	Unique (Tensile strength 14.7kN/ No damage after dynamic)	SRRV 22-3	SRRV 22-3, FMVSS 209
Malaysia	N/R	Unique (17.5kN)	Unique (Pelvic 200mm or less, Chest 300mm or less)
Mexico			
New Zealand	N/R	ADR 4	ADR 4
Papua New Guinea			
Philippines			
Singapore	N/R	Unique (18.0kN)	N/R
Chinese Taipei	Unique (Tensile strength 14.7kN / No damage after dynamic)	SRRV 22-3	SRRV 22-3 FMVSS 209
Thailand	N/R	Unique(2P 23.0kN, 3P 27.0kN)	N/R
USA	FMVSS 209(No elongation requirement)	FMVSS 209(Pelvic 1,130kgf, Shoulder 680kgf, Continuous 1,360kgf)	FMVSS 209 (Type 1 360mm, Type 2 500mm)
ECE	N/R	N/R	N/R

Economy	C-a-10	
	-3 Resistance to tensile load	-4 Dummy displacement
Australia	ADR4 (No separation, Manual buckle releasing)	N/R
Brunei	Unique(Normal buckle releasing, no total failure of any components)	Unique (Thigh pivot point 200mm or less Shoulder 300mm or less)
Canada	FMVSS 209	N/R
Chile		
China	Unique (No buckle releasing, Assemblyfunctions normally)	N/R
Hong Kong		
Indonesia		
Japan	SRRV 22-3(No breakage or crack etc , Buckle functions normally)	SRRV 22-3 (Pelvic level 80~200mm, Chest level 100~400mm)
Korea	Unique (No damage, deformation or cracks, no damage on dummies)	SRRV 22-3
Malaysia	Unique (No total failure and separation , normal buckle releasing, etc)	Unique(Pelvis 200mm or less, Chest 300mm or less)
Mexico		
New Zealand	ADR 4	N/R
Papua New Guinea		
Philippines		
Singapore	Unique (Normal buckle releasing, no total failure of any components)	Unique(Thigh pivot point 200mm or less, Shoulder 300mm or less)
ChineseTaipei	Unique(No deformation, breakage orcracks, no damage on dummies)	SRRV 22-3
Thailand	Unique(No damage on hardware, Other parts not broken or twisted)	N/R
USA.	FMVSS 209(No complete fracture of metal attachment hardware)	N/R
ECE	ECE 16-04(No breakage, No releasing orunlocking of buckle etc)	ECE 16-04(Pelvic level 80~200mm, Chest level 100~300mm)

Economy	E Alternative (Reference) Standards
Australia	ECE R 16/04
Brunei	BS 3254 / AU 160a
Canada	N/A
Chile	
China	N/A
Hong Kong	BS 3254-1960 / AU 160a, ECE R 16/04, FMVSS 209, JIS D4604, AS E35:1965, E35 PT I:1970, NZS 1662:1969
Indonesia	N/A
Japan	ECE R 16/04, FMVSS 209
Korea	N/A
Malaysia	ECE R 16/04, JIS D4603, AS E35 PT II, BS AU 160a
Mexico	N/A
New Zealand	AS 2596
Papua New Guinea	ADR 4/02
Philippines	N/A
Singapore	BS AU 160a, BS 3254-1960
Chinese Taipei	N/A
Thailand	N/A
U.S.A.	N/A
ECE	N/A

Member Economy: Australia
Title of Standard: ADR 4/02, AS 1753-1990

A: Application

It applies to the design and construction of motor tricycle, passenger car and light goods vehicle.

B-a-1.Structure:

Each belt assembly must only be used one occupant.

B-a-3.Buckle:

(1) In cases where the 'Buckle Component' of a 'Seat belt Assembly' can be engaged either wholly or partially with the 'Buckle Component' of a 'Seat belt Assembly' intended for an adjacent seating position. The design must be such that the 'Seat belt Assembly' so formed must comply with the requirements of clause 14 of the AS 2596-1983 "Seat belt Assemblies for Motor Vehicles". This requirement must apply irrespective of whether the wholly or partially engaged components will separate without operation of the unlatching device.

(2) In the case of 'lap-Sash Belt' assemblies not incorporating 'Emergency Locking Retractor', or 'Automatic Length Adjusting and Locking Retractors' fitted to outboard seating positions vehicles. The design must provide for a stowage feature for the part of the assembly which includes the 'Strap' designed to pass over the pelvis or torso of the occupant, to facilitate that part of assembly, when unlatched, being kept clear of the vehicle floor and the lower edge of the door opening.

B-a-7.Retractor:

(1) 'Emergency Locking Retractor' is a retractor incorporating a locking mechanism that is designed to lock under abnormal operating conditions.

(2) 'Automatic Length Adjusting and Locking Retractor' is a retractor incorporating a self actuating mechanism which automatically locks the retractor at webbing extension selected by the user.

C-a-1.Corrosion Resistance:

(1) The 'Seat Belt Assembly' must be conditioned by the procedure specified in the ASTM B117-64 "Standard Method of Salt Spray (Fog) Testing".

(2) The period of conditioning must be not less than 50 hours, and at the end of the conditioning procedure specified in clause (1) the 'Seat Belt Assembly' may be washed thoroughly with water to remove the salt. If washed, the webbing must be fully extended and allowed to dry for at least 24 hours in an atmosphere having a relative humidity of not less than 48% nor more than 67% and a temperature of not less than 21°C nor more than 25°C.

C-a-4. Webbing (Class D22)

(1) Width:	46 mm≤Width<76 mm (without load)
(2) Breaking strength:	≥22 kN at a speed to achieve the specified minimum breaking strength within 60±10 seconds

(3) Elongation:	5 %≤Elongation≤25 % at a speed to achieve 10 kN within 60 to 100 seconds
(4) Energy absorption:	
Hysteresis	≥60 % at a speed to achieve 10 kN within 60 to 100 seconds
Energy per meter:	not required
(5) Resistance to abrasion:	
Hex bar	≥80 % of mean dry breaking strength after 5000 oscillations
Component	≥75 % of dry breaking strength (and≥14.7 kN) after 2500 cycles
Sash Guide	≥75 % of dry breaking strength (and≥14.7 kN) after 50000 cycles
(6) Resistance to cold:	not required
(7) Resistance to heat:	not required
(8) Resistance to water:	not required for Polyester webbing
(9) Resistance to light:	≥70 % of mean dry breaking strength and ≥17.6 kN (80 % of minimum dry breaking strength required) after Ultraviolet Carbon Arc
(10) Colorfastness to light:	≥6 after Ultraviolet Carbon Arc
(11) Colorfastness to rubbing:	≥No.4
(12) Colorfastness to perspiration:	≥No.4

C-a-5. Buckle :

(1)Durability	Operating force of the spring shall not be reduced by ≥20% after releasing and latching of 50,000 times.
(2)Compressibility	N/R
(3)Partial engagement	Latch partially or release inadvertently.
(4)Releasing force	≥112N after 17.8±0.4kN is applied.

C-a-6. Length adjuster :

(1)Adjusting force	≤50N.
(2)Tilt lock angle	≥30°.

C-a-8. Retractors

'Emergency Locking Retractors'(other than 'Type 4N Retractors')

(1) Retraction Force	Must be not less than 2N nor more than 10 N before and after the durability test.
(2) Lock Position	Must lock when the retractor and any associated devices to sense acceleration are accelerated at not more than 5 m/s^2, the peak acceleration being attained in not less than 40 milliseconds. Must limit 'Strap' movement to not more than 30 mm, when the 'Strap' is withdrawn to a point which is 150±5 mm from the fully extended position and

	not more than 80 mm, when the 'Strap' is withdrawn to points 450±5 mm and 760±5 mm from the fully extended position. Must lock within 25 mm of 'Strap' extension at an acceleration of not more than 20 m/s^2. Must remain unlocked when the vehicle is tilted up to 12°. * All the above requirements must be met before and after the durability test.
(3) Durability	The strap must be withdrawn from the retractor an allowed to retract repeatedly until 40,000 cycles have been completed, and then satisfactorily complete a further 5,000 cycles (making 45,000 in all).
(4) Tensile Strength	Must withstand a tensile load of not less than 9kN after the durability test.

'Emergency Locking Retractors'('Type 4N Retractors')

(1) Retraction Force	Must be not less than 0.7 daN before and after the durability test if the retractor is part of a lap belt. Must be not less than 0.2 daN and not more than 0.7 daN before and after the durability test if the retractor is part of an upper torso restraint.
(2) Lock Position	The strap must not move more than 50 mm before the retractor locks: - at the vehicle deceleration of more than 0.85 $g^{/1}$; and - when its sensing device is tilted not less than 12°and not more than 40°. Must not lock until the strap moves more than 50 mm for values of acceleration of the strap measured in the direction of the extraction of the strap of less than 1.0 g. Must lock at a strap acceleration equal to or more than 2.0 g if the retractor has multiple sensitivities and one of them relates to strap extraction. * All the above requirements must be met before and after the durability test. $^{/1}$ 1g = 9.81 m/s^2
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 40,000 cycles have been completed, and then satisfactorily complete a further 5,000 cycles (making 45,000 in all).
(4) Tensile Strength	N/R

'Automatic Length Adjusting and Locking Retractors'

(1) Retraction Force	Must be not less than 2N nor more than 10N before and after the durability test.
(2) Lock Position	Must lock at least every 30 mm of 'Strap' extension when the 'Seatbelt Assembly' is correctly fitted for a '50 th

	Percentile 6 Years Old Child', with the 'Seat' in the rearmost riding position before and after the durability test.
(3) Durability	10,000 cycles.
(4)Tensile Strength	Must withstand a tensile load of not less than 9 kN before and after the durability test.

C-a-10.Assembly :	(Static test using body block, dynamic test)
(1)Breaking strength	17.8±0.4kN after static test.
(2)Elongation	Lap:≤180mm, other belts:≤260mm, after static test.
(3)Resistance to tensile load	No separation within itself or from any anchorage, and manual releasing of the buckle after dynamic test.
(4)Dummy displacement	N/R

D. Label:

(1)Each 'Seat belt Assembly' must be permanently and legibly marked with at least the manufacturer's name or trade mark, date of manufacture by month and year, and identification code. The identification code must be a number and / or symbol which uniquely identifies the 'Seat belt Assembly' or sub-assembly design.

Economy: Brunei Darussalam
Title of Standard: The Road Traffic Act chapter 68 Motor Vehicle (seat belts) Regulations, 1988
(Brunei accepts BS354:1960 or BS AU 160a as alternatives.)

A. Application

It applies to every motor car registered with the Department of Land Transport, but do not apply to:

a goods vehicle except a station wagon (goods-cum-passengers);
a public service vehicle except a private hire car and a taxi;
ambulances, fire engines and hearses.

B-a-1.Structure:

The assembly shall compare the following.

(1)Body-restraining components, incorporating a buckle.
(2)Load-carrying components, which may incorporate the body-restraining components or may restrain the chair in some types of assembly.
(3)Anchoring attachments, expect for type 4 devices where the chair assembly is attached to the car by the adult seat belt.
(4)Clips slides or other means of adjusting the body-restraining components.
(5)For types 1 and 2, car seat-restraining components and anchoring attachments.

The harness of a chair assembly shall include a crotch strap.

C-a-4. Webbing

(1) Width:	≥46 mm under load 9.8 kN
(2) Breaking strength:	≥14.7 kN at a speed of about 100 mm/min. or to achieve the specified minimum breaking strength within 60±10 seconds
(3) Elongation:	not required
(4) Energy absorption:	
Hysteresis:	not required
Energy per meter:	not required
(5) Resistance to abrasion:	Hex bar≥75 % of dry breaking strength (and≥14.7 kN) after 2500 cycles
(6) Resistance to cold:	≥75 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥75 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥75 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥75 % of dry breaking strength (and≥14.7 kN) after Carbon Arc
(10) Colorfastness to light:	not required
(11) Colorfastness to rubbing:	≥Rating 4
(12) Colorfastness to perspiration:	≥Rating 4

C-a-5. Buckle :

(1)Durability N/R

(2)Compressibility	N/R
(3)Partial engagement	N/R
(4)Releasing force	≤120N.

C-a-6. Length adjuster :	
(1)Adjusting force	≤50N.
(2)Tilt lock angle	N/R
C-a-7. Attachment Hardware	{Seat belt shall meet BS 3254:1960 or BS AU 160a, or such other specifications as the Director may approve from time to time.}
C-a-8. Retractors	{Seat belt shall meet BS 3254:1960 or BS AU 160a, or such other specification as the Director may approve from time to time.}
C-a-10.Assembly :	(Static test using body block, dynamic test)
(1)Breaking strength	18.0kN after static test.
(2)Elongation	N/R
(3)Resistance to tensile load	No total failure of any components, normal buckle releasing, and no separation of load-bearing parts from its mating part after each static and dynamic test).
(4)Dummy displacement	≤200mm (thigh pivot point), Belts with upper torso restraint: ≤300mm (datum point) after dynamic test.

Economy: Canada
Title of Standard:CMVSS209

A. Application

It applies to every vehicle, other than bus.

B-a-1.Structure:

(1)A seat belt assembly shall be designed for use by one, person at any one time.

(2)A Type 2 seat belt assembly shall provide upper-torso restraint without shifting the pelvic restraint into the abdominal region.

B-a-3.Buckle:

(1)The release mechanism of a seat belt assembly shall be accessible in both the stowed and operational positions to the occupant of the seat and shall, by a single push-button action,

(a) release the seat belt assembly at a single point; and

(b)release both the pelvic restraint and the upper torso restraint simultaneously.

B-a-4.Adjustment hardware:

(1)A Type 2 manual seat belt assembly shall be constructed such that, when a 50^{th} percentile adult male occupant is secured in place by the seat belt assembly, the intersection of the upper torso restraint and the pelvic restraint shall be at least 150 mm from the front vertical centerline of the occupant, measured along the centerline of the pelvic restraint, with

(a)any upper torso manual adjusting device adjusted in accordance with the manufacturer's instructions;

(b)the seat adjusted to its rearmost and lowest position; and

(c)the seat back adjusted to the manufacturer's nominal design riding position.

(2)When the seat is placed in any position, the seat back is placed in the manufacturer's nominal design riding position and any adjustable seat belt anchorage is placed in the manufacturer's nominal design position for a 50^{th} percentile adult male occupant, every pelvic restraint shall

(a)at the driver's designated seating position, be adjustable to fit any occupant whose dimensions range from those of a 5^{th} percentile adult female to those of a 95^{th} percentile adult male ; and

(b)at all other designated seating positions, be adjustable to fit any occupant whose dimensions range from those of a 50^{th} percentile six-year-old child to those of a 95^{th} percentile adult male.

B-a-6.Attachment hardware:

"Seat belt anchorage" means any component, other than the webbing or straps, involved in transferring seat belt load to the vehicle structure, including the attachment hardware, seat frames, seat pedestals, the vehicle structure and any part of the vehicle, the failure of which causes separation of the belt from the vehicle structure.

B-a-7.Retractor:

(1)An automatic-locking retractor shall

(a)engage the next locking position when a length of seat belt webbing between 19mm and 77mm has moved into the retractor, as measured from an initial position determined by extending the seat belt webbing to 75percent of its total length from the retractor; and

(b)if used on a vehicle seat has a suspension system, be attached to the seat portion of the vehicle seat.

C-a-4. Webbing:

(1) Width:	≥46 mm under load of 22 N and/or 9.8±0.4 kN
(2) Breaking strength:	(at a speed of between 50 and 100 mm/min.)
Type1	≥26.7 kN
Type2	≥22.2 kN (for pelvic)
Type2	≥17.8 kN (for upper torso)
(3) Elongation:	(under load of 11.1 kN)
Type1	≤20 %
Type2	≤30 % (for pelvic)
Type2	≤40 % (for upper torso)
(4) Energy absorption:	
Hysteresis:	not required
Energy per meter:	not required
(5) Resistance to abrasion:	(≥75 % of minimum dry breaking strength required after 2500 cycles)
Hex bar:	Type1≥20.0 kN
	Type2≥16.7 kN (for pelvic)
	Type2≥13.4 kN (for upper torso)
Manual adjusting device:	Type1≥20.0 kN
	Type2≥16.7 kN (for pelvic)
	Type2≥13.4 kN (for upper torso)
(6) Resistance to cold:	not required
(7) Resistance to heat:	not required
(8) Resistance to water:	not required
(9) Resistance to light:	≥60 % of dry breaking strength after Carbon Arc
(10) Colorfastness to light:	≥No.2 after Carbon Arc
(11) Colorfastness to rubbing:	≥Rating 3
(12) Colorfastness to perspiration:	not required

C-a-5. Buckle :

(1)Durability	Not fail, gall, or wear to an extent that normal latching and unlatching is impaired after cycling of 200 times.

(2)Compressibility	Not release under a force of 1,780N. Be operable and able to meet applicable requirements of following C-a-9 and C-a-10.
(3)Partial engagement	Release in any position by a force of ≤22N.
(4)Releasing force	≤133N.

C-a-6. Length adjuster :

(1)Adjusting force	≤49N.
(2)Tilt lock angle	≥30°.

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt	Shall withstand a force of 40 kN (9,000 pounds), except that such bolts need not withstand a force of more than 22.2 kN (5,000 pounds) if they are installed in such a manner that only one end of a seat belt assembly can be attached thereto;
(2) Tensile Strength of Attachment	Shall withstand a tensile force not less than 26.7 kN (6,000 pounds) without fracture of any section; and shall not move more than 2 mm inch) in either the vertical or horizontal direction. (single attachment hooks of the quick-disconnect type)

C-a-8. Retractors

Emergency-Locking Retractor

(1) Retraction Force	Must be at least 2.6 N (0.6 pound) under zero acceleration when attached only to a pelvic restraint. Must be not less than 0.9 N (0.2 pound) or more than 4.9 N (1.1 pounds) under zero acceleration when attached only to an upper torso restraint. Must be not less than 0.9 N (0.2 pound) or more than 6.7 N (1.5 pounds) under zero acceleration when attached to a strap or webbing that restrains both the upper torso and the pelvis. * All the above requirements must be met before the durability test. Must not be less than 50 percent of its original retraction force after the durability test.
(2) Lock Position	Must lock before the webbing extends 25 mm (1 inch) at an acceleration of 0.7 times. Must not lock before the webbing extends 50 mm (2 inches) at an acceleration of not more than 0.3 times if the retractor is sensitive to webbing withdrawal. Must not lock when the retractor is rotated in any direction to any angle of 15 degrees or less if the retractor is sensitive to vehicle acceleration. * All the above requirements must be met before and after the durability test.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 50,000 cycles have been completed when attached to an upper torso restraint.

(4) Tensile Strength	N/R

Automatic-Locking Retractor

(1) Retraction Force	Must be not less than at least 2.6 N (0.6 pound) under zero acceleration when attached to a pelvic restraint. Must be not less than 2N (0.45 pound) or more than 4.9 N (1.1 pounds) under zero acceleration when attached to an upper torso restraint.
(2) Lock Position	The webbing must not move more than 25 mm (1 inch) between locking positions of the retractor.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed when attached to a pelvic restraint.
(4) Tensile Strength	N/R

Non-Locking Retractor

(1) Retraction Force	Must be not more than 4.9 N (1.1 pounds).
(2) Residual Extension Length	The webbing may extend within 6 mm (0.25 inch) of maximum length.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed when attached to a pelvic restraint, and 50,000 cycles when attached to an upper torso restraint.
(4) Tensile Strength	N/R

C-a-9. <u>Load limiter :</u>	No need to meet the elongation requirement. In this case, it needs to be installed with automatic restraints, and needs to include such information in the label.

C-a-10.<u>Assembly :</u>	(Static test using loop)
(1)Breaking strength	Type 1 and type 2 (pelvic) : ≥11.1kN. Type 2 : ≥6,670N (upper torso). Type 2 : ≥13.3kN (common).
(2)Elongation	Type 1 : ≤360mm when 22.2kN is applied. Type 2 : ≤500mm (pelvic) when 11.1kN is applied. Type 2 : ≤500mm (upper torso) when 6,670N is applied.
(3)Resistance to tensile load	No complete fracture through any solid section of metal attachment hardware.
(4)Dummy displacement	N/R

Economy: Chile
Title of Standard: N/A

Economy: China
Title of Standard:GB14166-93

A. Application

It applies to safety belt assemblies for forward-facing seats on motor vehicles, "M" and "N", but not for side-facing seats and folding seats in aisles.

B-a-1.Structure:

"Seat belt assembly (hereinafter referred to as "the assembly")" means a whole seat belt assembly including webbings, buckles, length-adjusters, retractors and all hardware designed for installing such seat belt assembly in a motor vehicle.

B-a-2.Webbing:

"Webbing" means the narrow, soft strap-shaped portion of a seat belt that is intended to restrain the occupant on the seat concerned.

B-a-3.Buckle:

"Buckle" means the connector of a seat belt which is intended to fasten or release an occupant quickly in or from the seat belt assembly.

B-a-4.Adjustment Hardware:

"Length-adjuster" to adjust the length of the webbing means a portion of a seat belt which is provided to adjust the length of the webbing.

B-a-7.Retractor:

(1)"Retractor" means the device of a seat belt which is designed to wind off the accommodate part or the whole of the webbing of the seat belt.

(2)"Non-locking type retractor (hereinafter referred to as "NLR")" means a retractor equipped with no locking mechanism, from which the webbing can be extracted to its full length by a small external force and the restraint force can be sustained under a condition where the webbing has been extended fully.

(3)"Automatic locking retractor (hereinafter referred to as "ALR")" means a retractor from which the webbing can be extracted by a small external force. Furthermore, when the webbing is extended to a desired length and its extracting operation is stopped the webbing is locked automatically around this position and the restraint force can be sustained.

(4)"Emergency locking retractor (hereinafter referred to as "ELR")" means a retractor from which the webbing can be extracted by a small external force. Furthermore in an emergency the locking mechanism is actuated by the deceleration of the motor vehicle, the extracting speed of the webbing from the retractor or other factors, thereby sustaining force.

C-a-4. Webbing:

(1) Width:	≥46 mm under load of 9.81 kN
(2) Breaking strength:	(at a speed of about 100 mm/min.)

Lap	≥26.7 kN
Sash	17.7 kN
Lap-sash	≥22.3kN
(3) Elongation:	(under load of 11.1 kN)
Lap	≤20 %
Sash	≤40 %
Lap-sash	≤30 %
(4) Energy absorption:	(at a speed of about 100 mm/min. until 11.1 kN)
Hysteresis:	Lap≥50 %
	Sash≥60 %
	Lap-sash≥55 %
Energy per meter:	Lap≥539 N·m
	Sash≥1080 N·m
	Lap-sash≥784 N·m
(5) Resistance to abrasion:	(after 2500 cycles)
Hex bar:	≥60 % of dry breaking strength (and≥14.7 kN)
Manual adjusting device:	≥60 % of dry breaking strength (and≥14.7 kN)
(6) Resistance to cold:	≥60 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥60 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥60 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥60 % of dry breaking strength (and≥14.7 kN) after Carbon Arc
(10) Colorfastness to light:	not required
(11) Colorfastness to rubbing:	not required
(12) Colorfastness to perspiration:	not required

C-a-5. Buckle :

(1)Durability	Function normally after releasing and latching of 5,000 times.
(2)Compressibility	N/R
(3)Partial engagement	N/R
(4)Releasing force	≤137N after 22.3kN is applied.

C-a-6. Length adjuster :

(1)Adjusting force	≤49N.
(2)Tilt lock angle	N/R

C-a-10.Assembly :	(Static test using loop)
(1)Breaking strength	Type1and type 2 (lap):22.3kN
	Type 2:13.3kN (shoulder)
	Type 2:26.7kN (continuous)
(2)Elongation	Type 1 and type 2 (lap):≤180mm
	Type 2 (shoulder and continuous):≤250mm
(3)Resistance to tensile load	No buckle releasing. Assembly shall function normally.
(4)Dummy displacement	N/R

Economy: Hong Kong
Title of Standard: Safety Equipment Regulations

A. Application

It shall apply:

to every private car registered on or after 1 August 1976;
to every taxi registered on or after 1 January 1984;
with effect from 1 January 1986, to every taxi registered on or after 1 January 1981 and before 1 January 1984; and
to every light bus.

It shall not apply to:

a private car manufactured before 30 June 1964;
a taxi manufactured before 1 January 1981;
a light bus manufactured before 1 January 1984;
a private car, taxi or light bus while it is being used under a trade license issued or deemed to be issued under the Road Traffic (Registration and Licensing of Vehicles) Regulations; or a private car, taxi or light bus fitted with an alternative passive restraint system, designed to prevent or lessen injury to the driver and front seat passenger of the vehicle, approved in writing by the Commissioner.

C-a-4. Webbing:(Standard: BS AU 160a: 1971)

(1) Width:	≥46 mm under load 9.8 kN
(2) Breaking strength:	≥14.7 kN at a speed of about 100 mm/min. or to achieve the specified minimum breaking strength within 60±10 seconds
(3) Elongation:	not required
(4) Energy absorption:	
Hysteresis:	not required
Energy per meter:	not required
(5) Resistance to abrasion:	Hex bar≥75 % of dry breaking strength (and≥14.7 kN) after 2500 cycles
(6) Resistance to cold:	≥75 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥75 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥75 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥75 % of dry breaking strength (and≥14.7 kN) after Carbon Arc
(10) Colorfastness to light:	not required
(11) Colorfastness to rubbing:	≥Rating 4
(12) Colorfastness to perspiration:	≥Rating 4

C-a-5. Buckle :

(1)Durability	{It adopts the specifications on seat belt of the following countries:
(2)Compressibility	BS3254:1960/AU160a, BS A157a, ECE16-04, FMVSS209,
(3)Partial engagement	JIS4604(3-point belt only), AS E35:1965, E35PT II:1970, and
(4)Releasing force	NZS1662:1969.}

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt {It adopts the specifications on seat belt of the following countries:BS3254:1960/AU160a, BS A157a, ECE16-04, FMVSS209, JIS4604 (3-point belt only), AS E35:1965, E35PT II: 1970, and NZS1662:1969.}

C-a-8. Retractors {It adopts the specifications on seat belt of the following countries: BS 3254:1960/AU 160a, BS A157a, ECE16/04, FMVSS 209, JIS 4604(3-point belt only), AS E35:1965, E35PT II:1970, and NZS 1662:1969.}

Economy: Indonesia
Title of Standard: Regulation under Government Regulation of Rep. of Indonesia No.44/1993 on Vehicle and Drivers

A. Application
N/A

B-a-1.Structure:
The seat belts shall have two anchors or more and shall be installed to complete the driver's seat and the passenger's seat next to the driver's seat.

Economy: Japan
Title of Standard: Safety regulations for road vehicles, Article 22-3, and Technical standard for seat belt assemblies

A. Application

It shall applies to seat belt assemblies for ordinary-sized motor vehicles, small-sized motor vehicles or mini-sized motor vehicles (except two-wheeled motor vehicles with or without sidecars) with a maximum speed of 20 km/h or more. However, it does not apply to those seat belt assemblies for the following seats.

*Saddle seats.
*Folding seats in aisles, loading platforms or spaces other than those designed exclusively for installing seats (except those seats in which only the seat back section can be folded).
*Single seats at the side of the driver's seat of three-wheeled motor vehicles
*where the rotational angle of the steering wheel or bar is less than seven times the rotational angle of the steering tire.
*Side-facing seats.
*Seats near emergency exits.
*Seats for infants in infant-carrying vehicles.

B-a-1.Structure:

"Seat belt assembly (hereinafter referred to as "the assembly")" means a whole seat belt assembly including webbings, buckles, length-adjusters, retractors and all hardware designed for installing such seat belt assembly in a motor vehicle.

B-a-2.Webbing:

"Webbing" means the narrow, soft strap-shaped portion of a seat belt that is intended to restrain the occupant on the seat concerned.

B-a-3.Buckle:

"Buckle" means the connector of a seat belt which is intended to fasten or release an occupant quickly in or from the seat belt assembly.

(1)The buckles shall be designed so that it can be released by the wearer's one hand.
(2)For buckles of the Type 2 seat belt assemblies to be mounted on the driver's seat as well as on a seat contiguous to the side of the driver's seat and on the same row, they shall be so designed that they can be engaged by the wearer using one hand.
(3)The area and the minimum width of the section of a push-button type buckle to which a force must be applied for releasing the buckle, such as the push-button, etc. (hereinafter referred to as "the push-button, etc."), shall not be less than the values specified in Table 4. Furthermore, the surface of the push-button, etc. shall have a red color (limited to cases where the other portions of the buckle are of colors other than red colors) or the operating method shall be indicated by letters on the button etc.

Table4 Push button buckles

Shape of push-button	Area of push-button (cm^2)	Minimum width of push-button (cm)
Enclosed type	4.5	1.5
Other type	2.5	1.0

B-a-4.Adjustment Hardware:

"Length-adjuster" to adjust the length of the webbing means a portion of a seat belt which is provided to adjust the length of the webbing.

B-a-7. Retractor

(1)"Retractor" means the device of a seat belt which is designed to wind off the accommodate part or the whole of the webbing of the seat belt.

(2)"Non-locking type retractor (hereinafter referred to as "NLR")" means a retractor equipped with no locking mechanism, from which the webbing can be extracted to its full length by a small external force and the restraint force can be sustained under a condition where the webbing has been extended fully.

(3)"Automatic locking retractor (hereinafter referred to as "ALR")" means a retractor from which the webbing can be extracted by a small external force. Furthermore, when the webbing is extended to a desired length and its extracting operation is stopped the webbing is locked automatically around this position and the restraint force can be sustained.

(4)"Emergency locking retractor (hereinafter referred to as "ELR")" means a retractor from which the webbing can be extracted by a small external force. Furthermore in an emergency the locking mechanism is actuated by the deceleration of the motor vehicle, the extracting speed of the webbing from the retractor or other factors, thereby sustaining force.

C-a-3.Flammability

It should be suitable for whichever the following;

(1)The specimen shall not burn.

(2)The specimen shall not burn at a rate of more then 100mm per minute.

(3)If material stops burning before it has burned for 60 seconds from the arrival at line A of burning and has not burned more then 50mm from the point where burning reached line A.

C-a-4. Webbing:

(1) Width:	≥46 mm under load of 9.81 kN
(2) Breaking strength:	(at a speed of about 100 mm/min.)
Lap	≥26.7 kN
Sash	≥17.7 kN
Lap-sash	≥22.3 kN

(3) Elongation:	(under load of 11.1 kN)
Lap	≤20 %
Sash	≤40 %
Lap-sash	≤30 %
(4) Energy absorption:	(at a speed of about 100 mm/min. until 11.1 kN)
Hysteresis:	Lap≥50 %
	Sash≥60 %
	Lap-sash≥55 %
Energy per meter:	Lap≥539 N·m
	Sash≥1080 N·m
	Lap-sash≥784 N·m
(5) Resistance to abrasion:	(after 2500 cycles)
Hex bar:	≥60 % of dry breaking strength (and≥14.7 kN)
Manual adjusting device:	≥60 % of dry breaking strength (and≥14.7 kN)
(6) Resistance to cold:	≥60 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥60 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥60 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥60 % of dry breaking strength (and≥14.7 kN) after Carbon Arc
(10) Colorfastness to light:	not required
(11) Colorfastness to rubbing:	not required
(12) Colorfastness to perspiration:	not required

C-a-5. Buckle :

(1)Durability	No damage or excessive wear after normal latching and releasing of 5,000 times.
(2)Compressibility	N/R
(3)Partial engagement	N/R
(4)Releasing force	≤14kgf/137N after 22.3kN is applied.

C-a-6. Length adjuster :

(1)Adjusting force	≤5kgf or 49N.
(2)Tilt lock angle	N/R

C-a-8. Retractors

Emergency Locking Retractor

(1) Retraction Force	Must be 0.27 kgf (2.6 N) or more for the webbing for lap. Must be between 0.1 kgf (1N) and 0.7 kgf (7N) for the webbing for shoulder and the shoulder-to-lap continuous webbing.
(2) Lock Position	Must lock at a webbing extension length of not more than 25 mm at an acceleration of 0.7 G(Vehicle sensing type).

	Must not lock when the retractor is tilted 12°(Vehicle & multiple sensing type). Must not lock at the webbing extension length of not more than 50 mm at an acceleration of 0.3 G(Webbing sensing type). Must lock at the webbing extension length of not more than 25 mm at an acceleration of 0.7 G(Webbing sensing type). Must lock at the webbing extension length of not more than 50 mm at an acceleration of 2.0 G(Multiple sensing type).
(3) Durability	The webbing must be withdrawn from the retractor and allowed to retract repeatedly until 50,000 cycles have been completed.
(4) Tensile Strength	N/R

Automatic Locking Retractor

(1) Retraction Force	Must be 0.27 kgf (2.6 N) or more for the webbing for lap. Must be between 0.1 kgf (1N) and 0.7 kgf (7N) for the webbing for shoulder and the shoulder-to-lap continuous webbing.
(2) Lock Position	Must lock at a webbing displacement of not more than 25 mm.
(3) Durability	The webbing must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed.
(4) Tensile Strength	N/R

Non-Locking Retractor

(1) Retraction Force	Same as Emergency Locking Retractor.
(2) Durability	Same as Automatic Locking Retractor
(3) Residual Extension Length	Not exceed 6 mm.
(4) Tensile Strength	N/R

C-a-10.<u>Assembly :</u>	(Static test using loop, dynamic test)
(1)Breaking strength	Type 1 and type 2 (lap): 22.3kN, Type 2: 13.3kN (shoulder), Type 2: 26.7kN (continuous), after static test.
(2)Elongation	Lap:≤180mm, shoulder and continuous:≤250mm (No need to meet it with some conditions), after static test.
(3)Resistance to tensile load	No breakage, or no detachment, cracks or deformation in any parts that would influence normal function, and buckle normal functioning after dynamic test.
(4)Dummy displacement	Pelvic:80~200mm, chest:100~400mm (No need to meet it with some conditions), after dynamic test.

Economy: Korea
Title of Standard: KMVSS27, 103, and Korean Standard (KS R 4027-1990)

A. Application

It shall apply to each motor vehicle (except city motor buses).

B-a-1.Structure:

Each seat, the driver's seat and passenger seat parallel to the driver's seat of a passenger vehicle shall be equipped with a 3-point seat belt. However, a 2-point seat belt may be installed in a seat in the middle or other seats where the installation of a 3-point seat belt is difficult because of the seat or vehicle structure.

C-a-4. Webbing:(KS R 4027-1990)

(1) Width:	≥46 mm under load of 9.8 kN
(2) Breaking strength:	(at a speed of about 100 mm/min.)
Lap	≥26.7 kN
Sash	≥17.8 kN
Lap-sash	≥22.3 kN
(3) Elongation:	(under load of 11.1 kN)
Lap	≤20 %
Sash	≤40 %
Lap-sash	≤30 %
(4) Energy absorption:	(at a speed of about 100 mm/min. until 11.1 kN)
Hysteresis:	Lap≥50 %
	Sash≥60 %
	Lap-sash≥55 %
Energy per meter:	Lap≥539 N·m
	Sash≥1080 N·m
	Lap-sash≥785 N·m
(5) Resistance to abrasion:	(after 2500 cycles)
Hex bar:	≥75 % of dry breaking strength (and≥14.7 kN)
Manual adjusting device:	≥75 % of minimum dry breaking strength required (and≥14.7 kN)
(6) Resistance to cold:	≥80 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥80 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥75 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥60 % of dry breaking strength after Carbon Arc (and≥14.7 kN)
(10) Colorfastness to light:	≥No.2 after Carbon Arc
(11) Colorfastness to rubbing:	≥No.3
(12) Colorfastness to perspiration:	Change in color≥Rating 3
	Staining≥Rating 4

C-a-5. Buckle :

(1)Durability	No damage, abrasion, etc after latching and releasing of 5,000times.
(2)Compressibility	Not release, and function normally under a load of 1.8kN.
(3)Partial engagement	N/R
(4)Releasing force	≤140N after 22.3kN is applied. In case of seat belts with EA device, the loading force is 330±20N.

C-a-6. Length adjuster :

(1)Adjusting force	≤50N.
(2)Tilt lock angle	≥30°.

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt	Single type ≥22.3 kN Double type ≥40.0 kN
(2) Tensile Strength of Attachment	Shall not move more than 2 mm in either the vertical or horizontal direction. (single attachment hooks of the quick-disconnect type)

C-a-8. Retractors

Emergency Locking Retractor

(1) Retraction Force	Must be 0.27 kgf (2.6 N) or more for the webbing for lap. Must be between 0.1 kgf (1N) and 0.7 kgf (7N) for the webbing for shoulder and the shoulder-to-lap continuous webbing.
(2) Lock Position	Must lock at a webbing extension length of not more than 25 mm at an acceleration of 0.7 G(Vehicle sensing type). Must not lock when the retractor is tilted 12 °(Vehicle & multiple sensing type). Must not lock at the webbing extension length of not more than 50 mm at an acceleration of 0.3 G (Webbing sensing type). Must lock at the webbing extension length of not more than 25 mm at an acceleration of 0.7 G(Webbing sensing type). Must lock at the webbing extension length of not more than 50 mm at an acceleration of 2.0 G(Multiple sensing type).
(3) Durability	The webbing must be withdrawn from the retractor and allowed to retract repeatedly until 50,000 cycles have been completed.
(4) Tensile Strength	N/R

Automatic Locking Retractor

(1) Retraction Force	Must be 0.27 kgf (2.6 N) or more for the webbing for lap. Must be between 0.1 kgf (1N) and 0.7 kgf (7N) for the webbing for shoulder and the shoulder-to-lap continuous webbing.
(2) Lock Position	Must lock at a webbing displacement of not more than 25 mm.
(3) Durability	The webbing must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed.
(4) Tensile Strength	N/R

Non-Locking Retractor

(1) Retraction Force	Same as Emergency Locking Retractor.
(2) Durability	Same as Automatic Locking Retractor
(3) Residual Extension Length	Not exceed 6 mm.
(4) Tensile Strength	N/R

C-a-9. Load limiter :	Those constructed with webbing: tensile strength ≥14.7kN. Others: no damage, crack, or deformation after dynamic test. No need to meet elongation requirement.
C-a-10.Assembly :	(Static test using loop, dynamic test)
(1)Breaking strength	Lap:22.3kN, shoulder:13.3kN, continuous:26.7kN, after static test.
(2)Elongation	Lap:≤180mm, shoulder and continuous:≤250mm, after static test.
(3)Resistance to tensile load	No deformation or crack and breakage which would influence normal function and no damage on dummies, after dynamic test.
(4)Dummy displacement	Lap:80~200mm, shoulder:100~400mm, after dynamic test.

Economy: Malaysia
Title of Standard: Motor Vehicle (Safety Seat Belt) Rules, 1978 [P.U.(A)378/1978]
Malaysian Standard 6.29:1978, 6.3:1972

A. Application

It applies to motor vehicles except:

a good vehicle having a maximum permissible laden weight exceeding forty hundred weights;

a motor cycle and a pedestrian-controlled vehicle;

a motor vehicle constructed with more than fourteen seats inclusive of the driver's seat; and

which was registered prior to the 1st January 1967.

B-a-1.Structure :

(1)Every front seat of a motor vehicle shall be fitted with a safety seatbelt with three)Every safety seat-belt shall consist of -

(a)the full harness belt or the lap and diagonal strap belt; and

(b)a buckle of quick-release pattern which cannot be unclipped accidentally and has built-in anchorage points located in the best position for such fitting.

(2provision for adjustment to suit the weather.

(3)Notwithstanding paragraph (1), where by reason of the nature and construction of a motor vehicle to which paragraph (1) applies it is not possible or practicable to have the three built-in anchorage points in respect of the safety seat-belt for the middle seat of a front bench seat or for any other front seat, the safety seat-belt for such seat may consist only of the lap belt and the buckle referred to in paragraph (2) (b).

C-a-4. Webbing (MS 6.3: 1972)

(1) Width:	≥46 mm under load 9.8 kN
(2) Breaking strength:	≥14.7 kN at a speed of about 100 mm/min. or to achieve the specified minimum breaking strength within 60±10 seconds
(3) Elongation:	not required
(4) Energy absorption:	
Hysteresis:	not required
Energy per meter:	not required
(5) Resistance to abrasion:	Hex bar≥75 % of dry breaking strength (and≥14.7 kN) after 2500 cycles
(6) Resistance to cold:	≥75 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥75 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥75 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥75 % of dry breaking strength (and≥14.7 kN) after Carbon Arc
(10) Colorfastness to light:	not required
(11) Colorfastness to rubbing:	not required
(12) Colorfastness to perspiration:	not required

C-a-5. Buckle :

(1)Durability	Withstand repeated operation of 5,000 times.
(2)Compressibility	N/R
(3)Partial engagement	No partial engagement which allows it to open inopportunely.
(4)Releasing force	≤120N (27lb.)

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt	{Shall comply with the following standards: MS6.3:1972, MS6.29:1978, BS AU160a: 1971, BS3254, ECE16, JIS4604•4603, FMVSS208, and ADR4•4A•4B•4C.}

C-a-8. Retractors {Shall comply with the following standards: MS6.3:1972, MS6.29:1978, BS AU 160a:1971, BS3254, ECE16, JIS 4604•4603, FMVSS 208, and ADR4•4A•4B•4C}

'Emergency Locking Retractors'(other than 'Type 4N Retractors')

(1) Retraction Force	Must be not less than 2N nor more than 5 N before and after the durability test.
(2) Lock Position	Must lock when the retractor and any associated devices to sense acceleration are accelerated at not more than 0.5 g, the peak acceleration being attained in not less than 50±25 milliseconds. Must limit 'Strap' movement to not more than 25 mm, when the 'Strap' is withdrawn to a point which is 150±3 mm from the fully extended position and not more than 75 mm, when the 'Strap' is withdrawn to points 450±3 mm and 760±3 mm from the fully extended position. Must lock within 25 mm of 'Strap' extension at an acceleration of not more than 20 m/s^2. Must remain unlocked when the vehicle is tilted up to 12°. * All the above requirements must be met before and after the durability test.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 40,000 cycles have been completed, and then satisfactorily complete a further 5,000 cycles (making 45,000 in all).
(4) Tensile Strength	N/R

"Automatic Locking Retractors'

(1) Retraction Force	Must be 0.25 kgf (2.6N) or more for the webbing for lap. Must be between 0.2 kgf (2N) and 0.5 kgf (7N) for the webbing for shoulder and the shoulder-to-lap continuous webbing.
(2) Lock Position	Must lock at a webbing displacement of not more than 25 mm.
(3) Durability	The webbing must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed.
(4) Tensile Strength	N/R

Non-Locking Retractor

(1) Retraction Force	Same as Emergency Locking Retractor.
(2) Durability	Same as Automatic Locking Retractor
(3) Residual Extension Length	Not exceed 6 mm.
(4) Tensile Strength	N/R

C-a-10.<u>Assembly :</u>	(Static test using loop, dynamic test) Followings are required after each test.
(1) Breaking strength	Withstand a load of 17.5kN (4000lb.).
(2) Elongation	≤200mm (8in.) at lap level, ≤300mm at chest level, after tested statically and dynamically.
(3) Resistance to tensile load	No total failure and no separation of any load-bearing components from each mating part. Normal buckle releasing. No significant failure of stitching.
(4) Dummy displacement	(the same requirement as elongation)

Economy: Mexico
Title of Standard: Secretary of Communications and Transports

A. Application
N/A

Economy: New Zealand
Title of Standard: Transport(Vehicle Standards) Regulations 1990: Part II reg 29
AS/NZS 2596:1995

A. Application
It applies to every motorcar or goods service vehicle with a gross vehicle mass of less than 3500 kg.

B-a-1.Structure:
(1)Every motorcar or goods service vehicle with a gross vehicle mass of less than 3500 kg shall be fitted with three - point lap and diagonal seat belts for the use of the driver and any passenger who may occupy the sitting position (if any) nearest the opposite side of the vehicle to the driver.

C-a-4. Webbing (Class D22)(Standard: NZS 5432-1990 (same as AS 1753-1990))

(1) Width:	46 mm≤Width<76 mm (without load)
(2) Breaking strength:	≥22 kN at a speed to achieve the specified minimum breaking strength within 60±10 seconds
(3) Elongation:	5 %≤Elongation≤25 % at a speed to achieve 10 kN within 60 to 100 seconds
(4) Energy absorption:	
Hysteresis	≥60 % at a speed to achieve 10 kN within 60 to 100 seconds
Energy per meter:	not required
(5) Resistance to abrasion:	
Hex bar	≥80 % of mean dry breaking strength after 5000 oscillations
(6) Resistance to cold:	not required
(7) Resistance to heat:	not required
(8) Resistance to water:	not required for Polyester webbing
(9) Resistance to light:	≥70 % of mean dry breaking strength and ≥17.6 kN (80 % of minimum dry breaking strength required) after Ultraviolet Carbon Arc
(10) Colorfastness to light:	≥6 after Ultraviolet Carbon Arc
(11) Colorfastness to rubbing:	≥No.4
(12) Colorfastness to perspiration:	≥No.4

C-a-5. Buckle :

(1)Durability	Operating force of the spring shall not be reduced by ≥20% after releasing and latching of 50,000 times.
(2)Compressibility	N/R
(3)Partial engagement	Latch partially or release inadvertently.
(4)Releasing force	≤112N after 17.8±0.4kN is applied.

C-a-6. Length adjuster :

(1)Adjusting force	≤50N.
(2)Tilt lock angle	≥30°.

C-a-8. Retractors

'Emergency Locking Retractors'

(1) Retraction Force	Must be not less than 2N nor more than 10 N before and after the durability test.
(2) Lock Position	Must lock within 25 mm when the retractor and any associated devices to sense acceleration are accelerated at not more than 8 m/s^2 (Single-sensitive). Must lock when the retractor and any associated devices to sense acceleration are accelerated at not more than 5 m/s^2, the peak acceleration being attained in not less than 40 milliseconds. Must limit 'Strap' movement to not more than 30 mm, when the 'Strap' is withdrawn to a point which is 150±5 mm from the fully extended position and not more than 80 mm, when the 'Strap' is withdrawn to points 450±5 mm and 760±5 mm from the fully extended position. Must lock within 25 mm of 'Strap' extension at an acceleration of not more than 20 m/s^2. Must remain unlocked when the vehicle is tilted up to 12°(Dual-sensitive). * All the above requirements must be met before and after the durability test.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 45,000 cycles have been completed, and then satisfactorily complete a further 5,000 cycles (making 50,000 in all).
(4) Tensile Strength	Must withstand a tensile load of not less than 9kN after the durability test.

'Automatic Length Adjusting and Locking Retractors'

(1) Retraction Force	Must be not less than 2N nor more than 10N before and after the durability test.
(2) Lock Position	Must lock at least every 30 mm of 'Strap' extension when the 'Seatbelt Assembly' is correctly fitted for a '50 th Percentile 6 Years Old Child', with the 'Seat' in the rearmost riding position before and after the durability test.
(3) Durability	10,000 cycles.
(4)Tensile Strength	Must withstand a tensile load of not less than 9 kN before and after the durability test.

C-a-10.Assembly :	(Static test using body block, dynamic test)
(1)Breaking strength	17.8±0.4kN after static test.

(2)Elongation	Lap:≤180mm, other belts:≤260mm, after static test.
(3)Resistance to tensile load	No separation within itself or from any anchorage, and manual releasing of the buckle after dynamic test.
(4)Dummy displacement	N/R

Economy: Papua New Guinea
Title of Standard: N/A

Economy: Philippines
Title of Standard: N/A

Economy: Singapore
Title of Standard: Road Traffic (Motor Vehicles, Construction and Use) Rules:
(It adopts seat belts specification of BS AU160a)

A. Application

It applies to every motor car and motor car used for instructional purposes, every business service vehicle, every light goods vehicle, every private hire car, every station wagon (goods-cum-passengers), every ambulance, fire engine and hearse, every heavy goods vehicle registered on or after 1st January 1973 and every taxi.

B-a-1.Structure:

The assembly shall compare the following.

(1)Body-restraining components, incorporating a buckle.
(2)Load-carrying components, which may incorporate the body-restraining components or may restrain the chair in some types of assembly.
(3)Anchoring attachments, expect for type 4 devices where the chair assembly is attached to the car by the adult seat belt.
(4)Clips slides or other means of adjusting the body-restraining components.
(5)For types 1 and 2, car seat-restraining components and anchoring attachments.

The harness of a chair assembly shall include a crotch strap.

C-a-4. Webbing:

(1) Width:	≥46 mm under load 9.8 kN
(2) Breaking strength:	≥14.7 kN at a speed of about 100 mm/min. or to achieve the specified minimum breaking strength within 60±10 seconds
(3) Elongation:	not required
(4) Energy absorption:	
Hysteresis:	not required
Energy per meter:	not required
(5) Resistance to abrasion:	Hex bar≥75 % of dry breaking strength (and≥14.7 kN) after 2500 cycles
(6) Resistance to cold:	≥75 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥75 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥75 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥75 % of dry breaking strength (and≥14.7 kN) after Carbon Arc
(10) Colorfastness to light:	not required
(11) Colorfastness to rubbing:	≥Rating 4
(12) Colorfastness to perspiration:	≥Rating 4

C-a-5. Buckle :

(1)Durability	N/R
(2)Compressibility	N/R

(3)Partial engagement	N/R
(4)Releasing force	≤120N.

C-a-6. Length adjuster :

(1)Adjusting force	≤50N.
(2)Tilt lock angle	N/R

C-a-8. Retractors

Emergency Locking Retractor

(1) Retraction Force	Must be not less than 7 N before and after the durability test when attached to a lap belt. Must be not less than 2.0 N and not more than 10.0 N before and after the durability test when attached to an upper torso restraint.
(2) Lock Position	Must lock at a retractor deceleration or acceleration not exceeding 0.5 g.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 50,000 cycles have been completed.
(4) Tensile Strength	N/R

Automatic Locking Retractor

(1) Retraction Force	Must be not less than 7.0 N before and after the durability test when attached to a lap belt. Must be not less than 2.0 N and not more than 10.0 N before and after the durability test when attached to an upper torso restraint.
(2) Lock Position	Must not move more than 25 mm between locking positions.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed.
(4) Tensile Strength	N/R

Manually Unlocking Retractor

(1) Retraction Force than	The strap must extract within 6 mm at a tension of not more 22.0 N.
(2) Lock Position	Must not move more than 25 mm between locking positions.
(3) Durability to	The strap must be withdrawn from the retractor and allowed retract repeatedly until 10,000 cycles have been completed.

C-a-10.Assembly :	(Static test using body block, dynamic test)
(1)Breaking strength	18.0kN after static test.
(2)Elongation	N/R
(3)Resistance to tensile load	No total failure of any components, normal buckle releasing, and no separation of load-bearing parts from its mating part after each static and dynamic test.
(4)Dummy displacement	≤200mm from thigh pivot point,

Belts with upper torso restraint: ≤300mm (shoulder), after dynamic test.

Economy: Chinese Taipei
Title of Standard: Chinese National Standard 3972, 3973

A. Application
It applies to seat belts for motor vehicle.

B-a-1.Structure:
"Seat belt assembly (hereinafter referred to as "the assembly")" means a whole seat belt assembly including webbings, buckles, length-adjusters, retractors and all hardware designed for installing such seat belt assembly in a motor vehicle.

B-a-2.Webbing:
"Webbing" means the narrow, soft strap-shaped portion of a seat belt that is intended to restrain the occupant on the seat concerned.

B-a-3.Buckle:
"Buckle" means the connector of a seat belt which is intended to fasten or release an occupant quickly in or from the seat belt assembly.

B-a-4.Adjustment Hardware:
"Length-adjuster" to adjust the length of the webbing means a portion of a seat belt which is provided to adjust the length of the webbing.

B-a-7.Retractor:
(1)"Retractor" means the device of a seat belt which is designed to wind off the accommodate part or the whole of the webbing of the seat belt.
(2)"Non-locking type retractor (hereinafter referred to as "NLR")" means a retractor equipped with no locking mechanism, from which the webbing can be extracted to its full length by a small external force and the restraint force can be sustained under a condition where the webbing has been extended fully.
(3)"Automatic locking retractor (hereinafter referred to as "ALR")" means a retractor from which the webbing can be extracted by a small external force. Furthermore, when the webbing is extended to a desired length and its extracting operation is stopped the webbing is locked automatically around this position and the restraint force can be sustained.
(4)"Emergency locking retractor (hereinafter referred to as "ELR")" means a retractor from which the webbing can be extracted by a small external force. Furthermore in an emergency the locking mechanism is actuated by the deceleration of the motor vehicle, the extracting speed of the webbing from the retractor or other factors, thereby sustaining force.

C-a-4. Webbing:

(1) Width:	≥46 mm under load of 9.8 kN
(2) Breaking strength:	(at a speed of about 100 mm/min.)
Lap	≥26.7 kN

Sash	≥17.8 kN
Lap-sash	≥22.3kN
(3) Elongation:	(under load of 11.1 kN)
Lap	≤20 %
Sash	≤40 %
Lap-sash	≤30 %
(4) Energy absorption:	(at a speed of 100 mm/min. until the load of 11.1 kN)
Hysteresis:	Lap≥50 %
	Sash≥60 %
	Lap-sash≥55 %
Energy per meter:	Lap≥539 N·m
	Sash≥1080 N·m
	Lap-sash≥785 N·m
(5) Resistance to abrasion:	(after 2500 cycles)
Hex bar:	≥75 % of dry breaking strength (and≥14.7 kN)
Manual adjusting device:	≥75 % of minimum dry breaking strength required (and≥14.7 kN)
(6) Resistance to cold:	≥80 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥80 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥75 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥60 % of dry breaking strength (and≥14.7 kN)
(10) Colorfastness to light:	≥Rating 2
(11) Colorfastness to rubbing:	≥Rating 3
(12) Colorfastness to perspiration:	Change in color≥Rating 3
	Staining≥Rating 4

C-a-5. Buckle :

(1)Durability	Not be hurt or worn after releasing and latching of 5,000 times.
(2)Compressibility	Not become loose when 1.8kN is applied. It shall function normally.
(3)Partial engagement	N/R
(4)Releasing force	≤140N after 22.3kN is applied. In case of seat belts with EA device, the loading force is 330±20N.

C-a-6. Length adjuster :

(1)Adjusting force	≤50N.
(2)Tilt lock angle	≥30°.

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt	Single type ≥ 22.3 kN
	Double type ≥ 40.0 kN
(2) Tensile Strength of Attachment	Shall not move more than 2 mm in either the vertical or horizontal direction; (single

attachment hooks of the quick-disconnect type)

C-a-8. Retractors (Standard 3972, 3973, 4119)

Emergency Locking Retractor

(1) Retraction Force	Must be 0.27 kgf (2.6 N) or more for the webbing for lap. Must be between 0.1 kgf (1N) and 0.7 kgf (7N) for the webbing for shoulder and the shoulder-to-lap continuous webbing.
(2) Lock Position	Must lock at a webbing extension length of not more than 25 mm at an acceleration of 0.7 G(Vehicle sensing type). Must not lock when the retractor is tilted 12 °(Vehicle & multiple sensing type). Must not lock at the webbing extension length of not more than 50 mm at an acceleration of 0.3 G(Webbing sensing type). Must lock at the webbing extension length of not more than 25 mm at an acceleration of 0.7 G(Webbing sensing type). Must lock at the webbing extension length of not more than 50 mm at an acceleration of 2.0 G(Multiple sensing type).
(3) Durability	The webbing must be withdrawn from the retractor and allowed to retract repeatedly until 50,000 cycles have been completed.
(4) Tensile Strength	N/R

Automatic Locking Retractor

(1) Retraction Force	Must be 0.27 kgf (2.6 N) or more for the webbing for lap. Must be between 0.1 kgf (1N) and 0.7 kgf (7N) for the webbing for shoulder and the shoulder-to-lap continuous webbing.
(2) Lock Position	Must lock at a webbing displacement of not more than 25 mm.
(3) Durability	The webbing must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed.
(4) Tensile Strength	N/R

Non-Locking Retractor

(1) Retraction Force	Same as Emergency Locking Retractor.
(2) Durability	Same as Automatic Locking Retractor
(3) Residual Extension Length	Not exceed 6 mm.
(4) Tensile Strength	N/R

C-a-9. Load limiter :	Those constructed with webbing: tensile strength ≥14.7kN. Others: no damage, crack, or deformation after dynamic test
C-a-10.Assembly :	(Static test using loop, dynamic test)
(1)Breaking strength	Lap:22.3kN, shoulder:13.3kN, continuous:26.7kN after static test.
(2)Elongation	Lap:≤180mm, shoulder and continuous:≤250mm, after static test.
(3)Resistance to tensile load	No deformation or crack and breakage which would influence normal function and no damage on dummies, after dynamic test.
(4)Dummy displacement	Lap:80~200mm, shoulder:100~400mm, after dynamic test.

D. Label:

Each Seat belt must be marked as follows;

(1) Standard name or number of CNS
(2) Model or mark
(3) Type of retractor
(4) Manufacture’s name or trade mark
(5) Date of manufacture by month and year
(6) Number of manufacture

Economy: Thailand
Title of Standard: Thai Industrial Standard, (TIS 721-2539)

A. Application

It applies to the following:

Public car (taxi) except motor tricycle taxi and small-wheel taxi

Service car (green license plate)

Private passenger car having not more than 15 seats whose vehicle weight not exceeding 1,600 kg. and private pick-up whose vehicle weight not exceeding 1,600 kg. Except private motor tricycle and private small-wheel vehicle.

B-a-1.Structure:

"Waist belt" means an accessory consisting of waist belt, buckle, length adjuster, and other fittings for use in the waist area.

"Waist-shoulder continuous belt" means accessory consisting of continuous belt bands, buckle length adjuster, other fittings for use in the waist and shoulder areas.

B-a-2.Webbing:

"Webbing" means that part of a seat belt which is made of natural fiber and / or artificial fiber shaped into a flat band.

(1)"Waist webbing" means the belt band which goes around the waist area.

(2)"Waist-shoulder continuous webbing" means belt bands which have lengths joining into one belt unit and are used in the areas of the waist and the shoulder.

Belts shall be made of natural fiber and / or artificial fiber and shall flat in shape. Belts shall also be tear-resistant, flexible, and with no connecting traces, signs of tearing, or flows that will affect their performance.

B-a-3.Buckle:

"Buckle" means an accessory for buckling or releasing the seat belt quickly.

(1)Buckles shall have a smooth surface, be without pointed and sharp parts, and be of sizes and shapes which will not endanger the users.

(2)The buckle release button shall be red in color and shall have the word "Press" which cannot be easily erased.

B-a-4.Adjustment hardware:

"Length adjuster" means an accessory for adjusting the belt band to an appropriate length for the user. Length adjuster accessory must have a smooth surface, be without pointed or sharp parts, and shall be capable of conveniently adjusting the length and the belt without having to move from the set position.

B-a-5.Slip Guide:

"Slip guide" means an accessory for changing the direction of the belt ban. Slip guides must have a smooth surface, be without pointed or sharp parts, and shall not cause the belt to be damaged while in use. Testing shall be done by inspection.

B-a-6.Attachment hardware:

"Fitting" means a part which attaches the seat belt to the automobile's chassis and / or a components of the automobile's fittings used with waist-shoulder continuos webbing. The part which is used in the shoulder area is called upper fitting, and the fitting used in the waist area is called lower fitting.

B-a-7.Retractor:

"Retractor" means accessory for pulling the belt band back into belt storage device.

(1)"Automatically locking retractor (ALR)" means accessory for automatically retracting the belt at a length pre-selected by the user.

(2)"Emergency locking retractor (ELR)" means accessory which retracts the appropriate length automatically, allowing users to move freely, but this accessory will lock the belt band automatically when the automobile is suddenly accelerated in a direction and / or when the belt band is suddenly pulled as in the case of a collision, a roll-over, or a collision from the rear.

(3)Retractors must have a smooth surface, without pointed or sharp parts which may endanger the users, and shall not cause the belt to twist of be easily damaged.

C-a-4. Webbing:(TIS 721-1996)

(1) Width:	≥46 mm under load of 9.8 kN
(2) Breaking strength:	(at a speed of 100 mm/min.)
Lap	≥27.0 kN
Lap-sash	≥23.0 kN
(3) Elongation:	(under load of 11.1 kN)
Lap	≤20 %
Lap-sash	≤30 %
(4) Energy absorption:	(at a speed of 100 mm/min. until the load of 11.1 kN)
Hysteresis:	Lap≥50 %
	Lap-sash≥55 %
Energy per meter:	Lap≥539 N·m
	Lap-sash≥785 N·m
(5) Resistance to abrasion:	Hex bar≥75 % of minimum dry breaking strength required after 2500 cycles
(6) Resistance to cold:	not required
(7) Resistance to heat:	≥80 % of minimum dry breaking strength required
(8) Resistance to water:	≥75 % of minimum dry breaking strength required
(9) Resistance to light:	not required
(10) Colorfastness to light:	≥No.2 after Xenon Arc
(11) Colorfastness to rubbing:	≥No.2
(12) Colorfastness to perspiration:	Change in color≥No.3
	Staining≥No.3

C-a-5. Buckle

(1)Durability	No damage after latching and releasing of 5,000 times.
(2)Compressibility	N/R
(3)Partial engagement	N/R

(4)Releasing force ≤140N after 670±40N is applied.

C-a-6. Length adjuster :(TIS721-2539)

(1)Adjusting force ≤40N

(2)Tilt lock angle N/R

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt Shall withstand a force of 40 kN

(2) Tensile Strength of Attachment N/R

C-a-8. Retractors

Emergency Locking Retractor

(1) Retraction Force — Must not be less than 2.6 Newton for the two point seat belt, and must be between 2 and 5 Newton for the three point style before and after the durability test.
Must not be less than half of the value in the durability test.

(2) Lock Position — Must not lock the webbing at an acceleration of 2.9 metre per second^2, and the amount of webbing pulled out when locking shall be more than 50 mm.
Must lock the webbing at an acceleration of 19.6 metre per second^2, and the amount of webbing pulled out shall not exceed 50 mm.
The maximum permitted movement of webbing before locking is 25 mm at 6.9 m/s^2.
Must not lock when the inclination of the retractor is no more than 12°.
* All the above requirements must be met before and after the durability test.

(3) Durability — 50,000 cycles.

(4) Tensile Strength — II point; Shall withstand load of not less than 11.1 kN.
III point; Shall withstand load of not less than 6.7 kN.

Automatic Locking Retractor

(1) Retraction Force — Must be between 2.5 and 5 Newton before and after the durability test.
Must not be less than half of the value in the durability test.

(2) Lock Position — The difference in locking distance must not exceed 25 millimetres.

(3) Durability — 10,000 cycles.

(4) Tensile Strength — Same as Emergency Locking Retractor.

C-a-10.Assembly :(Static test using loop)

(1)Breaking strength	2-point:23.0kN, 3-point:27.0kN
(2)Elongation	N/R
(3)Resistance to tensile load	Hardware shall not be damaged, and other parts shall not be broken or twisted.
(4)Dummy displacement	N/R

D. Label:

All sets of seat belt must have, at a minimum, numbers and letters or signs showing the following in
clearly and in detail, and the information shall not be easily erased.

(1)The words: ”Seat belt for automobile.”
(2)Type and model
(3)Batch
(4)Model or code of automobile used.
(5)Identity of manufacturer or factory. Registered trademark.
(6)Country of manufacture.

In case a foreign language is used, the meaning of the above shall be the same as in Thai.

Economy: USA
Title of Standard: FMVSS209

A. Application

It applies to seat to seat belt assemblies for use in passenger cars, multipurpose passenger vehicles, trucks, and buses.

B-a-1.Structure:

(1)A seat belt assembly shall be designed for use by one, and only one, person at any one time.

(2)A type 2 seat belt assembly shall provide upper-torso restraint without shifting the pelvic restraint into the abdominal region.

B-a-2.Webbing:

The end of webbing in a seat belt assembly shall be protected or treated to prevent raveling.

B-a-3.Buckle:

A Type 1 or Type 2 seat belt assembly shall be provided with a buckle or buckles readily accessible to the occupant to permit his easy and rapid removal from the assembly. Buckle release mechanism shall be designed to minimize the possibility of accidental release. A buckle designed for pushbutton application of buckle release force shall have a minimum area of 4.5cm^2 with a minimum linear dimension of10 mm for applying the release force, or a buckle designed for lever application of buckle release force shall permit the insertion of a cylinder 10mm in diameter and 38mm in length to at least the midpoint of the cylinder along the cylinder's entire length in the actuation portion of the buckle release.

B-a-4.Adjustment Hardware:

"Adjustment hardware" means any or all hardware designed for adjusting the size of a seat belt assembly to fit the user, Including such hardware that may be integral with a buckle, attachment hardware, or retractor.

B-a-6.Attachment Hardware:

A seat belt assembly shall include all hardware necessary for installation in a motor vehicle in accordance with SAE J800c,(1973,11).however, seat belt assemblies designed for installation in motor vehicles equipped with seat belt assembly anchorages that do not require anchorage nuts, plates, or washers, need not have such hardware, but shall have 7/16-20 UNF-2A or 1/2-13 UNC-2A attachment bolts or equivalent hardware. Reinforcing plates or washers furnished for universal floor installations shall be of steel, free from burrs and sharp edges on the peripheral edges adjacent to the vehicle, at least 0.06 inch in thickness and at least 4square inches in projected area. The distance between any edge of the plate and the edge of the bolt hole shall be at least 0.6 inch. Any corner shall be rounded to a radius of not less than

0.25 inch or cut so that no corner angle is less than 135°and no side is less than 0.25 inch length.

B-a-7.Retractor:

(1)"Non-locking retractor" means a retractor from which the webbing is extended to essentially its full length by a small external force, which provides no adjustment for assembly length, and which may or may not capable of sustaining restraint force at maximum webbing extension.

(2)"Automatic-locking retractor" means a retractor incorporating adjustment hardware by means of a positive self-locking mechanism which is capable when locked of withstanding restraint forces.

(3)"Emergency-locking retractor" means a retractor incorporating adjustment hardware by means of a locking mechanism that is activated by vehicle acceleration, webbing movement relative to the vehicle, or other automatic action during an emergency and is capable when locked of withstanding restraint forces.

C-a-1.Corrosion Resistance:

Surface of buckles, retractors and metallic parts, other than attachment hardware, of a seat belt assembly shall be free of ferrous or nonferrous corrosion which may be transferred, either directly or by means of the occupant or his clothing when the assembly is worn.

C-a-2.Temperature Resistance:

Three seat belt assemblies having plastic or non-metallic hardware or having retractors shall be subjected to the conditions prescribed in Procedure D of American Society for Testing and Materials D756-78, "Standard Practice for Determination of Weight and Sharp Changes of Plastics under Accelerated Service Conditions."

C-a-3.Flammability:(FMVSS No. 302)

Material shall not burn, nor transmit a flame front across its surface, at a rate of more than 4 inches per minute. If a material stops burning before it has burned for 60 seconds from the start of timing, and has not burned more than 2 inches from the point where timing was started.

C-a-4. Webbing:

(1) Width:	≥1.8 inches under load of 2 kgf and/or 1000±50 kgf
(2) Breaking strength:	(at a speed of between 50 and 100 mm/min.)
Type1	≥2720 kg
Type2	≥2270 kg (for pelvic)
Type2	≥1810 kg (for upper torso)

(3) Elongation:	(under load of 1130 kgf)
Type1	≤20 %
Type2	≤30 % (for pelvic)
Type2	≤40 % (for upper torso)
(4) Energy absorption:	
Hysteresis:	not required
Energy per meter:	not required
(5) Resistance to abrasion:	(≥75 % of minimum dry breaking strength required after 2500 cycles)
Hex bar:	Type1≥2040 kg Type2≥1700 kg (for pelvic) Type2≥1360 kg (for upper torso)
Manual adjusting device:	Type1≥2040 kg Type2≥1700 kg (for pelvic) Type2≥1360 kg (for upper torso)
(6) Resistance to cold:	not required
(7) Resistance to heat:	not required
(8) Resistance to water:	not required
(9) Resistance to light:	≥60 % of dry breaking strength after Carbon Arc
(10) Colorfastness to light:	≥No.2 after Carbon Arc
(11) Colorfastness to rubbing:	not required
(12) Colorfastness to perspiration:	not required

C-a-5. Buckle :

(1)Durability	Not fail, nor gall or wear to an extent that normal latching and unlatching is impaired after latching and unlatching of 200 times.
(2)Compressibility	Not release under 400lb. Be operable and shall meet the applicable requirement of following C-a-6-1.
(3)Partial engagement	Separate by ≤5lb. or 2.3kgf.
(4)Releasing force	≤30lb. or 14kgf.

C-a-6. Length adjuster :

(1)Adjusting force	≤11lb. or 5kgf
(2)Tilt lock angle	≥30°.

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt	Shall withstand a force of 9,000 pounds or 4,080 kilograms, except a single bolt shall have a breaking strength of not less than 5,000 pounds or 2,270 kilograms.
(2) Tensile Strength of Attachment	Shall withstand a tensile force of at least 6,000 pounds or 2,720 kilograms without fracture of any section.

	Shall not move more than 0.08 inch or 2 millimeters in either the vertical or horizontal direction (single attachment hooks of the quick-disconnect type)

C-a-8 : Retractors

Emergency-Locking Retractor

(1) Retraction Force	Must be at least 0.6 pound under zero acceleration when attached to only to the pelvic restraint. Must be not less than 0.2 pound and not more than 1.1 pounds under zero acceleration when attached only to an upper torso restraint. Must be not less than 0.2 pound and not more than 1.5 pounds under zero acceleration when attached to a strap or webbing that restrains both the upper torso and the pelvis. * All the above requirements must be met before the durability test. Must be not less than 50 percent of its original retraction force after the durability test.
(2) Lock Position	Must lock before the webbing extends 1 inch at an acceleration of 0.7 g. Must not lock before the webbing extends 2 inches at an acceleration of 0.3 g or less if the retractor is sensitive to webbing withdrawal. Must not lock when the retractor is rotated in any direction to any angle of 15°or less if the retractor is sensitive to vehicle acceleration. * All the above requirements must be met before and after the durability test.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 50,000 cycles have been completed when attached to an upper torso restraint.
(4) Tensile Strength	N/R

Automatic-Locking Retractor

(1) Retraction Force	Must be not less than 0.6 pound or 0.27 kilogram when attached to a pelvic restraint. Must be not less than 0.45 pound or 0.2kilogram nor more than 1.1 pounds or 0.5 kilogram when attached to an upper torso restraint. Must be not less than 50 percent of its original retraction force after the durability test.

(2) Lock Position	The webbing must not move more than 1 inch or 25 millimeters between locking positions of the retractor.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 10,000 cycles have been completed when attached to a pelvic restraint.
(4) Tensile Strength	N/R

Nonlocking Retractor

(1) Retraction Force	Must not exceed 1.1 pounds or 0.5 kilogram.
(2) Residual Extension Length	The webbing may extend from a nonlocking retractor within 0.25 inch or 6 millimeters of maximum length.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 10, 000 cycles have been completed when attached to a pelvic restraint, and 50,000 cycles when attached to an upper torso restraint.
(4) Tensile Strength	N/R

C-a-9. Load limiter : No need to meet elongation requirements. It may be installed in motor vehicles at any designated seating position subject to frontal barrier crash test requirement of Standard No.208.

C-a-10.Assembly : (Static test using loop)

(1)Breaking strength	Type 1 and type 2(pelvic): ≥2,500lb. or 1,130kgf Type 2: ≥1,500lb. or 680kgf (upper torso) Type 2: ≥3,000lb. or 1,360kgf (common)
(2)Elongation	Type 1:≤14in. or 36cm, type 2:≤20in. or 50cm
(3)Resistance to tensile load	No complete fractures through any solid section of metal attachment hardware.
(4)Dummy displacement	N/R

D. Label:

Each seat belt assembly shall be permanently and legibly marked or labeled with year of manufacture or distributor, or of importer if manufactured outside the United States. A model shall consist of a single combination of webbing having a specific type of fiber weave and construction, and hardware having a specific design. Webbings of various colors may be included under the same model, but webbing of each color shall comply with the requirements for webbing.

Economy: ECE
Title of Standard:ECE16/04

A. Application

It applies to safety-belts and restraint systems for installation in power-driven vehicles with three or more wheels and are intended for separate use, i.e. as individual equipment, by persons of adult build occupying seats facing forward.

B-a-1.Structure:

An arrangement of straps with a securing buckle, adjusting devices and attachment which is capable of being anchored to the interior of a power-driven vehicle and is designed to diminish the risk of injury to its wearer, in the event of collision or of abrupt deceleration of the vehicle, by limiting the mobility of the wearer's body. Such an arrangement is generally referred to as a "belt assembly" , which term also embraces any device for absorbing energy or for retracting the belt.

B-a-2.Webbing:

The characteristics of the straps shall be such as to ensure that their pressure on the wearer's body is distributed as evenly as possible over their width and that they do not twist even under tension. They shall have energy-absorbing and energy-dispering capacities. The straps shall have finished salvages which shall not become unraveled in use.

B-a-3.Buckle:

The buckle shall be so designed as to preclude any possibility of incorrect use. This means, inter-alia,
that it must not be possible for the buckle to be left in a partially-closed condition. The procedure for opening the buckle must be evident.

B-a-4.Adjustment hardware:

The belt after being put on by the wearer, shall either adjust automatically to fit him or be such that the manually adjusting device shall be readily accessible to the seated wearer and shall also allow the belt to be tightened with one hand to suit the wearer's body size and the position of the vehicle seat.

B-a-6.Attachment hardware:

Parts of the belt assembly including the necessary securing components, which enable it to be attached to the belt anchorages.

B-a-7.Retractor:

(1)Non-locking retractor:

A retractor from which the straps is extracted to its full length by a small external force and which provides no adjustment for the length of the extracted straps.

(2)Manually unlocking retractor:

A retractor requiring the manual operation of a device by the user to unlock the retractor in order to obtain the desired straps extraction and which locks automatically when the said operation cases.

(3)Automatically locking retractor:

A retractor allowing extraction of the straps to the desired length and which, when the straps to the wearer.

(4)Emergency locking retractor:

A retractor which during normal driving conditions does not restrict the freedom of movement by the wearer of the safety-belt. Such a device has length adjusting components which automatically adjust the straps to the wearer and a locking mechanism actuated in an emergency by:

A combination of deceleration of the vehicle, movement of the webbing or any other automatic means(multiple sensitivity).

In case where the operation of a retractor depends on an external signal or power source, the design shall ensure that the retractor locks automatically upon failure or interruption of that signal or power source.

C-a-1.Corrosion Resistance:

A complete safety belt assembly shall be positioned in a test chamber as prescribed in annex 12 to this Regulation. In the case of an assembly incorporating a retractor, the strap shall be unwound to full length less 300±3mm. Except for short interruptions that may be necessary, for example, to check and replenish the salt solution, the exposure test shall proceed continuously for a period of 50 hours.

C-a-4. Webbing:

(1) Width:	≥46 mm under load 9.8 kN
(2) Breaking strength:	≥14.7 kN at a speed of about 100 mm/min.
(3) Elongation:	not required
(4) Energy absorption:	
Hysteresis:	not required
Energy per meter:	not required
(5) Resistance to abrasion:	
Component	≥75 % of dry breaking strength (and≥14.7 kN) after 45000 cycles
Sash Guide	≥75 % of dry breaking strength (and≥14.7 kN) after 45000 cycles
Manual adjusting device:	not required in case of micro-slip test
(6) Resistance to cold:	≥75 % of dry breaking strength (and≥14.7 kN)
(7) Resistance to heat:	≥75 % of dry breaking strength (and≥14.7 kN)
(8) Resistance to water:	≥75 % of dry breaking strength (and≥14.7 kN)
(9) Resistance to light:	≥75 % of dry breaking strength (and≥14.7 kN) after Xenon Arc
(10) Colorfastness to light:	not required
(11) Colorfastness to rubbing:	not required
(12) Colorfastness to perspiration:	not required

C-a-5. Buckle :

(1)Durability	Withstand repeated operation (in total 5,500 times).
(2)Compressibility	N/R
(3)Partial engagement	Not latch partially.
(4)Releasing force	Not release by a force of ≤1daN. Release by a force of ≤6daN when 60daN is applied after dynamic test.

C-a-6. Length adjuster :

(1)Adjusting force	≤5daN
(2)Tilt lock angle	N/R

C-a-7. Attachment Hardware

(1) Tensile Strength of Bolt	N/R
(2) Tensile Strength of Attachment	Must not break or become detached under the load of 1,470 daN

C-a-8 : Retractors

Emergency Locking Retractors

(1) Retraction Force	Must be not less than 0.7 daN before and after the durability test if the retractor is part of a lap belt. Must be not less than 0.2 daN before and after the durability test if the retractor is part of an upper torso restraint.
(2) Lock Position	The strap must not move more than 50 mm before the retractor locks: - at the deceleration of the vehicle of 0.45 g[/1] in the case of type 4 or 0.85 g in the case of type 4N retractors. - when its sensing device is tilted 12°or less. - when its sensing device is tilted by more than 27°in the case of type 4 or 40°in the case of type 4N retractors. Must not lock until the strap moves more than 50 mm for values of acceleration of the strap measured in the direction of the extraction of the strap of less than 0.8 g in the case of type 4 or less than 1.0 g in the case of type 4N retractors. Must lock at a strap acceleration equal to or more than 2.0 g if the retractor has multiple sensitivities and one of them relates to strap extraction. * All the above requirements must be met before and after the durability test.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 40,000 cycles have been completed, and then satisfactorily complete a further 5,000 cycles (making 45,000 in all).

[/1] $g = 9.81\ m/s^2$

(4) Tensile Strength	Shall withstand a load of not less than 980 daN(without slip guide). Shall withstand a load of not less than 1470 daN(with slip guide).

Automatically Locking Retractors

(1) Retraction Force	Must be not less than 0.7 daN before and after the durability test if the retractor is part of a lap belt. Must be not less than 0.2 daN and not more than 0.7 daN before and after the durability test if the retractor is part of an upper torso restraint.
(2) Lock Position	Must not move more than 30 mm between the locking positions of the retractor.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 5,000 cycles have been completed, and then complete a further 5,000 cycles of withdrawal and retraction.
(4) Tensile Strength	Same as Emergency Locking Retractors.

Manually Unlocking Retractors

(1) Lock Position locking	Must not move more than 25 mm between the positions of the retractor.
(2) Residual Extension Length	The strap must extract from a manually unlocking retractor within 6 mm of its maximum length at a tension of not less than 1.4 daN and not more than 2.2 daN.
(3) Durability	The strap must be withdrawn from the retractor and allowed to retract repeatedly until 5,000 cycles have been completed, and then complete a further 5,000 cycles of withdrawal and retraction.
(4) Tensile Strength	Same as Emergency Locking Retractors.

C-a-10.Assembly:	(Dynamic test)
(1)Breaking strength	N/R
(2)Elongation	N/R
(3)Resistance to tensile load	No part of the belt assembly or a restraint system shall break. No buckles or locking system or displacement system shall release or unlock.
(4)Dummy displacement	Pelvic:80~200mm, chest:100~300mm. It may exceed the specified amount at chest level with conditions.

D. Label:

The samples of a belt or type of restraint system submitted for approval in conformity

with the provision shall be clearly and indelibly marked with the manufacture’s name, initials or trade name or mark.

ITEM 97-19

Emission

APEC Regulation Analysis Findings
Item No.97-19: Emission

1. Member economies lay down emission requirements on the basis of the Japanese, U.S. and/or European requirements and test procedures, while also incorporating their unique national conditions. Three member economies can be placed in the Japan-based group, five in the U.S.-based group, and seven in the Europe-based group, although some member economies are identifiable with more than one group.

2. Many member economies adopt the previous emission limits of Japan, U.S. and/or Europe, rather than their current limits. The members' emission limits are:

   A. Canada adopts the U.S. limits in package.

   B. Australia (regarding diesel vehicles) and Hong Kong (both gasoline and diesel) accept those vehicles complying with the Japanese, U.S. or European emission limits.

   C. Brunei, Chile, Indonesia, New Zealand, and Papua New Guinea lack emission requirements for test mode running.

3. A comparison of specific requirements is as follows:

   A. Construction Requirements
      (1) Structure of Parts
      Only Canada and U.S. prohibit the furnishing of defeat devices.

      (2) Operation with Unleaded Fuel
      Only ECE still specifies the diameters of fuel tank receptacles.

      (3) OBD, ORVR
      Only Canada and U.S. require the furnishing of OBD and ORVR devices complying with their performance requirements.

   B. Performance Requirements
      (1) Mode of Emission Level
      There exist three (Japanese, U.S. and European) emission test modes, and member economies adopt any one of them.

      (2) Idling CO and HC
      The idling CO limits of member economies fall between 3% and 4.5%, except for Taiwan's 1%. The idling HC limits range from 600 ppm to 1,200 ppm (Taiwan 200 ppm). Thailand and ECE provide only idling CO emission limits, while other members adopt both CO and HC limits.

(3) Crankcase Emission

The member economies which regulate crankcase emissions simply require that no emissions be released into the atmosphere from the crankcase.

(4) Evaporative Emission

The test procedures can be divided into the Australian, Japanese, U.S. and European methods. The U.S. test procedure is characterized by greater strictness and the existence of separate limits for different test modes.

(5) Diesel Smoke

Test procedures are grouped into the load test (ECE 24/03 and SRRV 31) and the free acceleration test. A majority of member economies adopt the load test. Hong Kong and Indonesia require only the free acceleration test.

(6) Endurance

Many member economies require 80,000 km. Only Canada and U.S. demand 160,000 km.

(7) Certification Label

Only ECE requires approval marking.

(8) Label for Unleaded Fuel Use

Australia, Thailand, and ECE demand the affixing of a label to indicate that the vehicle uses unleaded fuel.

(9) Engine Data Label

Australia, Canada, Philippines, and U.S. require the affixing of an engine data label.

Reference (Emission Control in Running Mode)

	Japan base	U.S. base	Europe base
AUSTRARIA		US87	
(Diesel only)	SRRV31		ECE83/01
BRUNEI			
CANADA		US(current)	
CHILE	--	--	--
CHINA			ECE15/03-04
HONGKONG	SRRV31		ECE83/03
INDONESIA			
KOREA		US87	
MALAYSIA			ECE83/03
MEXICO		US87	
NEWZELAND	--	--	--
PAPUA NEW GUNIEA	--	--	--
PHILIPPINES		Test method only	Test method only
SINGAPOLE	SRRV31		ECE83/02
TAIPEI		US87	ECE83/02
THAILAND			ECE83/02

Note: The above table shows the rough grouping of emission requirements. Requirements in the same group are not necessarily identical in details but often contain the unique provisions of respective member economies.

<A. Application> Passenger Vehicles

Economy	B-a: Structure of parts	B-b-1: Endurance	B-b-2: "λ=1" Control for vehicles with O_2 sensor	B-b-3: Operation with unleaded fuel
Australia <ADR 37/01>				ADR37/01 (Designed and constructed to operate on unleaded petrol)
<ADR 70/00>				
Brunei				
Canada	CFR40 Part86			
Chile				
China				
Hong Kong				
Indonesia				
Japan				
Korea				
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				
Philippines				
Singapore	Unique (Every motor vehicle shall be so constructed that no avoidable smoke or visible vapour is emitted therefrom)			
Chinese Taipei				
Thailand		ECE15/04 & ECE83/02		ECE83/03
U.S.A.	CFR40 Part86 (Prohibition of defeat device)			

Economy	B-a: Structure of parts	B-b-1: Endurance	B-b-2: "λ=1" Control for vehicles with O_2 sensor	B-b-3: Operation with unleaded fuel
ECE <ECE No.15/04>		ECE15/04 (To comply with this Reg. within normal useful life)		
<ECE No.24/03>		ECE24/03 (To comply with this Reg. within normal useful life)		
<ECE No.49/02>		ECE49/02 (To comply with this Reg. within normal useful life)		
<ECE No.83/03>		ECE83/03 (To comply with this Reg. within normal useful life)	ECE83/03 (To be required)	ECE83/03 (Diameter of inlet orifice of the fuel tank <23.6 mm, or no device shall be affected by leaded petrol

Item No. 19 Emissions

<A. Application> Passenger Vehicles

Economy	B-b-4: OBD	B-b-5: ORVR	B-b-6: Crankcase emission	B-b-7: Fuel vapor emission	C-b-1: Mode & emission level
Australia <ADR 37/01>					ADR37/01 (US-FTP75 test mode CO : 2.1 g/km HC : 0.26 g/km NOx: 0.63 g/km)
<ADR 70/00>					ADR70/00 (Requirement of ECE R83/01 certificate) Alternative standards *CFR Part 86, sub-part A&B *91/441/EEC *SRRV 31
Brunei					Unique (To prohibit to emit any smoke, visible vapour, grit, sparks, ashes, cinders, oily substances, the emission of which causes or is likely to cause injury or annoyance to any person, or damage to property, or which endangers or is likely to endanger the safety of any person.)
Canada	CFR40 Part86	CFR40 Part86			CFR40 Part 86
Chile					

<table>
<tr><th>Economy</th><th>B-b-4: OBD</th><th>B-b-5: ORVR</th><th>B-b-6: Crankcase emission</th><th>B-b-7: Fuel vapor emission</th><th>C-b-1: Mode & emission level</th></tr>
<tr><td>China</td><td></td><td></td><td></td><td></td><td>Unique
ECE mode test(ECE15/04)
<table><tr><th>RM (kg)</th><th>CO</th><th>HC</th><th>NOx</th></tr><tr><td>RM≤1020</td><td>76</td><td>11.7</td><td>8.5</td></tr><tr><td>≤1250</td><td>87</td><td>12.8</td><td>10.2</td></tr><tr><td>≤1470</td><td>99</td><td>13.7</td><td>11.9</td></tr><tr><td>≤1700</td><td>110</td><td>14.6</td><td>12.3</td></tr><tr><td>≤1930</td><td>121</td><td>15.5</td><td>12.8</td></tr><tr><td>≤2150</td><td>132</td><td>16.4</td><td>13.2</td></tr><tr><td>2150<</td><td>143</td><td>17.3</td><td>13.6</td></tr></table></td></tr>
<tr><td>Hong Kong</td><td></td><td></td><td></td><td></td><td>SRRV 31 or ECE83/03 or
CFR40 Part 86</td></tr>
<tr><td>Indonesia</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><th>Economy</th><th>B-b-4: OBD</th><th>B-b-5: ORVR</th><th>B-b-6: Crankcase emission</th><th>B-b-7: Fuel vapor emission</th><th>C-b-1: Mode & emission level</th></tr>
<tr><td>Japan</td><td></td><td></td><td>SRRV 31
(Gasoline fueled passenger car shall be provided with a blow-by gas recirculation device.)</td><td>SRRV 31
(Gasoline fueled Passenger car shall be provided with a HC prevention device</td><td>SRRV 31
10.15 mode operation
<table>
<tr><th></th><th>CO</th><th>HC</th><th>NOx</th><th>PM</th></tr>
<tr><td>Gasoline</td><td>2.70</td><td>0.39</td><td>0.48</td><td></td></tr>
<tr><td>Diesel (C.W.≤1265 kg)</td><td>2.70</td><td>0.62</td><td>0.72</td><td>0.34</td></tr>
<tr><td>Diesel (C.W.>1265 kg)</td><td>2.70</td><td>0.62</td><td>0.84</td><td>0.34</td></tr>
</table>
11 mode operation
<table>
<tr><th></th><th>CO</th><th>HC</th><th>NOx</th></tr>
<tr><td>Gasoline</td><td>85.0</td><td>9.50</td><td>6.00</td></tr>
</table></td></tr>
<tr><td>Korea</td><td></td><td></td><td></td><td></td><td>Unique
USA-FTP75 test mode
<table>
<tr><th></th><th>CO</th><th>HC</th><th>NOx</th><th>PM</th></tr>
<tr><td>Gasoline
LPG</td><td>2.11</td><td>0.25</td><td>0.62</td><td>---</td></tr>
<tr><td>Diesel</td><td>2.11</td><td>0.25</td><td>0.62</td><td>0.08</td></tr>
</table></td></tr>
<tr><td>Malaysia</td><td></td><td></td><td></td><td></td><td>ECE83/03</td></tr>
</table>

<table>
<tr><th>Economy</th><th>B-b-4: OBD</th><th>B-b-5: ORVR</th><th>B-b-6: Crankcase emission</th><th>B-b-7: Fuel vapor emission</th><th>C-b-1: Mode & emission level</th></tr>
<tr><td>Mexico</td><td></td><td></td><td></td><td></td><td>Unique
(Only for gasoline engine
US-FTP75 test mode
CO:2.11g/km
HC:0.25g/km
N0x:0.62g/km)</td></tr>
<tr><td>New Zealand</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Papua New Guinea</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Philippines</td><td></td><td></td><td></td><td></td><td>Unique
Only for Gasoline vehicle
<table><tr><th>Weight GW (kg)</th><th>CO g/km</th><th>HC g/km</th></tr><tr><td>1000 or less</td><td>25</td><td>2.5</td></tr><tr><td>1001 - 1500</td><td>20</td><td>3.0</td></tr><tr><td>1501 - 3000</td><td>35</td><td>3.5</td></tr></table>(US-FTP75 or ECE test mode)</td></tr>
<tr><td>Singapore</td><td></td><td></td><td></td><td></td><td>ECE83/03 or SRRV 31</td></tr>
<tr><td>Chinese Taipei</td><td></td><td></td><td></td><td></td><td>Unique
Only for gasoline engine
US-FTP75 test mode
CO:2.11g/km
HC:0.25g/km
NOx:0.62g/km</td></tr>
</table>

<table>
<tr><th>Economy</th><th>B-b-4: OBD</th><th>B-b-5: ORVR</th><th>B-b-6: Crankcase emission</th><th>B-b-7: Fuel vapor emission</th><th>C-b-1: Mode & emission level</th></tr>
<tr><td>Thailand</td><td></td><td></td><td></td><td></td><td>Unique
New EC-mode test(in g/test)
<table>
<tr><th colspan="2">Vehicle Category</th><th>CO</th><th>HC+ Nox</th><th>PM</th></tr>
<tr><td colspan="2">*1</td><td>2.72</td><td>0.97</td><td>0.14</td></tr>
<tr><td rowspan="3">*2</td><td>Class I</td><td>2.72</td><td>0.97</td><td>0.14</td></tr>
<tr><td>Class II</td><td>5.17</td><td>1.4</td><td>0.19</td></tr>
<tr><td>Class III</td><td>6.9</td><td>1.7</td><td>0.25</td></tr>
</table>
note)
*1:except *2
*2:parson > 6 or GVW > 2.5ton
class I : RM≤1.25ton
class II : 1.25ton<RM
class III : 1.70ton<RM</td></tr>
<tr><td>U.S.A.</td><td>CFR40 Part86
(Monitoring Requirement
1.catalyst
2.fuel system
3..misfire
4.oxygen sensor
5.evaporative system
6.EGR
7.secondary air sys.)</td><td>CFR40 Part86
(Refueling emissions not exceed 0.20g HC/gallon of fuel dispensed.)</td><td></td><td></td><td>CFR40 Part86
FTP Gasoline/Diesel (in gpm)
<table>
<tr><th>Useful life</th><th>CO</th><th>THC</th><th>NM HC</th><th>NOx</th><th>PM</th></tr>
<tr><td>50K</td><td>3.4 /3.4</td><td>0.41 /0.41</td><td>0.25 /0.25</td><td>0.4 /1.0</td><td>0.08 /0.08</td></tr>
<tr><td>100K</td><td>4.2</td><td>0.80 /0.80</td><td>0.31 /0.31</td><td>0.6 /1.25</td><td>0.10 /0.10</td></tr>
<tr><td>120K</td><td>-</td><td>0.80</td><td>-</td><td>-</td><td>-</td></tr>
</table>
120K limit is applied to LDT
Cold CO ; 10gpm(50K)</td></tr>
</table>

<table>
<tr><td>Economy</td><td>B-b-4: OBD</td><td>B-b-5: ORVR</td><td>B-b-6: Crankcase emission</td><td>B-b-7: Fuel vapor emission</td><td>C-b-1: Mode & emission level</td></tr>
<tr><td>ECE <ECE No.15/04></td><td></td><td></td><td></td><td></td><td>ECE15/04
EC-mode test (in g/test)
<table><tr><th>RM (kg)</th><th>CO</th><th>HC+ NOx</th></tr><tr><td>RM≤1020</td><td>58</td><td>19</td></tr><tr><td>≤1250</td><td>67</td><td>20.5</td></tr><tr><td>≤1470</td><td>76</td><td>22</td></tr><tr><td>≤1700</td><td>84</td><td>23.5</td></tr><tr><td>≤1930</td><td>93</td><td>25</td></tr><tr><td>≤2150</td><td>101</td><td>26.5</td></tr><tr><td>2150<</td><td>110</td><td>28</td></tr></table></td></tr>
<tr><td><ECE No.24/03></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td><ECE No.49/02></td><td></td><td></td><td></td><td></td><td>ECE49/02
13-mode cycle (in g/kWh)
<table><tr><th>CO</th><th>HC</th><th>Nox</th><th>PM</th></tr><tr><td>4.0</td><td>1.1</td><td>7.0</td><td>0.15</td></tr></table></td></tr>
</table>

<table>
<tr><th>Economy</th><th>B-b-4: OBD</th><th>B-b-5: ORVR</th><th>B-b-6: Crankcase emission</th><th>B-b-7: Fuel vapor emission</th><th>C-b-1: Mode & emission level</th></tr>
<tr><td><ECE No.83/03></td><td></td><td></td><td></td><td></td><td>ECE83/03
APPROVAL A(EC-mode test)
<table><tr><th>RM (kg)</th><th>CO</th><th>HC+ NOx</th></tr><tr><td>RM≤1020</td><td>58</td><td>19</td></tr><tr><td>≤1250</td><td>67</td><td>20.5</td></tr><tr><td>≤1470</td><td>76</td><td>22</td></tr><tr><td>≤1700</td><td>84</td><td>23.5</td></tr><tr><td>≤1930</td><td>93</td><td>25</td></tr><tr><td>≤2150</td><td>101</td><td>26.5</td></tr><tr><td>2150 <</td><td>110</td><td>28</td></tr></table>
APPROVAL B,C
New EC-mode test(in g/test)
<table><tr><th colspan="2">Vehicle Category</th><th>CO</th><th>HC+ NOx</th><th>PM</th></tr><tr><td colspan="2">*1 G/D</td><td>2.2 /1.0</td><td>0.5 /0.7</td><td>- /0.14</td></tr><tr><td rowspan="3">*2</td><td>Class I</td><td>2.72</td><td>0.97</td><td>0.14</td></tr><tr><td>Class II</td><td>5.17</td><td>1.4</td><td>0.19</td></tr><tr><td>Class III</td><td>6.9</td><td>1.7</td><td>0.25</td></tr></table>
note)
*1:except *2
*2:parson>6 or GVW>2.5ton
class I : RM≤1.25ton
class II : 1.25ton<RM
class III : 1.70ton<RM</td></tr>
</table>

Item No. 19 Emissions

<A. Application> Passenger Vehicles

Economy	C-b-2:Iidling CO, HC	C-b-3: Crankcase emission	C-b-4: Evaporative emission	C-b-5: Diesel smoke
Australia <ADR 37/01>		ADR37/01 (No emission into the atmosphere)	ADR37/01 (2 g/test by 1975 USA FTP)	
<ADR 70/00>				
Brunei				
Canada		CFR40 Part86	CFR40 Part86	
Chile				
China	Unique (CO ≤ 3.0 %, HC ≤ 600 ppm)	ADR37/01, CFR40 Part 86 ECE15/04, ECE 83/03	ECE83/03	Unique (Free accel. : ≤ 3.5 FSN Full load : ≤ 4.0 FSN)
Hong Kong				Unique (Free accel:Hartridge Smoke Units≤35)
Indonesia	SRRV 31			Unique (Free accel BOSCH≤50%)
Japan	SRRV 31 (Gasoline fueled vehicles CO≤4.5%, HC≤1200ppm)		SRRV 31 (2g/test by Japanese test method)	SRRV 31 (Smoke (%)≤40% (GVW ≤ 1265 kg) ≤25% (GVW > 1265 kg))
Korea			ADR37/01	
Malaysia	Unique (New model CO≤3.5%, HC≤600ppm) (Existing model CO≤4.5% , HC≤800ppm)	ADR37/01, CFR40 Part 86 ECE15/04, ECE 83/03		
Mexico			ADR37/01	
New Zealand				
Papua New Guinea				
Philippines		ADR37/01, CFR40 Part 86 ECE15/04, ECE 83/03	ADR37/01	ECE 24/03, ADR 30/00 or CFR40 Part86

Economy	C-b-2:Iidling CO, HC	C-b-3: Crankcase emission	C-b-4: Evaporative emission	C-b-5: Diesel smoke
Singapore	SRRV 31	ADR37/01, CFR40 Part 86 ECE15/04, ECE 83/03	ECE83/03	ECE24/03
Chinese Taipei	Unique (CO≤1.0%, HC≤200ppm)	ADR37/01, CFR40 Part 86 ECE15/04, ECE 83/03	ADR37/01	Unique (Smoke(%) d≤50%)
Thailand	ECE15/04 (only CO%)	ADR37/01, CFR40 Part 86 ECE15/04, ECE 83/03	ECE83/03	ECE24/03
U.S.A.		CFR40 Part86 (No emission into the atmosphere)	CFR40 Part86 (HC standard three-diurnal ≤2.0g/test two-diurnal ≤2.5g/test running loss ≤0.5g/test spitback ≤1.0g/test)	
ECE <ECE No.15/04>	ECE15/04 (CO≤3.5%)	ECE15/04 (No emission into the atmosphere)		
<ECE No.24/03>				ECE24/03 (The light absorption coefficient of gases emitted at each nominal flow shall be with in the limit)
<ECE No.49/02>				
<ECE No.83/03>	ECE83/03 (APPROVAL A:CO≤3.5%)	ECE83/03 (No emission into the atmosphere)	ECE83/01 (APPROVAL B: <2g/test (ECE test procedure)	

Item No. 19 Emissions

<A. Application> Passenger Vehicles

Economy	C-b-6:Endurance	D-1:Certification label	D-2:Label for unleaded fuel use	D-3:Engine data label
Australia <ADR 37/01>	ADR37/01 (5 year or 8000 km)		ADR37/01 (the words:UNLEADED PETROL ONLY etc)	ADR37/01 (Engine idle speed, Ignition timing Cam dwell angle etc)
<ADR 70/00>				
Brunei				
Canada	CFR40 Part86			CFR40 Part 86
Chile				
China				
Hong Kong				
Indonesia				
Japan	SRRV 31 (5 years or 80,000km)			
Korea				
Malaysia				
Mexico				
New Zealand				
Papua New Guinea				

Economy	C-b-6:Endurance	D-1:Certification label	D-2:Label for unleaded fuel use	D-3:Engine data label
Philippines				Unique (Engine Exhaust Emission Control Information label - corporate name & trademark - Engine displacement - Engine family & model - Date of engine manufacture (month and year) - Engine line-up specification and adjustment as recommended by the manufacturer idle speed ignition timing idle air-fuel mixture setting procedure & value etc).
Singapore	ADR37/01, SRRV 31			
Chinese Taipei	SRRV 31			
Thailand	ECE83/03		ADR37/01, ECE83/03	
U.S.A.	CFR40 Part 86 5 years or 50k mile (Intermediate useful life) 10 years or 100k mile (Full useful life)			CFR40 Part86 (Vehicle emission control information)
ECE <ECE No.15/04>		ECE15/04 (Approval mark(E-mark label))		
<ECE No.24/03>		ECE24/03 (Approval mark(E-mark label))		
<ECE No.49/02>		ECE49/02 (Approval mark(E-mark label))		

Economy	C-b-6:Endurance	D-1:Certification label	D-2:Label for unleaded fuel use	D-3:Engine data label
<ECE No.83/03>	80,000km	ECE83/03 Approval mark(E-mark label))	ECE83/03 symbol for unleaded petrol (ISO 2575-1982)	

Item No. 19 Emissions

<A. Application> Passenger Vehicles

Economy	E:Referenced standards		
Australia <ADR 37/01> <ADR 70/00>	CFR40 Part86		
Brunei			
Canada	CFR40 Part 86		
Chile			
China	GB/T11642, GB/T14672, GB/T14763, GB/T11340, GB/T3845, GB/T3846, GB/T3847		
Hong Kong			
Indonesia			
Japan			
Korea			
Malaysia	-An engine type complying with equivalent or more stringent test procedure -The Japan Six Mode Exhaust Emission for diesel engine		
Mexico	CFR40 PART81 to 99(1990)		
New Zealand			
Papua New Guinea			

Economy	E:Referenced standards		
Philippines	- BS AU 141 (a);1971 - 72/306/EEC - ECE No.24 - ADR No. 30 - USA EPA Federal Reg. Part 85 or Federal Reg. Part 86 - N.P.C.C Rules and Reg. Implementing P.D.1181		
Singapore	-91/441/EEC -ECE24/03 -SRRV 31		
Chinese Taipei			
Thailand			
U.S.A.			
ECE <ECE No.15/04>			
<ECE No.24/03>			
<ECE No.49/02>			
<ECE No.83/03>			

AUSTRALIA

Australian Design Rule 37/01 Emission Control for Light Vehicles

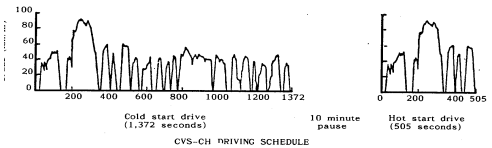
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars (MA)	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	1. Petrol filler inlet shall be so designed to prevent the insertion of a leaded petrol nozzle, but allows the insertion of an unleaded petrol nozzle. 2. Idle air/fuel mixture screw, if equipped, shall be so designed inaccessible or sealed. 3. Requirements for Control of Crankcase Gases Every vehicle must be so constructed that crankcase gases are not permitted to escape into the atmosphere.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	1. Requirements 1.1. Requirements for Emissions Standards 1.1.1. Every vehicle, when tested in accordance with the requirements specified in this rule, shall be such that its emissions do not exceed the relevant limits in Table 1. Table 1 Pollutant / Limits Carbon monoxide g/ km 2.1 Hydrocarbon g/ km 0.26 Oxides of nitrogen g/ km 0.63 Evaporative Emission g/test 2.0 1.1.2. The emissions standards specified in clause 1.1.1 apply to vehicles for a period of use of 5 years or 80,000 km, whichever occurs first. 2. Test Procedure 2.1. Sequence of Events for Emissions Tests Refer to Table 2.	

ITEM	CONTENTS	Illustration/Supplement

Table 2: Sequence of Events for Emissions Tests

TEST STAGE	PARTICULAR STEPS	DURATION OF STAGE/STEP
Start	Vehicle & Engine Preparation 'Stabilization Distance' Accumulation Optional Additional Preconditioning -Cold Soak -1,2, or 3 'Simulated Trips' Fuel Drain & Fill [40% fill] -Interval-	 1 h minimum [to precede each trip] 1,372 s [per trip] 1 h maximum
Vehicle Preconditioning	'Simulated Trip' -Interval- Cold Soak Parking Fuel Drain & Fill [40% fill] -Interval-	1,372 s 5 min maximum 12 h minimum -36 h maximum to start of Cold Start Drive
Diurnal breathing loss test HC measurements before & after	Heat build [fuel temp increase 13.3 ± 0.5°C at end of test] -Interval-	Test to start between 10 h and 35 h after the end of pre-conditioning 60 ± 2 min 1 h maximum
Exhaust emission sampling	CVS-CH Dynamometer Schedule -Cold Start Drive -Pause [engine off] -Hot Start Drive -Interval-	(Shown diagrammatically in Figure 1) 1,372 s 10 min 505 s 7 min maximum
Hot soak loss test HC measurements before & after	Hot Soak in 'SHED'	60 ± 0.5 min
End		

Figure 1: Dynamometer Driving Schedule



Australian Design Rule 37/01 Emission Control for Light Vehicles		
ITEM	CONTENTS	Illustration/Supplement
	2.2. Flywheels, electrical device or other means of simulating “Equivalent Test Inertia Mass” shall be used.(Refer to Table 3) 2.3. Fuel Evaporative Emissions Test Procedure The test comprises 2 components : a ‘Diurnal Breathing Loss’ test and a ‘Hot soak Loss’ test.	Table 3
D:Label marking requirements	1. Engine Data Label	

Reference Mass kg	Equivalent Test Inertia Mass kg	Road Power Absorber Setting at 80km/h
- 481	454	4.4
- 538	510	4.6
- 595	567	4.8
- 652	624	5.0
- 708	680	5.3
- 765	737	5.5
- 822	794	5.7
- 878	850	6.0
- 935	907	6.2
- 992	964	6.4
- 1048	1021	6.6
- 1105	1077	6.8
- 1162	1134	7.0
- 1219	1191	7.2
- 1275	1247	7.4
- 1332	1304	7.6
- 1389	1361	7.7
- 1445	1417	7.9
- 1502	1474	8.0
- 1559	1531	8.2
- 1615	1588	8.4
- 1672	1644	8.5
- 1729	1701	8.6
- 1786	1758	8.8
- 1872	1814	9.0
- 1984	1928	9.2
- 2097	2041	9.5
- 2211	2155	9.7
- 2324	2268	10.0
- 2438	2381	10.2
- 2608	2495	10.4
2609 -	2722	10.7

AUSTRALIA

Australian Design Rule 37/01 Emission Control for Light Vehicles		
ITEM	CONTENTS	Illustration/Supplement
	1.1. Every vehicle must have an engine data label(s) fitted in a readily visible position in the engine compartment. 1.2. The label(s) must be legible, durable, permanently affixed, and must state directly, or by reference 'Approved', engine tune-up data. 1.3. The data must include: - the minimum RON of the recommended fuel, where the vehicle 'Manufacturer' recommends operation exclusively on high octane (95 to 96 RON) 'Unleaded Petrol'; - engine idle speed; - ignition timing; - cam dwell angle or contact breaker gap (where appropriate); - the transmission position during adjustments and settings; - the engine operation conditions, and indicate any accessory which should be in operation; and - any other information required to enable the adjustments to be correctly out. 2. Fuel Label 1.1. Every vehicle must have the words "UNLEADED PETROL ONLY", "UNLEADED FUEL ONLY" or "UNLEADED GASOLINE ONLY" 1.2. Every vehicle must be affixed a durable label or by other durable means permanently to the area immediately adjacent to the petrol filler inlet(s), on the door to the filler inlet compartment, or within 150 mm of the door to the filler inlet compartment, or on or within 150 mm of the filler inlet cap, readily visible to any person intending to refuel the vehicle. 1.3. The lettering must be legible and in capital letters no smaller than 6.0 mm high.	
E:Referenced standards	CFR Part 86, Sub-parts A and B	

AUSTRALIA

Australian Design Rule 70/00 Exhaust Emission Control for Diesel Engined Vehicles		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars (MA)	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle		
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle	Requirements 1. Relevant standards ECE R83/01 ECE R49/02	
D:Label marking requirements	Refer to the relevant standards; ECE R83/01 and ECE R49/02	
E:Referenced standards	Alternative Standards (a) CFR Part 86, Sub-part A and B (b) 91/542/EEC Section 6.2.1 and 8.3.1.1, Line A (c) 91/441/EEC (d) Japan; Safety Regulations for Road Vehicles, Article 31	

BURUNEI

The Road Traffic Enactment 1954		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle		
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle	1. No motor vehicle shall be used which emits any smoke, visible vapour, grit, sparks, ashes, cinders, oily substances, the emission of which causes or is likely to cause injury or annoyance to any person, or damage to property, or which endangers or is likely to endanger the safety of any person.	
D:Label marking requirements		
E:Referenced standards		

CANADA

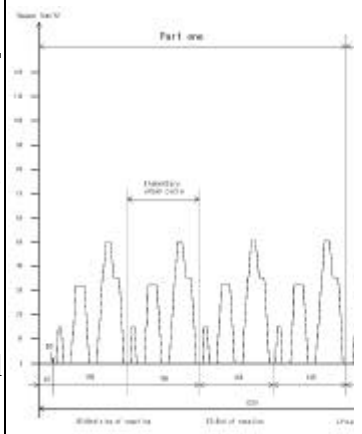
Canada Motor Vehicle Safety Regulations 1100 to 1105		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger car(Light-duty vehicle)	
B:Structure requirements B-a:Structure of parts		
B-b:Structure of parts installed in vehicle	US Regulation 40 CFR Part 86	
C:Performance requirements C-a:Performance of parts		
C-b:Performance of parts installed in vehicle	US Regulation 40 CFR Part 86	
D:Label marking requirements	US Regulation 40 CFR Part 86	
E:Referenced standards	US Regulation 40 CFR Part 86	

THE PEOPLE'S REPUBLIC OF CHINA

Emission Standard for Exhaust Pollutant from Light-duty Vehicle ; GB14761.1-93 to GB14761.7-93

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars: Light Duty Vehicles(Maximum Mass of 3,500 kg or less)	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle		
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle	1. Exhaust pollutants from light duty vehicles after cold start 1.1. Emission limits Table below shows the exhaust pollutants emission limits for vehicles given reference mass at Type Approval test. (g/test)	

Reference Mass (RW) kg	CO	HC (C equivalent)	NOx (NO_2 equivalent)
RW≤ 750	65	10.8	8.5
750<RW≤ 850	71	11.3	8.5
850<RW≤1020	76	11.7	8.5
1020<RW≤1250	87	12.8	10.2
1250<RW≤1470	99	13.7	11.9
1470<RW≤1700	110	14.6	12.3
1700<RW≤1930	121	15.5	12.8
1930<RW≤2150	132	16.4	13.2
2150<RW	143	17.3	13.6

Emission Standard for Exhaust Pollutant from Light-duty Vehicle ; GB14761.1-93 to GB14761.7-93		
ITEM	CONTENTS	Illustration/Supplement
	1.2. Test procedure The test shall be carried out according to the procedure described in GB/T 11642. The vehicle shall be placed on a chassis dynamometer. A test lasting a total 13 minutes and comprising four cycles shall be carried out without interruption. Each cycle shall comprise 15 modes (idling, acceleration, steady speed, deceleration, etc.).(Refer to Fig.1) The exhaust gases shall be sampled by Constant Volume Sampling Method (CVS). 3. Evaporative emission from vehicle with gasoline engine 3.1. Limit for fuel evaporative emission: 2 g/test 3.2. Test procedure The test shall be carried out according to the procedure described in GB/T 14763. 4. Pollutants from crankcase of gasoline engine 4.1. Emission limits The pressure measured in the crankcase at the dipstick hole shall not exceed the atmospheric pressure under any measuring condition. 4.2. Test procedure The test shall be carried out according to the procedure described in GB 11340.	

Emission Standard for Exhaust Pollutant from Light-duty Vehicle ; GB14761.1-93 to GB14761.7-93

ITEM	CONTENTS	Illustration/Supplement

5. Exhaust pollutants at idle speed from vehicle with gasoline engine

5.1. Emission limits

Table below shows the emission limit at idle speed from vehicle with gasoline engine.

Applicable Vehicle	CO (%)	HC (ppm)	
		4 Stroke	2 Stroke
Type approval vehicle	3.0	600	6,000
New manufactured vehicle	3.5	700	6,500

5.2. Test procedure

The test shall be carried out according to the procedure described in GB/T 3845.

6. Smoke at free acceleration from vehicle with diesel engine

6.1. Emission limits

Table below shows the emission limit for smoke at free acceleration from vehicle with diesel engine.

Applicable Vehicle	Limit Value, FSN
Type approval vehicle	3.5
New manufactured vehicle	4.0

6.2. Test procedure

The test shall be carried out according to the procedure described in GB/T 3846.

Emission Standard for Exhaust Pollutant from Light-duty Vehicle ; GB14761.1-93 to GB14761.7-93

ITEM	CONTENTS	Illustration/Supplement
	7. Smoke at full load from vehicle with diesel engine 7.1 Emission limits Table below shows the emission limits for smoke at full load from vehicle with diesel engine. Applicable Vehicle / Limit Value, FSN Type approval vehicle / 4.0 New manufactured vehicle / 4.5 7.2. Test procedure The test shall be carried out according to the procedure described in GB/T 3847.	
D:Label marking requirements		
E:Referenced standards	1. GB/T 11642 Measuring Method for Exhaust Pollutants from Light-duty Vehicle 2. GB/T 14762 Measuring Method for Exhaust Pollutants from Gasoline engine of Vehicle 3. GB/T 14763 Measuring Method for Fuel Evaporative Emission from Vehicle with Petrol Engine 4. GB 11340 Measuring Method for Pollutants from Crankcase of Vehicle Engine 5. GB/T 3845 Measurement Method for Pollutants at Idle Speed from Vehicle with Gasoline Engine 6. GB/T 3846 Measurement Method for Smoke at Free Acceleration from Vehicle with Diesel Engine by the Filter Method 7. GB/T 3847 Measuring Method for Smoke at Full Load from Diesel Engine of vehicle	

HONG KONG

Air Pollution Control (Vehicle Design Standards) (Emission) Regulation 1996

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle		
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle	1. Emission 1.1. Gasoline fueled vehicle Emission shall not exceed either- (a) (g/km) HC: 0.26 / NMHC: 0.16 / CO: 2.10 / NOx: 0.25 Test procedure: 1975 US FTP (b) (g/km) HC: 0.25 / CO: 2.10 / NOx: 0.25 Test procedure:the 10.15-mode operation administered by the Ministry of Transport of Japan	

HONG KONG

Air Pollution Control (Vehicle Design Standards) (Emission) Regulation 1996

ITEM	CONTENTS	Illustration/Supplement

(c)

Category of vehicle		Reference mass	Limit values	
			CO	HC+NOx
		Rm(kg)	L1(g/kg)	L2(g/kg)
*1		All	2.2	0.5
*2	Category I	Rm ≤ 1,250	2.72	0.97
	Category II	1,250< Rm ≤ 1,700	5.17	1.4
	Category III	1,700 < Rm	6.9	1.7

*1. Except:
-vehicles designed to carry more than six occupants including the driver;
-vehicles whose maximum mass exceeds 2,500kg.
Test procedure: the Type I test procedure specified in 94/12/EEC

*2 And those category M vehicles which are specified note *1 above.
Test procedure: the Type I test procedure specified in 93/59/EEC

2.2. Diesel fueled vehicle
Emission shall not exceed either-

(a) (g/km)

HC	CO	NOx	PM
0.26	2.10	0.25	0.12

Test procedure: 1975 US FTP

HONG KONG

Air Pollution Control (Vehicle Design Standards) (Emission) Regulation 1996

ITEM	CONTENTS	Illustration/Supplement

(b)

(g/km)

HC	CO	NOx		PM
		VW≤1.265 t	VW>1.265 t	
0.62	2.70	0.72	0.84	0.34

VW:Vehicle weight

Test procedure: the 10.15-mode operation administered by the Ministry of Transport of Japan

(c)

Category of vehicle		Reference mass	Limit values		
			CO	HC+Nox	PM
		Rm(kg)	(g/kg)	(g/kg)	(g/kg)
*1		All	2.72	0.97	0.14
*2	Category I	Rm ≤ 1,250	2.72	0.97	0.14
	Category II	1,250< Rm ≤ 1,700	5.17	1.4	0.19
	Category III	1,700 < Rm	6.9	1.7	0.25

Test procedure: the Type I test procedure specified in 93/59/EEC

2. Smoke Emission

2.1. Maximum permitted smoke level

(a) 35 Hartridge Smoke Units

(b) in absolute units of light absorption (m^{-1}): 1.0

Test procedure: Free acceleration test procedure specified in Council Directive 72/306/EEC as amended by Council Directive 89/491/EEC, both made by the Council

HONG KONG

Air Pollution Control (Vehicle Design Standards) (Emission) Regulation 1996		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements		
E:Referenced standards		

REPUBLIC OF INDONESIA

<table>
<tr><td colspan="3">Regulation under Government Regulation of Republic of Indonesia, No.44/1993 on Vehicle & drivers</td></tr>
<tr><td>ITEM</td><td>CONTENTS</td><td>Illustration/Supplement</td></tr>
<tr><td>A:Application</td><td>Passenger cars</td><td rowspan="5"></td></tr>
<tr><td>B:Structure requirements
B-a: Structure of parts

B-b:Structure of parts installed in vehicle</td><td></td></tr>
<tr><td>C:Performance requirements
C-a: Performance of parts

C-b:Performance of parts installed in vehicle</td><td>1. Every motor vehicle operated on the road shall have a driving engine that meets the threshold of exhaust gas emission.
<table>
<tr><th colspan="2">Pollutant</th><th>Limit</th></tr>
<tr><td rowspan="2">Gasoline</td><td>Idle CO</td><td>4.5 %</td></tr>
<tr><td>Idle HC</td><td>1200 ppm</td></tr>
<tr><td>Diesel</td><td>Free acceleration smoke</td><td>BOSCH 50 %</td></tr>
</table></td></tr>
<tr><td>D:Label marking requirements</td><td></td></tr>
<tr><td>E:Referenced standards</td><td></td></tr>
</table>

JAPAN

Safety Regulation for Road Vehicle

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars : a passenger capacity ≤ 10	
B:Structure requirements B-a: Structure of parts B-b:Structure of parts installed in vehicle	1. Crankcase Emission The engine of Gasoline fueled passenger cars shall be provided with a blow-by gas recirculation device which is a device that recirculates the leaked gases from the combustion chamber of the engine to the crankcase. 2. Fuel Vapor Emissions Gasoline-fueled passenger cars shall be provided with a device which may efficiently prevent the emission of HC vapor from the fuel system to the atmosphere.	
C:Performance requirements C-a: Performance of parts C-b:Performance of parts installed in vehicle	1. General Provisions No motor vehicle shall emit excessive smoke, bad-smelling gases or harmful gases while running. 2. 10·15-Mode Operation for CO, HC and NOx of Gasoline Fueled Passenger Car. (Hot) 2.1. Emission limits	

(g/km)

CO	HC	NOx
2.70	0.39	0.48

Safety Regulation for Road Vehicle

ITEM	CONTENTS	Illustration/Supplement

2.2. Test Method

2.2.1. Test Vehicle weight

The test vehicle shall have a weight (hereinafter referred to as the “test vehicle weight”) obtained when two persons (55 kg×2) or weights of 110 kg are loaded on the test vehicle under the unloaded state.

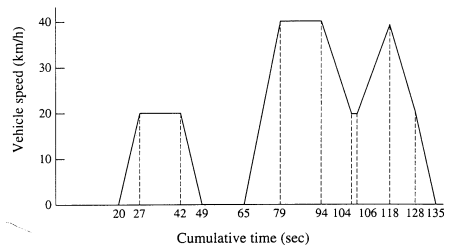
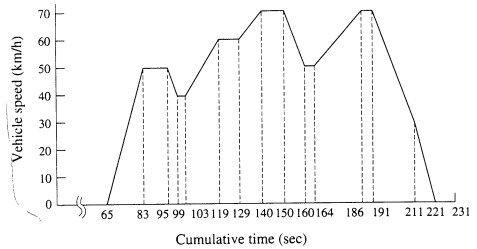
2.2.2. Setting of equivalent inertia weight

The equivalent inertia weight of the chassis dynamometer shall be set to the standard value specified in the Table below.

Test vehicle weight	Standard value of equivalent inertia weight (kg)
Up to 562	500
563 - 687	625
688 - 812	750
813 - 937	875
938 - 1,125	1,000
1,126 - 1,375	1,350
1,376 - 1,125	1,500
1,626 - 1,875	1,750
1,876 - 2,125	2,000
2,126 - 2,375	2,250
2,376 - 2,625	2,500
2,626 - 2,875	2,750
2,876 - 3,250	3,000
Continues in increments of 500 kg	Continues in increments of 500 kg

JAPAN

Safety Regulation for Road Vehicle

ITEM	CONTENTS	Illustration/Supplement
	2.2.3.(1)Warming-up 60 ± 2 km/h-5min., after idling test described in paragraph 5. (2)Driving schedule of test vehicle - 15-mode operation×1 - idling operation for 24 seconds - 10-mode operation×3 - 15-mode operation×1 In the case of motor vehicles incapable of attaining the acceleration acceleration obtained by opening the throttle valve fully shall be used for the said mode operation. 3. 11-Mode Operation for CO, HC and NOx of Gasoline Fueled Passenger Car. (Cold) 3.1. Emission limits (g/km) CO: 85.0 / HC: 9.50 / NOx: 6.00 3.2. Test Method 3.2.1. Test vehicle weight Refer to paragraph 2.2.1. 3.2.2. Setting of equivalent inertia weight Refer to paragraph 2.2.2. 3.2.3.(1) 11-mode operation is a testing performed when the motor vehicle is operated for 25 seconds idling and successively through the driving schedule in Table below. Prior to the test motor vehicle shall be conditioned in an area with the engine stopped where the ambient temperature is maintained at between 20°C for at least six hours.	(Reference Diagram) 10-Mode  (Reference Diagram) 15-Mode 

JAPAN

Safety Regulation for Road Vehicle

ITEM	CONTENTS	Illustration/Supplement

3.2.3.(2) Driving schedule of test vehicle
The gear position of the test vehicle shall be placed in neutral or parking.
Start the engine and run it at the idling speed for 25 seconds.
Then, immediately repeat the 11-mode operation four times consecutively.

4. 10·15-mode Operation for CO, HC, NOx of Diesel Fueled Passenger Car (Hot)
4.1 Emission limits

(g/km)

Vehicle weight	CO	HC	NOx	PM
≤1265	2.70	0.62	0.72	0.34
1265kg<	2.70	0.62	0.84	0.34

5. Idling Operation for CO and HC of Gasoline Fueled Motor Vehicles
5.1 Emission limits
CO≤4.5%
HC≤1,200 ppm

5.2 Test Method
- Warming-up, 60 ± 2 km/h, 15min.
- the transmission gear placed in neutral or parking
- measured by a nondispersive infrared analyzer (NDIR).

6. Fuel Vapor Emissions
6.1. Emission limits

The evaporation emission≤2.0 g/test.

Safety Regulation for Road Vehicle		
ITEM	CONTENTS	Illustration/Supplement
	6.2. Test method 6.2.1. Test vehicle weight Refer to paragraph 2.2.1. 6.2.2. Setting of equivalent inertia weight Refer to paragraph 2.2.2. 6.2.3. Measuring Method of Fuel Evaporation Emission Weight The measurement shall be conducted using the trap method or enclosure method. 6.2.3.1. Trap Method (1)Warming-up: 40 ± 2 km/h for about 15 minutes. (2)After warming-up, drain the fuel. (3)Refill the fuel tank fuel of about 40% of the nominal capacity of the fuel tank. (4)Engine running: 40 ± 2 km/h for 40 minutes (5) stop the engine. Immediately plug the exhaust pipe opening. (6)Install the traps securely to the air inlet openings of the engine, etc. Soak the test vehicle for one hour. (7)The emission weight shall be calculated by the difference in weight of each trap before and after the test. 6.2.3.2. Enclosure Method: (1)After completion of the running, stop the engine. (2)Put the test vehicle in the enclosure. (3)The emission weight shall be calculated using, the temperature, pressure and concentration of gas in enclosure at the temperature, pre and post test. 7. Full-load Test for Diesel Smoke of Diesel Fueled Passenger Car 7.1 Requirement The measured value shall not exceed 40% as regards diesel smoke contained 7.2. Test Method (1) Operating Conditions (a)While the engine is running under full-load at the revolution speed of 40 % of the speed at	

Safety Regulation for Road Vehicle		
ITEM	CONTENTS	Illustration/Supplement
	which the engine produces its maximum output (1,000 rpm., if the revolution speed is less than 1,000 rpm.); (b)While the engine is running under full-load at the revolution speed of 60% of the speed at which the engine produces its maximum output; and (c)While the engine is running under full-load at the revolution speed at which it produces its maximum output. (2) Measuring method Exhaust emissions of a volume of 330 cc shall be sucked through a filter paper by a pump-type gas sampling system, and then the degree of pollution of the filter paper shall be measured by a light reflexibility measuring instrument.	
D:Label marking requirements		
E:Referenced standards		

KOREA

<table>
<tr><td colspan="3">The Regulation of the Motor Vehicle Safety Standards, Article 36(Article 36 of the Atmospheric Environment Preservation Act.)</td></tr>
<tr><td>ITEM</td><td>CONTENTS</td><td>Illustration/Supplement</td></tr>
<tr><td>A:Application</td><td>Passenger cars
-</td><td rowspan="5"></td></tr>
<tr><td>B:Structure requirements
B-a: Structure of parts

B-b: Structure of parts installed in vehicle</td><td></td></tr>
<tr><td>C:Performance requirements
C-a: Performance of parts

C-b: Performance of parts installed in vehicle</td><td>1 Exhaust emission limits (g/km)

<table>
<tr><td></td><td>CO</td><td>HC</td><td>NOx</td><td>Evaporative emission</td><td>PM</td></tr>
<tr><td>Gasoline, LPG</td><td>2.11</td><td>0.25</td><td>0.62</td><td>2.0 (g/test)</td><td>---</td></tr>
<tr><td>Diesel</td><td>2.11</td><td>0.25</td><td>0.62</td><td>---</td><td>0.08</td></tr>
</table>
1.2. Test procedure
According to the USA EPA test procedure:CVS-75</td></tr>
<tr><td>D:Label marking requirements</td><td></td></tr>
<tr><td>E:Referenced standards</td><td></td></tr>
</table>

MALAYSIA

Environmental Quality (Control of Emission from Petrol Engines) Regulations

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle		
C:Performance requirements C-a: Performance of parts		
C-b: Performance of parts installed in vehicle	1. Control of petrol engine on motor vehicle 1.1. Emission limits: (g/km) HC: 2.72 / CO+NOx: 0.97 1.2.2. Test procedure: the Council Directive 91/441/EEC 2. Control of diesel engine on motor vehicle 2. 1. Emission limits: Reference mass Rm(kg) / CO (g/kg) / HC+NOx (g/kg) / PM (g/kg) Rm ≤ 1,250 / 2.72 / 0.97 / 0.14 1,250< Rm ≤ 1,700 / 5.17 / 1.4 / o.19 1,700 < Rm / 6.9 / 1.7 / o.25 2.2. Test procedure: the Council Directive 93/59/EEC.	

MALAYSIA

Environmental Quality (Control of Emission from Petrol Engines) Regulations		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements		
E:Referenced standards	The Director General may accept: - An engine type complying with equivalent or more stringent test procedure and specifications determined by him from time to time. - The Japan Six Mode Exhaust Emission for diesel engine.	

MEXICO

NOM-CCAT-004-ECOL/1993

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars - Gross Vehicle Mass of 400 to 3,857 kg - Seating capacity ≤ 10	
B:Structure requirements B-a: Structure of parts B-b:Structure of parts installed in vehicle		
C:Performance requirements C-a: Performance of parts C-b:Performance of parts installed in vehicle	1. Emission limit for gasoline-fueled, LPG-fueled and Natural gas-fueled vehicles 2. Test procedure : US-FTP75	
D:Label marking requirements		
E:Referenced standards	U.S. FR40, PART81 to 99 (1990).	

Emission limits			
g/km			g/test
HC	CO	NOx	Evaporative emission
0.25	2.11	0.62	2.0

PAPUA NEW GUINEA

Regulation No. 125C - Exhaust , Silencer, etc.		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle	1. A motor vehicle that has an internal combustion engine shall be equipped with an exhaust system, or silencer, which shall, at all times, be in good working condition. 2. The outlet of an exhaust system referred to in Section 1. shall not project to the side of the motor vehicle in such a manner as is likely to cause danger or annoyance to any person.	
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle		
D:Label marking requirements		
E:Referenced standards		

PHILIPPINES

<table>
<tr><td colspan="3">PRESIDENTIAL DECREE NO.1181:MINISTRY, BUREAU AND OFFICE ADMINISTRATIVE ORDERS AND REGULATIONS</td></tr>
<tr><td>ITEM</td><td>CONTENTS</td><td>Illustration/Supplement</td></tr>
<tr><td>A:Application</td><td>Passenger cars</td><td rowspan="3"></td></tr>
<tr><td>B:Structure requirements
B-a: Structure of parts

B-b: Structure of parts installed in vehicle</td><td></td></tr>
<tr><td>C:Performance requirements
C-a: Performance of parts

C-b: Performance of parts installed in vehicle</td><td>1. Diesel-fueled vehicles must comply to one of the following regulations.
- British Standard BS AU 141 (a);1971
- European Economic Community Directive 72/306/EEC
- Economic Commission for Europe Regulation No.24
- Australian Design Rule No. 30
- USA EPA Federal Regulations Part 85 or Federal Regulations Part 86
- N.P.C.C Rules and Regulations Implementing P.D.1181
2. Gasoline vehicles mast be comply to the followings.
- Positive crankcase ventilation
- Fuel evaporative emission shall not exceed 2.0g of HC per test.
- The exhaust emission shall not exceed the values given in the following table:

<table><tr><td>Weight GW (kg)</td><td>CO g/km</td><td>HC g/km</td></tr><tr><td>1000 or less</td><td>25</td><td>2.5</td></tr><tr><td>1001 - 1500</td><td>20</td><td>3.0</td></tr><tr><td>1501 - 3000</td><td>35</td><td>3.5</td></tr></table>
Test procedure:1975 USA Federal test procedure, or ECE test procedure</td></tr>
</table>

PHILIPPINES

PRESIDENTIAL DECREE NO.1181:MINISTRY, BUREAU AND OFFICE ADMINISTRATIVE ORDERS AND REGULATIONS		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements	1. Label of the type shall be affix in the manner described below. - It shall be a permanent legible label. - It cannot be removed without defacing it. - It shall be affix in a readily visible position in the engine compartment. - It shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrast with the background of the label. (1) Label heading:Engine Exhaust Emission Control Information (2) Full corporate name and trademark (3) Engine displacement in cubic centimeters (4) Engine family identification and model (5) Date of engine manufacture(month and year) (6) Engine line-up specification and adjustment as recommended by the manufacturer including but not limited to idle speed ignition timing idle air-fuel mixture setting procedure and value high idle speed initial injection timing valve lash(as applicable) other parameter deemed necessary by the manufacturer	
E:Referenced standards	1. For diesel-fueled vehicles - British Standard BS AU 141 (a);1971 - European Economic Community Directive 72/306/EEC - Economic Commission for Europe Regulation No.24 - Australian Design Rule No. 30 - USA EPA Federal Regulations Part 85 or Federal Regulations Part 86	

REPUBLIC OF SINGAPORE

Road Traffic (Motor Vehicles, Construction & Use) Rules		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle	1. Every motor vehicle shall be so constructed that no avoidable smoke or visible vapour is emitted therefrom.	
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle	1. Emission limits of gaseous pollutants 1.1. Every petrol driven motor vehicle shall comply with the standard for exhaust emission specified: - in the EC Directive 91/441/EEC or - in Article 31 of the Japanese Safety Regulations for Road Vehicles. 1.2. Such vehicle shall undergo a durability test for 80,000 km in accordance with the EC Directive 91/441/EEC or a durability test for 20,000 km or 30,000 km in accordance with the Japanese standard for certification. 1.3. The manufacturer of the vehicle may use the Deterioration Factor as specified in the EC Directive 91/441/EEC or such other Deterioration Factor as may be acceptable to the Registrar. 2. Diesel smoke All diesel driven motor vehicles shall comply with the standard for exhaust emission specified in the ECE Regulation 24.03 Standard for exhaust emission for diesel driven motor vehicle.	

REPUBLIC OF SINGAPORE

Road Traffic (Motor Vehicles, Construction & Use) Rules		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements		
E:Referenced standards	EC Directive 91/441/EEC ECE Regulation 24.03 Article 31 of the Japanese Safety Regulations for Road Vehicles	

CHINESE TAIPEI

<table>
<tr><td colspan="3">Emission Standards of Air Pollutants for Transportation Vehicles</td></tr>
<tr><td>ITEM</td><td>CONTENTS</td><td>Illustration/Supplement</td></tr>
<tr><td>A:Application</td><td>Passenger cars</td><td rowspan="3"></td></tr>
<tr><td>B:Structure requirements

B-a: Structure of parts

B-b: Structure of parts installed in vehicle</td><td></td></tr>
<tr><td>C:Performance requirements

C-a: Performance of parts

C-b: Performance of parts installed in vehicle</td><td>1. Gasoline- and alternative clean fuel-engine vehicles
1.1. The standards of CO, HC and NOx for the exhaust emissions of measured by the driving cycle and idle tests.
1.1.1. Emission limitsz
<table><tr><td colspan="3">Driving Cycle Test</td><td colspan="2">Idle Test</td></tr><tr><td colspan="3">g/km</td><td>CO</td><td>HC</td></tr><tr><td>CO</td><td>HC</td><td>NOx</td><td>(%)</td><td>(ppm)</td></tr><tr><td>2.11</td><td>0.255</td><td>0.62</td><td>1.0</td><td>200</td></tr></table>The useful-life and warranty period of emission-related control system is 5 years or 80,000 km.
1.1.2. The test method :
The driving schedule of “The test procedure and method for gasoline-fueled vehicles”.</td></tr>
</table>

Emission Standards of Air Pollutants for Transportation Vehicles		
ITEM	CONTENTS	Illustration/Supplement
	1.2. The hydrocarbon (HC) in the crankcase blow-by gases 1.2.1. Emission limits: “0” emission. 1.2.2. The test method : CNS 11496. 1.3. The hydrocarbon (HC) in the fuel tank and carburetor evaporative gases 1.3.1. Limit for fuel evaporative emission: 2 g/test The useful-life and warranty period of emissions-related control systems is 5 years or 80,000 km. 1.3.2. The test method : The SHED method of “The test procedure and method for gasoline-fueled vehicles”. 2. Diesel and alternative clean fuel-engine vehicles 2.1. Limit of smoke pollution degree: 50 % 2.2. The test method for the degree of pollution: CNS 11644 and 11645. (If both standards of opacity and pollution degree are available, the manufacturer may specify which test method should be used.)	

CHINESE TAIPEI

Emission Standards of Air Pollutants for Transportation Vehicles		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements		
E:Referenced standards		

THAILAND

Thai Industrial Standard (TIS 1365-2539 and TIS 1370-2539)

ITEM	CONTENTS	Illustration/Supplement
A:Application	1. Gasoline engined vehicles (TIS 1365-2539) Passenger cars (off-road vehicle is included) 2. Diesel engined vehicles (TIS 1370-2539) Passenger cars not more than 9 seats,	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle	1. For passenger cars not more than 6 seats the inlet orifice of the fuel tank shall be so designed as to prevent the tank from being filled from a petrol pump delivery nozzle which has an external diameter of 23.6 mm, or greater.	
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle	1. Gasoline engined vehicles 1.1. Type 1 test (Emission after cold start) After the test in accordance with TIS 1280, Type approval test, Type 1 test; (a) Passenger car not more than 6 seats, GVW not exceeding 2500 kg. The average mass of carbonmonoxide and the average combined mass of hydrocarbons and oxides of nitrogen from 3 tests multiplied by the deterioration factor (see clause 1.5) shall be less than the limit given table 1. Table 1; Limits of mass of pollutants from engine of passenger car	

CO (g/km.)	HC+NOx (g/km.)
2.72	0.97

Thai Industrial Standard (TIS 1365-2539 and TIS 1370-2539)

ITEM	CONTENTS	Illustration/Supplement

(b) Passenger car with more than 6 seats or converted from light-duty trucks or with GVW exceeding 2500 kg.

The average mass of carbonmonoxide and the average combined mass of hydrocarbons and oxides of nitrogen from 3 tests multiplied by the deterioration factor shall be less than the limit given in table 2.

Table 2; Limits of mass of pollutants from engine of passenger car

Reference mass (kg)	CO (g/km)	HC + NOx (g/km)
Rm≤1250	2.72	0.97
1250<Rm≤1700	5.17	1.4
1700<Rm	6.9	1.7

1.2. Type 2 test (Carbonmonoxide at idling speed)

After the test in accordance with TIS 1280 Type approval test Type 2 test, the concentration of carbonmonoxide;

(a) Shall not exceed 3.5% by volume when tested by setting the components for adjusting the idling speed according to the manufactures recommendations for type I test,

(b) Shall not exceed 4.5% by volume when tested by setting the components for adjusting the idling speed within the range of adjustment

1.3. Type 3 test (crankcase emission)

After the test in accordance with TIS 1280 Type approval test Type 3 test, no crankcase gas is permitted to ventilate into the atmosphere.

Thai Industrial Standard (TIS 1365-2539 and TIS 1370-2539)

ITEM	CONTENTS	Illustration/Supplement

1.4. Type 4 test (evaporative emission)

After the test in accordance with TIS 1280 Type approval test Type 4 test, the evaporative emission shall be less than 2 g/test.

1.5. Type 5 test (durability of pollution control equipment)

After the test in accordance with TIS 1280, Type approval test, Type 5 test the interpolated values of the mass of carbonmonoxide and of the combined mass of hydrocarbons and oxides of nitrogen at 6,400 km. and 80,000 km shall be less than the limit given in those tables for Type 1 test as appropriate.

Manufacturer may choose to use the deterioration factor 1.2 as an alternative to the Type 5 test.

2. Diesel engined vehicles

2.1. CO, HC, NOx, and Particulate pollutants (Type I)

When tested according to the type approval test specified in TIS 1285;

(a) Passenger car not more than 6 seats

The arithmetic mean of CO, HC + NOx and particulate pollutants obtained from 3 repeated tests multiplied by the deterioration factor in table 3 shall be less than the amounts shown in table 4.

Table 3: Deterioration factor

Pollutants	Deterioration factor
CO	1.1
HC+NOx	1.0
Particulate pollutants	1.2

Thai Industrial Standard (TIS 1365-2539 and TIS 1370-2539)

ITEM	CONTENTS	Illustration/Supplement

Deterioration factors are determined using either type V test or using the values above table.

Table 4 : CO, HC + NOx and PM of exhaust gas (unit : g/km)

CO	HC + NOx	PM
2.72	0.97	0.14

(b) Passenger car more than 6 seats or GVW exceeds 2500 kgs, light duty trucks and passenger cars converted from trucks

The arithmetic mean of CO, HC + NOx and particulate pollutants obtained from 3 repeated tests multiplied by the deterioration factor in table 3 shall be less than the amounts shown in table 5.

Table 5: CO, HC + NOx and PM of exhaust gas (unit : g/km)

Reference Weight (R) kg	CO	HC + NOx	PM
≤ 1250	2.72	0.97	0.14
1250 <R< 1700	5.17	1.4	0.19
1700<	6.9	1.7	0.25

2.2. Durability of pollution control devices (Type V)

When test according to TIS 1280 type approval test type V, the interpolated 6400 km and 80000 km point of CO, HC + NOx and PM shall be within the limits prescribed in table 4 or table 5 above.

Deterioration factors are determined using either type V test or using the values in the table 3.

Thai Industrial Standard (TIS 1365-2539 and TIS 1370-2539)

ITEM	CONTENTS	Illustration/Supplement

2.3. Black smoke

(a) When tested according to TIS 1140, the light absorption coefficient-K of gases emitted at each nominal flow shall be within the limits prescribed in table 6.

(b) For vehicles with a supercharger, when tested according to TIS 1140 the light absorption coefficient of gases shall not exceed the limit prescribed in table 6 for the nominal flow value corresponding to the maximum absorption coefficient measured during the tests according the method in TIS 1140, plus 0.5 m^{-1}

Table 6: Light absorption coefficient for nominal flow values of exhaust gases

Nominal flow (G) dm^3/sec	Absorption coefficient (K) m^{-1}	Nominal flow (G) dm^3/sec	Absorption coefficient (K) m^{-1}
≤42	2.26	125	1.345
45	2.19	130	1.32
50	2.08	135	1.30
55	1.985	140	1.27
60	1.9	145	1.25
65	1.84	150	1.225
70	1.775	155	1.205
75	1.72	160	1.19
80	1.665	165	1.17
85	1.62	170	1.155
90	1.575	175	1.14
95	1.535	180	1.125
100	1.495	185	1.11
105	1.465	190	1.095
110	1.425	195	1.08
115	1.395	≥200	1.065
120	1.37		

Note: Although the above values are rounded to the nearest 0.01 or 0.005, this does not mean that the measurements need to be made to this tolerance

THAILAND

Thai Industrial Standard (TIS 1365-2539 and TIS 1370-2539)		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements	1. For passenger cars not more than 6 seats the inlet orifice of the fuel tank shall be legibly and indelibly marked with the symbol for unleaded petrol in a position immediately visible to a person filling the fuel tank. 2. At least there shall be affixed, legibly, clearly and permanently to a part of the engine or in the engine compartment of every vehicle, number, letter or mark representing the model of the engine corresponding to the vehicle. In case foreign language is used, the meaning shall correspond to that in Thai specified above. 3. Any person who manufactures products complying with this standard may use the safety mark in connection with his products only after having received a license from the Industrial Product Standards Council.	
E:Referenced standards	Sampling and criteria for conformity 1. Gasoline engined vehicle Sampling and criteria for conformity shall be according to TIS 1280 or any other technically equivalent plan shall be followed. 2. Diesel engined vehicle Sampling and criteria shall be the same method as specified in TIS 1285 or its equivalent method.	

UNITED STATES OF AMERICA

Clean Air Act

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars (Light-duty vehicle)	
B:Structure requirements B-a:Structure of parts		
B-b:Structure of parts installed in vehicle	1. Prohibition of defeat devices. No new gasoline-fueled vehicle shall be equipped with a defeat device. 1. Emission control diagnostic system (OBD) 1.1. All vehicles, excluding diesel cycle vehicles, shall be equipped with an OBD Monitoring requirement: Catalyst deterioration Engine misfire Oxygen sensor deterioration EGR Vapor leak Secondary air system Any other deterioration or malfunction	
C:Performance requirements C-a:Performance of parts		
C-b:Performance of parts installed in vehicle	1. Emission standards for 1996 and later model year vehicles. 1.1. Emission limits Intermediate Useful Life Standards (g/mile)	

Fuel	THC	NMHC	THCE	NMHCE	CO	NOx	PM
Gasoline	0.41	0.25	--------	---------	3.4	0.4	0.08
Diesel	0.41	0.25	--------	---------	3.4	1.0	0.08
Methanol	---------	--------	0.41	0.25	3.4	0.4	0.08
Natural Gas	---------	0.25	--------	---------	3.4	0.4	0.08
LPG	0.41	0.25	--------	---------	3.4	0.4	0.08

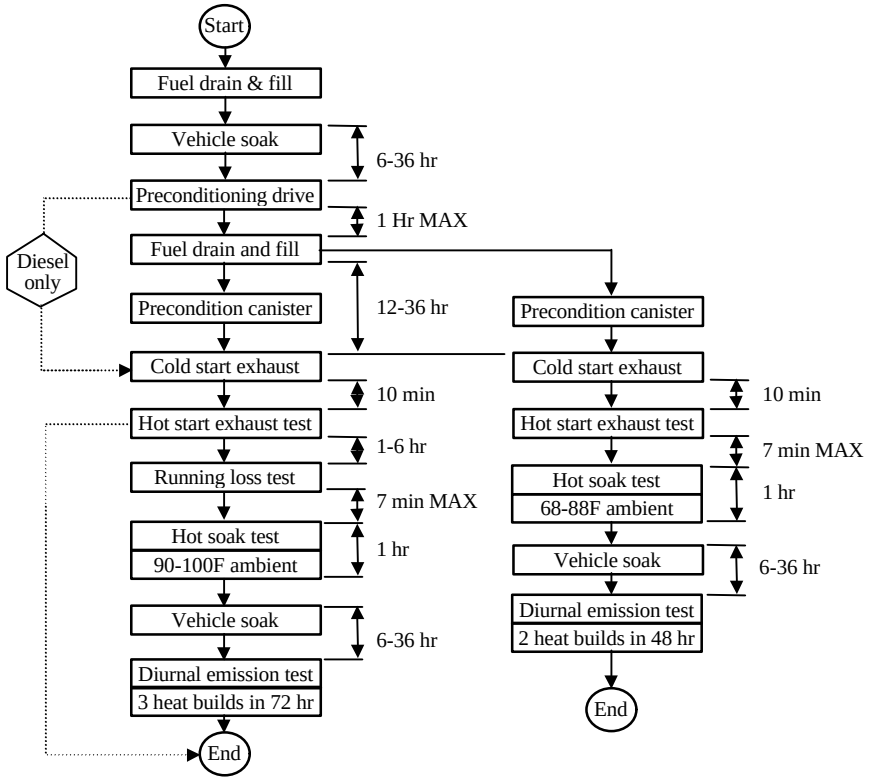
ITEM	CONTENTS	Illustration/Supplement

Full Useful Life Standards (g/mile)

Fuel	THC	NMHC	THCE	NMHCE	CO	NOx	PM
Gasoline	---------	0.31	--------	---------	4.2	0.6	0.10
Diesel	---------	0.31	--------	---------	4.2	1.25	0.10
Methanol	---------	--------	--------	0.31	4.2	0.6	0.10
Natural Gas	---------	0.31	--------	---------	4.2	0.6	0.10
LPG	---------	0.31	--------	---------	4.2	0.6	0.10

1.2. Test procedure

1.2.1. Test procedure chart is shown below.

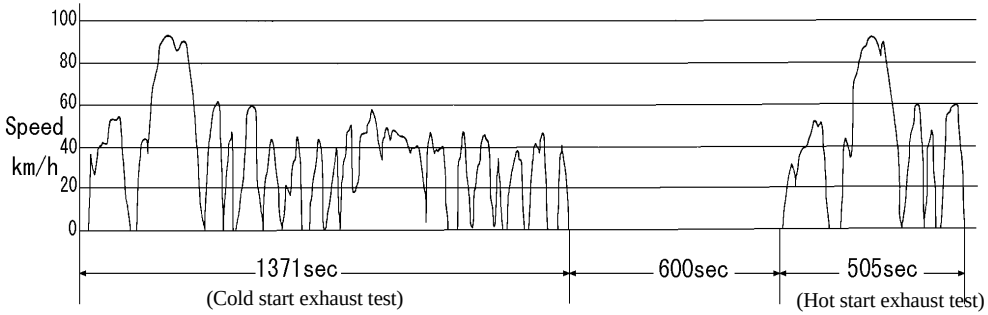


UNITED STATES OF AMERICA

Clean Air Act

ITEM	CONTENTS	Illustration/Supplement

1.2.2. Cold and hot start exhaust test schedule in test procedure chart is shown below.



1.2.3. Setting of equivalent inertia weight

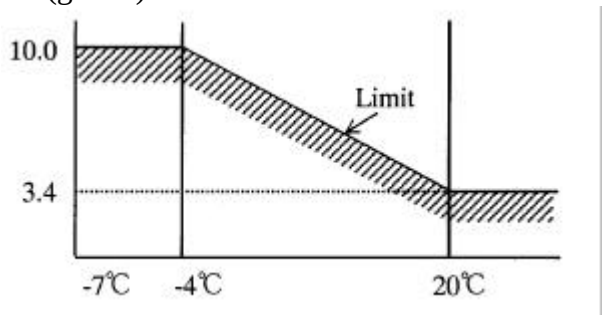
Reference Mass kg	Equivalent Test Inertia Mass kg	Reference Mass kg	Equivalent Test Inertia Mass kg
- 481	454	- 1389	1361
- 538	510	- 1445	1417
- 595	567	- 1502	1474
- 652	624	- 1559	1531
- 708	680	- 1615	1588
- 765	737	- 1672	1644
- 822	794	- 1729	1701
- 878	850	- 1786	1758
- 935	907	- 1872	1814
- 992	964	- 1984	1928
- 1048	1021	- 2097	2041
- 1105	1077	- 2211	2155
- 1162	1134	- 2324	2268
- 1219	1191	- 2438	2381
- 1275	1247	- 2608	2495
- 1332	1304	2609 -	2722

UNITED STATES OF AMERICA

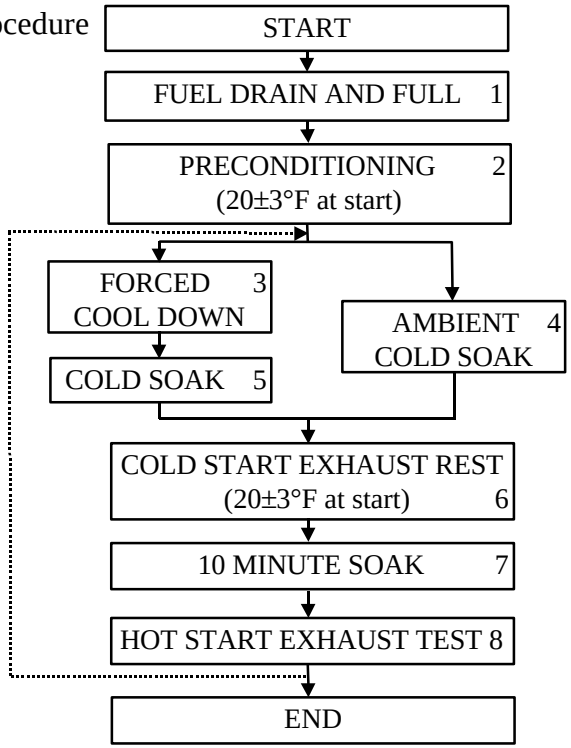
Clean Air Act		
ITEM	CONTENTS	Illustration/Supplement

3. Cold temperature CO emission control

3.1. Emission limits (g/mile)



3.2. Test procedure



STEP	NOTE
1	Winter grade fuel (option:FTP-fuel)
2	Full UDDS
3	No limit specification Uniform vehicle cooling Oil Temp.at 20±3°F
4	12-36 hours
5	1 hour minimum
6	Full UDDS
7	On dynamometer
8	Partial UDDS(505sec.)

UNITED STATES OF AMERICA

Clean Air Act		
ITEM	CONTENTS	Illustration/Supplement
	4. Refueling emissions(ORVR) 4.1. Emission limits (a) HC≤0.053 g/ℓ (for gasoline-fueled Otto-cycle and petroleum-fueled diesel cycle vehicles) (b) THC. ≤ 0.053 g/ℓ (for methanol-fueled vehicles) 4.2. Test procedure Fuel Drain & Fill 10% plus Fuel for LA4, FTP and RL ↓ 12-36hr Soak ↓ Preconditioning UDDS ↓ Vehicle Soak(68-86F) Load Canister ↓ Preconditioning FTP ↓ Running Loss Drive (68-86F) ↓ Vehicle Soak ↓ ORVR Measurement	

Clean Air Act		
ITEM	CONTENTS	Illustration/Supplement
	5. Evaporative emissions 5.1. Emission limits Hydrocarbons (for gasoline-fueled, natural gas-fueled, and liquefied petroleum-gas fueled vehicles). (a) (i) For the full three-diurnal test diurnal plus hot soak measurements: ≤2.0 g/test. (ii) For the supplemental two-diurnal test sequence diurnal plus hot soak emission (gasoline-fueled vehicles only): ≤2.5 g/test (b) Running loss test (gasoline-fueled vehicles only): ≤0.05 g/mile (c) Fuel dispensing spitback test (gasoline-fueled vehicles only): ≤1.0 g/test. 5.2 Test procedure Refer to test procedure chart described in paragraph 1.2.1.	

UNITED STATES OF AMERICA

Clean Air Act		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements	1. Emission control information label 1.1. Label of the type shall be affix in the manner described below. - It shall be a permanent legible label. - It cannot be removed without defacing it. - It shall be affix in a readily visible position in the engine compartment. - It shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrast with the background of the label. (1) Label heading: Engine Exhaust Emission Control Information (2) Full corporate name and trademark (3) Engine displacement in cubic centimeters (4) Engine family identification and model (5) Date of engine manufacture(month and year) (6) Engine line-up specification and adjustment as recommended by the manufacturer including but not limited to idle speed ignition timing idle air-fuel mixture setting procedure and value high idle speed initial injection timing valve lash(as applicable) other parameter deemed necessary by the manufacturer	
E:Referenced standards		

ECE

ECE Regulation No. 15 - The Emission of Gaseous Pollutants by the Engine

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars (M_1) - positive-ignition engines - compression-ignition engines. - an unladen mass ≥400 kg, or a design speed ≥ 50 km/h.	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	1. The components liable to affect the emission of gaseous pollutants shall be so designed, constructed and assembled as to enable the vehicle, in normal use, despite the vibration to which they may be subjected, to comply with the provisions of this Regulation.	
C:Performance requirements C-a:Performance of parts C-b:Performance of parts installed in vehicle	1. Type I test (verifying the average exhaust emissions after a cold start). 1.1. Emission limits For all vehicles equipped with a positive-ignition engine fueled with leaded petrol, the limits, as a function of given reference mass, are;	

Reference mass (Rm) (kg)	Carbon monoxide g/test L1	Combined emission of hydrocarbons and oxides of nitrogen in g/test L2
< Rm ≤ 1,020	58	19
1,020 < Rm ≤ 1,250	67	20.5
1,250 < Rm ≤ 1,470	76	22
1,470 < Rm ≤ 1,700	84	23.5
1,700 < Rm ≤ 1,930	93	25
1,930 < Rm ≤ 2,150	101	26.5
2,150 < Rm	110	28

Above emission limits shall be satisfied, when a test lasting a total of 13 minutes and comprising four elementary urban cycles is carried out without interruption.

ECE Regulation No. 15 - The Emission of Gaseous Pollutants by the Engine

ITEM	CONTENTS	Illustration/Supplement

1.2. Test procedure

1.2.1. Adjustment of inertia simulators to the vehicle's translatory inertias

An inertia simulator shall be used enabling a total inertia to be obtained proportional to the reference mass within the following limits:

Reference mass of vehicle Rm (kg)	Equivalent inertias I (kg)
Rm ≤ 750	680
750 < Rm ≤ 850	800
850 < Rm ≤ 1,020	910
1,020 < Rm ≤ 1,250	1,130
1,250 < Rm ≤ 1,470	1,360
1,470 < Rm ≤ 1,700	1,590
1,700 < Rm ≤ 1,930	1,810
1,930 < Rm ≤ 2,150	2,040
2,150 < Rm ≤ 2,380	2,270
2,380 < Rm ≤ 2,610	2,270
2,610 < Rm	2,270

1.2.2. Conditioning of vehicle

Before the test, the vehicles shall be kept in a room in which the temperature remains relatively constant between 20 and 30°C at least six hours and continue until the engine oil temperature and coolant, if any, are within ±2°C of the temperature of the room.

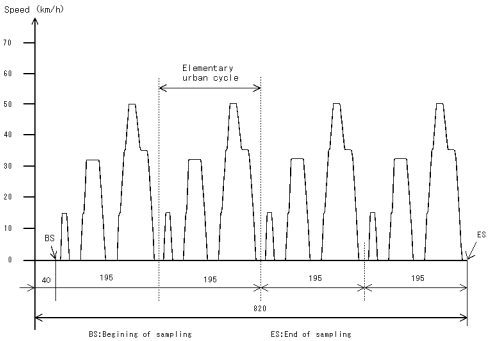
1.2.3. Special conditions

During the test, the test cell temperature must be between 20 and 30°C.

1.2.4. Operating cycle for the type I test

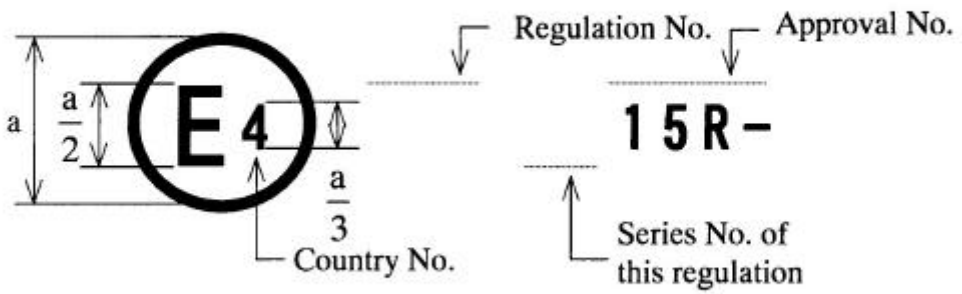
Refer to Fig.1

Fig.1



ECE Regulation No. 15 - The Emission of Gaseous Pollutants by the Engine		
ITEM	CONTENTS	Illustration/Supplement
	2. Type II test (carbon monoxide emission test at idling speed). 2.1. Emission limits The carbon monoxide content by volume of the exhaust gases emitted with the engine idling must not exceed 3.5% and must not exceed 4.5% within the range of adjustments specified in the regulation. 2.2. Test procedure The type II test shall be carried out immediately after the completion of the urban cycle of the type I test, with the engine at idle The measurement of the carbon-monoxide content of exhaust gases shall be carried out for all the possible positions of the adjustment components, The type II test shall be considered satisfactory if one or both of the two following conditions is met: none of values exceeds the limit values; the maximum content obtained by continuously varying of the adjustment components not exceed the value. 3. Type III test (verifying emissions of crankcase gases). 3.1. Requirement The crankcase ventilation system must not permit the emission of any of the crankcase gases into the atmosphere. 3.2. Test procedure 3.2.1. Method of verification The pressure in the crankcase shall be measured at an appropriate location. The vehicle shall be deemed satisfactory if, in every condition of measurement the pressure measured in the crankcase does not exceed the atmospheric pressure. If pressure measured in the crankcase exceeds the atmospheric pressure, an additional test shall be performed if so requested by the manufacturer.	

ECE

ECE Regulation No. 15 - The Emission of Gaseous Pollutants by the Engine		
ITEM	CONTENTS	Illustration/Supplement
	3.2.2. Additional test method A flexible bag impervious to crankcase gases and having a capacity of approximately five litres shall be connected to the dipstick hole. The vehicle shall be deemed satisfactory if, in every condition of measurement no visible inflation of the bag occurs.	
D:Label marking requirements	1. The approval mark shall be clearly legible and be indelible. 2. The approval mark shall be placed close to or on the vehicle data plate. Example  	
E:Referenced standards		

ECE

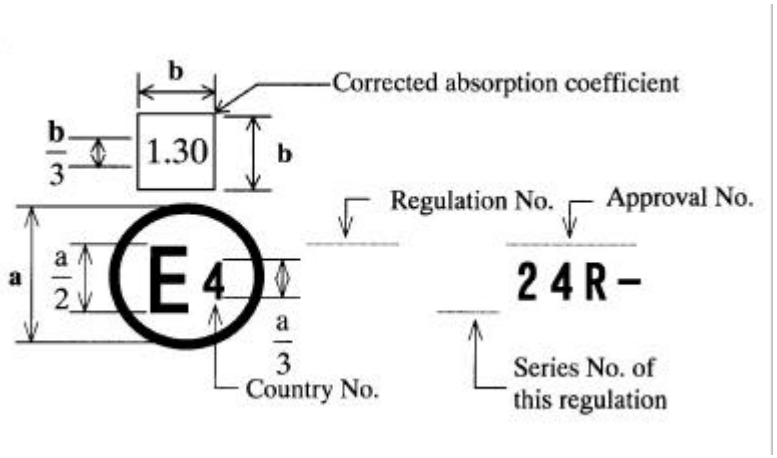
ECE Regulation No. 24 - Emission of Visible Exhaust Pollutants from C.I. Engine(Diesel Smoke)		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars (M1) - compression-ignition engines.	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	1. The components liable to affect the emission of gaseous pollutants shall be so designed, constructed and assembled as to enable the engine or the vehicle, in normal use, despite the vibration to which they may be subjected, to comply with the provisions of this Regulation. 2. The cold-start device shall be so designed and constructed that it cannot be brought into or kept in action when the engine is running normally. 3. The provisions of above paragraph shall not apply if at least one of the following conditions is met, 1) The light absorption coefficient of the gases emitted by the engine at steady speeds when measured by the procedure prescribed in this Regulation with the cold-start device operating, is within the Table 1. 2) Keeping the cold-start device in operation cause the engine to stop within a reasonable time. If necessary any vehicle related parts of the system may be simulated for the approval test.	

ECE Regulation No. 24 - Emission of Visible Exhaust Pollutants from C.I. Engine(Diesel Smoke)

ITEM	CONTENTS	Illustration/Supplement
C:Performance requirements C-a: Performance of parts C-b:Performance of parts installed in vehicle	1. The emission of visible pollutants shall be measured by the two methods of test at steady speeds and under free acceleration. 1.1. The steady speed test 1.1.1. The light adsorption coefficient of the gases emitted by the engine at steady speeds shall be within the limits prescribed in Table below.	

Nominal flow G (ℓ/sec)	Absorption coefficient k (m^{-1})
42	2.26
45	2.19
50	2.08
55	1.985
60	1.90
65	1.84
70	1.775
75	1.72
80	1.665
85	1.62
90	1.575
95	1.535
100	1.495
105	1.465
110	1.425
115	1.395
120	1.37
125	1.345
130	1.32
135	1.30
140	1.27
145	1.25
150	1.225
155	1.205
160	1.19
165	1.17
170	1.155
175	1.14
180	1.125
185	1.11
190	1.095
195	1.08
200	1.065

ECE Regulation No. 24 - Emission of Visible Exhaust Pollutants from C.I. Engine(Diesel Smoke)		
ITEM	CONTENTS	Illustration/Supplement
	1.1.2 Test procedure 1) The opacity of the exhaust gases produced by the engine shall be measured with engine running under full-load and at steady speed. 2) A sufficient number of measurements will be carried out ranging between the maximum rated speed and the minimum rated speed, including the speeds at the maximum power and maximum torque. 3) The light-absorption coefficient of the exhaust gases shall be measured with an opacimeter. 4) For each of the engine speeds at which the absorption coefficient is measured , the nominal gas flow shall be calculated by means of the following formulae, for two-stroke engine $G = V \cdot n/60$ for four-stroke engine $G = V \cdot n/120$ in which, G = gas-flow (ℓ/sec),V = cylinder capacity of the engine (ℓ) n = engine speed(min^{-1}) 1.2. The free acceleration test 1.2.1. No limit is required, but visible pollutant shall be measured by the method of test under free acceleration. 1.2. 2. Test procedure 1) The free acceleration visible pollutants shall be measured with the engine in the maximum rated speed and maximum power condition. 2) With the engine idling, the acceleration control shall be operated quickly so as to obtain maximum delivery from the injection pump. This position shall be maintained until maximum engine speed is reached and the governor comes into action. As soon as this speed is reached the accelerator shall be released until the engine resumes its idling speed and the opacimeter reverts to the corresponding conditions.	

ECE Regulation No. 24 - Emission of Visible Exhaust Pollutants from C.I. Engine(Diesel Smoke)		
ITEM	CONTENTS	Illustration/Supplement
	3) The above mentioned operation shall be repeated not less than six times in order to clean the exhaust system. The maximum opacity values read in each successive acceleration shall be noted until stabilized value are obtained. The absorption coefficient(X_M) to be recorded shall be the arithmetical mean of these four values. 4) The absorption coefficient being expressed in m^{-1} the corrected value X_L is given by the smaller of the following two expressions: $X_L = \frac{S_L}{S_M} X_M$ or $X_L = X_M + 0.5$	
D:Label marking requirements	1. The approval mark shall be clearly legible and be indelible. 2. The approval mark shall be placed close to or on the vehicle data plate. Example  	
E:Referenced standards		

ECE No. 49 The Emissions of Pollutants by the Engine

ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars (M1) C.I. and N.G. engines and P.I. engines fueled with LPG (a design speed>25 km/h, 5 tones≥total mass>3.5 tones.)	
B:Structure requirements B-a:Structure of parts B-b:Structure of parts installed in vehicle	1. The components liable to affect the emission of gaseous pollutants shall be so designed, constructed and assembled as to enable the engine, in normal use, despite the vibration to which it may be subjected, to comply with the provisions of this Regulation.	
C:Performance requirements C-a:Performance of parts	1.Emission limits The mass of the carbon monoxide, the mass of the hydrocarbons, the mass of the oxides of nitrogen and the mass of the particulates must not exceed the amounts shown in the table below:	

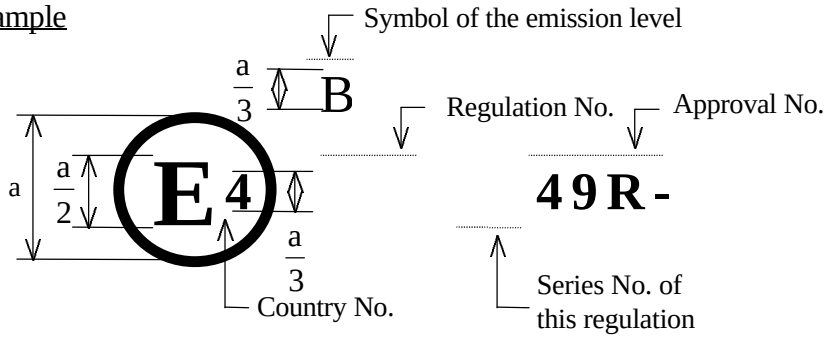
Mass of Carbon Monoxide (CO) g/kWh	Mass of Hydrocarbons (HC) g/kWh	Mass of Oxides of Nitrogen (NOx) g/kWh	Mass of Particulates (PT) g/kWh
4.0	1.1	7.0	0.15*/

*/ If necessary, this limit value for particulate emissions will be revised upwards, depending upon the availability of technologies for controlling air polluting emissions form diesel engines, particularly those of less than an 85 kW.

2.Test procedure
The test shall be carried out with the engine mounted on a test bench and connected to a dynamometer.
2.1. Engine test conditions
The absolute temperature (T) of the engine air at the inlet to the engine expressed in Kelvin, and the dry atmospheric pressure (ps), expressed in kilopascals, shall be measured and the parameter F shall be determined according to the following provisions:

ECE No. 49 The Emissions of Pollutants by the Engine		
ITEM	CONTENTS	Illustration/Supplement
	2.1.1. Naturally aspirated and mechanically supercharged engines: (a) C.I. engines $F = \left(\frac{99}{ps}\right) \times \left(\frac{T}{298}\right)^{0.7}$ (b) Spark ignition engines $F = \left(\frac{99}{ps}\right)^{0.65} \times \left(\frac{T}{298}\right)^{0.5}$ 2.1.2. Turbo-charged engines with or without cooling of inlet air: (a) C.I. engines $F = \left(\frac{99}{ps}\right)^{0.7} \times \left(\frac{T}{298}\right)^{1.5}$ (b) Spark ignition engines $F = \left(\frac{99}{ps}\right)^{0.65} \times \left(\frac{T}{298}\right)^{0.5}$ 2.1.3. For test to be recognized as valid, the parameter F shall be such that; $0.96 \leq F \leq 1.06$ 2.2. Fuel 2.2.1. The fuel shall be the reference fuel specified in this regulation for C.I. engines and N.G. engines. 2.2.2. In the case of LPG. The fuel shall be of commercial quality, of which density and heating value shall be determined and noted in the report. 2.3. Test Cycle The following 13-mode cycle shall be followed in dynamometer operation on the test engine:	

ECE

ECE No. 49 The Emissions of Pollutants by the Engine		
ITEM	CONTENTS	Illustration/Supplement
C-b:Performance of parts installed in vehicle	Mode Number / Engine Test Speed / Per cent load 1 idle -- 2 intermediate 10 3 intermediate 25 4 intermediate 50 5 intermediate 75 6 intermediate 100 7 idle -- 8 rated 100 9 rated 75 10 rated 50 11 rated 25 12 rated 10 13 idle -- Not applicable	
D:Label marking requirements	1. The approval mark shall be clearly legible and be indelible. 2. The approval mark shall be placed close to or on the vehicle data plate. Example  	
E:Referenced standards		

ECE

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements		
ITEM	CONTENTS	Illustration/Supplement
A:Application	Passenger cars (M_1) - positive-ignition engines (leaded petrol or unleaded petrol) - compression-ignition engines. - an unladen mass ≥400 kg, or a design speed ≥ 50 km/h.	
B:Structure requirements B-a: Structure of parts B-b: Structure of parts installed in vehicle	1. The components liable to affect the emission of gaseous pollutants shall be so designed, constructed and assembled as to enable the vehicle, in normal use, despite the vibration to which they may be subjected, to comply with the provisions of this Regulation. 2. If an oxygen sensor is used in the catalytic converter system, steps must be taken to ensure that the stoichiometric air-fuel ratio (lambda) is maintained when a certain speed is reached or when accelerating. 3.(a) The inlet orifice of the fuel tank shall be so designed as to prevent the tank from being filled from a petrol pump delivery nozzle an external diameter of 23.6 mm or greater, or (b) no device designed to control the emission of gaseous pollutants shall be adversely affected by leaded petrol.	
C:Performance requirements C-a: Performance of parts C-b: Performance of parts installed in vehicle	Table 1 below specifies the various possibilities for type-approval of a vehicle.	

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements

ITEM	CONTENTS	Illustration/Supplement

Table 1: Approval system

Type-approval Test	Vehicles fueled with leaded petrol Approval A	Vehicles fueled with unleaded petrol Approval B	Vehicles fueled with diesel fuel Approval C
Type I (Test mode)	YES (PART 1)	YES (PART 1 + 2)	YES (PART 1 + 2)
Type II:	YES	---	---
Type III:	YES	YES	---
Type IV:	---	YES	---
Type V:	---	YES	YES

1. Type I test (verifying the average exhaust emissions after a cold start).

1.1. Emission limits

1.1.1. Emission limits of gaseous pollutants normally required for vehicles fueled with leaded petrol. (Approval A.)

For all vehicles of category M_1 equipped with a positive-ignition engine fueled with leaded petrol, the limits, as a function of given reference mass, are

Reference mass Rm (kg)	Carbon monoxide L1(g/test)	Combined emission of hydrocarbons and oxides of nitrogen (g/test) L2
< Rm ≤ 1,020	58	19
1,020 < Rm ≤ 1,250	67	20.5
1,250 < Rm ≤ 1,470	76	22
1,470 < Rm ≤ 1,700	84	23.5
1,700 < Rm ≤ 1,930	93	25
1,930 < Rm ≤ 2,150	101	26.5
2,150 < Rm	110	28

Above emission limits shall be satisfied, when a test lasting a total of 13 minutes and comprising only four elementary urban cycles (part one) is carried out without interruption.

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements

ITEM	CONTENTS	Illustration/Supplement

1.1.2. Emission limits of gaseous pollutants normally required for vehicles fueled with unleaded petrol. (Approval B).

Category of vehicle		Reference mass	Limit values	
			Mass of carbon monoxide	Combined mass of hydrocarbons and nitrogen oxides
		Rm(kg)	L1(g/kg)	L2(g/kg)
*1		All	2.2	0.5
*2	Category I	Rm ≤ 1,250	2.72	0.97
	Category II	1,250 < Rm ≤ 1,700	5.17	1.4
	Category III	1,700 < Rm	6.9	1.7

Above limit values shall be satisfied, when a test lasting a total of 19 minutes and 40 seconds, made up of two parts, one and two, is carried out without interruption.

1.1.3. Exhaust emission limits normally required for vehicles fueled with diesel fuel. (Approval C)

Category of vehicle		Reference mass	Limit values		
			Mass of carbon monoxide	Combined mass of hydrocarbons and nitrogen oxides	Mass of particulates
		Rm(kg)	L1(g/kg)	L2(g/kg)	L4(g/kg)
*1		All	1.0	0.7(*)	0.08(*)
*2	Category I	Rm ≤ 1,250	2.72	0.97	0.14
	Category II	1,250 < Rm ≤ 1,700	5.17	1.4	0.19
	Category III	1,700 < Rm	6.9	1.7	0.25

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements

ITEM	CONTENTS	Illustration/Supplement

Above limit values shall be satisfied, when a test lasting a total of 19 minutes and 40 seconds, made up of two parts, one and two, is carried out without interruption.

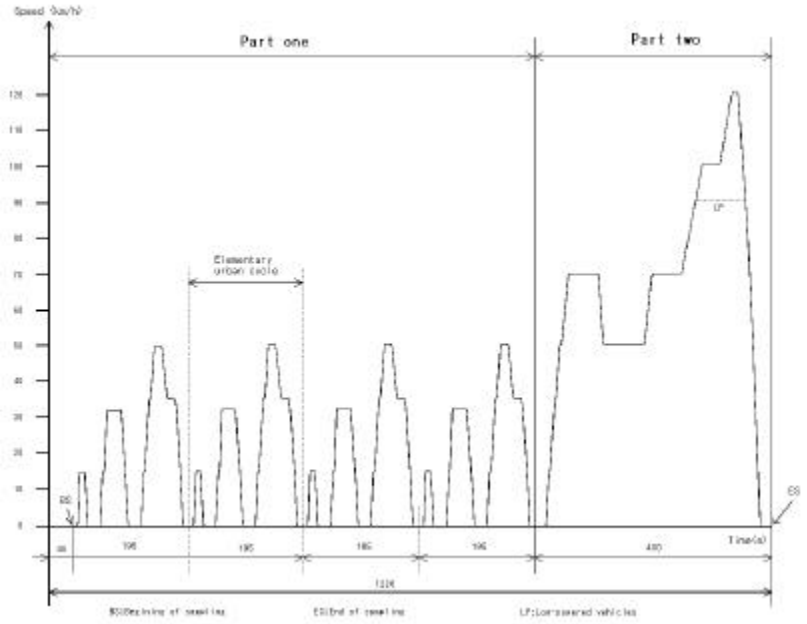
*1 Except:
-vehicles designed to carry more than six occupants including the driver;
-vehicles whose maximum mass exceeds 2,500kg.
*2 And those category M vehicles which are specified note *1 above.

1.2. Test procedure

1.2.1. Adjustment of inertia simulators to the vehicle's translatory inertias

An inertia simulator shall be used enabling a total inertia to be obtained proportional to the reference mass within the following limits:

Reference mass of vehicle Rm (kg)	Equivalent inertias I (kg)
Rm ≤ 750	680
750 < Rm ≤ 850	800
850 < Rm ≤ 1,020	910
1,020 < Rm ≤ 1,250	1,130
1,250 < Rm ≤ 1,470	1,360
1,470 < Rm ≤ 1,700	1,590
1,700 < Rm ≤ 1,930	1,810
1,930 < Rm ≤ 2,150	2,040
2,150 < Rm ≤ 2,380	2,270
2,380 < Rm ≤ 2,610	2,270
2,610< Rm	2,270

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements		
ITEM	CONTENTS	Illustration/Supplement
	1.2.2. Conditioning of vehicle For compression-ignition engine vehicles for the purpose of measuring particulates, as most 36 hours and at least 6 hours before testing, the part two cycle shall be used. Before testing, vehicles shall be kept in a room in which the temperature remains relatively constant between 20 and 30°C at least six hours and continue until the engine oil temperature and coolant, if any, are within ±2°C of the temperature of the room. 1.2.3. Special conditions During the test, the test cell temperature must be between 20 and 30°C. 1.2.4. Operating cycle for the type I test 	

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements		
ITEM	CONTENTS	Illustration/Supplement
	2. Type II test (carbon monoxide emission test at idling speed). 2.1. Emission limits The carbon monoxide content by volume of the exhaust gases emitted with the engine idling must not exceed 3.5% and must not exceed 4.5% within the range of adjustments specified in the regulation. 2.2. Test procedure The type II test shall be carried out immediately after the completion of the urban cycle (part one) of the type I test, with the engine at idle The measurement of the carbon-monoxide content of exhaust gases shall be carried out for all the possible positions of the adjustment components, The type II test shall be considered satisfactory if one or both of the two following conditions is met: none of values exceeds the limit values; the maximum content obtained by continuously varying of the adjustment components not exceed the value. 3. Type III test (verifying emissions of crankcase gases). 3.1. Requirement The crankcase ventilation system must not permit the emission of any of the crankcase gases into the atmosphere. 3.2. Test procedure 3.2.1. Method of verification The pressure in the crankcase shall be measured at an appropriate location. The vehicle shall be deemed satisfactory if, in every condition of measurement the pressure measured in the crankcase does not exceed the atmospheric pressure. If pressure measured in the crankcase exceeds the atmospheric pressure, an additional test shall be performed if so requested by the manufacturer.	

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements

ITEM	CONTENTS	Illustration/Supplement

3.2.2. Additional test method

A flexible bag impervious to crankcase gases and having a capacity of approximately five liters shall be connected to the dipstick hole.

The vehicle shall be deemed satisfactory if, in every condition of measurement no visible inflation of the bag occurs.

4. Type IV test (determination of evaporative emissions).

4.1. Emission limits

Evaporative emissions shall be less than 2 g/test.

4.2. Test procedure

Refer to the diagram on the next page.

5. Type V test (durability of pollution control equipment).

Deterioration factors shall be used to establish compliance with the requirements of type 1 test for Approval B and Approval C.

Manufacturer may choose to use either the deterioration factors from the following table or the actual deterioration factor measured by an endurance test of 80,000km performed in accordance with the driving schedule specified in this regulation.

Engine Category	Deterioration Factors		
	CO	HC + NOx	Particulates
(i) Positive-ignition	1.2	1.2	---
(ii) Compression-ignition	1.1	1.0	1.2

ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements

ITEM	CONTENTS	Illustration/Supplement

Test Procedure for Determining Evaporative Emissions

Vehicle preconditioning	Purge canister by driving or air purge at 293 to 303 K (20-30°C) ambient 2 x diurnal heat build (reference fuel 289 K (16°C) ± 1 K, Δt = 14 K ± 0.5 K). 1 part one + 2 part two driving cycles. Soak
Soak period 10-36 hours	Ambient temperature 293 to 303 K (20-30°C)
Fuel drain fuel tank fill	40 % ± 2 % of normal tank capacity fuel temperature 283 to 287 K (10-14°C)
Diurnal test 289 to 303 K (16-30°C) in 1 hour	Fuel temperature 289 K (16 °C) ± 1 K test begins ΔT : 14 ± 0.5 K over 60 ± 2 minutes
1 hour maximum	
Dynamometer test	1 part one + 1 part two driving cycles
7 minutes maximum 2 minutes from engine switch off	
Hot soak in chamber 1 hour 296 to 304 K (23-31°C)	Starting temperature inside shed is a minimum of 296 K (23°C).Maximum temperature 304 K (31°C)
End	Test result (grams) = diurnal result (grams) + hot soak result (grams)

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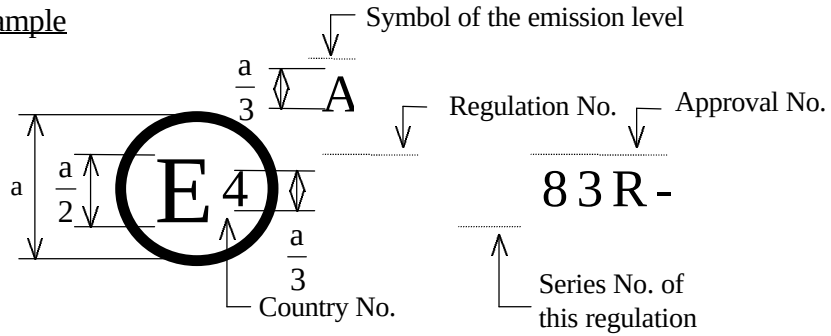
ECE Regulation No. 83 - The Emission of Pollutants according to Engine Fuel Requirements		
ITEM	CONTENTS	Illustration/Supplement
D:Label marking requirements	1. The approval mark shall be clearly legible and be indelible. 2. The approval mark shall be placed close to or on the vehicle data plate. 3. Symbols “A”, “B” or “C” corresponding to the emissions level required according to fuel requirements shall be affixed near the approval mark A : for an engine fueled with leaded petrol B : for an engine fueled with unleaded petrol C : for an engine fueled with diesel fuel Example  4. The vehicle is conspicuously, legibly and indelibly marked with the symbol for unleaded petrol, specified in ISO 2575-1982, in a position immediately visible to a person filling the fuel tank.	
E:Referenced standards		

ITEM 97-20

Brakes

APEC Regulation Analysis Findings
Item No.97-20: Brake

1. Although the Japanese Safety Regulation, ECE 13, FMVSS/CMVSS 105 differed from each other in the past, today a considerably degree of harmonization has been achieved for cars through the establishment of the Revised Safety Regulations, ECE 13H, and FMVSS/CMVSS 135. The major remaining difference among them is that only ECE 13H provides requirements concerning ABS performance.

2. Australia has long maintained equivalence with FMVSS 105 for the brakes of cars and with ECE 13 for the brakes of commercial vehicles.

3. China's brake requirements are based on ECE 13.

4. Korea adopts its own domestic technical standards for brakes, but also accepts ECE 13 and FMVSS 105 as alternatives.

5. New Zealand demands compliance with ECE, FMVSS or the Japanese Safety Regulation.

6. Hong Kong, Indonesia and some other member economies provide requirements concerning brake efficiency as measured by a brake tester, and meeting these requirements serves as an alternative to undergoing a dynamic test on performance requirements. Singapore and Chinese Taipei check brake efficiency using brake testers during their in-use vehicle inspections, but do not include brake efficiency requirements in their regulations for vehicle construction.

ITEM 97-20 : Brakes A: Application, B: Structure requirement
C: Performance requirement, D: Label/ Marking

Regulation	A:Application	B: Service Brake Transmission	B: Other feature
ECE13-09	All	Independent, two or more circuit	-Asbestos free linings -EMC (Electronic Magnetic Compatibility)
FMVSS105 CMVSS105	All	Independent, two or more circuit	N/R
ECE13H FMVSS135 CMVSS135	Passenger cars	Independent, two or more circuit	(ECE only) -Asbestos free linings -EMC (Electronic Magnetic Compatibility)
Safety Regulation for road vehicles	Passenger cars	Independent, two or more circuit	N/R
ADR31	Passenger cars	N/R	N/R
China (Chinese standards)	All	Independent, two or more circuit	N/R
Hong Kong	All	Two means of operation separated each other	N/R
Indonesia	All	N/R	N/R
Korea	All	N/R	N/R
Malaysia	All	Two means of operation (Split brake circuit)	N/R
New Zealand	All	Independent (service, emergency, parking)	N/R
Papua New Guinea	All	Separated from service brake	N/R
Philippines	All	Dual hydraulic system	N/R
Singapore	All	Two system having two means of operation	N/R
Chinese Taipei	All	N/R	N/R
Brunei	All	Shall have two means of operation	N/R

ITEM 97-20 : Brakes A: Application, B: Structure requirement
C: Performance requirement, D: Label/ Marking

Regulation	B: PKB	B: Brake stroke	B: Lining
ECE13-09	Independent from service brake, Mechanical	Automatic adjuster	Easy to be inspected
FMVSS105 CMVSS105	Independent from service brake, Mechanical	Automatic adjuster	N/R
ECE13H FMVSS135 CMVSS135	Independent from service brake, Mechanical	Automatic adjuster	(ECE only) Easy to be inspected
Safety Regulation for road vehicles	Independent from service brake, Mechanical	N/R	N/R
ADR31	Independent from service brake, Mechanical	Automatic adjuster	N/R
China (Chinese standards)	Independent from service brake mechanical	Automatic adjuster	N/R
Hong Kong	N/R	N/R	N/R
Indonesia	Separated from main brake	N/R	N/R
Korea	Separated from service brake	N/R	N/R
Malaysia	N/R	N/R	N/R
New Zealand	Shall act at least half of wheels	N/R	N/R
Papua New Guinea	N/R	N/R	N/R
Philippines	N/R	N/R	N/R
Singapore	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	N/R
Brunei	N/R	N/R	N/R

ITEM 97-20 : Brakes A: Application, B: Structure requirement
C: Performance requirement, D: Label/ Marking

Requirement / Regulation	B: Warning	B: Installation of ABS
ECE13-09	-Hydraulic transmission system or fluid level -Booster pressure -ABS check warning -Reservoir can be checked visibly and easily	N2,N3,M2,M3 Implemented on schedule for each category
FMVSS105 CMVSS105	-Hydraulic transmission system or fluid level -ABS check warning -Booster pressure	N/R
ECE13H FMVSS135 CMVSS135	-Hydraulic transmission system or fluid level -ABS check warning -Booster pressure (FMVSS only) Symbol ‘Parking’ or ‘Park’ in English	(F/CMVSS only) ABS cut-off S/W is prohibited
Safety Regulation for road vehicles	-Hydraulic transmission system or fluid level -ABS check warning -Booster pressure	N/R
ADR31	-Hydraulic transmission system or fluid level -ABS check warning -Booster pressure	N/R
China (Chinese standards)	-Hydraulic transmission system or fluid level -ABS check warning -Reservoir can be checked visibly and easily -Booster pressure	N/R
Hong Kong	Brake fluid	N/R
Indonesia	N/R	N/R
Korea	Brake fluid level Air pressure(in case of air brake system)	N/R
Malaysia	N/R	N/R
New Zealand	ECE/FMVSS/SRRV	N/R
Papua New Guinea	N/R	N/R
Philippines	N/R	N/R
Singapore	Vacuum pressure	N/R
Chinese Taipei	N/R	N/R
Brunei	Vacuum on pressure system	N/R

ITEM 97-20 : Brakes A: Application, B: Structure requirement
C: Performance requirement, D: Label/ Marking

Requirement / Regulation	C: Service brake (Type 0)	C: Service brake (Type I, Fade) Water Recovery
ECE13-09	(1)Clutch off M1 0.1V+V2/150(5.8m/s2) Others 0.15V+V2/130(5.0m/s2) (2)Clutch on M1 0.1V+V2/130(5.0m/s2) Others 0.15V+V2/103(4.0m/s2)	80% of Service Brake requirement (clutch off) or 60% of tested value
FMVSS105 CMVSS105	Specified for each category	Specified/ Water recovery test
ECE13H FMVSS135 CMVSS135	0.1V+0.006V2/70m(6.43m/s2) 0.1V+0.0067V2/70m(High speed) 153.4m(5.76m/s2)	Specified 70-150% of tested value
Safety Regulation for road vehicles	0.1V+0.006V2/70m(6.43m/s2) 0.1V+0.0067V2/70m(High speed) 153.4m(5.76m/s2)	Specified 70-150% of tested value
ADR31	Refer to ADR (similar to FMVSS105)	Refer to ADR (similar to FMVSS105)
China (Chinese standards)	Clutch off M1 0.1V+V2/150(5.8m/s2) Others 0.15V+V2/130(5.0m/s2)	80% of Service Brake requirement (clutch off) or 60% of tested value
Hong Kong	Brake efficiency 50%	N/R
Indonesia	16% by 400N (Hand-operated) 500N (Foot-operated) For passenger cars 12% by 500N(Hand-operated)	N/R
Korea	V=50km/h Stopping distance 22m Brake efficiency 50% of GVW Difference between right/left 8%	0.35 after fading (Applicable to air brake)
Malaysia	N/R	N/R
New Zealand	ECE/FMVSS/SRRV	ECE/FMVSS/SRRV
Papua New Guinea	N/R	N/R
Philippines	N/R	N/R
Singapore	N/R	(Brake efficiency)
Chinese Taipei	N/R	(Brake efficiency)
Brunei	N/R	N/R

(4)Inoperative Brake Power Assist

-A vehicle with power assist shall meet either I, II or III

.

Stop No.	I Average deceleration, FPSPS				II. Equivalent stopping distance, feet			
	Column 1 – brake power assist		Column 2 - brake power unit		Column 3 - brake power assist		Column 4 – brake power unit	
	(a)	(b) &(c)	(a)	(b) & (c)	(a)	(b)& (c)	(a)	(b) & (c)
1	16.0	14.0	16.0	13.0	242	277	242	298
2	12.0	12.0	13.0	11.0	323	323	298	352
3	10.0	10.0	12.0	10.0	388	388	323	388
4	9.0	8.5	11.0	9.5	431	456	352	409
5	8.0	7.5	10.0	9.0	484	517	388	431
6	7.5	6.7	9.5	8.5	517	580	409	456
7	[1]7.0	[1]6.0	9.0	8.0	554	646	431	484
8	NA	NA	8.5	7.5	NA	NA	456	517
9	NA	NA	8.0	7.0	NA	NA	484	554
10	NA	NA	7.5	6.5	NA	NA	517	596
11	NA	NA	[1]7.0	[1]6.0	NA	NA	554	646

[1]Depleted. (a)Passenger cars ; (b)vehicles other than passenger cars with GVWR of 10,000 lbs or less; vehicles with GVWR greater than 10,000 lbs; NA=Not applicable

III.Shall capable of stopping from 60mph in 15 consecutive stops at deceleration not lower 12f/s^2.(323ft distance)

ITEM 97-20 : Brakes A: Application, B: Structure requirement
C: Performance requirement, D: Label/ Marking

Requirement / Regulation	C: Service Brake (Type II, Long down hill)	C: Emergency Partial failure	C: Stop engine off
ECE13-09	N3 0.15V+1.33V2/115 (3.3 m/s2) M3 0.15V+1.33V2/130 (3.75m/s2)	M1 0.1V+2V2/150(2.9m/S2) N1,N2,N3 0.15V+2V2/115(2.2m/S2) M2,M3 0.15V+2V2/130(2.5m/S2) Specified for each category	N/R
FMVSS105 CMVSS105	N/R	Specified for each category	N/R
ECE13H FMVSS135 CMVSS135	N/R	Circuit failure/Power assist failure 0.1V+0.0158V2 ABS 0.1V+0.0075V2 LSPV Failure 0.1V+0.01V2	0.1+0.006V2
Safety Regulation for road vehicles	N/R	Circuit failure/Power assist failure 0.1V+0.0158V2 ABS 0.1V+0.0075V2 LSPV Failure 0.1V+0.01V2	0.1+0.006V2
ADR31	Refer to ADR (similar to FMVSS105)	(partial failure) minimum average deceleration is less than 2.55m/s2	Refer to ADR (similar to FMVSS105)
China (Chinese standards)	N/R	M1 0.1V+2V2/150(2.9m/S2) N1,N2,N3 0.15V+2V2/115(2.2m/S2) M2,M3 0.15V+2V2/130(2.5m/S2) Specified for each category	N/R
Hong Kong	N/R	Brake efficiency 25%	N/R
Indonesia	N/R	N/R	N/R
Korea	N/R	Brake efficiency 0.35 Incase of air pressure failure	N/R
Malaysia	N/R	In case of circuit failure, apply not less than half number of wheels	N/R
New Zealand	ECE/FMVSS/SRRV	ECE/FMVSS/SRRV	FMVSS
Papua New Guinea	N/R	Without power assist V=30km/h 7m distance	N/R
Philippines	N/R	N/R	N/R
Singapore	N/R	Shall supply half number of wheels	Performance shall not be rendered.
Chinese Taipei	N/R	Shall supply half number of wheels	N/R
Brunei	N/R	N/R	N/R

ITEM 97-20 : Brakes A: Application, B: Structure requirement
C: Performance requirement, D: Label/ Marking

Requirement / Regulation	C: PKB	C: Dynamic parking performance	C: Locking and stability
ECE13-09	With coupling 12% W/O coupling 18%	1.5m/s2 or 2.0m/s2	Shall not rotate extremely
FMVSS105 CMVSS105	30% gradient (PC, School bus) 20%gradient(Others)	N/R	Shall not be out of 12ft-width lane
ECE13H FMVSS135 CMVSS135	20% gradient	1.5m/s2	Shall not be out of 11.5ft.(3.5m)width lane without rotation more than 15degree
Safety Regulation for road vehicles	1/5 gradient	2.0m/s2	Shall not be out of 3.5m width lane
ADR31	30% gradient	N/R	Shall not be out of 12ft-width lane
China (Chinese standards)	With coupling 12% W/O coupling 18%	1.5m/s2 or 2.0m/s2	Shall not be out of 3.7m width lane
Hong Kong	1/6,25	N/R	N/R
Indonesia	16% by 400N (Hand-operated) 500N (Foot-operated) For PC 12% by 500N (Hand-operated)	N/R	N/R
Korea	11.5% gradient or 20% of GVW	N/R	N/R
Malaysia	N/R	N/R	N/R
New Zealand	1/5 gradient	ECE/FMVSS/SRRV	ECE/FMVSS/SRRV
Papua New Guinea	N/R	N/R	N/R
Philippines	N/R	N/R	N/R
Singapore	N/R	N/R	N/R
Chinese Taipei	Shall be effective at a gradient	N/R	N/R
Brunei	N/R	N/R	N/R

ITEM 97-20 : Brakes A: Application, B: Structure requirement
C: Performance requirement, D: Label/ Marking

Requirement / Regulation	C: Brake distribution requirement (Adhesion utilization)	C: ABS performance	D: Marking
ECE13-09	O	Specified performance	LSPV marking for N1, ECE approved mark
FMVSS105 CMVSS105	N/R	N/R	Fluid reservoir caution
ECE13H FMVSS135 CMVSS135	O	(FMVSS) N/R (ECE 13H) Specified performance	(FMVSS only) Fluid reservoir caution (ECE only) ECE approval mark
Safety Regulation for road vehicles	O	N/R	N/R
ADR31	N/R	N/R	N/R
China (Chinese standards)	O	N/R	N/R
Hong Kong	N/R	N/R	N/R
Indonesia	N/R	N/R	N/R
Korea	N/R	N/R	N/R
Malaysia	N/R	N/R	N/R
New Zealand	N/R	N/R	N/R
Papua New Guinea	N/R	N/R	N/R
Philippines	N/R	N/R	N/R
Singapore	N/R	N/R	N/R
Chinese Taipei	N/R	N/R	N/R
Brunei	N/R	N/R	N/R

ITEM No.20 Australia, Australian Design Rule 31

<table>
<tr><td>A:
Application</td><td></td><td>Passenger cars</td></tr>
<tr><td>B: Structure requirements</td><td>Warning device</td><td>-Shall install Service brake and Parking brake(PKB).

-Shall install one or more Service brake failure indicator lamps.
-Shall install a Parking brake lamp which is common with or separate from any Service brake failure indicator lamp.
-Shall install the ABS failure lamp if ABS is installed.
-Reservoirs for master cylinder shall have a total minimum capacity equivalent to the fluid displacement to fully worn, fully applied position.</td></tr>
<tr><td>C-a:
Performance requirements</td><td></td><td>
<table>
<tr><th>Item No.</th><th>Series of Tests and Procedures</th><th>Initial Vehicle Speed##(km/h)</th><th>Vehicle Mass</th><th>Gear Selector Position</th></tr>
<tr><td>1</td><td>Pre-test Instrumentation Check</td><td>65(max)</td><td>N.A.</td><td>N.A.</td></tr>
<tr><td>2</td><td>First Effectiveness Test</td><td>45-55
95-105</td><td>M
M</td><td>Neutral
Neutral</td></tr>
<tr><td>3</td><td>First Burnishing Procedure</td><td>55-65</td><td>M</td><td>Drive</td></tr>
<tr><td>4</td><td>Second Effectiveness Test</td><td>45-55
95-105
125-135</td><td>M
M
M</td><td>Neutral
Neutral
Neutral</td></tr>
<tr><td>5</td><td>First Reburnishing Procedure</td><td>55-65</td><td>M</td><td>Drive</td></tr>
<tr><td>6</td><td>Parking Brake</td><td>N.A.</td><td>M&L</td><td></td></tr>
<tr><td>7</td><td>Third Effectiveness Test</td><td>95-105</td><td>L</td><td>Neutral</td></tr>
<tr><td>8</td><td>Partial Failure</td><td>95-105</td><td>M&L</td><td>Drive</td></tr>
</table>
</td></tr>
</table>

Item No.	Series of Tests and Procedures	Initial Vehicle Speed##(km/h)	Vehicle Mass	Gear Selector Position
9	Inoperative “Brake Power Assist Unit” or “Brake Power Unit 31/00”	95-105	M	Drive
10	First Base Line Check Procedure	45-55	M	Drive
11	First Fade Test	95-105	M	Drive
12	First Fade	45-55	M	Drive
13	First Fade Recovery Test	45-55	M	Drive
14	Second Reburnishing Procedure	55-65	M	Drive
15	Second Brake Line Check Procedure	45-55	M	Drive
16	Second Fade Test	95-105	M	Drive
17	Second Fade Recovery Procedure	45-55	M	Drive
18	Second Fade Recovery Test	45-55	M	Drive
19	Third Reburnishing Procedure	55-65	M	Drive
20	Fourth Effectiveness Test	45-55 95-105 125-135 or 160	M M M	Neutral Neutral Neutral
21	Third Base Line Check Procedure	45-55	M	Drive
22	Water Conditioning Procedure	5-10	M	Drive
23	Water Recovery	45-55	M	Drive

<table>
<tr><td></td><td></td><td>
<table>
<tr><th>Item No.</th><th>Series of Tests and Procedures</th><th>Initial Vehicle Speed##(km/h)</th><th>Vehicle Mass</th><th>Gear Selector Position</th></tr>
<tr><td>24</td><td>Water Recovery</td><td>45-55</td><td>M</td><td>Drive</td></tr>
<tr><td>25</td><td>Spike Stops</td><td>45-55</td><td>M</td><td>Neutral</td></tr>
<tr><td>26</td><td>Final Effectiveness Test</td><td>95-105</td><td>M</td><td>Neutral</td></tr>
</table>
</td></tr>
<tr><td>D :Label</td><td></td><td>———————————————————</td></tr>
<tr><td>E Reference standards</td><td></td><td>FMVSS105 is deemed to be equivalent, but must comply with a part of ADR requirement.</td></tr>
</table>

ITEM No.20 Australia, Australian Design Rule 35

<table>
<tr><td>A: Application</td><td></td><td>Commercial vehicles</td></tr>
<tr><td>B: Structure requirements</td><td>Warning device</td><td>-Shall install Service brake, Parking brake(PKB) and Secondary brake..

-Shall install one or more Service brake failure indicator lamps.
-Shall install a Parking brake lamp which is common with or separate from any Service brake failure indicator lamp.
-Shall install the ABS failure lamp if ABS is installed.</td></tr>
<tr><td>C-a: Performance requirements</td><td></td><td>
<table>
<tr><th>Item No.</th><th>Tests & Procedures</th><th>Vehicle Category</th><th>Initial Speed(km/h)</th><th>Vehicle Mass</th><th>Gear Selector</th><th>Maximum “Control” Force(N)</th></tr>
<tr><td>1</td><td>Pre-test Instrumentation Check</td><td>All</td><td>40 Max</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>Service Brake Burnishing Procedure(optional)</td><td>All</td><td>65 Max</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>Service Brake Lightly Laden Effectiveness Test</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3.1</td><td>First Mode</td><td>MB,MC,MD,ME
NA
NB
NC</td><td>30
35
25
20</td><td>L</td><td>N</td><td>685</td></tr>
</table>
</td></tr>
</table>

Item No.	Tests & Procedures	Vehicle Category	Initial Speed(km/h)	Vehicle Mass	Gear Selector	Maximum “Control” Force(N)
3.2	Second Mode	MB,MC,MD,ME	60			
		NA	70			
		NB	50	L	N	685
		NC	40			
3.3	Third Mode	MB,MC,MD,ME	100	L	N	685
		NA,NB,NC	100			
4	Lightly Laden	MB,MC,MD,ME	60			590(hand)
	Secondary Brake Test	NA	70			
		NB	50	L	N	685(foot)
		NC	40			
5	Lightly Laden Partial	MB,MC,MD,ME	60			
	Failure Test	NA	70			
		NB	50	L	N	685
		NC	40			
6	Service Brake Laden					
	Effectiveness Test					
6.1	First Mode	MB,MC,MD,ME	30			
		NA	35			
		NB	25	M	N	685

Item No.	Tests & Procedures	Vehicle Category	Initial Speed (km/h)	Vehicle Mass	Gear Selector	Maximum "Control" Force(N)
6.2	Second Mode	MB,MC,MD,ME NA NB NC	60 70 50 40	M	N	685
6.3	Third Mode	MB,MC,MD,ME NA,NB,NC	100 100	M	N	685
7	Laden Secondary Brake Test	MB,MC,MD,ME NA NB NC	60 70 50 40	M	N	590(hand) 685(foot)
8	Laden Partial Failure Test	MB,MC,MD,ME NA NB NC	60 70 50 40	M	N	685
9	Service Brake Fade Test	All		M	D	
10	Service Brake Fade Effectiveness Check	MB,MC,MD,ME NA NB NC	60 70 50 40	M	N	685

Item No.	Tests & Procedures	Vehicle Category	Initial Speed (km/h)	Vehicle Mass	Gear Selector	Maximum "Control" Force(N)
11	Service Brake Water Conditioning Procedure	MB,MC,MD1		M	D&R	
12	Service Brake Water Recovery Procedure	MB,MC,MD1		M	D	685
13	Service Brake Water Effectiveness Check	MB,MC,MD1	60	M	N	685
14	Service Brake "Spike Stop 35/00" Procedure	All without a "Brake Power Unit 35/00"	40	M	N	
15	Service Brake "Spike Stop 35/00" Effectiveness Check (Applicable only to vehicles without a "Brake Power Unit 35/00")	MB,MC,MD,ME	60			
		NA	70			
		NB	50	M	N	685
		NC	40			
16	Parking Brake Test	All		M	N	590(hand) 685(foot)

<table>
<tr><td></td><td></td><td>
<table>
<tr><th>Item No.</th><th>Tests & Procedures</th><th>Vehicle Category</th><th>Initial Speed (km/h)</th><th>Vehicle Mass</th><th>Gear Selector</th><th>Maximum “Control” Force(N)</th></tr>
<tr><td>17</td><td>Service Brake Actuating Time Test</td><td></td><td>N.A.</td><td>N.A.</td><td>N.A.</td><td></td></tr>
<tr><td colspan="7">“M” means “Maximum Loaded Test Mass”.
“L” means “Lightly Loaded Test Mass”
“D” means transmission control in “drive” position appropriate to test speed.
“N” means transmission control in “neutral” position.
“R” means transmission control in “reverse” position.
“M.B.” means a passenger vehicle, not being an off-road passenger vehicle, having up to 9seating positions, including that of the driver, and in which the center of the steering wheel is in the forward quarter of the vehicle’s Total Length.
“N.A.” means not applicable.</td></tr>
</table>
</td></tr>
<tr><td>D :Label</td><td></td><td>_____</td></tr>
<tr><td>E Reference standards</td><td></td><td>-ECE13-01 - 06 is deemed to be equivalent to ADR, but must comply with a part of ADR requirement.</td></tr>
</table>

ITEM No.20 Brunei, The road traffic Enactment 1954. The road traffic regulations

A: Application		All
B-b: Structure requirements	Warning Device	-Shall have two means of operation (For vehicles fitted with a service braking system which embodies a vacuum or pressure reservoirs) -Shall be provided with a warning device visible to the driver to indicate any failure or deficiency in the vacuum or pressure system.
	Partial Failure	-In case of failure, there shall still remained available not less than half the number of the wheels.
C: Performance requirements		———
D: Label		———
E: Reference requirements		———

A: Application		Passenger car
B: Structure requirements		Same as 105 -It shall be possible to easily check the wear on service brake lining from outside of the vehicle. -Fluid reservoirs must be readily accessible. The level can be easily checked on warning signals of low level. -ABS manual cut-off is not allowed.(only FMVSS,CMVSS)
C: Performance requirements	(1)Service Brake	V = 100km/h →0km/h $S \leq 0.1V+0.006V^2$ Brake force : 65N-500N High speed effectiveness V=80% of maximum speed if 125km/h<vehicle max. speed<200km/h $S \leq 0.1V+0.0067V^2$
	(2)Fade and Recovery	(2)-1 Fade V = 120km/h →60km/h G = 3.0m/s² (9.8ft/s²) 15times <u>Deceleration</u> 75% of the service brake deceleration, 60% of the deceleration actually achieved during the cold test. (2)-2Recovery V = 50km/h → 0km/h G = 3.0m/s²(9.8ft/s²) <u>Deceleration</u> 70%-150% of the deceleration actually achieved during the cold test.

	(3)Partial Failure	V = 100km/h → 0km/h S ≤0.1V+0.0158V²(168m/551ft)
	(4)Power Brake Unit Failure	V = 100km/h → 0km/h S ≤0.1V+0.0158V²(168m/551ft)
	(5)ABS Failure	V = 100km/h → 0km/h S ≤ 0.1V+0.0075V²(85m/279ft)
	(6)Stop Engine off	V = 100km/h → 0km/h S ≤0.1V+0.006V²(70m/230ft)
	(7)LSPV Failure	V = 100km/h → 0km/h S ≤0.1V+0.01V²(110m/361ft)
	(8)Stability	Without leaving the lane, not notable 15 degree. (3.5m/11.5ft)
	(9)Locking (Adhesion utilization Requirement)	Adhesion utilized curve on rear wheel shall meet K : 0.15-0.8 Z ≥0.1+0.7(K-0.2) Z : Braking ratio K : Friction coefficient. For all states of load of the vehicle, the adhesion utilization curve of the front axle shall be situated above that for the rear axle for all braking rate(Z) as specified for that category of vehicle.
D: Label		(FMVSS) Same as FMVSS 105
E: Reference standards		———

ITEM No.20 China, Chinese Standards ZBT.24007-89

<table>
<tr><td>A:
Application</td><td></td><td>All</td></tr>
<tr><td>B: Structure requirements</td><td>Warning Device</td><td>1.Shall consist of service braking, secondary braking, and parking brake.
2.Service and secondary braking must be independent.
3.However, the system may have common components so long as they fulfill following.
-must have at least two controls, independent each other and readily accessible to the driver.
-The control of the service braking system must be independent of the control of PKB.

-The failure part of hydraulic transmission system, and alternatively, fluid in the reservoir below manufacturer’s spec shall be signaled by a red warning.
-Any vehicle fitted with a service brake actuated from an energy reservoir must be provided with a warning device giving
an optical or acoustic signal, where braking performance cannot be obtained without use of stored energy.</td></tr>
<tr><td>C:
Performance requirements</td><td>(1)Service Brake
(Type 0)</td><td>
<table>
<tr><td></td><td>M1</td><td colspan="2">M2</td><td>M3</td><td>N1</td><td>N2</td><td>N3</td></tr>
<tr><td>Initial speed(km/h) V =</td><td>80</td><td colspan="3">60</td><td>80</td><td colspan="2">60</td></tr>
<tr><td>Stopping Distance(m) S≤</td><td>0.10V+V²/ 150</td><td colspan="6">0.15V+V²/ 130</td></tr>
<tr><td>Deceleration(m/s²) d ≥</td><td>5.8(Reference only)</td><td colspan="6">5 (Reference only)</td></tr>
<tr><td>Brake Force(N) ≤</td><td>500</td><td colspan="6">700</td></tr>
</table>
</td></tr>
</table>

(2)Fade

(Type 1)

		M1	M2	M3	N1	N2	N3
Initial Speed(m/s)	V1=	0.8 Vmax					
	In case Vmax≥V1=	120	100	60	120	60	60
		0.5 Vmax					
Final Speed(m/s)	V2=	V1/2					
Cycle(s)	t=	45	55	60	55	60	60
Times		15	15	20	15	20	20
Stopping Distance(m)	SH≤	1. 0.1V+V²/(150×0.6Xo), Xo ≤ V²/(150So-0.10V) [So; Stopping distance by baseline check of Type 0(Laden)] 2. 0.10 V+V²/150×0.8					

(3)Emergency Brake

		M1	M2	M3	N1	N2	N3
Initial Speed	V =	80	60	60	70	50	40
Stopping Distance(m)	S≤	0.1V+2V²/150	0.15V+2V²/130		0.15V+2V²/115		

(4)Residual braking after transmission failure.

		M1	M2	M3	N1	N2	N3
Initial Speed	V =	80	60	60	70	50	40
Mean Deceleration	≥	1.5	1.3	1.5	1.1	1.3	
		1.7	1.5		1.3		

<table>
<tr><td></td><td>(5)Stability

(6)PKB</td><td>After conduct each test, not exceed 3.7m lane
<table>
<tr><td colspan="2"></td><td>M1</td><td>Others</td></tr>
<tr><td colspan="2">Gradient(%) GVM</td><td>18%</td><td></td></tr>
<tr><td colspan="2">GVM+Towing</td><td>12%</td><td></td></tr>
<tr><td colspan="2">Hand-Operated Brake Force(N) f =</td><td>400</td><td>600</td></tr>
<tr><td colspan="2">Foot-Operated Brake Force (N) f =</td><td>500</td><td>700</td></tr>
</table></td></tr>
<tr><td>D: Label</td><td></td><td>_____</td></tr>
<tr><td>E: Reference requirements</td><td></td><td>ECE 13 • 06 is accepted .</td></tr>
</table>

ITEM No.20 Hong Kong(China), Road Traffic(Construction and Maintenance of Vehicles) Regulations

A: Application		All
B-b: Structure requirements	Warning Device	-Shall be equipped with system having two means of operation or two systems each having a separate means of operation. -Shall be audible to indicate failure due to fluid loss.
C-a: Performance requirements	Service Brake	-Total braking efficiency, not less than 50%.
	Emergency	-Second independent brake , not less than 25%.
	Partial Failure	-Remaining split brake system , not less than 25%.
	PKB	Capable of holding on a gradient of at least 1 in 6.25
	Test method	Brake tester , running order
D: Label		———
E: Reference requirements		———

ITEM No.20 Indonesia, Requirements for motor vehicle road worthiness

A: Application		All
B-b: Structure requirements		-Shall be equipped with a brake system comprising a main brake and parking brake. -The main brake system enable the driver to control without taking hands away from steering.
C-a: Performance requirements	Brake efficiency in percent	a. Service brake 1) Passenger car by brake force ≤500N, Brake efficiency>60% 2) Bus & cargo car with brake force≤700N, Brake efficiency >60% b. Parking brake 1) by hand brake a) Passenger car by brake force ≤400N, Brake efficiency >16% b) Bus & cargo car with brake force≤500N, Brake efficiency >12% 2) by foot brake a) Passenger car by brake force ≤600N, Brake efficiency >16% b) Bus & cargo car with brake force≤700N, Brake efficiency >12%
C-b: Test method		Brake tester
D: Label		———————————
E: Reference requirement		———————————

A: Application		Passenger Cars(with a riding capacity of 10 persons or less)
B: Structure requirements	Warning Device	1.-Shall be provided with at least two separate lines. 2.-Shall not interfere with the steering performance. 3.-Service brake shall work on the wheels, the number of being half the number of wheels, which include all rear wheels. 4.-Shall be constructed so that even if part of braking piping is damaged, at least two wheels still may be braked. 5.-Shall be equipped with ABS, for, GVW≥12t Bus, GVW≥13t Tractors 6.-Brake system operated by fluid pressure shall be provided with a buzzer or other warning devices. -The provision shall not apply the vehicle with emergency braking system. 7.-Brake system operated or assisted by pneumatic or vacuum shall be provided with buzzer or warning to give warning, when the pressure on vacuum in the brake system drops. If it complies with service brake performance without pressure, it shall not apply.
C: Performance requirements	(1)Service Brake (2)High Speed Brake	V = 100km/h $S \leq 0.1V+0.006V^2$ F(Braking force) ≤ 50kg V = Max. speed ×0.8 However, if it exceed 160km/h, adopt 160km/h $S \leq 0.1V+0.0067V^2$ F(Braking force) ≤ 50kg

	(3)Parking Brake (Dynamic performance)	(Static performance) -Shall hold the motor vehicle with a gradient of 1/5. V = 30km/h $S \leq 0.1V+0.0193V^2$ F(Braking force) : Foot-operated ≤ 50kg Hand-operated≤ 40kg
	(4)Fade and Recovery	(4)-1 Fade $V = \sqrt{80\%\ V_{MAX}{}^2 - 40\%\ V_{MAX}{}^2}$ → 0km/h or 80% V_{MAX} - - > 40% V_{MAX} 15times <u>Deceleration operation before braking</u> 80% $V_{MAX}{}^2$ - - > 40% $V_{MAX}{}^2$ at deceleration rate of 3.0 m/s^2, 15 times (4)-2 Recovery 50km/h → 0km/h 4times <u>Deceleration</u> 70% - 150% of the deceleration actually achieved during the cold test.
	(5)Stop Engine off	V = 100km/h→0km/h $S \leq 0.1V+0.006V^2 (6.43m/s^2)$
	(6)Partial Failure Brake	$S \leq 0.1V+0.0158V^2 (2.44m/s^2)$ V = 100km/h

	(7)Power Assist Failure	V = 100km/h $S \leq 0.1V + 0.0158V^2 (2.44m/s^2)$
	(8)LSPV Failure	V = 100km/h $S \leq 0.1V + 0.01V^2 (3.86m/s^2)$
	(9)ABS Failure	V = 100km/h $S \leq 0.1V + 0.0075V^2 (5.14m/s^2)$
	(10)Brake Adhesion Utilization	For all states of load of the vehicle, the adhesion utilization curve of the front axle shall be situated above that for the rear axle for all braking rate(Z). $Z < 0.1 + 0.7 (K-0.2)$ K=0.2-0.8 i.e. K: Coefficient of adhesion between tyre and road. Z: Braking rate
	(11) Warning	The service brake system with electric system to control brake system shall be provided with warning to give warning of failure of function.
D: Label		_____
E: Reference Standards		_____

ITEM No.20 Korea, The regulations of the motor vehicle safety standards

<table>
<tr><td>A:
Application</td><td></td><td>All</td></tr>
<tr><td>B-b:
Structure requirements</td><td></td><td>-Shall be equipped with two separate brake systems, service brake and parking brake system.
-Shall be equipped with warning devices so that the driver can recognize the malfunction of brake fluid drops(Air pressure
in case of an air brake)
-Sound(65dβ(A) for passenger cars, 75 dβ (A) for others) or lump can be combined with PKB indicating device.</td></tr>
<tr><td>C:
Performance requirements</td><td>C-1:
Service Brake</td><td>
<table>
<tr><td></td><td>vehicle with maximum speed not less than 80km per hour</td><td>vehicle with maximum speed not less than 35 km and less than 80 km per hour</td><td>vehicle with maximum speed less than 35 km per hour</td></tr>
<tr><td>stopping speed (km/hour)</td><td>50</td><td>35</td><td>Maximum attainable speed of vehicle</td></tr>
<tr><td>stopping distance (meter)</td><td>20 or less</td><td>12 or less</td><td>5 or less</td></tr>
<tr><td>control force in testing (kg)</td><td colspan="3">foot operated : 90 or less
hand operated : 30 or less</td></tr>
<tr><td>loading state of the vehicle</td><td colspan="3">Loaded state</td></tr>
</table>
</td></tr>
</table>

C-2:

Service Brake

(Brake Tester)

	Standard	
loading state	Loaded state	
braking performance		Sum of brake performance of each axle
	vehicle≥80km/h	50% of GVW
	Vehicle < 80km/h	40% of GVW
difference of braking performance between left and right axle brake	6% of any tested axle or less	

C-3:

Parking Brake

	standard	
loading state of vehicle	loaded state	
control force in testing	passenger car	foot-operated : 60 kg or less
		hand-operated : 40 kg or less
	other vehicles	foot-operated : 70 kg or less
		hand-operated : 50 kg or less
braking performance	the parking brake system shall be capable of holding the vehicle stationary on a greater than 20% grade or braking performance shall be greater than 20% of the gross vehicle weight	

	C-4: Braking Efficiency of air brake system (Fade)	-Braking efficiency shall be not less than 0.35 after brake pedal forced 15 times at every 10 seconds. -Braking efficiency shall not be less than 0.35 when warning system is activated.(Air pressure failure) - In the case of a tractor and trailer, the pressure of a test tank should reach within 0.7 second 60 % of the reference pressure after the operation of a brake pedal.
D: Label		———————————————
E: Reference requirements		FMVSS 105, 121, 71/320/EEC, ECE13

ITEM No.20 Malaysia, Road Traffic(Motor Vehicle, Construction & Use) Rule

A: Application		All
B-b: Structure requirements		-Shall be equipped with system having two means of operation or a separate means of operation. *System with a split braking line is acceptable. Partial Failure : In case of failure, there still shall be available to not less than half the number of the wheels.
C: Performance requirements		_____
D: Label		_____
E: Reference requirements		_____

ITEM No.20 New Zealand, Transport (Vehicle Standard) Regulations 1990

A: Application		All (except a trailer with a GVM of less than 2000kg)
B-b: Structure requirements		1.-Shall be equipped with at least two independent systems which shall provide the functions. a)Service brake b)Emergency brake c)Parking brake 2.Emergency brake -Shall act on at least half of wheels. -Shall act directly. -May be combined with PKB function. 3.PKB -Shall act on at least half of wheels. -Shall be capable of holding on slope of 1:5. 4.Others -Compressed air, hydraulic oil or vacuum system, the hose or other flexible the tubing forming part shall comply with appropriate safety standard or standard approved by Director. -Shall comply appropriate vehicle standard.
C: Performance requirements		———
D: Label		———
E: Reference requirements		ECE13, 71/320/EEC, FMVSS105, ADR31·35, Japanese Safety Regulations for road vehicles. One of them is implemented.

ITEM No.20 Papua New Guinea, Motor Traffic Regulations under the motor traffic act 125A

A: Application		All
B-b Structure requirements		———
C: Performance requirements		-Without assistance of compression, from a speed of 30km/h, the service brake is capable to stop the vehicle within a distance of seven meters. -A compressor, if needed, shall be capable of raising pressure in the system within not more than 1 1/2 minutes. -Where a truck utilizing compressed air the system shall be protected so that the operation of auxiliaries cannot lower the pressure below 2/3 of maximum operational pressure.
D: Label		———
E: Reference requirements		———

ITEM No.20 Philippines, Republic Act No.4136

A: Application		All
B-b: Structure requirements		-Shall be provided with dual hydraulic brake system. -In the absence of such dual braking system, brake system shall be provided with safety valve devices which make the braking power effective on two front or rear wheels.
C: Performance requirements		———
D: Label		———
E: Reference requirements		———

ITEM No.20 Singapore, Road Traffic (Motor Vehicle , Construction & Use) Rule

A: Application		All
B-b: Structure requirements	Warning	-Shall be equipped with system having two means of operation on a separate means of operation. *system with a split braking system is acceptable. <u>Partial Failure</u> -In case of failure, there still shall be available not less than half the number of the wheels. -No system shall be rendered ineffective by non-rotation of the engine. -One of the means of operation shall be capable of being applied by direct mechanical action to not less than half the number of wheels. -The braking system which embodies a vacuum or pressure reservoir(s) shall be provided with warning system for the failure. In case of a vehicle not exceeding 3tons, warning device is not necessary, if in the event of a failure, the brakes are sufficient performance.
C: Performance requirements		———————————
D: Label		———————————
E: Reference requirements		———————————

ITEM No.20 Chinese Taipei, Road Traffic Regulations

A: Application		———
B-b: Structure requirements		-Service brake shall be effective and be balanced. -PKB shall be effective at a gradient.
C: Performance requirements		———
D: Label		———
E: Reference standards		———

Item 20 Brakes
Thailand, Ministerial regulation No.22(B.E.2537) Article 2(6)

Application	Motor vehilce
C-a: Performance requirements Service brake	Can work very well
Parking brake	Can work very well

ITEM No.20 U.S.A., FMVSS105

A: Application		All
B-b: Structure requirements	Warning Device	1.-Shall be equipped with a service brake system acting on all wheels. 2.-Wear of the service brake shall be compensated for by means of a system of automatic adjustment. 3.-In the event of failure in a single subsystem, the remaining portion of service brake system shall continue to operate. 4.-Reservoirs for master cylinder shall have a total minimum capacity equivalent to the fluid displacement to fully worn, fully applied position. -Shall have one or more brake system indicator lamps, which shall be activated and displaying “STOP BRAKE FAILURE” (Applicable for FMVSS only), when the ignition(start) switch is “on” position. (a)A gross loss of pressure. (b)A drop in the level of brake fluid. (c)A total functional electrical failure in anti-lock or a variable proportioning brake system. (d)Application of the PKB.

C-b: Performance requirements	(1) Service brake

Stopping Distances

Vehicle test speed (miles per hour)	Stopping distance in feet for tests indicated										
	I-1st(prebumished) and 4th effectiveness : spike effectiveness check				II-2d effectiveness			III-3d(lightly loaded vehicle) effectiveness			
	(a)	(b)	(c)	(d)	(a)	(b)& (c)	(d)	(a)	(b)	(c)	(d)
30	[1]57	[1] [2]65	[1] [2]69(1st) [1] [2]65(4th &spike) [1]72	[1]88	[1]54	[1]57	[1]81	51	57	65	81
35	74	83	91	132	70	74	132	67	74	83	132
40	96	108	119	173	91	96	173	87	96	108	173
45	121	137	150	218	115	121	218	110	121	137	218
50	150	169	185	264	142	150	264	135	150	169	264
55	181	204	224	326	172	181	326	163	181	204	326
60	[1]216	[1]242	[1]267	[1]388	[1]204	[1]216	[1]388	[1]194	[1]216	[1]242	[1]388
80	[1]405	[1]459	[1]510	NA	[1]383	NA	NA	NA	NA	NA	NA
95	[1]607	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
100	[1]673	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1]Distances for specified tests. [2]Applicable to school buses only. NA = Not applicable

Note : (a)Passenger cars ; (b)vehicles other than passenger cars with GVWR of less than 8,000 1bs ; vehicles with GVWR of less than 8,000 1bs and not more than 10,000 1bs ;
vehicles with GVWR greater than 10,000 1bs.

Brake Test Procedure Sequence				
No.-Sequence	Test load		Test procedure	Requirements
	Light	GVWR		
Instrumentation check			S7.2	
First (prebumish) effectiveness test		X	S7.3	S5.1.1.1
Bumish procedure		X	S7.4	
Second effectiveness		X	S7.5	S5.1.1.2
First rebumish		X	S7.6	
Parking brake	X	X	S7.7	S5.2
Third effectiveness (lightly loaded vehicle)	X		S7.8	S5.1.1.3
Partial filure	X	X	S7.9	S5.1.2
Inoperative brake power and assist units		X	S7.10	S5.1.3
First fade and recovery		X	S7.11	S5.1.4
Second rebumish		X	S7.12	
Second fade and recovery		X	S7.13	S5.1.4
Third rebumish		X	S7.14	
Fourth effectiveness		X	S7.15	S5.1.1.4
Water recovery		X	S7.16	S5.1.5
Spike stops		X	S7.17	S5.1.6
Final inspection			S7.18	S5.6
Moving barrier test		X	S7.19	S5.2.2.3

(2) Fade and Recovery

	GVWR≤10000lb	GVWR > 10000lb
Fade	V=60→0mph G=15ft/s² 5times or more G=5-15ft/s² 5times F=150lb(Control Force)	V=40→20mph G=10ft/s² 10times(2nd fade 20times) F=180lb
Recovery	V=30→0mph G=10ft/s² 5times F=(Control Force) max.20lb more than the base line check min.-10lb from baseline check or 0.6 of baseline check.	V=40→20mph G=10ft/s² 5times ←

(3) Partial

Vehicle test speed (miles per hour)	Stopping distance in feet for tests indicated		
	V-Inoperative brake power and power assist unit ; partial failure		
	(a)	(b) & (c)	(d)
30	114	130	170
35	155	176	225
40	202	229	288
45	257	291	358
50	317	359	435
55	383	433	530
60	[1]456	[1]517	[1]613
80	NA	NA	NA
95	NA	NA	NA
100	NA	NA	NA

	(5) Water-fade Recovery	<u>Water fade</u> V = 5mph. for 2min. <u>Water Recovery</u> V = 30mph. 10ft/s² 5times F(Control force) max. 45lb more than average of baseline check. First four stops 150lb or less. min. 10lb from baseline check or 0.6 of baseline check.
	(6) Stability	-Test shall be made within 12-foot-wide road.
	(7) PKB	-Shall be capable of holding the vehicle stationary for 5minutes. 20% grade(GVWR≤10000lb Truck, Bus School Bus>10000lb) 30% grade(Passenger cars School Bus≤10000lb)
D: Label		Reservoir labeling -Shall have a brake fluid warning statement “Warning Clean filler cap before moving, use only fluid from a sealed container”.
E: Reference standards		———————————————

<table>
<tr><td>A:
Application</td><td></td><td>All</td></tr>
<tr><td>B-b:
Structure
requirements</td><td>Warning
Device

ABS</td><td>1.-Shall consist of Service braking, Secondary braking and Parking brake(PKB).
2.-Brake lining shall not contain asbestos.
3.-System shall not be adversely affected by magnetic or electric filed.
4.-Service and Secondary braking must be independent
5.-Must be at least two controls, independent each other and readily by accessible to the driver.
6.-Wear adjustment shall be automatic for the service brake.
7.-It shall be possible to easily check the wear on service brake lining from the outside or underside of the vehicle.
8.-Fluid reservoirs can not be readily accessible. The level can be easily checked on warning signals of low level.
-The failure of a part of a hydraulic transmission system and alternatively, fluid in the reservoir below manufacture’s spec shall be signaled by a red warning.
-Any vehicle fitted with a service brake actuated from an energy reservoir must be provided with a warning device giving an optical or acoustic signal, where braking performance can not be obtained without use of stored energy.
-Anti-lock braking device shall be applied for trailers O3, O4, M3 > 12tonnes maximum ma
<table>
<tr><th>Vehicle category</th><th>New type approvals (paragraph 12.1.2)</th><th>Limit of validity of old type approvals (paragraph 12.1.3)</th></tr>
<tr><td>N3</td><td>1 October 1996</td><td>1 October 1998</td></tr>
<tr><td>M2, M3</td><td rowspan="3">1 April 1998</td><td rowspan="3">1 April 2000</td></tr>
<tr><td>N2>7.5tonnes maximum mass</td></tr>
<tr><td>O3>5tonnes maximum mass</td></tr>
<tr><td>N2≤7.5tonnes maximum mass</td><td rowspan="2">1 April 1999</td><td rowspan="2">1 April 2001</td></tr>
<tr><td>O3>5tonnes maximum mass</td></tr>
</table>
-Warning signal shall light up when Anti-lock system energized and it shall be certified that none defects are present by extinguishing the signals.</td></tr>
</table>

C: Performance requirements

(1)Service Brake force

(a)Type 0 (Cold)

	Category	M1	M2	M3	N1	N2	N3
Type 0 test with engine disconnected	V	80km/h	60km/h	60km/h	80km/h	60km/h	60km/h
	S≤	$0.1V+V^2/150$	$0.15V+V^2/130$				
	dm≥	$5.8m/s^2$	$5.0m/s^2$				
Type 0 test with engine connected	V=80%Vmax but not exceeding:	160km/h	100km/h	90km/h	120km/h	100km/h	90km/h
	S≤	$0.1V+V^2/130$	$0.15V+ V^2/103.5$				
	dm ≥	$5.0m/s^2$	$4.0m/ s^2$				
	F≤	50daN	70daN				

Where:
V = prescribed test speed, in km/h
S = stopping distance, in meters
dm = mean fully developed deceleration, in m/s^2
F = force applied to foot control, in daN
Vmax= maximum speed of the vehicle, in km/h

(b)Type I (Fade Test)

Category of vehicles	Conditions			
	V1(km/h)	V2(km/h)	Δt(sec.)	n
M1	80% Vmax ≤ 120	1/2 V1	45	15
M2	80% Vmax ≤ 100	1/2 V1	55	15
N1	80% Vmax ≤ 120	1/2 V1	55	15
M3, N2, N3	80% Vmax ≤ 60	1/2 V1	60	20

where:
V1 = initial speed, at beginning of braking
V2 = speed at end of braking
Vmax= maximum speed of vehicle
n = number of brake applications
Δt = duration of a braking cycle : time elapsing between the initiation of one brake application and the initiation of the next

Requirement
Hot performance must not be less than 80% of requirement nor less than 60% of the figure recored in Type0 test with engine disconnected.

(c)TypeII(Downhill behavior Test)

Category	V	N	
N3	60km/h	70kg	$0.15V+(1.33V^2/130)$ (the second term corresponds to a mean fully developed deceleration dm = $3.75m/s^2$)
M3			Category N3 $0.15V+(1.33V^2/115)$ (the second term corresponds to a mean fully developed deceleration dm = $3.3m/s^2$)

(2) Secondary (Emergency Braking System)

Test method

-Laden vehicle driven at an average speed of 30km/h on a 6% down gradient for a distance of 6km with appropriate gear.

-When energy is absorbed by braking action, 130±5km/h on a 6% down gradient, mean deceleration measured is at least 0.5m/s².

Category	V	N	S
M1	80	Manual(Hand) 40kg Foot 50kg	0.1V+(2V²/150) (the second term corresponds to a mean fully developed deceleration dm = 2.9m/s²)
N1	70	Manual(Hand) 60kg Foot 70kg	0.15V+(2V²/115) (the second term corresponds to a mean fully developed deceleration dm = 2.2m/s²)
N2, N3	60		
M2, M3	60	Manual(Hand) 60kg Foot 70kg	0.15V+(2V²/130) (the second term corresponds to a mean fully developed deceleration dm = 2.5m/s²)

Static

	N(kg)	Gradient(%)
without coupling	Manual(Hand) 40kg M1 60kg others Foot 50kg M1 70kg others	18
with coupling		12

Dynamic

In this case, the mean fully developed deceleration must be not less than 2.0m/s², the deceleration immediately before the vehicles

stops must be not less than 1.5 m/s².

(4)Residual braking after transmission failure

The residual performance, in the event of failure in a part of its transmission, must give a stopping distance.
Brake effort : 70kg

Stopping distance(m) and mean fully developed deceleration (m/s^2)					
	(km/h)	LADEN	(m/s^2)	UNLADEN	(m/s^2)
M1	80	$0.1V+100/30 \cdot V^2/150$	(1.7)	$0.1V+100/25 \cdot V^2/150$	(1.5)
M2	60	$0.15V+100/30 \cdot V^2/130$	(1.5)	$0.15V+100/25 \cdot V^2/130$	(1.3)
M3	60	$0.15V+100/30 \cdot V^2/130$	(1.5)	$0.15V+100/30 \cdot V^2/130$	(1.5)
N1	70	$0.15V+100/30 \cdot V^2/115$	(1.3)	$0.15V+100/25 \cdot V^2/115$	(1.1)
N2	50	$0.15V+100/30 \cdot V^2/115$	(1.3)	$0.15V+100/25 \cdot V^2/115$	(1.1)
N3	40	$0.15V+100/30 \cdot V^2/115$	(1.3)	$0.15V+100/30 \cdot V^2/115$	(1.3)

(5)Response

The response time must not exceed 0.6sec.

(6)Brake Adhesion Utilization

-Shall meet the distribution of breaking.
Specified for each category.

i.e. K : Coefficient of adhesion between tyre and road
Z : Braking rate
ε : Adhesion utilized of the vehicle
All category · $K = 0.2 - 0.8\ Z \geq 0.1+0.85(K-0.2)$

For all states of load of the vehicle, the adhesion utilization curve of the front axle shall be situated above that for the rear axle for all braking rate(Z) as specified for that category of vehicle.

<table>
<tr>
<td></td>
<td>(7)
Anti-Lock Breaking (ABS)</td>
<td>
<table>
<tr><th>Road Surface</th><th>km/h</th><th>Requirements</th></tr>
<tr><td>Lowμ</td><td>40
120</td><td>-At speeds ≥15 No Locking on wheels</td></tr>
<tr><td>Highμ→ Lowμ</td><td>40
120</td><td>-Shall be stable</td></tr>
<tr><td>Lowμ→ Highμ</td><td>50</td><td>1sec after get into highμ, enoughμ shall be achieved.</td></tr>
<tr><td>Between High/Low</td><td>50</td><td>-Can be stopped between High/Lowμ.
-Steering should be within 120º within 2sec. of braking totally 240º.</td></tr>
</table>
<table>
<tr><th>Surface</th><th>K</th><th>km/h</th><th>Laden</th><th>Unladen</th><th>Requirement</th></tr>
<tr><td>Highμ</td><td>K1</td><td>50</td><td>○</td><td>○</td><td>ε ≥0.75</td></tr>
<tr><td>Lowμ</td><td>K2</td><td>50</td><td>○</td><td>○</td><td>ε = Z/K</td></tr>
<tr><td>Between High/Lowμ</td><td>(K1+4·K2)/5</td><td>50</td><td>_____</td><td>○</td><td>Z≥0.75· (K1+4·K2)/5
and Z≥K2</td></tr>
</table>
</td>
</tr>
<tr><td>D: Label</td><td></td><td>LSPV marking for commercial vehicle category.</td></tr>
<tr><td>E: Reference Requirements</td><td></td><td>_____</td></tr>
</table>