

UN Regulation No. 16-06 (SAFETY-BELTS) Technical Requirements

Myanmar Expert Meeting

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PASSIVE SAFETY SUBCOMMITTEE



JAPAN AUTOMOBILE STANDARDS INTERNATIONALIZATION CENTER

UN Regulation No. 16-06 (SAFETY-BELTS)

- I. Safety-belts,
restraint systems,
child restraint systems
and ISOFIX child restraint systems for occupant
of power-driven vehicles.**



- II. Vehicles
equipped with safety-belts,
safety-belt reminders,
restraint systems,
child restraint systems
and ISOFIX child restraint systems
and i-Size child restraint systems.**



History of Requirements (06 Series)

Series	Sup./Corr.	Effective Date	Remarks	Major Elements
06	S1	2011/6/23	WP29/2010/121	-Permission to add a red warning light on a buckle
	S2	2012/7/26	WP29/2011/117	-Clarification of Scope: Addition of side-facing seats -Clarification of definitions of "forward-facing seats," "side-facing seats," and "rearward-facing seats"
	R7-C1	2012/7/26	-	Erratum
	S3	2013/7/15	WP29/2012/43	-Requirements for i-size seating position, if fitted (a) CRF (fixture): ISO/F2X and ISO/R2 with "support leg foot assessment volume" (b) Vehicle handbook information: specific table for i-size seating position
	S4	2014/2/13	WP29/2013/43	-Requirement to emergency locking retractor Locking acceleration: 3.0 G <- 2.0 G
	S5	2014/6/10	WP29/2013/104	-Warning Label Requirement against rearward-facing CRS in seating positions fitted with a frontal protection airbag The same requirement for the warning label (pictograms) and the details of the warning in the owner's manual as in UN-R94
	S6	2016/06/18	WP29/2015/93	Added requirements for buckle lighting lamp
	S7	2017/02/09	WP29/2016/36	Supplement 7 to the 06 series of amendments to Regulation No. 16 (Safety-belts, ISOFIX and i-Size)

Safety-belts and restraint systems

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 - 6.2.5.2. Automatically locking retractor
 - 6.2.5.3. Emergency locking retractor
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Safety-belts and restraint systems (continued)

6. Specifications

6.3. Strap

6.3.1. General

6.3.2. Strength after room conditioning

6.3.3. Strength after special conditioning

6.4. Belt assembly or restraint system

6.4.1. Dynamic test

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8. Requirements concerning the installation in the vehicle

8.1. Safety-belt and restraint systems equipment

8.2. General requirements

8.3. Special requirements for rigid parts incorporated in safety-belt or restraint system

1. Scope

Vehicle category	M1	M2	M3	N1	N2 N3	O, L2, L4, L5, L6, L7, T
Installation of Safety-Belts and Restraint Systems	✓	✓	✓	✓	✓	✓
Safety-Belts and Restraint Systems	✓	✓	✓	✓	✓	✓
Installation of Child Restraint Systems and ISOFIX child restraint systems	✓	* 1	* 1	✓	-	-
Installation of Safety Belt Reminder	✓	-	-	* 2	-	-
Installation of safety-belts for side-facing seats	-	-	* 3	-	-	-
Installation of i-size CRS	* 4	* 4	* 4	* 4	-	-

* 1: At the request of the manufacturer

* 2: Japan

* 3: Class II, III and B1

* 4: Only when defined by the vehicle manufacturer

Structure of "Safety-Belt"



2.15. Belt Anchorages

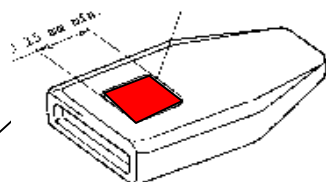


2.14. Retractor

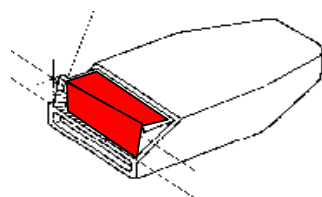
2.3. Strap



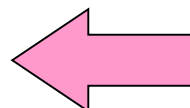
2.12. Attachment (Pillar Loop)



2.26. Enclosed Buckle-Release
Button: 15 mm/4.5 cm² (minimum)



2.27. Non-Enclosed Buckle-Release
Button: 10 mm/2.5 cm² (minimum)



Buckle

Tongue



2.4. Buckle



2.14.6. Belt Adjustment Device for Height

2.14. Retractor:

Device to extract or retract the whole or part of strap



2.14.1. Non-Locking Retractor (type 1):

Retractor which the strap is extracted to its full length, but no adjustment for the length of the extracted strap

2.14.2. Manually Unlocking Retractor (type 2):

Retractor which is unlocked by manually to obtain the desired strap extraction and is locked automatically when manual operation is stopped

2.14.3. Automatically Locking Retractor (ALR) (type 3):

Retractor that strap is extracted to the desired length, and automatically adjusts the strap when buckle is fastened

2.14.4. Emergency Locking Retractor (ELR) (type 4):

Retractor that automatically adjusts the strap and has a locking mechanism actuated in an emergency by:

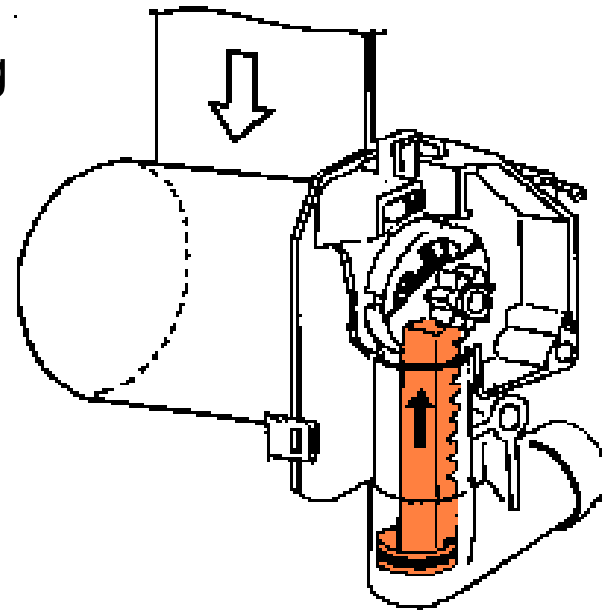
1. Vehicle Acceleration Sensitivity
2. Vehicle Acceleration Sensitivity (Vehicle Sense)
+ Strap-Movement Sensitivity (Strap Sense)

2.14.5. ELR with Higher Response Threshold (type 4N):

Vehicle acceleration for locking is set up higher than the usual ELR. It is for big-sized vehicles such as truck that is subject to vibration at running. By higher response threshold, it prevents unnecessary locking at running.

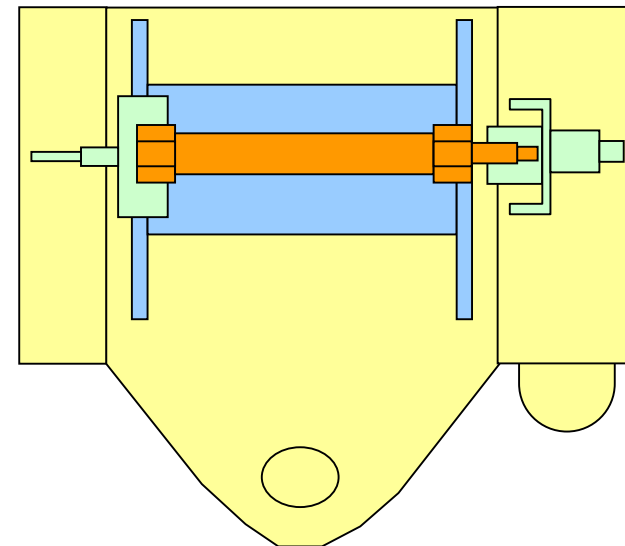
2.6. Pre-Loading Device:

Device to restrain the wearer by retracting Strap rapidly right **after impact** to remove the slack of Strap



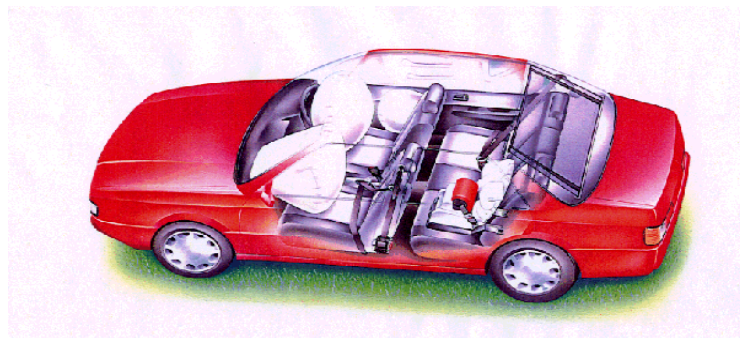
2.13. Energy Absorber:

Strap Pull-Out Mechanism after impact to reduce the load on the wearer



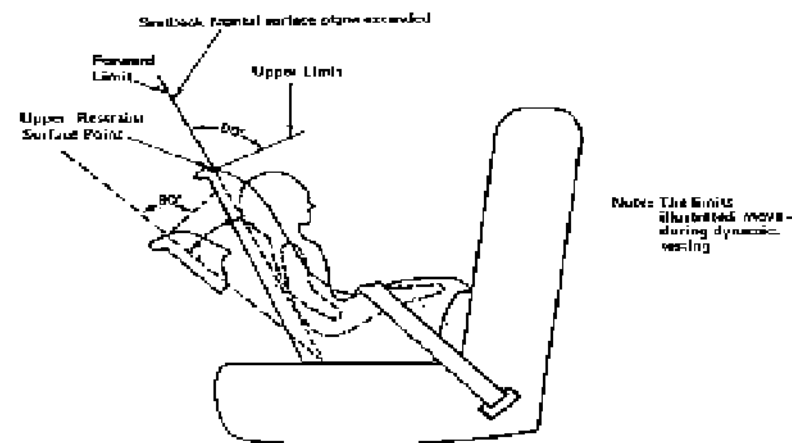
2.28. Tension-Reducing Device:

Device to reduce the tension of strap on the wearer when the wearer fastens Safety-Belts, to remove unpleasant state of the wearer by Safety-Belts fastening



2.8. Airbag

2.9. Passenger Airbag



2.10. Child Restraint with Rearward Facing (2.11)

2.12. Attachments:

Parts of Belt Assembly including securing components fixed to the Belt Assembly

2.16. Vehicle Type as regards Safety-Belts and Restraint System:

Category of Power-Driven Vehicles that are not different in dimensions, lines and materials of components of vehicle or seat structure or any other part of vehicle to which the Safety-belts and Restraint Systems are attached.

2.17. Restraint System:

System for a specific vehicle type or a type defined by the Vehicle Manufacturer and agreed by the Technical Service. It consists of a seat and a belt fixed to the vehicle by appropriate means and all additional elements to diminish the risk of injury to the wearer.

2.18. Seat

2.19. Group of Seats

2.20. Bench Seat

2.21. Adjustment System of the Seat

2.22. Seat Anchorage

2.23. Seat Type

2.24. Displacement System of the Seat

2.25. Locking System of the Seat



Definitions related to seats

Safety-belts and Restraint Systems

6.1.2.

The belt or restraint system shall be so designed and constructed that it reduces the risk of bodily injury in the event of an accident.

6.1.3.

The straps of the belt shall not be liable to assume a dangerous configuration.

6.1.4.

Polyamide 6 must not be used in all mechanical parts.

(There is a problem of hydrolysis. Polyester is mainly used.)

6.2.1. General

6.2.1.1. No sharp edge

6.2.1.2. Protected against corrosion

(7.2. corrosion test: exposure to salt solution for 50 hours)

6.2.1.3. Shall not be fragile

6.2.1. General

6.2.1.4. Cold impact requirement

The rigid items and parts made of plastics of a safety-belt shall be so located and installed that they are not liable, to become trapped under a moveable seat or in a door of that vehicle.

If not above conditions \Rightarrow cold impact test (7.5.4.)

(7.5.4)

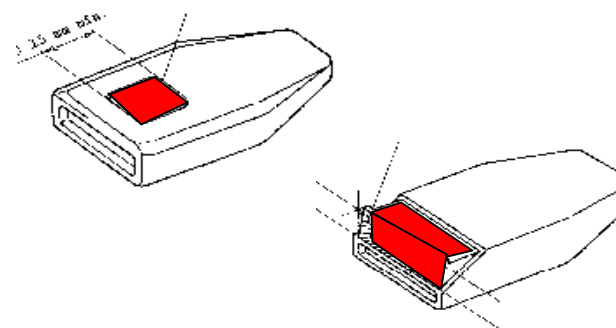
- (1) Left in cabinet at -10 deg. C for 2 hours
- (2) 18 kg mass fall through 300 mm onto the sample within 30 seconds of removal of the sample from the cabinet

If any visible cracks on plastic cover or retainer of rigid parts, plastic parts shall be removed, and then, other remaining parts shall be reassessed. If no visible cracks or the remaining parts is still secure, move on to the following inspection. (6.2.2., 6.2.3. and 6.4.)



6.2.2. Buckle

- **contact surface**: 20 cm²(Section)/46 mm(Width) (minimum)
- can fasten/release with a **single simple movement** (one hand in one direction)
- area of **release button**
 - enclosed**: 15 mm/4.5 cm² (minimum)
 - non-enclosed**: 10 mm/2.5 cm² (minimum)
- color of the button: **RED** (button ONLY)
- **Red warning light** allowed if the **light goes off** after the occupant has buckled.
- Lights illuminating the buckle in a color **other than red** are **not required to be switched off** by the action of buckling the seat belt.
- **must not release inadvertently**, accidentally or with a force of less than 1 daN



6.2.2. Buckle

6.2.2.3.

- Resistance to cold

(7.5.3.)

Placed in -10 deg. C for 2 hours and shall operate normally

6.2.2.4.

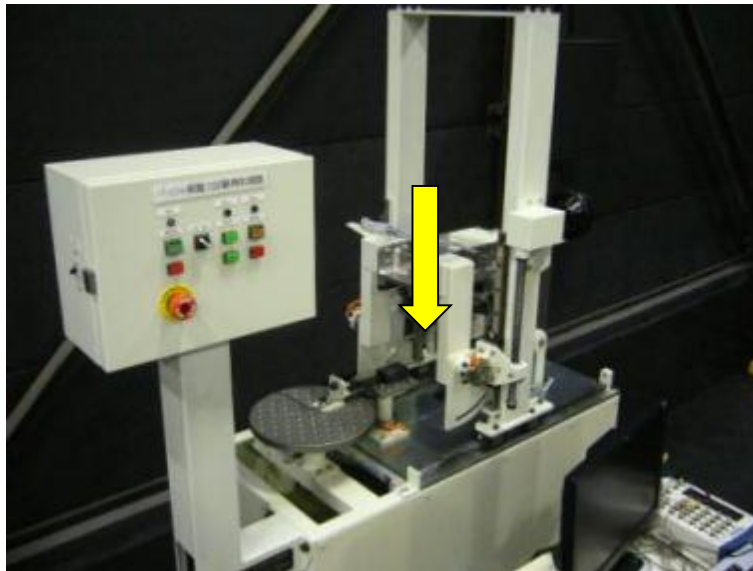
- **Durability**: 5000 opening/closing cycles under normal conditions of use



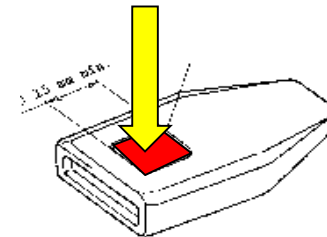
6.2.2. Buckle

6.2.2.5.

- **Release force**: 6 daN (maximum) after the dynamic test (7.7.)



Buckle release testing machine



(7.8.)

Apply release force at 400 mm/min under belt tied by load of $60/n$ daN
(It is understood that “n” is the number of straps linked to the buckle when it is in a locked position.)

6.2.2. Buckle

6.2.2.6.

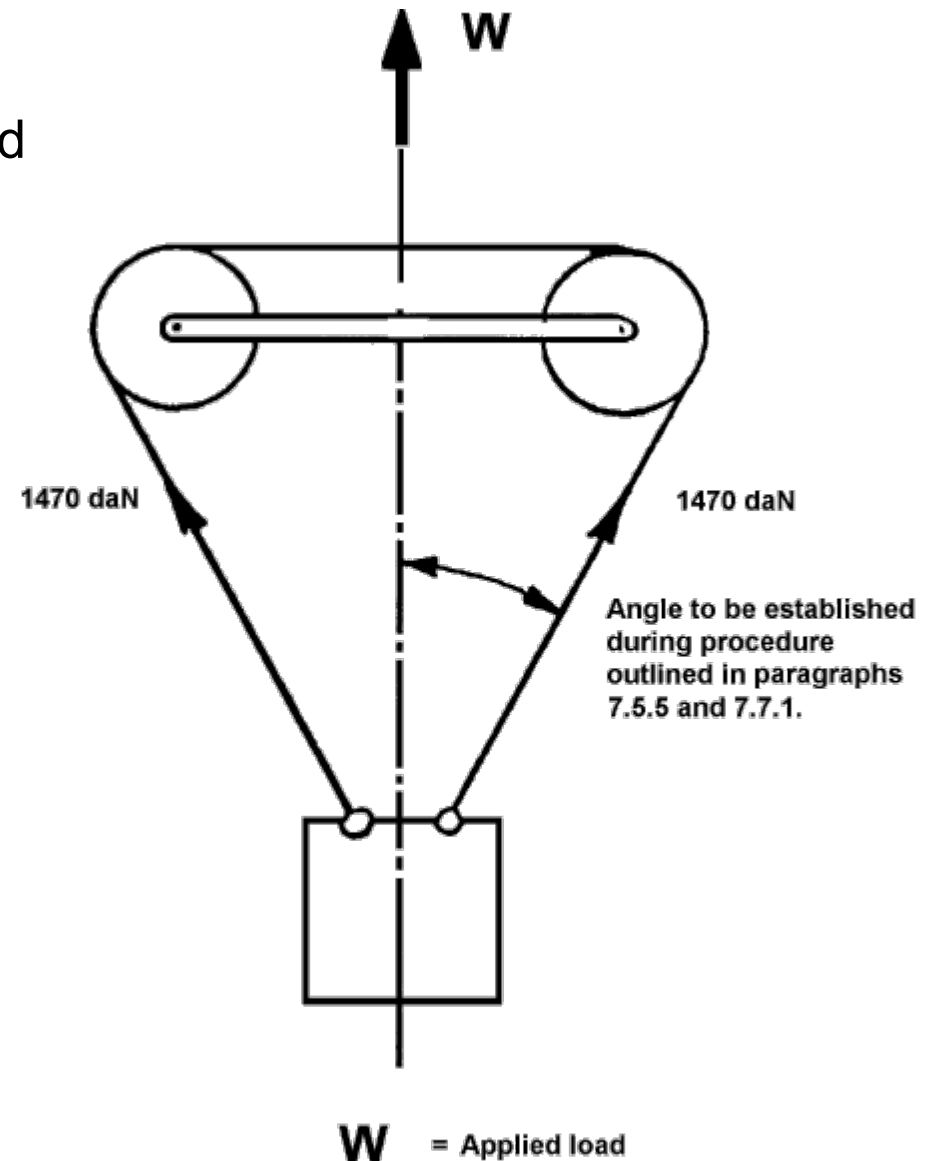
- **Not broken** or detached under the load

(7.5.1.)

Tensile strength: 980 daN

(7.5.5.)

1470 daN for buckles having parts
common to two safety belts
(ANNEX 10, dual buckle test)



6.2. Rigid parts

6.2.3. Belt adjusting device

- Belt shall have suitable adjusting mechanism

- Micro-slip test:

25 mm/each sample (maximum)

40 mm/the sum of two samples (maximum)

(7.3.)

1000 cycles/300 mm shift with load of 5 daN

(ANNEX 11)

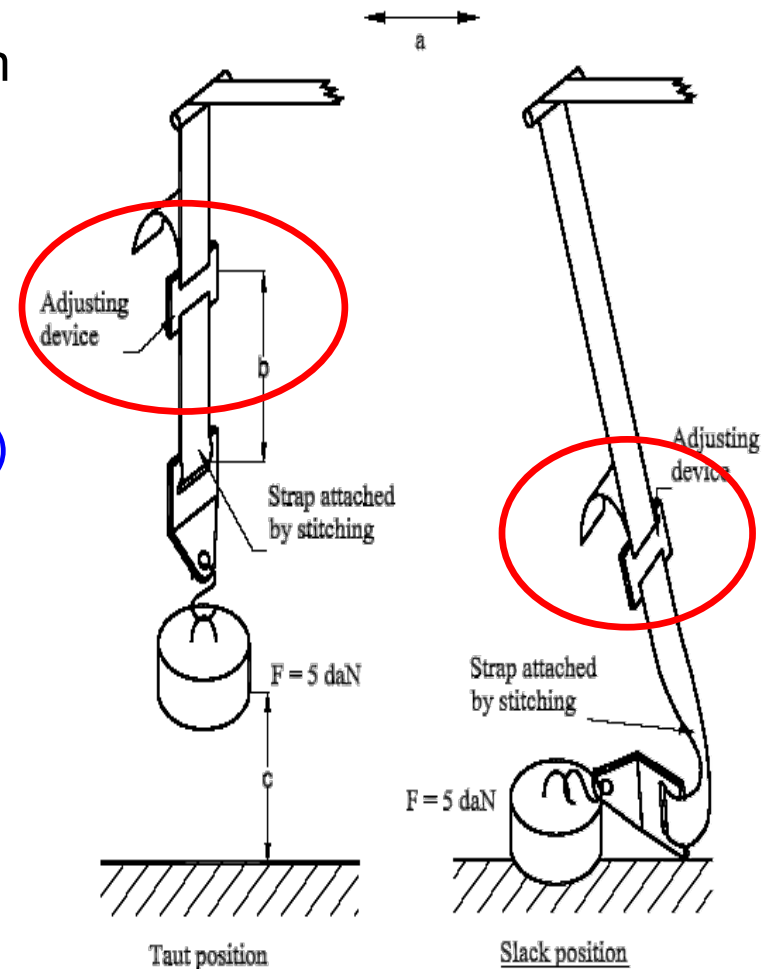


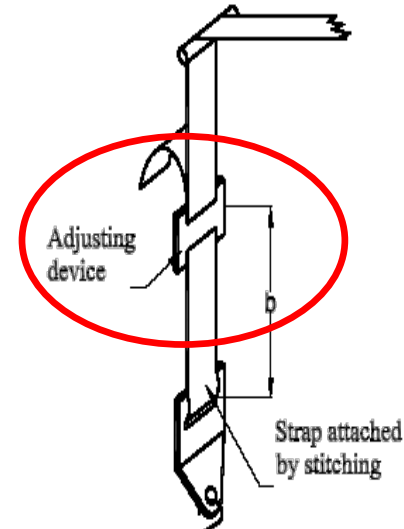
Figure 3:

Type 3 Procedure and Micro-slip Test

6.2.3. Belt adjusting device

- **Not broken or detached** under the load
(7.5.1.)

Tensile strength: 980 daN



- **Adjusting force 5 daN** (maximum)
(7.5.6.)

Determined at the first 25 mm shift with drawn

6.2.4. Attachment and belt adjusting device for height

- Not broken or detached under the load



2.14.6.
Belt Adjustment
Device for Height

(7.5.2.)

Tensile strength: 1470 daN

In case that Belt adjusting device for height has not been tested on the vehicle in application of UN-R14.

6.2.5. Retractor

- Tensile strength: (7.5.1.) 1470 daN/980 daN (with pillar loop)

- Requirement for each type of retractor as follows

→After the **Next Page**

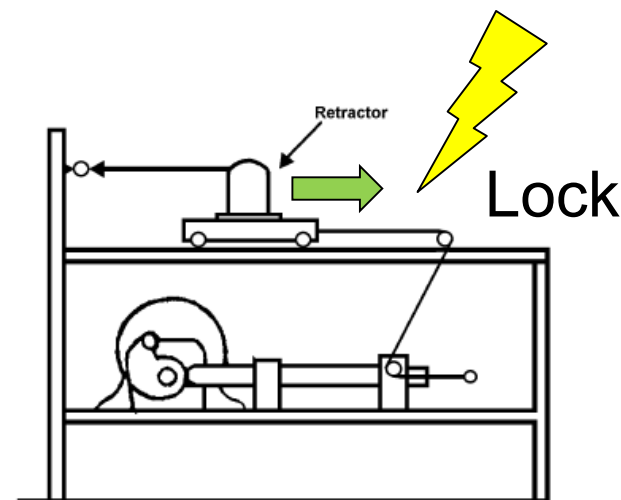
6.2.5.1. Manually unlocking retractor

6.2.5.2. Automatically locking retractor(ALR)

6.2.5.3. Emergency locking retractor locking performance (ELR)

6.2.5.3. Emergency locking retractor locking performance (ELR)

- Locking must occur within 50 mm of strap extraction at
Vehicle deceleration: 0.45 G for type 4 / 0.85 G for type 4N
Strap acceleration: 3.0 G (with multiple sensitivity)
Tilted angle: up to 27 degrees for type 4 / 40 degrees for type 4N
- Locking must **not** occur within 50 mm of strap extraction at
Strap acceleration: 0.8 G for type 4 / 1.0 G for type 4N
Tilt angle : up to 12 degrees



(7.6.2.)(ANNEX4)

- Tested with retractor with 300 mm strap on spool.
- Vehicle deceleration sensitivity: tested along 2 perpendicular axes
- Strap acceleration increased rate: 55 G/s (minimum), 150 G/s (maximum)
- Vehicle acceleration increased rate: 25 G/s (minimum), 150 G/s (maximum)
- Tilted speed: 2 degrees/sec.

6.2.5.3. Emergency locking retractor(ELR)

-Retraction force

for Lap belt: 0.7 daN (minimum)

for upper torso restraint: 0.1 daN

(0.05 daN with tension-reducing device) - 0.7 daN

(7.6.4.)

When measured with belt fitted to a dummy at the point of contact with (but just clear of) the dummy with strap retracted at rate of 0.6 m/min.

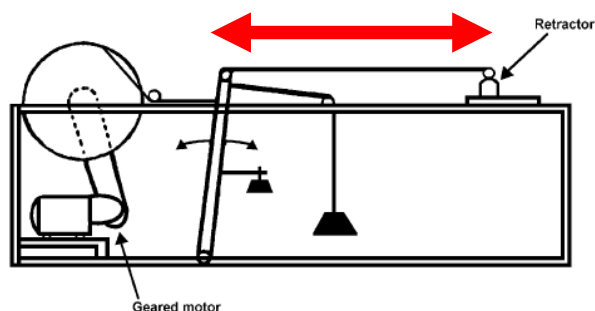


6.2.5.3. Emergency locking retractor(ELR)

- Durability:
- Durability : **work normally after 40000 cycles** (7.6.1.) 30 cycles/min.
and locking at 90, 80, 75, 70, 65% retraction per 5 cycles
- Salt spray (7.2.) exposure for 50 hours
- Dust(dry quartz) (7.6.3.) left in chamber for 5 hours -> **5000 cycles**
(making 45,000 in all).

(7.6.1.)- After durability test, retractor must still meet requirement.

DIAGRAM OF AN APPARATUS TO TEST DURABILITY OF RETRACTOR MECHANISM



(7.6.1.) Apparatus for retractor durability test
(ANNEX 3)



Salt Spray Testing Chamber



(7.6.3.) Chamber for dust resistance
(ANNEX 5)

6.2.5.1. Manually unlocking retractor

- Movement between locking position: 25 mm (maximum)
- Extract length: within 6 mm under between 1.4 daN and 2.2 daN
- Durability: work normally after 5000 cycles (7.6.1.) 30 cycles/min
 - > Salt spray (7.2.) exposure for 50 hours
 - > Dust (7.6.3.) left in chamber includes dry quartz for 5 hours
 - > 5000 cycles (7.6.1.)

6.2.5.2. Automatically locking retractor (ALR)

- Movement between locking position: 30 mm (maximum)
- Retracting force
 - for lap: 0.7 daN (minimum)
 - for upper torso: 0.1 daN-0.7 daN

(7.6.4.)

When measured with belt fitted to a dummy at the point of contact with (but just clear of) the dummy with strap retracted at rate of 0.6 m/min



6.2.5.2. Automatically locking retractor (ALR)

- Durability : work normally after 5000 cycles (7.6.1.) 30 cycles/minutes
 - > Salt spray (7.2.) exposure for 50 hours
 - > Dust (7.6.3.) left in chamber includes dry quartz for 5 hours
 - > 5000 cycles (7.6.1.)



6.2.6. Pre-loading device

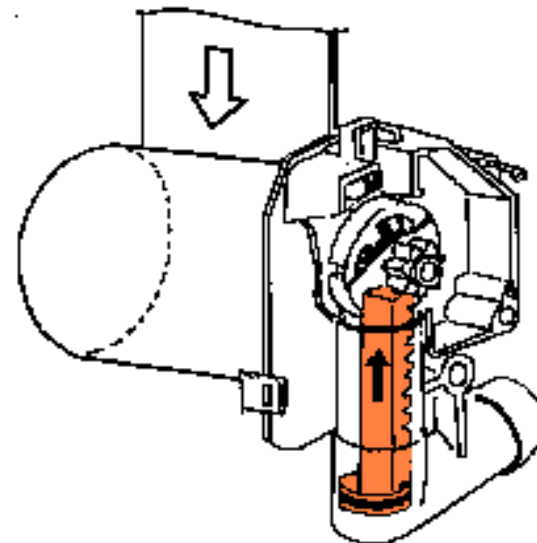
- Work normally after corrosion test
(7.2.) exposure to salt spray for 50 hours
- Prevent injury risk by inadvertent operation
- Shall not have been activated by temperature

Conditioning (7.9.1.)

60 degrees for 24 hours

-> 100 degrees for 2 hours

-> -30 degrees for 24 hours



2.6. Pre-Loading Device

6.3.1. General

- **No twist** under tension
- **Have energy-absorbing** and energy-dispersing capacities
- Must **have finished selvages** not to be unraveled in use



2.3. Strap

- **Width: 46 mm** (minimum) under load of 980 daN +100 -0 daN
- The dimension shall be measured according to the test prescribed in 7.4.3., stopping the machine at the above mentioned load. ⁷

7

The test has not been performed for woven straps in twill construction with high-tenacity polyester yarns as those webbings get wider under load. In that case the width without load shall be ≥ 46 mm.

6.3.2. Strength after room conditioning

- Tensile strength: **not less than 1470 daN** (after room conditioning)

(7.4.1.1.)

Conditioning: ISO 139 (2005) *

(7.4.2.)

Speed of traverse: 100 mm/min

Distance between clamps: 200 mm

*ISO 139 (2005)

The regulation accepts both conditions
of standard alternative atmosphere
(23.0 +/-2.0 deg. C / RH 50.0 +/-4.0%)
and standard atmosphere
(20.0 +/-2.0 deg. C / RH 65.0 +/-4.0%).



Tensile testing machine

6.3.3. Strength after special conditioning

- Tensile strength:
 - shall be not less than 75 per cent of average of the loads and not less than 1,470 daN.

- Light conditioning:

(7.4.1.2.)

(1) **Conditioning: ISO 105-B02**

(1994/Amendment 2:2000)

Exposure to light to produce contrast grade 4



(2) Room-conditioning under 7.4.1.1. after exposure

(3) Measured within 5 minutes after removal of the sample

6.3.3. Strength after special conditioning

- Tensile strength:
shall be not less than 75 per cent of average of the loads
and not less than 1,470 daN.

- Cold conditioning:

(7.4.1.3.)

(1) Room conditioning same as 7.4.1.1.

(2) -30 deg. C with folded with 2 kg mass previously cooled to -30 deg. C
for 30 minutes

(3) Measured after the mass has been removed and within 5 minutes after
removal of the sample from the low-temperature chamber

6.3.3. Strength after special conditioning

- Tensile strength:
shall be not less than 75 per cent of average of the loads
and not less than 1,470 daN.

- Heat conditioning:

(7.4.1.4.)

(1) At 60 deg. C / RH of 65% for 3 hours

(2) Measured within 5 minutes after removal of the sample from the heating cabinet

- Exposure to water:

(7.4.1.5.)

(1) In distilled water (20 deg. C) for 3 hours

(2) Measured within 10 minutes after removal of the sample from the water

6.4. Belt assembly or restraint system

6.4.1. Dynamic test

(7.7.1.)

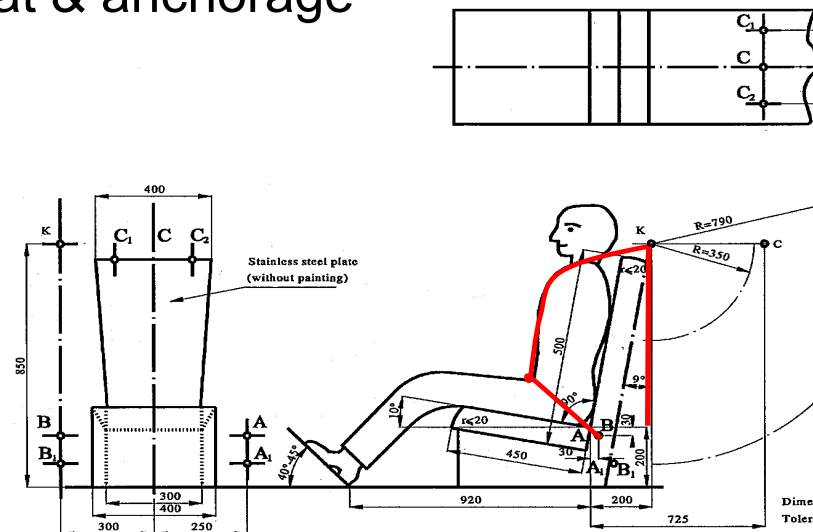
The belt assembly shall be mounted on a trolley equipped with the seat and the anchorage defined in Annex 6 to this Regulation.

(Annex 6 Para. 1.) Trolley

Mass: 400 +/- 20 kg (for tests on safety belts)

Mass: 800 kg (for test on restraint systems)

(Annex 6 Para. 2. and Para. 3.) Seat & anchorage



Trolley, seat, anchorage

6.4.1. Dynamic test

- Conditioning before dynamic test
- Durability
- Corrosion
- Dust
- No part affecting the restraint shall break and no buckles or locking system or displacement system shall release or unlock (6.4.1.3.1.)
- Displacement of manikin (6.4.1.3.2.)
 - Chest level: 100^(*1) - 300^(*2, 3) mm
 - Pelvic level: 80^(*1) - 200 mm

6.4.1. Dynamic test

(7.7.4.) Deceleration or Acceleration devices

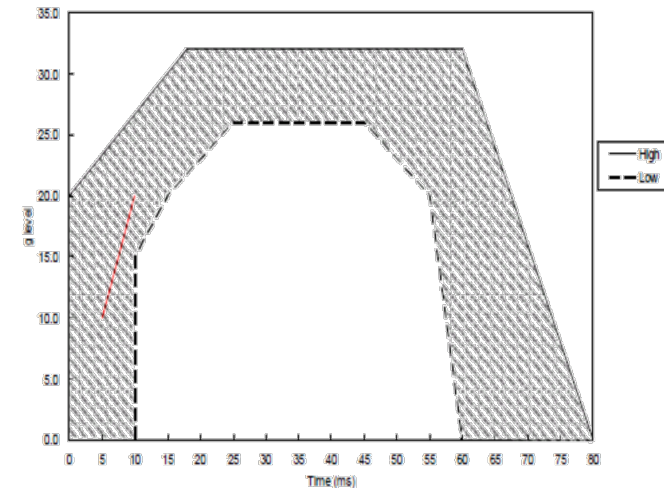
- The applicant shall choose to use one of the two following devices:

(7.7.4.1.) Deceleration test device

- The speed of the trolley is 50 +/-1 km/h at the moment of impact

(7.7.4.2.) Acceleration test device

- The total velocity change ΔV is 51 km/h +2-0 km/h



6.4.1. Dynamic test

- (*1) In the case of a safety belt **with pre-loading device**, the minimum displacement may be **reduced by half** (6.4.1.2.4.)
- (*2) In the case of following belts, the displacement of the chest **may exceed 300 mm** if its speed of this value does not exceed 24 km/h:
 - A belt is mounted the vehicle **meeting the requirement of Regulation No.94-01.**, and
 - A belt intended for use in an outboard front seating position **protected by airbag.**
- (*3) In the case of a safety belt, displacement of the chest **may exceed 300 mm** if no part of the torso or the head of the manikin would have come into contact with any rigid part of the vehicle other than the chest with steering assembly, if the latter meets **the requirements of No. 12 and provided contact does not occur at a speed higher than 24 km/h.**

6.4.2. Strength after abrasion conditioning

- shall be not less than 75 per cent of average of the loads and not less than 1,470 daN.
- Room conditioning same as 7.4.1.1. ->
- During the **abrasion** procedure, the ambient temperature shall be between 15 deg. C and 30 deg. C.

	Procedure 1	Procedure 2	Procedure 3
Attachment	—	—	X
Guide & Pulley	—	X	—
Buckle-loop	—	X	X
Adjusting device	X	—	X
Parts sewn to the strap	—	—	X

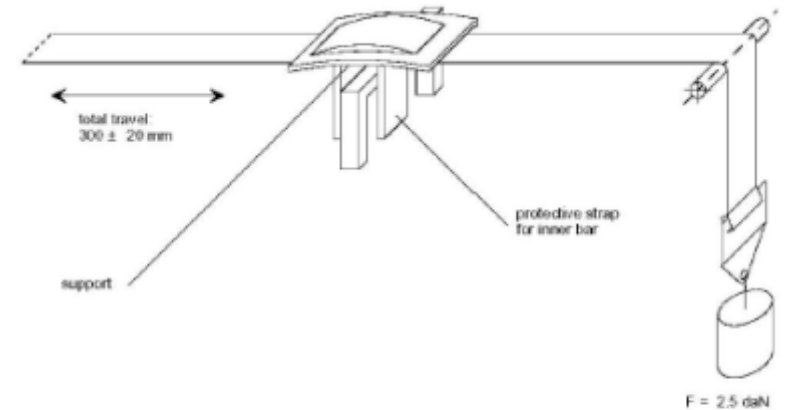
(7.4.1.6.1.) Procedure 1 is not required if micro slip test (7.3.) result < 12.5 mm
(half of the requirement = 25 mm (6.2.3.2.))

6.4. Belt assembly or restraint system

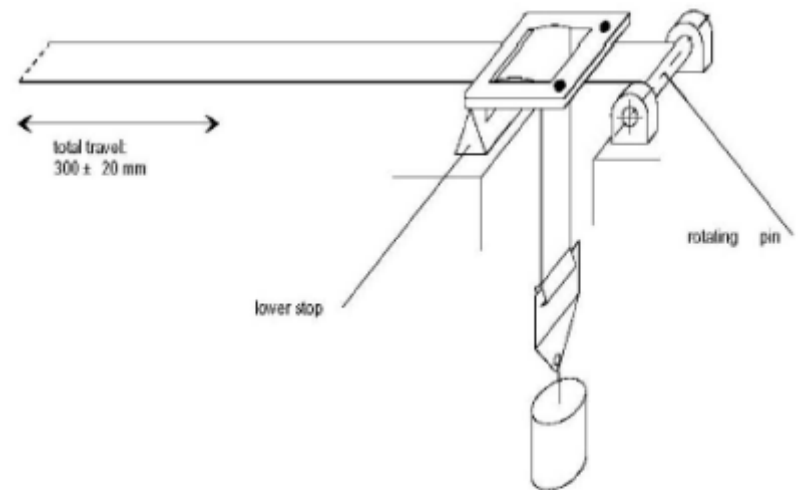
6.4.2. Strength after abrasion conditioning

7.4.1.6.

- Procedure 1



Example a



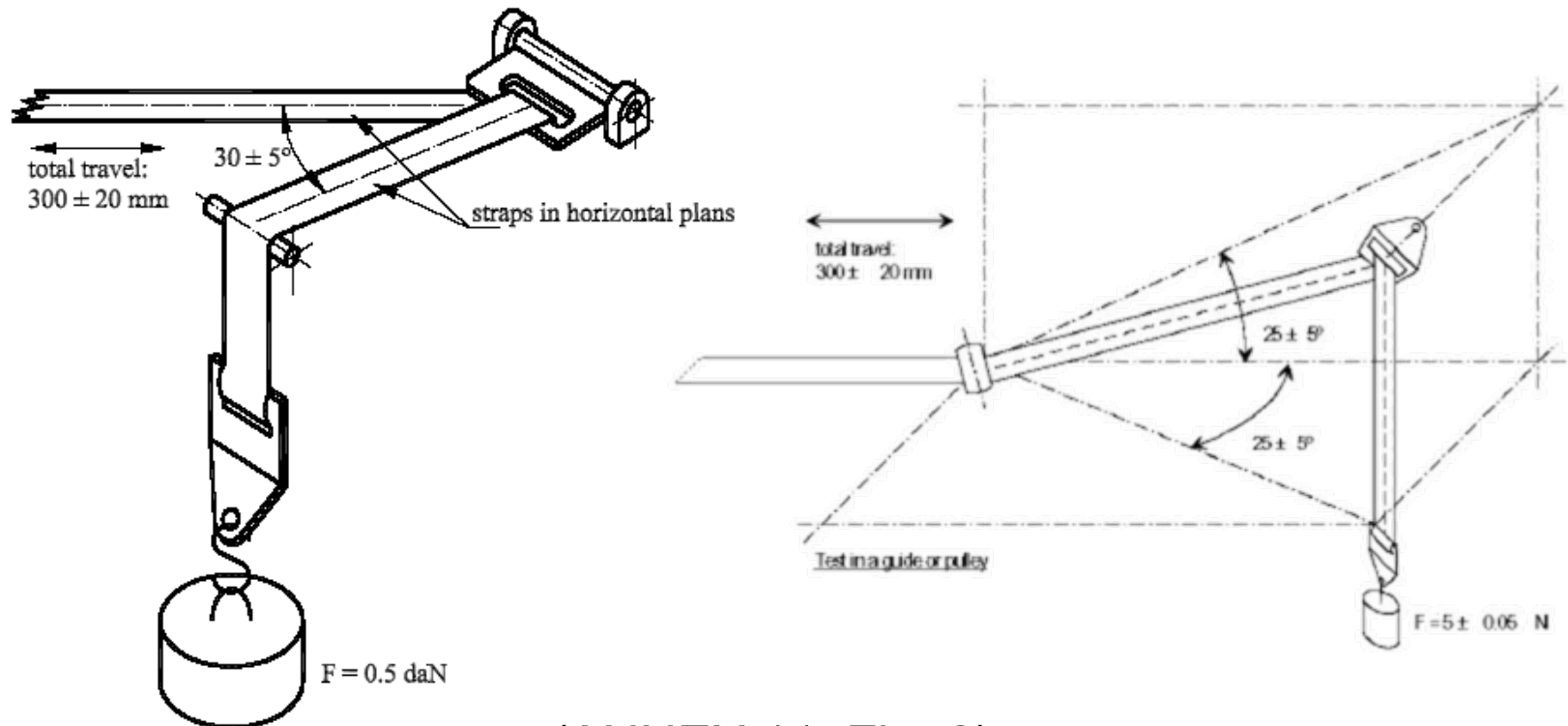
Example b
Examples of test arrangements corresponding
to the type of adjusting device

(ANNEX 11, Fig. 1)

6.4.2. Strength after abrasion conditioning

7.4.1.6.

- Procedure 2



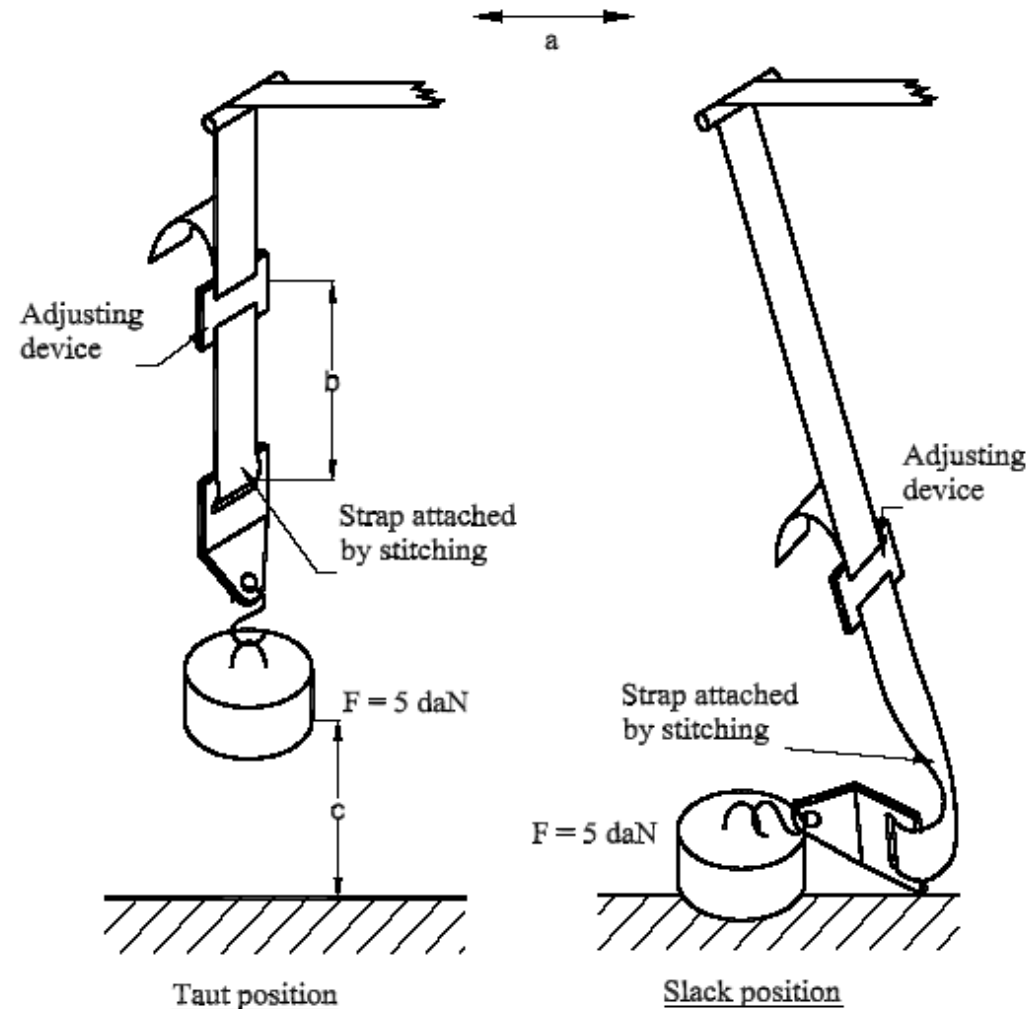
(ANNEX 11, Fig. 2)

6.4. Belt assembly or restraint system

6.4.2. Strength after abrasion conditioning

7.4.1.6.

- Procedure 3



(ANNEX 11, Fig.3) _{est}

Requirements concerning the installation in the vehicle

8.1. Safety-belt and restraint systems equipment

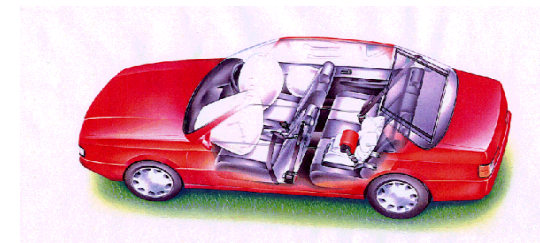
Safety- belt Equipment

N

M1

M2

M3



Reg.No.52

Small Capacity Vehicles with regard to their general construction

Reg.No.107

Double Deck Large Passenger Vehicles with regard to their general Construction

Reg.No.36

Large Passenger Vehicles with regard to their general construction

Driver + 22 passenger or less

Driver + 23 passenger or more

Class A

With areas for standing passengers

Class B

No areas for standing passengers

Class I


City buses (With areas for standing passengers)

Class II

Interurban buses (With areas for standing passengers)

Class III

Touring coaches (No areas for standing passengers)

 : Must equip Safety belts and/or restraint system conforming to UN-R16 for all seating positions.

 : may be fitted with safety-belts or restraint systems conforming to requirements of this Regulation

 : CP may demand the installation of safety-belts

Annex 16: Minimum requirements for seat belts and retractors.

A: three-point (lap and diagonal) belt

B: 2-point (lap) belt

r: retractor

m: emergency locking retractor with multiple sensitivity

3: automatically locking retractor

4: emergency locking retractor

N: higher response threshold

(see Regulation No. 16, paras. 2.14.3. and 2.14.5.)

*** : Refers to para. 8.1.6. of this Regulation**

Φ: Refers to para. 8.1.2.1. of this Regulation

●: refers to para. 8.1.7. of this Regulation

Minimum requirements for seat belts and retractors

Vehicle Category	Forward facing seating positions	
	Outboard seating positions	
	Front	Other than front
M1	Ar4m	Ar4m
M2 < 3.5 t	Ar4m, Ar4Nm	Ar4m, Ar4Nm
M2 > 3.5 t	Br3, Br4m, Br4Nm, or Ar4m or Ar4Nm ●	Br3, Br4m, Br4Nm, or Ar4m or Ar4Nm ●
M3	See para. 8.1.7. for conditions when a lap belt is permitted	See para. 8.1.7. for conditions when a lap belt is permitted
N1	Ar4m, Ar4Nm	Ar4m, Ar4Nm, Br4m, Br4Nm φ
		Para. 8.1.2.1. lap belt permitted if seat is inboard of a passageway
N2 N3	Br3, Br4m, Br4Nm or Ar4m, Ar4Nm*	B, Br3, Br4m, Br4Nm
	Para. 8.1.6. lap belt permitted if the windscreen is outside the reference zone and for the driver's seat.	

Minimum requirements for seat belts and retractors



Vehicle Category	Forward facing seating positions	
	Center seating position	
	Front	Other than front
M1	Ar4m	Ar4m
M2 < 3.5 t	Ar4m, Ar4Nm	Ar4m, Ar4Nm
M2 > 3.5 t	Br3, Br4m, Br4Nm or Ar4m or Ar4Nm ●	Br3, Br4m, Br4Nm or Ar4m or Ar4Nm ●
M3	See para. 8.1.7. for conditions when a lap belt is permitted	See para. 8.1.7. for conditions when a lap belt is permitted
N1	B, Br3, Br4m, Br4Nm or A, Ar4m, Ar4Nm	B, Br3, Br4m, Br4Nm
	Para. 8.1.6. lap belt permitted if the windscreen is not in the reference zone.	
N2 N3	B, Br3, Br4m, Br4Nm, or A, Ar4m, Ar4Nm*	B, Br3, Br4m, Br4Nm
	Para. 8.1.6. lap belt permitted if the windscreen is not in the reference zone.	

Minimum requirements for seat belts and retractors

Vehicle Category	Rearward-facing seating positions	Side-facing seating position
M1	B, Br3, Br4m	-
M2 < 3.5 t	Br3, Br4m, Br4Nm	-
M2 > 3.5 t	Br3, Br4m, Br4Nm	-
M3	Br3, Br4m, Br4Nm	B, Br3, Br4m, Br4Nm
N1	B, Br3, Br4m, Br4Nm	-
N2 N3	B, Br3, Br4m, Br4Nm	-

Examples of installation

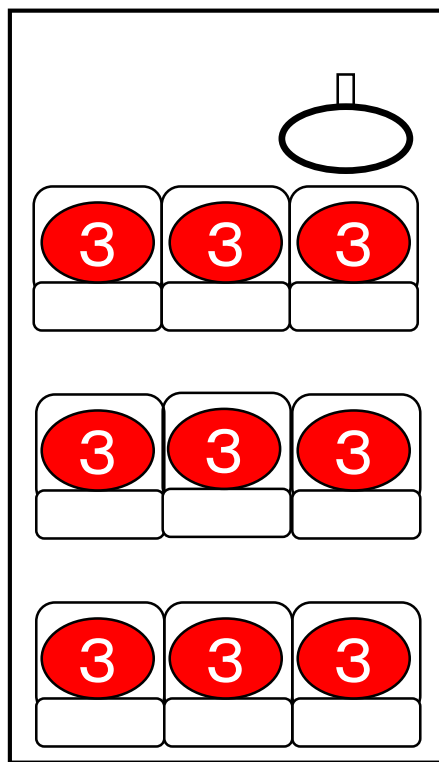
In the following figures,

-  means 3 point seat belt (lap belt + diagonal belt)
-  means 2 point seat belt (lap belt)

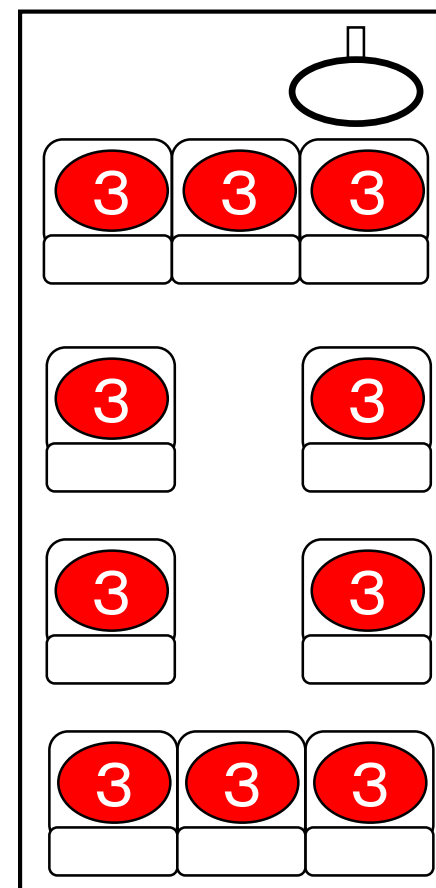
“Passenger” means NOT including the driver

Category M1 and M2 (Mass ≤ 3.5 t)

Category M1 : Passenger ≤ 8



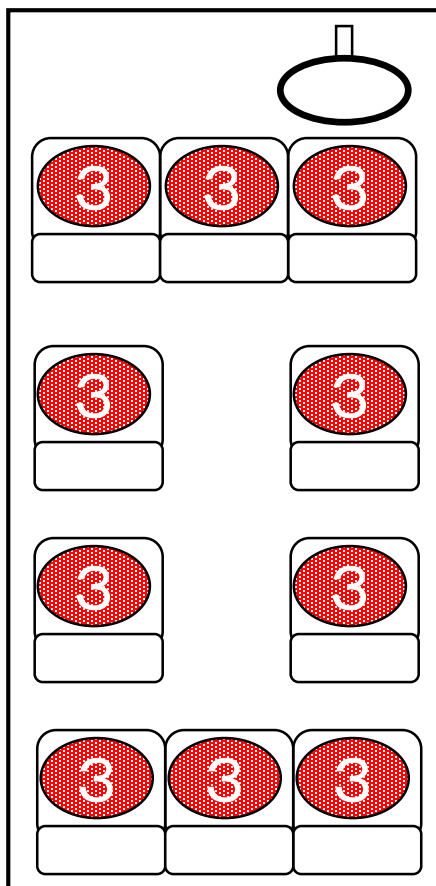
Category M2
Mass ≤ 3.5 t, Passenger > 8



Category M2 ($3.5 \text{ t} < \text{Mass} \leq 5 \text{ t}$) and M3

Category M2: $3.5 \text{ t} < \text{Mass} \leq 5 \text{ t}$, Passenger > 8

Category M3: $5 \text{ t} < \text{Mass}$, Passenger > 8



3 See para.8.1.7

- For every seating position except for rearward facing seating position, 3-point belt shall be provided.
- However, if one of the following conditions is fulfilled, 2 point belt may be provided.

2



8.1.7.

8.1.7.1.

There is a seat or other vehicle parts conforming to para.3.5. of Appendix 1 [to UN-R80](#) directly in front; or

8.1.7.2.

No part of the vehicle is in or, when the vehicle is in motion, capable of being in the [reference zone](#)^{*}, or

8.1.7.3.

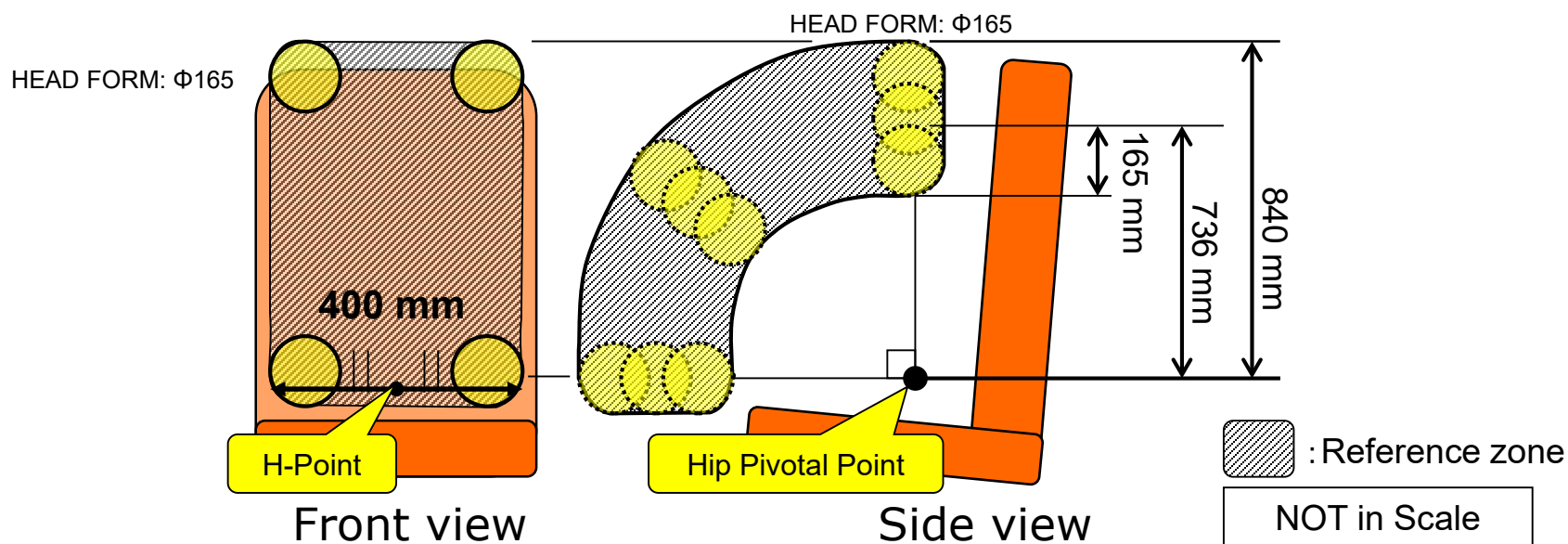
Parts of the vehicle within the said reference zone comply with the energy absorbing requirements set out in [Appendix 6 to UN-R80](#)^{**}.

NOTE

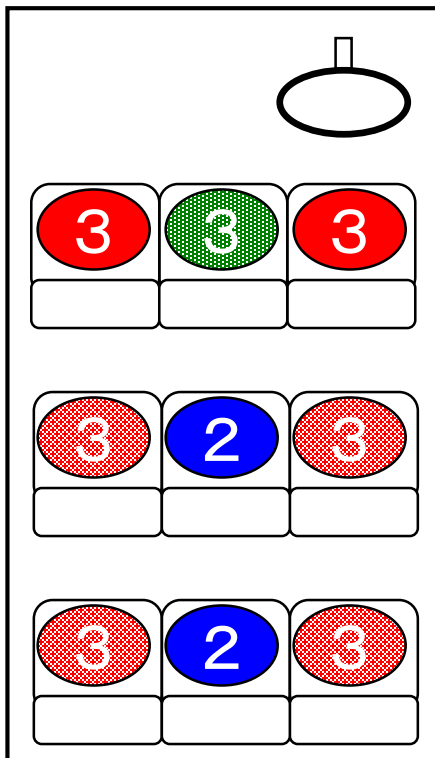
*“Reference zone” is almost equal to “head-impact zone” described in UN-R21 Annex 1.

Reference zone means the space between two vertical longitudinal planes, 400 mm part and symmetrical with respect to the H-point, and defined by rotation from vertical to horizontal of the head-form apparatus, described in UN-R21 Annex1.

- The apparatus height (hip to top of the head) can be adjusted between 736 and 840 mm.



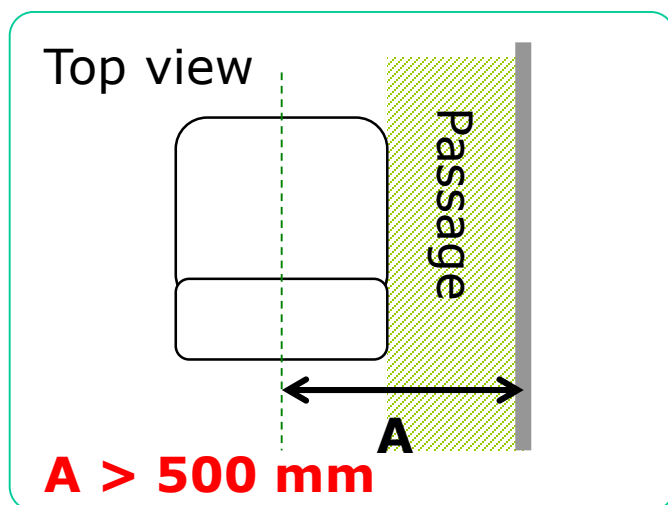
Category N1 (Mass ≤ 3.5 t)



- **3** : the installation of a lap belt of (type Br4m or Br4Nm) is allowed, where a passage exists between a seat and the nearest side wall.
- **3** : Lap belts shall be considered adequate where the windscreen is located outside the reference zone defined in Annex1 to UN-R21.
- **2** : means 2 point seat belt (lap belt)

8.1.2.1.

For outboard seating positions, other than front, of vehicles of the category N1, **the installation of a lap belt of type Br4m or Br4Nm is allowed**, where there exists a passage* between a seat and the nearest side wall of the vehicle intended to permit access of passengers to other parts of the vehicle.



*A space between a seat and the side wall is considered as a passage, if the distance between that side wall, with all doors closed, and a vertical longitudinal plane passing through the center line of the seat concerned is more than 500 mm.

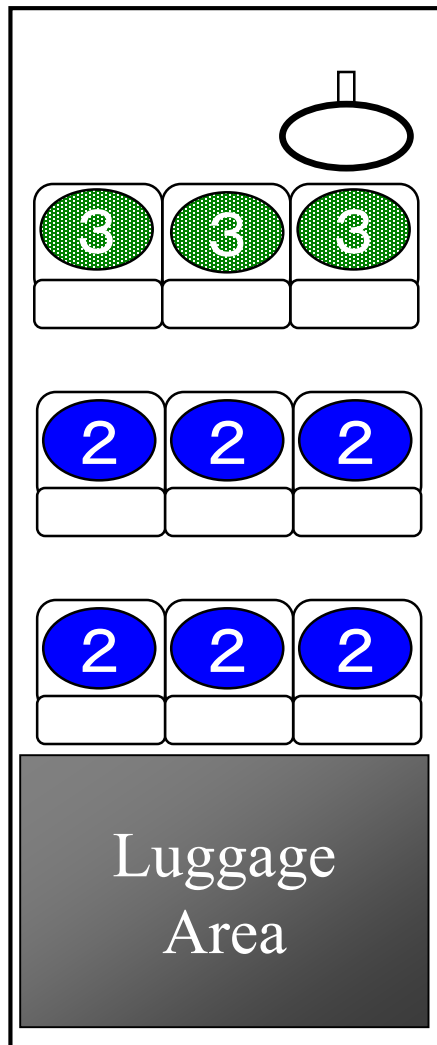
8.1.6.

For following seating positions, lap belts shall be considered adequate where the windscreen is located outside the reference zone defined in Annex 1 to UN-R21.

- Category N1 [Forward facing, front center seating position]
- Category N2/N3
[Forward facing, front outboard and front center seating position]

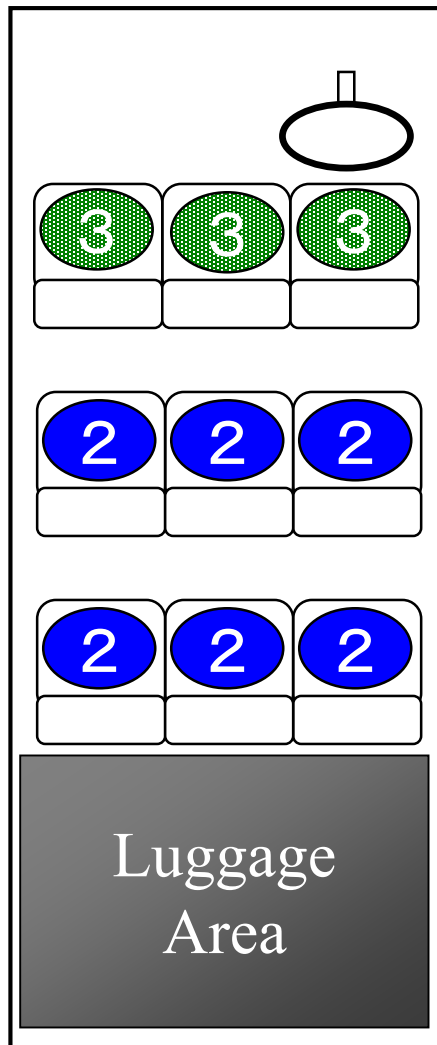
As regards safety-belts, the windscreen is considered as part of the reference zone when it is capable of entering into static contact with the test apparatus according to the method described in Annex 1 of UN-R21.

Category N2 ($3.5 \text{ t} < \text{Mass} \leq 12 \text{ t}$)



- **3** : Lap belts shall be considered adequate where the windscreen is located outside the reference zone defined in Annex1 to UN-R21.
- **2** : means 2 point seat belt (lap belt)

Category N3 (12 t \geq Mass)



- **3** : Lap belts shall be considered adequate where the windscreen is located outside the reference zone defined in Annex1 to UN-R21.
- **2** : means 2 point seat belt (lap belt)

8.2.1.

Safety-belts, restraint systems ... shall be fixed to anchorages ... conforming to [the specifications of UN-R14](#), such as the design and dimensional characteristics, the number of anchorages, and the strength requirements.

8.2.2.

The safety-belts, restraint systems ... shall be so installed that [they will work satisfactorily](#) and [reduce the risk of bodily injury](#) in the event of an accident.

- In particular they shall be so installed that: (to continue)

8.2.2.1.

The straps are **not** liable to assume a **dangerous configuration**;

8.2.2.2.

The danger of a correctly positioned belt **slipping from the shoulder** of a wearer as a result of his/her forward movement **is reduced to a minimum**.

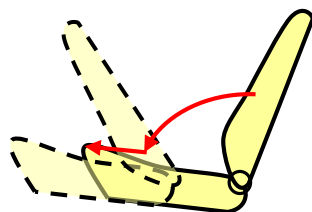
8.2.2.3.

The risk of the strap deteriorating through contact with sharp parts of the vehicle or seat structure, and child restraint systems recommended by the manufacturer according to tables 1 to 3 of Annex 17 - Appendix 3, **is reduced to a minimum**.

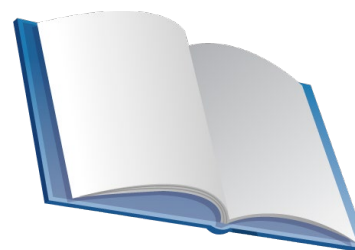
8.2.2.4.

The design and installation of every safety-belt provided for each seating position shall be such as to be **readily available for use**.

Furthermore, where the complete seat or the seat cushion and/or the seat back can be folded to permit access to rear of the vehicle or to goods or luggage compartment, **after folding and restoring those seats to the seating position**, the safety-belts provided for those seats **shall be accessible for use** or can be easily recovered from under or behind the seat, **by one person**, according to instructions in the vehicle **users handbook**, **without the need for that person to have training or practice**.



Folding seats



User handbook

8.2.2.5.

With the buckle tongue engaged in the buckle:



8.2.2.5.1.

The possible slack in the belt **does not prevent the correct installation of child restraint systems** recommended by the manufacturer, and

8.2.2.5.2.

In case of 3-point belts, at least 50 N is loaded in the lap section of the belt by externally applying in the diagonal section of the belt, when positioned:

- (a) on a 10-year old manikin as specified in Annex 8, Appendix 1 to UN-R44 and set in accordance with Annex 17, Appendix 4 to this Regulation;
- (b) Or on the fixture specified in Annex 17, Appendix 1, figure 1 to the this Regulation for the seats that enable the installation of a child restraint device of universal category.



8.3.1.

- Rigid parts, such as the buckles, adjusting devices and attachments, shall not increase the risk of bodily injury to the wearer or to other occupants of the vehicle in the event of an accident.

8.3.2.

- The device for releasing the buckle shall be so designed that it cannot be opened inadvertently or accidentally
- The buckle shall be capable of being released by the wearer with a single simple movement of either hand in one direction.
- If the buckle is in contact with the wearer, the width of the contact surface is not less than 46 mm.

A check shall be made to ensure that, if the buckle is in contact with the wearer, the contact surface satisfies the requirements of paragraph 6.2.2.1. of this Regulation .

8.3.3.

When the belt is being worn, it shall either **adjust automatically to fit** the wearer or be so designed that the manual adjusting device is readily accessible to the wearer when seated and is convenient and **easy to use**. It shall also be **possible for it to be tightened with one hand** to suit the build of the wearer and the position of the vehicle seat.

8.3.4.

Safety-belts or restraint systems incorporating retractors shall be so installed that the retractors are **able to operate correctly and stow the strap efficiently**.

Child Restraint Systems, ISOFIX CRS and i-size CRS

Child restraint systems, ISOFIX CRS and i-size CRS

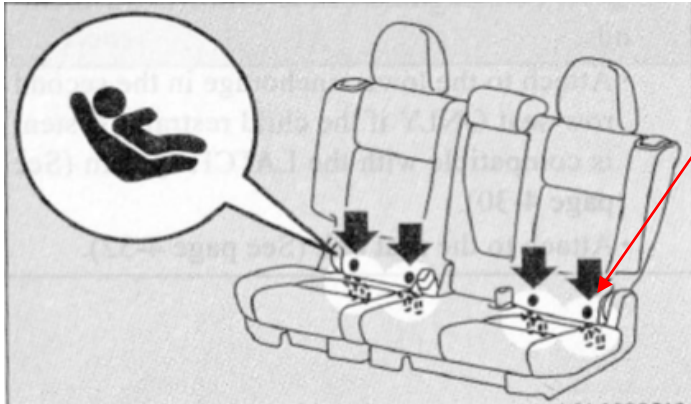
1. Scope
2. Definitions
8. Requirements concerning the installation in the vehicle
 - 8.1. Safety-belt and restraint systems equipment
 - 8.1.8. to 8.1.10
 - 8.2. General requirements
 - 8.3. Special requirements for rigid parts incorporated in safety-belt or restraint system
 - 8.3.5.
 - 8.3.6.

Annex 17



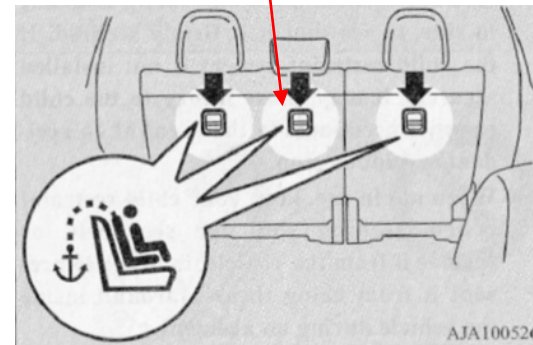
2.10. Child restraint:

A safety device as defined in UN-R44 or UN-R129.



2.29 ISOFIX

two corresponding rigid attachment
+
limit the pitch rotation



2.30. ISOFIX Child Restraint System (CRS):

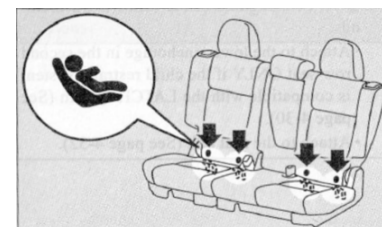
Child Seat conformed to UN-R44, and attached to an ISOFIX anchorage system conformed to UN-R14

2.31. **ISOFIX Position:**

Position that allows installing a ISOFIX child restraint system as defined in UN-R44 or UN-R129 (currently i-size and specific ISOFIX CRS ONLY)

2.33. **ISOFIX Low Anchorage:**

6mm diameter rigid round horizontal bar extended from vehicle or seat structure to fix ISOFIX CRS

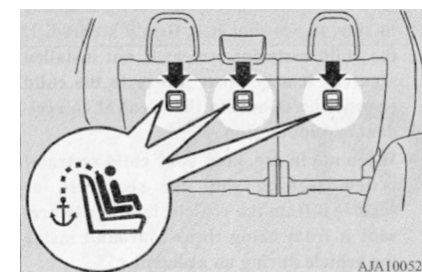


2.34. **Anti-rotation device:**

A device which is intended to limit the rotation of child restraint system, such as a **top tether**, the **vehicle dashboard**, or a **support leg**

2.35. **ISOFIX Top Tether Anchorage:**

Feature conformed to R14 to accept an ISOFIX top tether strap connector



2.36. Guidance Device:

Device to help the person to install the ISOFIX CRSISOFIX positions

2.37. ISOFIX Marking Fixture:

A marking to show someone the desired position of ISOFIX CRS



2.38. Child Restraint Fixture (CRF):

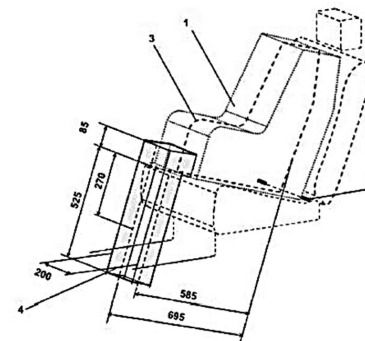
Fixture to check what are the ISOFIX CRS size class which can be accommodated on the vehicle ISOFIX positions



2.39. i-size support leg installation assessment volume:

A volume, which ensures the dimensional and geometrical compatibility between the support leg of an i-size CRS and i-size seating position of the vehicle

Figure 9: 3D view of the i-Size support leg installation assessment volume for assessing compatibility of the i-Size seating positions with support legs of i-Size child restraint systems



2.40. i-size seating position:

designed to accommodate an i-size CRS defined in UN-R129, and fulfils the requirement of this Regulation

8.1. Safety-belt and restraint systems equipment

8.1.8.

Every passenger seating position fitted with a frontal protection airbag shall be provided **with a warning** against the rearward -facing CRS.



The overall dimensions shall be at least 120 x 60 mm or the equivalent area.

The label shown above may be adapted in such a way that the layout differs from the example above; however, the content shall meet the above prescriptions."

8.1.9.

- (1) In case of a frontal protection airbag in the front passenger seat
 - The warning label shall be affixed to:
 - each face of the front passenger sun visor, or
 - the visible face of the stowed sun visor and to the roof behind the visor
- (2) In case of a front protection airbag for other seats
 - The warning label shall be directly ahead of the relevant seat, and clearly visible at all times.
- (3) The label shall not be possible to be removed easily without any obvious and clearly visible damage remaining to the visor or the roof.
- (4) Exemption of the warning label
Those seating positions equipped with a device which automatically deactivate the frontal protection airbag when any rearward-facing CRS is installed.



8.1.10.

Requirement for warnings in the owner's manual:

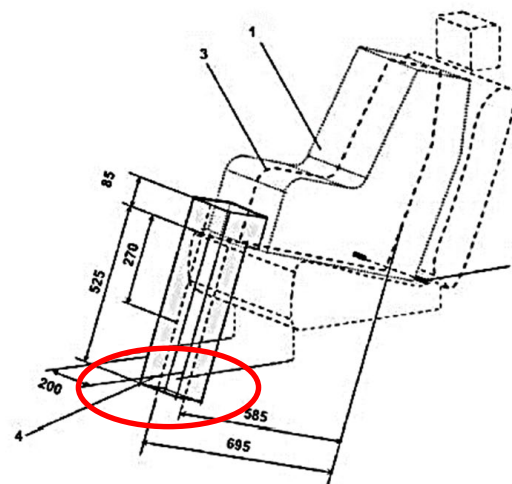
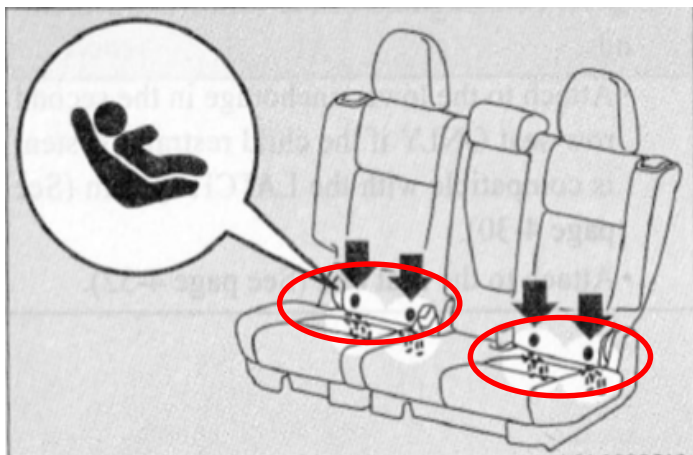
- (1) The text at least including “**NEVER use a rearward facing** child restraint on a seat protected by an ACTIVE AIRBAG in front of it, DEATH or SERIOUS INJURY to the CHILD can occur” **in all languages** of the country or countries the vehicle could reasonably be expected to be registered
- (2) An illustration of the warning label
- (3) Exemption of the warnings in the owner's manual
Vehicles of which all passenger seating positions are equipped with a device which automatically deactivates the frontal protection airbag when any rearward-facing CRS is installed



8.2.1.

Safety-belts, restraint systems, and **ISOFIX** child restraint systems according to table 2 of **Annex 17** - Appendix 3, as well as i-size child restraint systems according to table 3 of Annex 17 – Appendix 3, **shall be fixed to anchorages and in case of i-size CRS, supported by a vehicle floor contact surface, conforming to the specifications of UN-R14**, such as the design and dimensional characteristics, the number of anchorages, and the strength requirements.

Figure 9: 3D view of the i-Size support leg installation assessment volume for assessing compatibility of the i-Size seating positions with support legs of i-Size child restraint systems

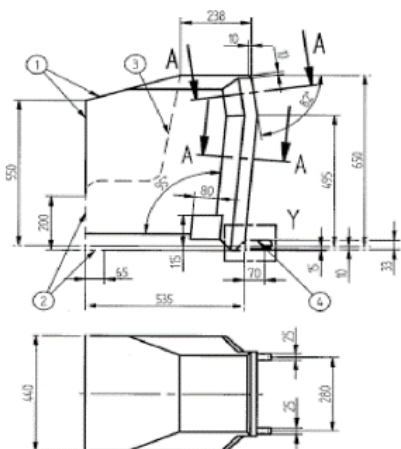


8.3.5.

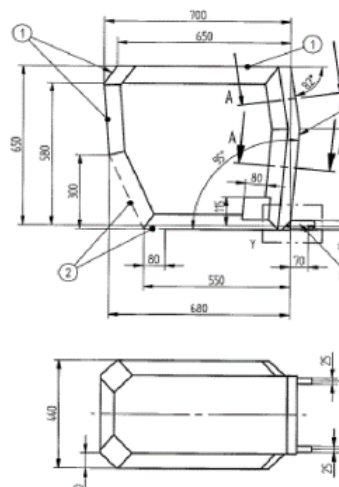
- In order to inform vehicle user(s) of the provisions made for the transport of children, vehicles of categories M1, M2, M3 and N1 shall meet the information requirements of Annex 17.
- Any vehicle of category M1 must be equipped with ISOFIX positions, in accordance with the relevant prescriptions (para 5.3.8.) of UN-R14.
- The first ISOFIX position shall allow at least the installation of one out of the three forward-facing fixtures as defined in Appendix 2 of Annex 17.
- The second ISOFIX position shall allow at least the installation of one out of the three rear-facing fixtures as defined in Appendix 2 of Annex 17.
 - > For this second ISOFIX position, in case where the installation of the rear-facing fixture is not possible on the second row of seats of the vehicle due to its design, the installation of one out of the six fixtures is allowed in any position of the vehicle.

8.3.6.

Any **i-Size seating position** shall allow the installation of the ISOFIX child restraint fixtures "ISO/F2X" (B1), "ISO/R2" (D) **and the support leg installation assessment volume** as defined in Appendix 2 of **Annex 17**.

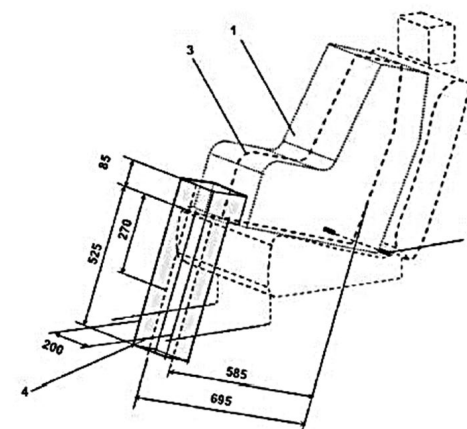


ISO/F2X (B1)



ISO/R2 (D)

Figure 9: 3D view of the i-Size support leg installation assessment volume for assessing compatibility of the i-Size seating positions with support legs of i-Size child restraint systems



support leg installation
assessment

There shall be no interference between the support leg installation assessment volume and any vehicle part.

Annex 17

Requirements for the installation of safety-belts and restraint systems

FOR THE INSTALLATION OF ISOFIX CHILD RESTRAINT SYSTEMS AND i-size CHILD RESTRAINT SYSTEMS

1. **Compatibility** with child restraint systems

1.1.

The vehicle manufacturer shall include in the vehicle handbook advice on the suitability of each passenger seat position for the carriage of children up to 12 years old (or up to 1.5 m tall), or the fitting of child restraint systems.

This information shall be given in the **national language**, or at least one of the national languages, of the country in which the vehicle is offered for sale.



The installation of “universal” CRS installed with safety-belt of the vehicle

3. Requirements

3.1.

The base of the fixture (CRF) shall contact both the forward and rearward parts of the seat cushion surface.

3.2.

The lap portion of the belt shall touch the fixture on both sides at the rear of the lap belt path (see figure 3).

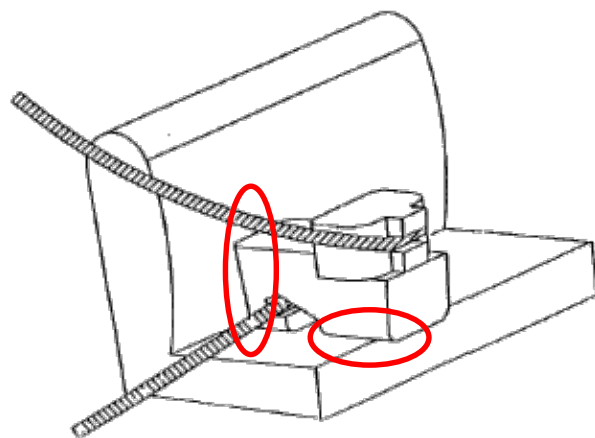
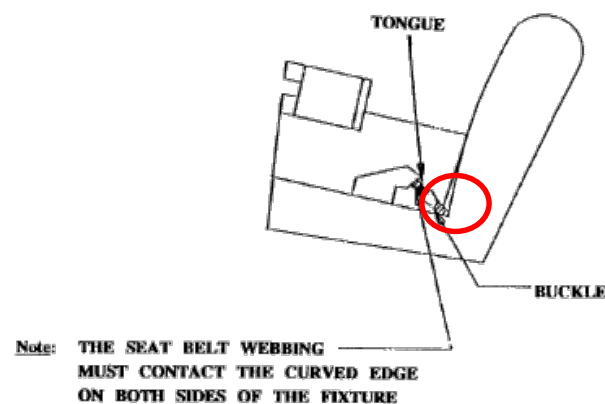


Figure 2 Installation of Fixture onto Vehicle Seat



LAP BELT ONLY SHOWN
Figure 3 Check for Compatibility

3.3. the seat, seat-back and safety-belt anchorages may be adjusted to an alternative position designated by the manufacturer for normal use.

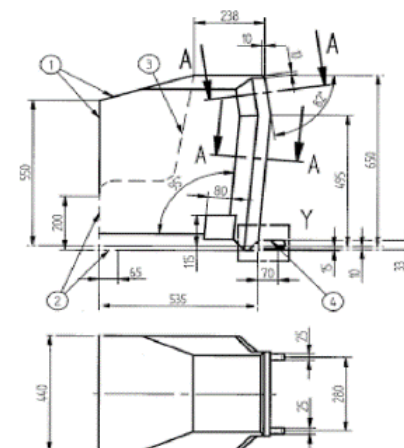
The installation of forward facing and rearward facing ISOFIX CRS of universal and semi-universal categories installed on ISOFIX or i-size positions

3. Requirements

The following testing conditions only apply for the CRF(s), with or without i-Size support leg installation assessment volume, when accommodated in the ISOFIX and/or i-size position. It is not required that the CRF(s), with or without i-Size support leg installation assessment volume, shall be able to move in and out of the ISOFIX and/or i-size position under these conditions.

4. ISOFIX Child restraint system size classes and fixtures (CRF)

- A - ISO/F3: Full-Height Forward Facing toddler CRS
- B - ISO/F2: Reduced-Height Forward Facing toddler CRS
- B1 - ISO/F2X: Reduced-Height Forward Facing toddler CRS
- C - ISO/R3: Full-Size Rearward Facing toddler CRS
- D - ISO/R2: Reduced-Size Rearward Facing toddler CRS
- E - ISO/R1: Rearward Facing infant CRS
- F - ISO/L1: Left Lateral Facing position CRS (carry-cot)
- G - ISO/L2: Right Lateral Facing position CRS (carry-cot)



ISO/F2X ⇒ B1

Mass group	ISOFIX size class	Fixture (CRF)
0 - up to 10 kg	F	ISO/L1
	G	ISO/L2
	E	ISO/R1
0+ - up to 13 kg	C	ISO/R3
	D	ISO/R2
	E	ISO/R1
I - 9 to 18 kg	A	ISO/F3
	B	ISO/
	B1	ISO/ F2X
	C	ISO/R3
	D	ISO/R2

Table 1 and 2 shall be included in the vehicle hand book, and Table 3, in case i-Size seating positions are defined by the vehicle manufacturer.

Table 1: Table of vehicle handbook information on child restraint systems
installation suitability for various seating positions

Mass Group	Seating position (or other site)				
	Front passenger	Rear outboard	Rear centre	Intermediate outboard	Intermediate centre
Group 0 up to 10 kg	X	U	X	U	X
Group 0+ up to 13 kg	X	U,L	X	U,L	X
Group I 9 to 18 kg	L	U,L	X	U,L	X
Group II 15 to 25 kg	L	U,L	X	U,L	X
Group III 22 to 36 kg	L	U,L	X	U,L	X

Key of letters to be inserted in the above table:

U = Suitable for "universal" category restraints approved for use in this mass group.

UF = Suitable for forward-facing "universal" category restraints approved for use in this mass group.

L = Suitable for particular child restraints given on attached list. These restraints may be of the "specific vehicle", "restricted" or "semi-universal" categories.

B = Built-in restraint approved for this mass group.

X = Seat position not suitable for children in this mass group.



Table 2: Table of vehicle handbook information on ISOFIX child restraint systems **installation suitability for various ISOFIX positions**

Mass Group	Size class	Fixture	Vehicle ISOFIX positions					
			Front passenger	Rear outboard	Rear centre	Intermediate outboard	Intermediate centre	Other sites
carrycot	F	ISO/L1		X				
	G	ISO/L2		X				
		(1)						
0 - up to 10 Kg	E	ISO/R1		X				
		(1)						
0+ - up to 13 kg	E	ISO/R1		IL				
	D	ISO/R2		X				
	C	ISO/R3		X				
		(1)						
I - 9 to 18 kg	D	ISO/R2		X				
	C	ISO/R3		X				
	B	ISO/F2		IUF				
	B1	ISO/F2X		IUF,IL				
	A	ISO/F3		IUF				
		(1)						
II - 15 to 25 kg		(1)		X				
III - 22 to 36 kg		(1)		X				

(1) = For the CRS which do not carry the ISO/XX size class identification (A to G), for the applicable mass group, the car manufacturer shall indicate the vehicle specific ISOFIX child restraint system(s) recommended for each position.

Key of letters to be inserted in the above table

IUF = Suitable for ISOFIX forward child restraints systems of universal category approved for use in the mass group

IL = Suitable for particular ISOFIX child restraint systems (CRS) given in the attached list. These ISOFIX CRS are those of the "specific vehicle", "restricted" or "semi-universal" categories.

X = ISOFIX position not suitable for ISOFIX child restraint systems in this mass group and/or this size class.

Table 1 and 2 shall be included in the vehicle hand book, and Table 3, in case i-Size seating positions are defined by the vehicle manufacturer.

Table 3: Table of vehicle handbook information on i-Size child restraint systems for installation in various seating positions

	Seating position							
	Front Passenger Outboard	Front Passenger Centre	Rear Outboard Left	Rear Outboard Right	Rear Centre	Intermediate Outboard Left	Intermediate Outboard Right	Intermediate Centre
i-Size Child Restraint Systems	X	X	i-UF	i-UF	X	i-U	i-U	X

Note: Orientation is normal driving direction; columns for seating positions not available in a vehicle can be deleted.

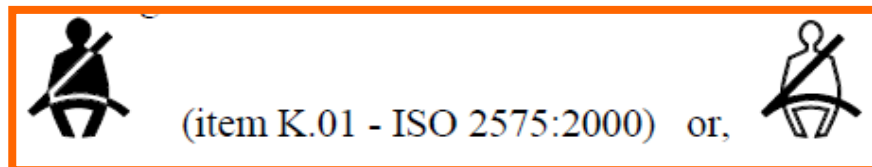
Key of letters to be inserted in the above table:		
i-U	=	Suitable for i-Size "universal" Child Restraint Systems forward and rearward facing.
i-UF	=	Suitable for forward-facing i-Size "universal" Child Restraint Systems only.
X	=	Seating position not suitable for i-Size "universal" Child Restraint Systems.

Safety-belt Reminder

Safety-belt reminder

1. Scope
2. Definitions
8. Requirements concerning the installation in the vehicle
 - 8.4. Safety-belt reminder equipment

Annex 18



2.41. **Safety-belt reminder:**

A system dedicated to alert the driver when the safety-belt isn't used

2.42. **Visual warning:**

Warning by visual signal

2.43. **Audible warning:**

Warning by sound signal

2.44. **First level warning:**

Visual warning activated when ignition switch is engaged and safety-belt isn't fastened by driver

2.45. **Second level warning:**

Visual and audible warning activated when a driver operates a vehicle without fastening the safety- belt

2.46. **Safety-belt is not fastened:**

The option of the manufacturer, either the driver safety-belt buckle is not engaged or the webbing length pulled out of the retractor is 100 mm or less

2.47. **Vehicle is in normal operation:**

The vehicle is in forward motion at the speed greater than 10 km/h

8.4.1.

The driver seating position of the **M1 category of vehicles**, shall be equipped with a safety-belt reminder satisfying the requirements of this Regulation.

Where the **vehicle manufacturer provides** a safety-belt reminder system on the driver seat in another category of vehicle, the safety-belt reminder system may be approved **according to this Regulation^{11/}**.

11/ While the current requirements for a safety-belt reminder is limited to the driver's seat of vehicles category M1, **it is understood that the scope of this Regulation will be extended** to vehicles of other categories and to other seating positions.

8.4.1.1.

Contracting Parties may allow deactivation of the safety-belt reminder provided that such deactivation satisfies to the requirements of paragraph

8.4.2.6.

(next page)

8.4.2.6.

The safety-belt reminder may be **designed to allow deactivation**.

8.4.2.6.1.

In the case a short term deactivation is provided, it shall be more difficult to deactivate the safety-belt reminder than buckling the safety-belt on and off. When the ignition is switched off for more than 30 minutes and switched on again, a short-term deactivated safety-belt reminder must reactivate.

8.4.2.6.2.

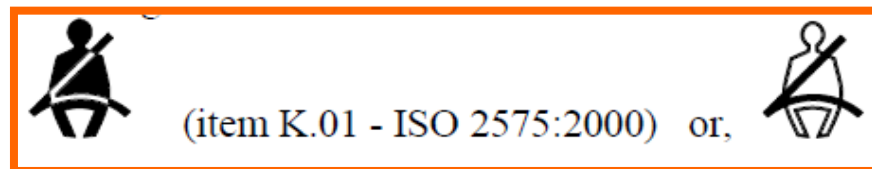
In the case that a facility for a long term deactivation is provided, it shall require a sequence of operations to deactivate, that are detailed only in the manufacturer's technical manual and/or which **requires the use of tools (mechanical, electrical, digital, etc..) that are not provided with the vehicle**.

Visual warning

8.4.2.1.1.

Visual warning shall be so located as to be **readily visible** and recognizable in the daylight by the driver and distinguishable from other alerts.

Where the visual signal warning employs **the color red**, it shall use a symbol in accordance with item 21 in table 1 of UN-R121.



8.4.2.1.2.

Visual warning shall be by continuous or intermittent signal.

Audible warning

8.4.2.1.3.

Audible warning shall be by **continuous or intermittent sound signal or by vocal information**. Where vocal information is employed, the manufacturer shall ensure that the alert uses the language(s) of the market into which the vehicle is sold. This audible warning may be constituted by more than one step.

8.4.2.1.4.

Audible warning shall be **easily recognized by the driver**.

First level warning

8.4.2.2.

First level warning shall be at least **a visual warning activated for 4 seconds** or longer when the driver safety-belt is not fastened and the ignition switch is engaged.

8.4.2.3.

The activation of the first level warning shall be **tested according to** the test procedure defined in **Annex 18**, paragraph 1.

Second level warning

8.4.2.4.

Second level warning shall be a **visual and audible signal activated for 30 seconds** or longer except for cases in which the warning stops for over 3 seconds when the safety-belt is not fastened, when the vehicle is in normal operation and when at least one of the following conditions (or any combination of these conditions), is fulfilled:

8.4.2.4.1.

Distance driven greater than the **distance threshold**. The threshold shall not exceed **500 m**. The distance the vehicle is not in normal operation shall be excluded.

8.4.2.4.2.

Speed greater than the **speed threshold**. The threshold shall not exceed **25 km/h**.

Second level warning

8.4.2.4.3.

Duration time (engine running) greater than the duration time threshold. The threshold **shall not exceed 60 seconds**. The first level warning duration time and the duration time the vehicle is not in normal operation shall be excluded.

8.4.2.5.

The activation of the second level warning shall be tested according to the test procedure defined in Annex 18, paragraph 2.

Annex 18 SAFETY-BELT REMINDER TESTS

1. The **first level warning** shall be tested according to the following conditions:

- (a) Safety-belt is not fastened;
- (b) Engine is stopped or idling
and the vehicle is not in forward or reverse motion;
- (c) Transmission is in neutral position;
- (d) Ignition switch is engaged.

2. **The second level warning** shall be tested according to the following conditions:

(a) Safety-belt is not fastened;

(b) Test vehicle driven with one or any combination of the conditions of paragraphs 2.1. to 2.3. of this Annex at the manufacturer's choice.

2.1. Accelerate the test vehicle to 25 -0/+10 km/h from a halt and continue on the same speed.

2.2. The test vehicle is driven forward at least 500m from a halt position.

2.3. The vehicle is tested when the vehicle is in normal operation for at least 60 seconds.

First & Second level warning

3. A system that the first level warning stops after a certain period of time, the second level warning shall be tested according to Paragraph 2. of this Annex after the first level warning has been deactivated.

A system that the **first level warning does not stop** after a certain period of time, the second level warning shall be tested according to Paragraph 2. of this Annex while the first level warning is activated.

Thank you for your attention