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Item 12 of the provisional agenda

UN Regulation No. 129 (Enhanced Child Restraint Systems)

Proposal for the 04 Series of Amendments to UN Regulation No. 129 (Enhanced Child Restraint Systems) *

Submitted by the expert from the Netherlands

The text reproduced below was prepared by the Ad Hoc Group on CRS, aiming to introduce definitions, requirements and a test procedure for lower tether anchorages. The modifications to the current text of the UN Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2023 as outlined in proposed programme budget for 2023 (A/77/6 (Sect. 20), table 20.6), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposal

Paragraph 2.12., amend to read:

"2.12. *"Anti-rotation device"*. Means a device intended to limit the rotation of the Enhanced Child Restraint System during a vehicle impact and consisting of:

- (a) A top-tether strap; or
- (b) A support-leg.

Meeting the requirements of this Regulation and fitted to an ISOFIX anchorage system and ISOFIX top tether anchorages or vehicle floor contact surface meeting the requirements of UN Regulation No. 14 or UN Regulation No. 145.

An "Anti-rotation device" for a "specific vehicle" Enhanced Child Restraint System may comprise a top tether, a support leg, **lower tether strap(s)** or, any other means capable of limiting the rotation.

Paragraph 2.14., amend to read:

"2.14. *"Tension relieving device"* means a system, which allows to release the device that adjusts and maintains the tension in the ISOFIX top tether strap **or in the lower tether strap(s).**"

Insert new paragraphs 2.63. to 2.63.6., to read:

"2.63. *"Lower tether anchorage (LTA)"* is an anchorage on the vehicle seat track, or on or close to the vehicle floor to which a lower tether bracket can be attached or is integrated. The lower tether bracket may or may not be part of the vehicle approval.

2.63.1. *"Lower tether"* is a type of anti-rotational device intended to restrict the rearward rotation of a rearward-facing ECRS.

2.63.2. *"Lower tether strap"* is a webbing strap (or equivalent) which extends from the back of an Enhanced Specific Vehicle Child Restraint System to the lower tether anchorage in the vehicle and which is equipped with an adjustment device, a tensioning-relieving device and a lower tether connector.

2.63.3. *"Lower tether connector"* means a device intended to be attached to a lower tether bracket.

2.63.4. *"Lower tether hook"* means a connector typically used to attach a lower tether strap to a lower tether bracket and which is the same and has the same dimensions as the ISOFIX top tether hook as defined in figure 3 of Annex 4 of this Regulation.

2.63.5. *"Lower tether bracket"* means the bracket that is attached to or integrated with the lower tether anchorage.

2.63.6 *"Generic lower tether bracket"* means the bracket provided by the ECRS manufacturer together with the ECRS, to be attached under the rail of the front seat to the hole defined as LTA, indicated by the vehicle manufacturer."

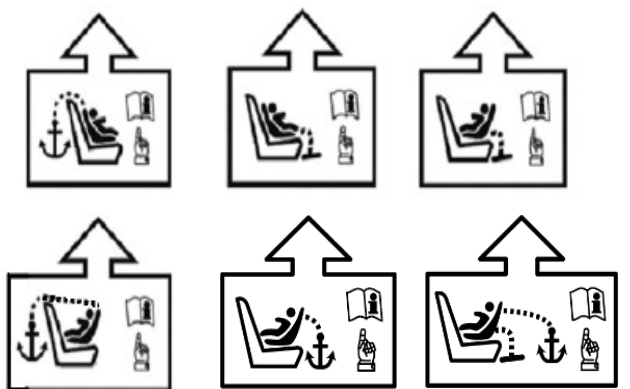
Paragraph 4.14., amend to read:

"4.14. Additional markings

The following information may be conveyed by pictograms and/or text. The marking shall indicate:

- ...
- (c) The position and if necessary, the routing of top tethers, **lower tethers**, or other means of limiting Enhanced Child Restraint System

rotation requiring action by the user, shall be indicated using one or **more** of the following symbols as appropriate:



Paragraph 6.3.4.1., amend to read:

- "6.3.4.1. Top tether connector
The top tether connector shall be ISOFIX top tether hook as shown in Figure 3(c), or similar devices that fit within the envelope given by Figure 3(c). **The same connector is also used as the lower tether hook (if applicable; see paragraph 6.3.6.).**"

Insert new paragraph 6.3.4.2.1., to read:

- "6.3.4.2.1. **The ISOFIX top tether straps shall fulfil the requirements specified in paragraphs 6.7.4.2. to 6.7.4.4.**"

Paragraphs 6.3.4.2.1 to 6.3.4.2.2.(former), renumber as paragraphs 6.3.4.2.2 to 6.3.4.2.3.

Paragraph 6.3.4.2.3., renumber as paragraph 6.3.2.4. and amend to read:

- "6.3.4.2.4. Dimensions
Engagement dimensions for ISOFIX top tether hooks / **lower tether hooks** are shown in Figure 3(c).

...

Figure 3(c)

ISOFIX top tether **or lower tether** connector (hook type) dimensions....."

Insert new paragraphs 6.3.6. to 6.3.8., to read:

- "6.3.6. **Specific vehicle belted Enhanced Child Restraint System lower tether strap specifications**
- 6.3.6.1. **The lower tether straps shall fulfil the requirements specified in paragraphs 6.7.4.2. to 6.7.4.4.**
- 6.3.6.2. **Lower tether strap length**
Enhanced Child Restraint System lower tether strap length shall be at least 900 mm including lower tether connector.
- 6.3.6.3. **Lower tether no-slack indicator**
The lower tether strap or the Enhanced Child Restraint System shall be equipped with a device that will indicate that all slack has been removed from the strap. The device may be part of an adjustment and tension relieving device.
- 6.3.6.4. **Lower tether Retractor**
An automatically locking retractor can be used to replace the provision for adjustment and release of the tension in the lower tether strap and the no

slack indicator. In this case the retractor shall fulfil the requirements specified in paragraph 6.7.3.2.

6.3.6.5. Dimensions

Engagement dimensions for lower tether connectors (hook type) are shown in paragraph 6.3.4.2.4., Figure 3 (c).

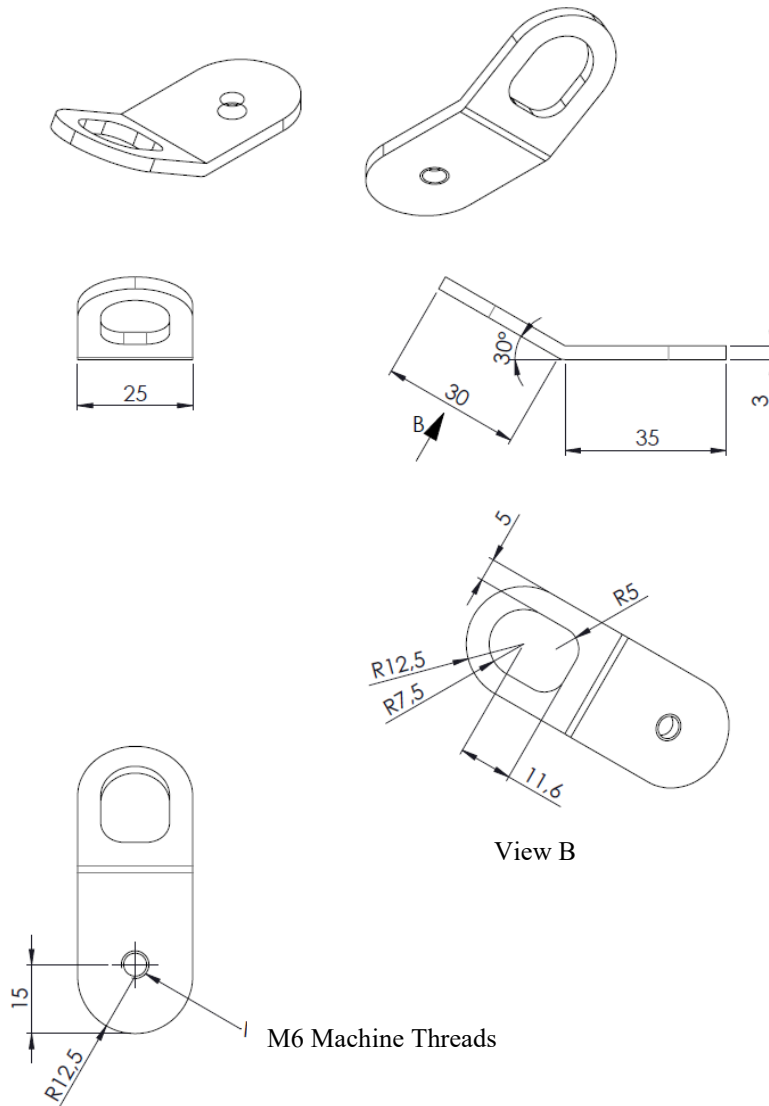
6.3.7. Generic lower tether bracket and mounting material specifications (for applications where the vehicle manufacturer provides the generic anchorages).

6.3.7.1. The generic lower tether brackets supplied by the manufacturer of the child restraint, shall be accompanied by mounting instructions including required torque application and a note that this shall be done by qualified personnel only.

6.3.7.2. Dimensions and material specifications bracket:

- (a) The generic lower tether bracket shall have dimensions according to Figure 3 (f);
- (b) The outer edges of the lower tether bracket shall be at least blunted.

**Figure 3 (f)
Generic Lower Tether Bracket**



6.3.7.3. Mounting material bracket the mounting material consists of:

- (a) M6x8 flange buttonhead hexagon socket-cap screw see figure 3 (g);
- (b) M6 washer; see figure 3 (h);
- (c) M6 -8 shoulder washer; see figure 3 (i).

Figure 3 (g)
M6x8 Flange Buttonhead Hexagon Socketcap Screw (ISO 7380-2)

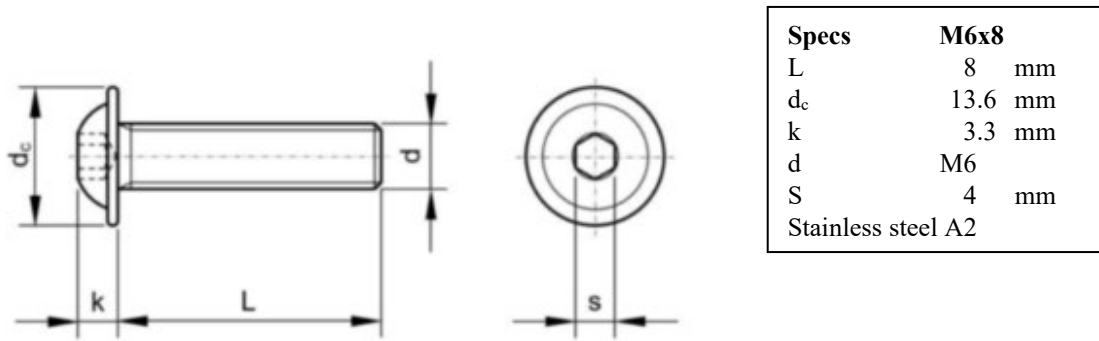


Figure 3 (h)
M6 washer

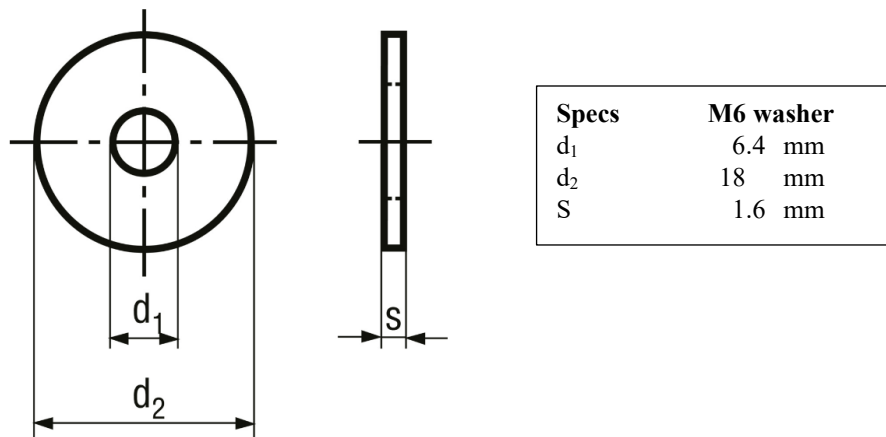
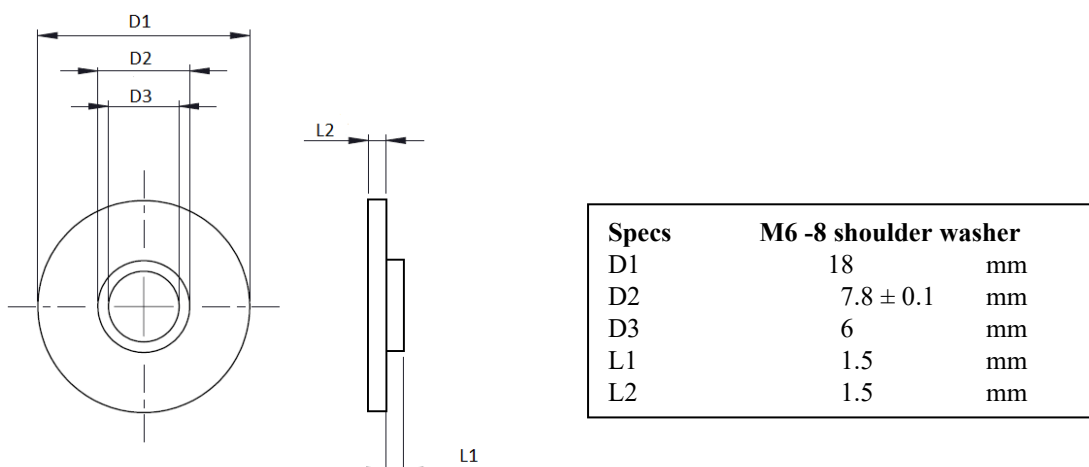


Figure 3 (i)
M6 -8 shoulder washer



6.3.8. Strength test generic lower tether bracket

6.3.8.1. Force application

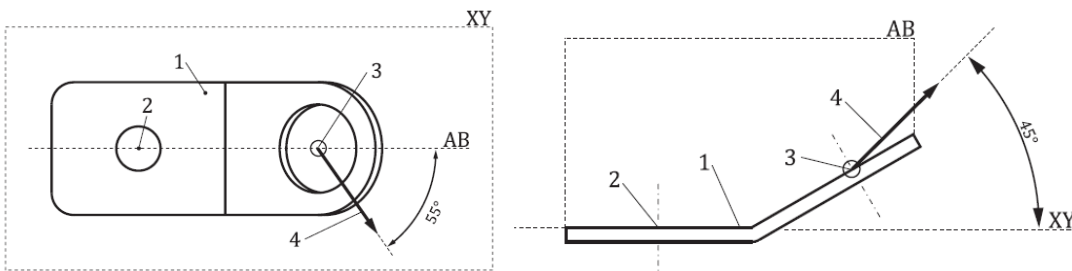
Apply a force of 2,500 N to each generic lower tether bracket, by means of a representative lower tether strap 38 mm ± 3 mm wide that is fitted at one end with suitable hardware for applying the force and at the other end with a lower tether hook for the attachment to the lower tether bracket. For anchorages designed to be used for two adjacent CRS positions, or in case of a single LTA, the force shall be 5,000 N.

6.3.8.2. Force direction

Two tests are performed; See figure 3 (j) and 3 (k)

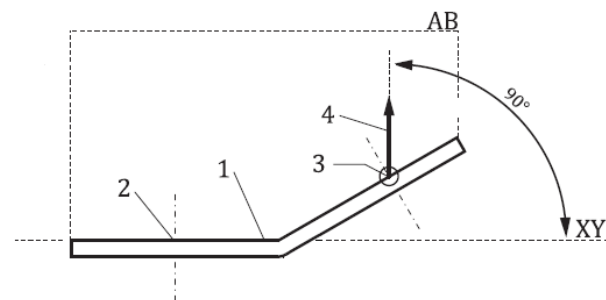
- (a) the force shall be applied in a direction of $55^\circ \pm 5^\circ$ against plane AB, measured in a plane parallel to the rigid surface XY, and a direction of $45^\circ \pm 5^\circ$ against the rigid surface XY, measured in plane AB; see figure 3 (j);
- (b) the force shall be applied in a direction perpendicular ($90 \pm 5^\circ$) to the rigid surface XY.

**Figure 3 (j)
Test 1**



- Key:**
- 1. generic lower tether bracket (not actual design).
 - 2. anchorage point to vehicle.
 - 3. anchorage point lower tether hook.
 - 4. test 1 - force direction.

**Figure 3 (k)
Test 2**



- Key:**
- 1. generic lower tether bracket (not actual design).
 - 2. anchorage point to vehicle.
 - 3. anchorage point lower tether hook.
 - 4. test 2 – force direction.

6.3.8.3. the load shall be attained within 30 s, and shall be maintained for a minimum of 0.2 s.

6.3.8.4. When testing in accordance with paragraphs 6.3.8.1. to 6.3.8.3., excursion is not limited, and permanent deformation of the generic lower tether

bracket with respect to the rigid structure it is attached to is acceptable provided that the anchorage does not break or separate from the rigid structure."

Paragraph 6.6.4.1.2.1., amend to read:

"6.6.4.1.2.1. Head excursion: no part of the head of the dummy shall pass beyond the planes

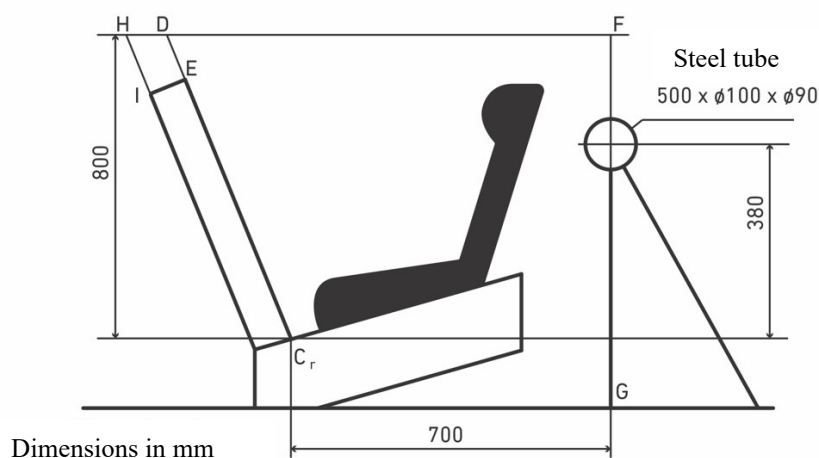
...

Where a test is conducted with paragraphs 6.6.4.1.6.1.1. or paragraph 6.6.4.1.6.1.2. or paragraph 6.6.4.1.8.2. above, only the second test results without 100 mm diameter bar will be considered. **A tolerance of +10 per cent shall be applicable to the head excursion value distance between Cr point and plane DF and the dummy should not pass beyond the plane HI, parallel to plane DE.**"

Figure 5, amend to read:

"Figure 5

Test Arrangement for a Rearward-Facing Device, Not Supported by the Dashboard



Paragraph 6.7.4.3.2., amend to read:

"6.7.4.3.2. In addition, the breaking load shall be not less than 3.6 kN for the restraints of ~~i-Size~~ Enhanced Child Restraint Systems."

Insert new paragraphs 16.13. to 16.15., to read:

"16.13. As from [1 September 2025], Contracting Parties applying this Regulation shall not be obliged to accept UN type-approvals to the preceding series of amendments, first issued after [1 September 2025].

16.14. As from [1 September 2027], Contracting Parties applying this Regulation shall not be obliged to accept type-approvals issued to the preceding series of amendments to this Regulation.

16.15. Notwithstanding paragraphs 16.13 and 16.14, Contracting Parties applying the UN Regulation shall continue to accept, and grant extensions to, UN type-approvals issued according to the preceding series of amendments to the UN Regulation, for the Enhanced Child Restraint Systems which are not affected by the changes introduced by the 04 series of amendments."

Annex 2, amend to read:

"Annex 2

1. Arrangements of the Approval Mark

..."

Replace "03" by "04" series of amendments throughout the text.

Annex 6, Appendix 2, amend to read:

"Annex 6 - Appendix 2

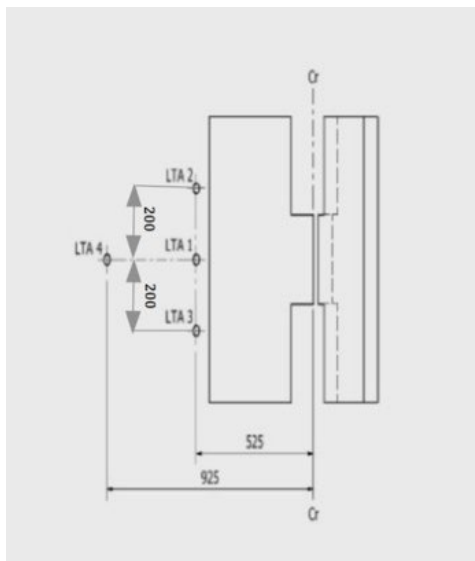
Arrangement and Use of Anchorages on the Test Trolley

1. The anchorages shall be positioned as shown in the Figure below.
2. Enhanced Child Restraint Systems in the i-Size universal, specific and restricted categories shall use the following anchorage points: H₁ and H₂.
3. For testing of Enhanced Child Restraint Systems with top tether, the anchorage G₁ or G₂ shall be used.
4. In the case of Enhanced Child Restraint Systems utilising a support-leg, the Technical Service shall select the anchorages to be used according to paragraph 3. above and with the support-leg adjusted as specified in paragraph 7.1.3.6.3. of this Regulation.
5. **For the testing of Enhanced Child Restraint Systems with lower tether(s), the floor shall be placed in its lowest position. LTA 4 is to be used in case the top tether anchorage from the seat in front is used. Otherwise LTA 2 and LTA 3; see figure 5. Generic lower tether brackets to be used for the dynamic test in case they are provided by the CRS manufacturer.**
56. The structure carrying the anchorages shall be rigid. The upper anchorages shall not be displaced by more than 0.2 mm in the longitudinal direction when a load of 980 N is applied to them in that direction. The trolley shall be so constructed that no permanent deformation shall occur in the parts bearing the anchorages during the test."

Annex 6, Appendix 2, figure 5, amend to read:

"Figure 5

Top View – Bench with Lower strap-Tether Anchorages
(LTA 1, LTA 2, LTA 3 and LTA 4)



Dimensions in mm; Tolerance general: +/- 2 mm."

Annex 24, amend to read:

"Annex 24

Additional Attachment points Required for Securing Rearward Facing Enhanced Child Restraint System, of the Category Specific Vehicle Belted, to Motor Vehicles

1. This annex applies only to the additional anchorages for attaching Enhanced Child Restraint in the Specific vehicle Belted category or to bars or other special items used to secure child-restraining devices to the bodywork, whether or not they make use of UN Regulation No. 14 or UN Regulation No. 145, on ISOFIX anchorage systems, ISOFIX top tether anchorages, **lower tether anchorages** and i-Size seating positions.
2. ~~The anchorages shall be determined by the manufacturer of the child restraint system and details shall be submitted for approval to the Technical Service conducting the tests.~~

The manufacturer of the child restraint system shall describe how the child restraint system attaches to different vehicles and shall submit this to the Technical Service conducting the tests for its assessment.

The manufacturer of the child restraint system shall consult the information supplied by the vehicle manufacturer, as supplied according to UN Regulation No. 16, Annex 17, Appendix 3 and/or the vehicle handbook, e.g. with regard to allowing the use of additional anchorages and a support leg before inclusion of the vehicle type in the vehicle list.

The Technical Services may consider information obtained from the vehicle manufacturer.

3. The manufacturer of the child restraint shall provide the necessary parts for fitting the ~~anchorages~~ **generic lower tether brackets (if any)** and a special plan for each vehicle showing their exact location.
4. ~~The child restraint manufacturer shall indicate if the anchorages required for attaching the restraint to the vehicle structure are in accordance with the position and strength requirements of paragraph 3. onwards in the recommendation given to Governments intending to adopt specific requirements relating to anchorages for child restraints used in passenger cars."~~

Annex 27, amend to read:

"Annex 27

List of Minimum Contents for The Test Reports included in the Type Approval Application

This annex contains a list of the minimum content and information that shall be provided in the test reports that are included in the Type Approval Application. How this information is presented in the Type Approval Application shall be the choice of the Technical Service, i.e. the layout, format, order of the information may be changed.

ECRS Description

	ECRS Category (3.2.2.)	Stature Range	Orientation	Attachment
	Category 1			
	Category 2			
	Category 3			
			
	...			
6.3.3.	<i>ISOFIX attachments</i>			
6.3.3.2.	Dimensions			
6.3.3.3.	Partial latching indication			
6.3.3.3.	The ISOFIX Enhanced Child Restraint System shall incorporate means by which there is a clear indication that both of the ISOFIX attachments are completely latched with the corresponding ISOFIX lower anchorages.			latch indicator [Y/N]
6.3.3.3.	The indication means may be audible,			check [Y/N]
6.3.3.3.	tactile or			check [Y/N]
6.3.3.3.	visual or			check [Y/N]
6.3.3.3.	a combination of two or more.			check [Y/N]
6.3.3.3.	In case of visual indication, it shall be detectable under all normal lighting conditions.			check [Y/N]

6.3.4.	ISOFIX Enhanced Child Restraint System top tether strap specifications		
6.3.4.1.	Top tether connector		
6.3.4.1.	The top tether connector shall be ISOFIX top tether hook as shown in Figure 3(c), or similar devices that fit within the envelope given by Figure 3(c). Figure 3(c): ISOFIX top tether or lower tether connector (hook type) dimensions		[Y/N]
6.3.4.2.	ISOFIX top tether strap features		
6.3.4.2.	The ISOFIX top tether strap shall be supported by webbing (or its equivalent), having a provision for adjustment and release of tension.	check	[Y/N]
6.3.4.2.1.	The ISOFIX top tether straps shall fulfil the requirements specified in paragraphs 6.7.4.2. to 6.7.4.4.		[pass/fail]
6.3.4.2.2.	ISOFIX Top tether strap length ISOFIX Enhanced Child Restraint System top tether strap length shall be at least 2,000 mm.	TT strap length [mm]	
6.3.4.2.3.	No-slack indicator The ISOFIX top tether strap or the ISOFIX Enhanced Child Restraint System shall be equipped with a device that will indicate that all slack has been removed from the strap. The device may be part of an adjustment and tension relieving device.	check	[Y/N]
6.3.4.2.4.	Dimensions Engagement dimensions for ISOFIX top tether hooks are shown in Figure 3(c).	check	

Insert new paragraphs 6.3.6. to 6.3.8., to read:

6.3.6.	<i>Lower tether strap specifications</i>		
6.3.6.1.	The lower tether straps shall fulfil the requirements specified in paragraphs 6.7.4.2. to 6.7.4.4.		[pass/fail]
6.3.6.2.	Lower tether strap length: Enhanced Child Restraint System lower tether strap length shall be at least 900 mm including lower tether connector.	LT strap length [mm]	
6.3.6.3.	Lower Tether No-slack indicator: The lower tether strap or the Enhanced Child Restraint System shall be equipped with a device that will indicate that all slack has been removed from the strap. The device may be part of an adjustment and tension relieving device.	check	[Y/N]
6.3.6.4.	Lower tether Retractor: An automatically locking retractor can be used to replace the provision for adjustment and release of the tension in the lower tether strap and the no slack indicator.	check	[Y/N]

	In this case the retractor shall fulfil the requirements specified in paragraph 6.7.3.2.		[pass/ fail]
6.3.6.5.	Dimensions Engagement dimensions for lower tether hooks are shown in paragraph 6.3.4.2.4., Figure 3(c).	check	
<hr/>			
6.3.7.	<i>Generic lower tether bracket specifications</i>		
<hr/>			
6.3.7.1.	The generic lower tether brackets supplied by the manufacturer of the child restraint, shall be accompanied by mounting instructions including required torque application and a note that this shall be done by qualified personnel only.	Torque [Nm]	[pass/ fail] ...
6.3.7.2.	Dimensions and material specifications bracket:		
	(a) the generic lower tether bracket shall have dimensions according to Figure 3 (f);	check	
	(b) the outer edges of the lower tether bracket shall be at least blunted.	check	
6.3.7.3.	mounting material bracket the mounting material consists of:		
	(a) M6x8 flange buttonhead hexagon socketcap screw; see figure 3 (g);	check	
	(b) M6 washer; see figure 3 (h);	check	
	(c) M6 -8 shoulder washer; see figure 3 (i).	check	
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6.3.8.	<i>Generic lower tether bracket strength test</i>		
<hr/>			
6.3.8.1.	Force application Apply a force of 2,500 N to each generic lower tether bracket, by means of a representative lower tether strap 38 mm ± 3 mm wide that is fitted at one end with suitable hardware for applying the force and at the other end with a lower tether hook for the attachment to the lower tether bracket. For anchorages designed to be used for two adjacent CRS positions, or in case of a single LTA, the force shall be 5,000 N.	Measured force [N]	
6.3.8.2.	Force direction Two tests are performed; See figure 3 (j) and 3 (k):	check	[pass/ fail]
	(a) The force shall be applied in a direction of 55° ± 5° against plane AB, measured in a plane parallel to the rigid surface XY, and a direction of 45° ± 5° against the rigid surface XY, measured in plane AB; see figure 3 (j);		

(b) The force shall be applied in a direction perpendicular ($90 \pm 5^\circ$) to the rigid surface XY.

6.3.8.3.	The load shall be attained within 30 s, and shall be maintained for a minimum of 0.2 s.	check	[pass/fail]
6.3.8.4.	When testing in accordance with paragraphs 6.3.8.1. to 6.3.8.3., excursion is not limited, and permanent deformation of the generic lower tether bracket with respect to the rigid structure it is attached to is acceptable provided that the anchorage does not break or separate from the rigid structure.	check	[pass/fail]

...

* The measurement procedures shall follow those of ISO 6487 with SAE J211 sign convention."

II. Justification

1. This proposal, together with simultaneous proposals updating UN Regulation No. 16 and UN Regulation No. 145 aims at:

- (a) Introducing definitions and requirements for lower tether anchorages;
- (b) Only facilitating attachment by means of the ISOFIX top tether connector;
- (c) Facilitating four options: anchorage provided in the vehicle, anchorage and bracket provided in the vehicle (including integral solution whereby the connector can be directly hooked to the seat rail) and top tether anchorage of the front seat used as LTA, at the discretion of the vehicle manufacturer;
- (d) not allowing other constructions whereby straps around vehicle seats, straps around seat rails, etc. are used.

2. See GRSP-71-19, distributed at the seventy-first session of the Working Party on Passive Safety (GRSP) for background information.

3. This proposal does not mandate the use of LTAs; but if LTAs are used as an anti-rotation device, the requirements shall be unambiguous, and the user shall be sufficiently informed.

4. The use of rearward-facing child restraints of age groups >1.5 is recommended by the medical society (age groups 0, 1 and 1.5 are already covered by i-Size). The most common and dangerous car accidents are frontal collisions. They represent the accidents where the highest speeds and the greatest forces are at play. When a child is forward-facing and a frontal collision occurs, the child is flung forward in the seat, being caught by the harness. This puts stress on the neck, the spine and the internal organs. Rearward facing seats counteract this forward movement, the child would be thrown back into the car seat. This distributes the force more evenly across their backs and causes far less stress on "bendy" parts of the body. To prevent rotation during the rebound phase, LTAs have become a common means of "anti-rotation device".

5. By making use of an anti-rotation device with lower tethers straps the tests without lower tether straps in use, should be carried out when there is no mechanism or audible and visual warning system. Since the lower tether straps are relevant to stop the rotation in a rear impact, the relevant plane DF can be passed with an additional 10 per cent, in the same way as defined for forward facing tests with plane AB. For the passage of plane DE, a new plane HI parallel to plane DE is defined, to make the assessment well defined. This is in line with the 'misuse' test without top tether where the excursion limit is also increased by 10 per cent.

6. Since there are vehicles on the market already equipped with LTAs not meeting the requirements of the Regulation or approved as such, there is a need to introduce transitional provisions and therefore a new series of Amendments.
