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## Economic Commission for Europe

### Inland Transport Committee

### World Forum for Harmonization of Vehicle Regulations

#### Working Party on Passive Safety

#### Fiftieth session

Geneva, 6–9 December 2011

Item **X** of the provisional agenda

**Regulation No. 16 (Safety-belts)**

## **Proposal for Supplement 2 to the 06 series of amendments**

### **Submitted by the experts from the GRSP Informal Group on CRS\***

The text reproduced below was prepared by the experts from OICA to introduce requirements for “i-Size” Child Restraint Systems according to the new ECE Regulation No. 12X on Child Restraint Systems. The modifications to the current text of the Regulation are marked in bold for new or strikethrough for deleted characters.

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\* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106 and ECE/TRANS/2010/8, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

## I. Proposal

*Title on front page amend to read:*

"II. VEHICLES EQUIPPED WITH SAFETY-BELTS, SAFETY-BELT REMINDER, RESTRAINT SYSTEMS, CHILD RESTRAINT SYSTEMS ~~AND~~, ISOFIX CHILD RESTRAINT SYSTEMS ~~AND I-SIZE CHILD RESTRAINT SYSTEMS~~"

*Title on second page amend to read:*

"II. VEHICLES EQUIPPED WITH SAFETY-BELTS, SAFETY-BELT REMINDER, RESTRAINT SYSTEMS, CHILD RESTRAINT SYSTEMS ~~AND~~, ISOFIX CHILD RESTRAINT SYSTEMS ~~AND I-SIZE CHILD RESTRAINT SYSTEMS~~"

*Contents / Annexes add a new Table 3 to Appendix 3 of Annex 17:*

**"Table 3 - Table of vehicle handbook information on i-Size child restraint systems installation suitability for various seating positions"**

*Add a new paragraph 1.6.:*

**"1.6 At the request of the manufacturer, it also applies to the installation of i-Size child restraint systems, if any i-Size seating positions are defined by the vehicle manufacturer."**

*Paragraph 2.10. amendment to read:*

"2.10. "Child restraint" means a safety device as defined in Regulation No. 44 ~~or Regulation No. [12X]~~."

*Paragraph 2.31. add new sub-items:*

**"(f) or an i-Size child restraint system as defined in Regulation No. [12X],  
(g) or a specific vehicle ISOFIX child restraint system as defined in Regulation No. [12X]."**

*Paragraph 2.34. amendment to read:*

"2.34. "Anti-rotation device"

- (a) An anti-rotation device for an ISOFIX universal child restraint system consists of the ISOFIX top-tether,
- (b) An anti-rotation device for an ISOFIX semi-universal child restraint system consists of a top tether, the vehicle dashboard or a support leg intended to limit the rotation of the restraint during a frontal impact,
- (c) **An anti-rotation device for an i-Size child restraint system consists of either a top tether or a support leg intended to limit the rotation of the restraint during a frontal impact.**
- (d) For ISOFIX, **i-Size**, universal and semi-universal, child restraint systems the vehicle seat itself does not constitute an anti-rotation device."

*Paragraph 2.38. amendment to read:*

"2.38. "Child restraint fixture" (CRF) means a fixture according to one out of the ~~seven~~**eight** ISOFIX size classes defined in ..."

*Add a new paragraph 2.39.:*

"**2.39. "i-Size support leg installation assessment volume"** means a volume, which ensures the dimensional and geometrical compatibility between the support leg of an i-Size child restraint system and an i-Size seating position of a vehicle. "

*Add a new paragraph 2.40.:*

"**2.40. "i-Size seating position"** means a seating position, if any defined by the vehicle manufacturer, which is designed to accommodate an i-Size child restraint system, as defined in Regulation No. [12X], and fulfils the requirements defined in this Regulation."

*Renumber paragraphs 2.39.to 2.45. in 2.41. to 2.47.:*

- "~~2.39~~**41.** "Safety-belt reminder" ...
- "~~2.40~~**42.** "Visual warning" ...
- "~~2.41~~**43.** "Audible warning" ...
- "~~2.42~~**44.** "First level warning" ...
- "~~2.43~~**45.** "Second level warning" ...
- "~~2.44~~**46.** "Safety-belt is not fastened" ...
- "~~2.45~~**47.** "Vehicle is in normal operation" ..."

*Paragraph 8.2.1. amendment to read:*

"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 child restraint systems supported by a vehicle floor contact surface** conforming to the specifications of Regulation No. 14, such as the design and dimensional characteristics, the number of anchorages, and the strength requirements."

*Paragraph 8.2.2. amendment to read:*

"8.2.2. The safety-belts, restraint systems, **and** child restraint systems ~~and ISOFIX child restraint systems~~ recommended by the manufacturer according to tables 1 ~~and 2~~ **to 3** of Annex 17 – Appendix 3, 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:"

*Paragraph 8.2.2.3. amendment to read:*

"8.2.2.3. The risk of the strap deteriorating through contact with sharp parts of the vehicle or seat structure, ~~and~~ **and** child restraint systems ~~and ISOFIX child restraint systems~~ recommended by the manufacturer according to tables 1 ~~and 2~~ **to 3** of Annex 17 – Appendix 3, is reduced to a minimum."

*Add a new paragraph 8.3.6.:*

**"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.**

**The support leg installation assessment volume is characterized as follows (see also annex 17, appendix 2, figure 8 and 9 of this Regulation):**

**Lateral limitation: By two planes parallel to and 100mm apart from the median longitudinal plane of the child restraint fixture installed in the respective seating position; and**

**Forward limitation:**

**By a plane perpendicular to the plane given by the child restraint fixture bottom surface and perpendicular to the median longitudinal plane of the child restraint fixture, 695mm apart from the plane passing through the centerlines of the ISOFIX lower anchorages and being perpendicular to the CRF bottom surface; and**

**Rearward limitation:**

**- Above the level of the bottom surface of the child restraint fixture by the front surface of the child restraint fixture, and**

**- Below the level of the bottom surface of the child restraint fixture by a plane perpendicular to the plane given by the child restraint fixture bottom surface and perpendicular to the median longitudinal plane of the child restraint fixture, 585mm apart from the plane passing through the centerlines of the ISOFIX lower anchorages and being perpendicular to the CRF bottom surface; and**

**Height limitation:**

**- Above the level of the bottom surface of the child restraint fixture by a plane which is parallel to the child restraint bottom surface and 85mm above this surface, and**

**- below the level of the bottom surface of the child restraint fixture by the upper surface of the vehicle floor (incl. trim, carpet, foam, etc.).**

**The pitch angle used for the geometrical assessment above shall be as measured in 5.2.3.4. of Regulation No. 14.**

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

**Compliance with this requirement can be proven by a physical test or computer simulation or representative drawings."**

*Headline of Annex 17 amendment to read:*

**"REQUIREMENTS FOR THE INSTALLATION OF SAFETY-BELTS AND RESTRAINT SYSTEMS FOR ADULT OCCUPANTS OF POWER-DRIVEN VEHICLES ON FORWARD FACING SEATS, ~~AND~~ FOR THE INSTALLATION OF ISOFIX CHILD RESTRAINT SYSTEMS **AND I-SIZE CHILD RESTRAINT SYSTEMS"****

*Paragraph 1.1. of Annex 17 amendment to read:*

"1.1. The vehicle manufacturer shall include in the vehicle handbook advice on the suitability of each passenger seating 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.

For each forward-facing passenger seating position, and for each ISOFIX position, the vehicle manufacturer shall either:

- (a) Indicate that the seating position is suitable for child restraints of the "universal" category (see paragraph 1.2. below);
- (b) Indicate if the ISOFIX position is suitable for ISOFIX child restraint systems of the "universal" category (see paragraph 1.2. below);
- (c) Provide a list of child restraint systems of the "semi-universal", "restricted" or "vehicle-specific" categories, suitable for that vehicle seating position, indicating the mass group(s) for which the restraints are intended;
- (d) Provide a list of ISOFIX child restraint systems of the "semi-universal", "restricted" or "vehicle specific" categories, suitable for that vehicle ISOFIX position, indicating the mass group and the ISOFIX size class for which the ISOFIX child restraints are intended;
- (e) Provide a built-in child restraint system, indicating the mass group(s) for which the restraint is intended and the corresponding configuration(s);
- (f) Provide any combination of (a), (b), (c), (d), (e);
- (g) Indicate the mass group(s) of the children which shall not be carried in that seating position.

**The vehicle manufacturer shall identify within the handbook each seating position which is also suitable for the accommodation of an i-Size child restraint system (see paragraph 1.3 below).**

If a seating position is only suitable for use with forward-facing child restraint systems, this shall be indicated.

Tables in a suitable format for the above information are given in Appendix 3 to this annex."

*Paragraph 1.2. of Annex 17 amendment to read:*

"... seating position..."

*Add a new paragraph 1.3. in Annex 17:*

**"1.3. An i-Size child restraint means a child restraint approved to the i-Size category of Regulation No. [12X]. Seating positions, which are indicated by the vehicle manufacturer as being suitable for the installation of i-Size child restraints systems shall comply with the provisions of Appendix 2 to this annex. Where applicable any restriction on the simultaneous use on adjacent positions of ISOFIX child restraint systems or i-Size child restraint systems and/or between ISOFIX positions, i-Size positions and adult seating positions shall be reported in the table 2 of Appendix 3 to this annex."**

*Annex 17- Appendix 2 amendment to read:*

"PROVISIONS CONCERNING THE INSTALLATION OF FORWARDS-FACING AND REARWARD-FACING ISOFIX CHILD RESTRAINT SYSTEMS OF UNIVERSAL AND SEMI-UNIVERSAL CATEGORIES INSTALLED ON ISOFIX **OR I-SIZE** POSITIONS

...

1.1. The test procedure and the requirements in this appendix shall be used to determine the suitability of ISOFIX positions for the installation of ISOFIX child restraint systems of universal and semi-universal categories, **as well as to determine the suitability of i-Size seating positions for installation of i-Size child restraint systems.**

1.2. The tests may be carried out in the vehicle or in a representative part of the vehicle.

**For i-Size seating positions, compliance with the i-Size support leg installation requirements may be assessed by a physical test, computer simulation or representative drawings.**

2. Test procedure

For any ISOFIX position in the vehicle, as indicated by the ~~car~~ vehicle manufacturer, in table 2 of Appendix 3, **as well as for any i-Size seating position if any, as indicated by the vehicle manufacturer in table 3 of Appendix 3**, it has to be checked that it is possible to accommodate the corresponding child restraint fixture(s) (CRF) **and in case of an i-Size seating position additionally the i-Size support leg installation assessment volume:**

2.1. When checking a CRF, **with or without i-Size support leg installation assessment volume**, on a seat, this seat may be adjusted longitudinally to its rearmost position and in its lowest position.

2.2. Adjust the seat-back angle to the manufacturer's design position and the head restraint in the lowest and rearmost position. In the absence of any specification an angle of the seat-back corresponding to a torso angle of 25° from the vertical, or the nearest fixed position of the seat-back, shall be used.

When checking a CRF, **with or without i-Size support leg installation assessment volume**, on a rear seat, the vehicle seat located in front of this rear seat may be adjusted longitudinally forward but not further than the mid position between its rearmost and foremost positions. The seat backrest angle may also be adjusted, but not to a more upright angle than corresponding to a torso angle of 15°.

...

2.4. Place the CRF, **with or without i-Size support leg installation assessment volume**, on the ISOFIX **or i-Size** position.

...

2.6. Attach the CRF, **with or without i-Size support leg installation assessment volume**, to the ISOFIX anchorages system.

...

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 possible to move in and out of the ISOFIX **and/or i-Size** position under these conditions.

3.1. It has to be possible to accommodate the CRF(s), **with or without i-Size support leg installation assessment volume**, without interference with the vehicle interior. The CRF base shall have a pitch angle of  $15^\circ \pm 10^\circ$ , above the horizontal plane passing through the ISOFIX anchorages system.

...

3.3 Should the above requirements not be met with the adjustments indicated in paragraph 2. above, the seats, the seat-backs, the head restraints may be adjusted to alternative positions designated by the manufacturer for normal use following which the above installation procedure shall be repeated and the requirements verified and met. These alternative positions shall be included as information in table 2 **and/or 3** given in Appendix 3 to this annex. **Passenger seats in front of i-Size seating positions may be also displaced to a position more forward than a normal position of use. In such cases the vehicle manufacturer shall provide information in the vehicle handbook, that the respective passenger seat shall not be occupied in such positions of displacement.**

3.4 Should the above requirements not be fulfilled when some removable interior fittings were present, such fittings may be removed and then requirements of paragraph 3. have to be verified again and fulfilled. In such a case corresponding information shall be included in table 2 **and/or 3** of Appendix 3 of this annex.

..."

*Key of Figure 1 to 7 of Annex 17- Appendix 2 amendment to read:*

"Key

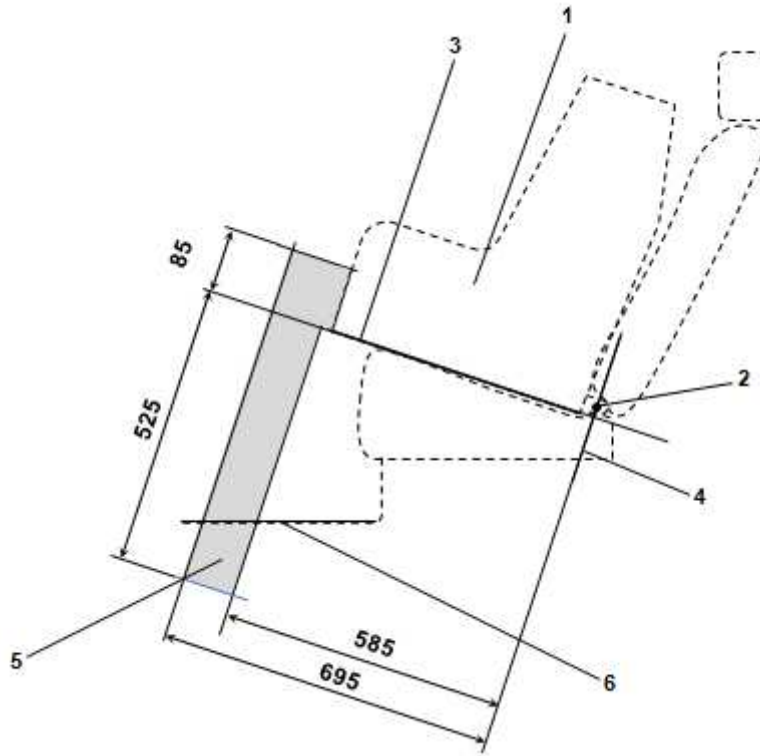
...

2 Dashed line marks area where a support leg, or similar, **of a specific vehicle CRS** is allowed to protrude

..."

Add new Figures 8 and 9, incl. key to Annex 17- Appendix 2:

"



**Key:**

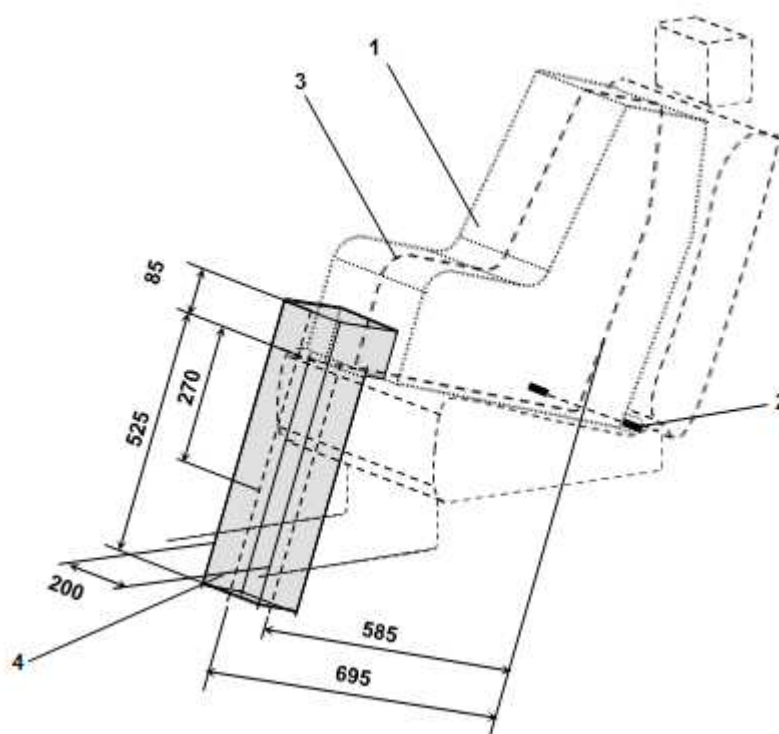
- 1 Child Restraint Fixture (CRF)
- 2 ISOFIX low anchorages bar
- 3 Plane formed by the bottom surface of the CRF when installed in the designated seating position
- 4 Plane passing through the lower anchorage bar and oriented perpendicular to the median longitudinal plane of the CRF and perpendicular to the plane formed by the bottom surface of the CRF when installed in the designated seating position
- 5 i-Size support leg installation assessment volume representing the geometrical boundaries for an i-Size ISOFIX child restraint system support leg.
- 6 Vehicle floor

**Notes:**

1. Drawing not to scale.

**Figure 8 -** Side view of the i-Size support leg installation assessment volume for compatibility assessment of i-Size seating positions with support legs of i-Size child restraint systems





**Key:**

- 1 Child Restraint Fixture (CRF)
- 2 ISOFIX low anchorages bar
- 3 Median longitudinal plane of the CRF
- 4 i-Size support leg installation assessment volume

**Notes:**

1. Drawing not to scale.

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

"

Add a new Table 3 to Annex 17- Appendix 3:

"

**Table 3**

**TABLE OF VEHICLE HANDBOOK INFORMATION ON i-Size CHILD RESTRAINT SYSTEMS INSTALLATION SUITABILITY FOR 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
<b>i-Size Child Restraint Systems</b>								

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. "

## II. Justification

1. The proposed amendments of this document, together with the draft amendments to ECE R14 (ECE/TRANS/WP.29/GRSP/2011/XX), introduce vehicle related requirements connected to the new ECE draft Regulation on child restraint systems (ECE/TRANS/WP.29/GRSP/2011/XX), especially i-Size child restraint systems. Furthermore, they align the definitions for child restraint systems with the new CRS draft regulation.

2. In detail, the proposed amendments of this document shall ensure geometrical compatibility of i-Size CRS, characterized by the F2X and R2 envelope, as well as the i-Size support leg installation assessment volume. Furthermore, the amendments describe, how the vehicle manufacturer has to inform the customer with regard to i-Size seating positions.