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## **Proposal for amendment of document ECE/TRANS/WP.29/GRSP/2014/10**

Draft new Regulation on uniform provisions concerning the approval of passenger cars with regard to the protection of the occupants in the event of a frontal collision with focus on the restraint system

### **Submitted by the expert from France as Chair of the Informal Working Group on Frontal Impact \***

The text reproduced below was prepared by the expert from France in response to the request of GRSP (ECE/TRANS/WP29/GRSP/54, para. 23) on developing a separate new Regulation on frontal impact focusing on requirements for restraint systems. This text introduces all the modifications needed in UN Draft New Regulation No. 13x that were suggested by the experts of the informal working group on Frontal Impact (IWG FI). The modifications to the text of the Draft UN Regulation are marked in bold for new characters. This document amends ECE/TRANS/WP.29/GRSP/2014/10.

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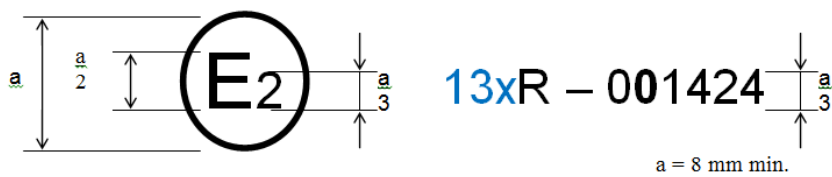
\* In accordance with the programme of work of the Inland Transport Committee for 2012–2016 (ECE/TRANS/224, para. 94 and ECE/TRANS/2012/12, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

## I. Proposal

### Annex 2- ARRANGEMENTS OF APPROVAL MARKS

*Model A and paragraph to amend :*

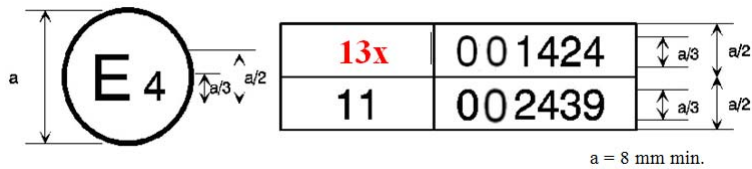
Model A  
(See paragraph 4.4. of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has, with regard to the protection of the occupants in the event of a frontal collision, been approved in France (E 2) pursuant to Regulation No. 13x under approval number 001424. The approval number indicates that the approval was granted in accordance with the requirements of Regulation No. 13x as amended by the 00 series of amendments.

*Model B and paragraph to amend :*

Model B  
(See paragraph 4.5. of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos. 13x and 11<sup>1</sup>. The first two digits of the approval numbers indicate that, at the dates when the respective approvals were granted, Regulation No. 13x incorporated the 00 series of amendments and Regulation No. 11 incorporated the 00 series of amendments.

<sup>1</sup> The latter number is given only as an example.

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## Annex 3 –Test procedure

*Paragraph 1.4.2.4 to amend:*

- 1.4.2.4 If the mass of the measuring apparatus on board of the vehicle exceeds the 25 kg allowed; it may be compensated by reductions which have no noticeable effect on the results measured under paragraph 6 below.

*Paragraph 1.4.3.10 to amend:*

- 1.4.3.10. Head restraints adjustable for height shall be in their ~~uppermost~~ **appropriate** position.

*Paragraph 1.4.3.11.2 to amend:*

- 1.4.3.11.2 Position of front passenger seat  
Seats adjustable longitudinally shall be placed so that their "H" point, determined in accordance with the procedure set out in annex 6, is:
- a) in the position given by the manufacturer, **which** shall be forward of the middle position of travel, **or**
  - b) ~~in the [forward quarter] position of travel or in the nearest locking position thereto~~ **in the absence of any particular recommendation by the manufacturer, as near as possible to a position which is midway between the forward most position of the seat and the centre position of its travel** and at the height position defined by the manufacturer (if independently adjustable for height). In the case of a bench seat, the reference shall be to the "H" point of the driver's place.

*Paragraph 2.1.1, footnote 1 to amend:*

2. Dummies
- 2.1. Front seats
- 2.1.1. A dummy corresponding to the specifications for HYBRID III 50<sup>th</sup> <sup>1/</sup> meeting the specifications for its adjustment shall be installed in the driver seat in accordance with the conditions set out in Annex 5.
- A dummy corresponding to the specifications for HYBRID III 5<sup>th</sup> <sup>1/</sup> meeting the specifications for its adjustment shall be installed in the passenger seat in accordance with the conditions set out in Annex 5.

Deleted: and

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<sup>1/</sup> The technical specifications and detailed drawings of **50<sup>th</sup> Hybrid III** and **5<sup>th</sup> Hybrid III**, {shall correspond to those included in the Mutual Resolution ~~1~~.}

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## Annex 4 Performance criteria

Paragraphs 1 to 1.1, to amend:

1. Head Performance Criterion (HPC<sub>36</sub>)
- 1.1. The Head Performance Criterion (HPC<sub>36</sub>) is considered to be satisfied when, during the test, there is no contact between the head and any vehicle component.

## Annex 5 Arrangement and installation of dummies and adjustment of restraint systems

...

Paragraphs 3 to 3.9.2, to amend:

### 3. {Installation of the dummy HIII 5th on the passenger seat }

- 3.1. Head

The transverse instrumentation platform of the head shall be horizontal within 2.5°. To level the head of the test dummy in vehicles with upright seats with non-adjustable backs, the following sequences must be followed. First adjust the position of the "H 5<sup>th</sup>" point within the limits set forth in paragraph 3.4.3.1. below to level the transverse instrumentation platform of the head of the test dummy. If the transverse instrumentation platform of the head is still not level, then adjust the pelvic angle of the test dummy within the limits provided in paragraph 3.4.3.2. below. If the transverse instrumentation platform of the head is still not level, then adjust the neck bracket of the test dummy the minimum amount necessary to ensure that the transverse instrumentation platform of the head is horizontal within 2.5°.
- 3.2. Arms
- 3.2.1. The passenger's upper arms shall be in contact with the seat back and the sides of the torso.
- 3.3. Hands
- 3.3.1. The palms of the passenger test dummy shall be in contact with outside of thigh. The little finger shall be in contact with the seat cushion.
- 3.4. Torso
- 3.4.1. In vehicles equipped with bench seats, the upper torso of the passenger test dummy shall rest against the seat back. The midsagittal plane of the passenger dummy shall be vertical and parallel to the vehicle's longitudinal centreline and the same distance from the vehicle's longitudinal centreline as the midsagittal plane of the driver dummy.
- 3.4.2. In vehicles equipped with individual seats, the upper torso of the passenger test dummy shall rest against the seat back. The midsagittal plane of the passenger dummy shall be vertical and shall coincide with the longitudinal centreline of the individual seat.
- 3.4.3. Lower torso
- 3.4.3.1. "H 5<sup>th</sup>" point

The "H 5<sup>th</sup>" point of passenger test dummy shall coincide within ~~113 mm in the vertical dimension and~~ 13 mm in the horizontal dimension with a point 6 mm below **the position of the "H 5<sup>th</sup>" point determined using the procedure described in [Annex 6.4.16].** ~~except that the length of the lower leg and thigh segments of the "H" point machine shall be adjusted to 414 and 401 mm, instead of 417 and 432 mm respectively.~~

3.4.3.2. Pelvic angle

As determined using the pelvic angle ~~gauge drawing TE-2504, incorporated by reference in 49 CFR Part 572, Subpart O of this chapter,~~ as defined in the Mutual Resolution N° 1 which is inserted into the "H" point gauging hole of the dummy, the angle measured from the horizontal on the [76.2 mm (3 inch)] flat surface of the gauge shall be ~~22.5~~ **20** degrees plus or minus 2.5 degrees.

3.5. Legs

The upper legs of the passenger test dummy shall rest against the seat cushion to the extent permitted by placement of the feet. The initial distance between the outboard knee clevis flange surfaces shall be ~~{270 mm ± 10 mm}~~ **[229 mm ± 5 mm]** as shown in Fig.X. To the extent practicable, both legs of the passenger dummy shall be in vertical longitudinal planes. Final adjustment to accommodate placement of feet in accordance with paragraph 3.6. for various passenger compartment configurations is permitted.

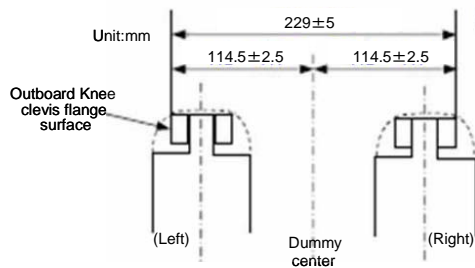


Fig.X The initial knee distance of Hybrid III 5th percentile female

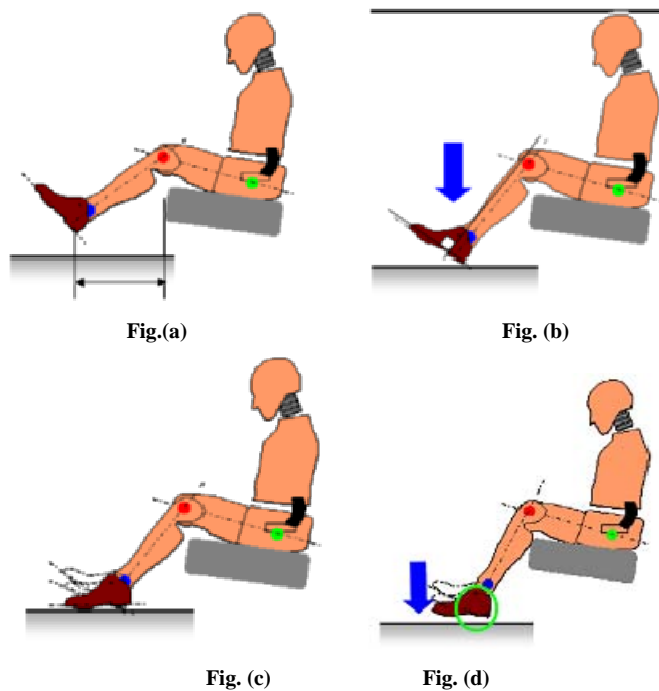
3.6. Feet

3.6.1. ~~The heels of both feet of the passenger test dummy shall be placed as far forward as possible and shall rest on the floor pan. Both feet shall be positioned as flat as possible on the toe board. The longitudinal centreline of the feet shall be placed as parallel as possible to the longitudinal centreline of the vehicle.~~

**The legs shall be positioned as distant as possible from the front end of the rear seat cushion while the thighs are kept in contact with the seat cushion as shown in Fig.(a). As shown in Fig.(b), each leg shall be lowered until the foot comes in contact with the floor while the foot and tibia are kept in a right angle to one another and the thigh inclination angle kept constant. When each heel is in contact with the floor, the foot shall be rotated so that the toe comes as much in contact as possible with the floor as shown in Fig.(c).**

**If it is not possible to have each foot in contact with the floor, the foot shall be lowered until the calf comes in contact with the front end of the seat cushion or the back of the foot comes in contact with the vehicle interior. The foot shall be kept as parallel as possible to the floor as shown in Fig.(d).**

In case of interference by a vehicle body protrusion, the foot shall be rotated as minimally as possible around the tibia. In case interference still remains, the femur shall be rotated to resolve or minimize the interference. The foot shall be moved inward or outward while the separation distance between the knees is kept constant.



- 3.7. The measuring instruments installed shall not in any way affect the movement of the dummy during impact.
- 3.8. The temperature of the dummies and the system of measuring instruments shall be stabilized before the test and maintained so far as possible within a range between 19 °C and 22.2 °C.
- 3.9. {Dummy HIII 5th clothing
- 3.9.1. The instrumented dummy will be clothed in formfitting cotton stretch garments with short sleeves and mid-calf length trousers specified in FMVSS 208, drawings 78051-292 and 293 or their equivalent.
- 3.9.2. A size 7.5 W small female size shoe, which meets the configuration size, sole and heel thickness specifications of the US military standard MIL-S-21711E, revision P and whose weight is  $0.41 \pm 0.09$  kg, shall be placed and fastened on each foot of the test dummies.}

**Paragraph 4 to add:**

**4. The dummy jacket shall be installed at the appropriate position where the bolt hole of the neck lower bracket and the work hole of the dummy jacket should be at the same position. With the test dummy at its designated seating position, as specified by the appropriate requirements of paragraphs 2.1. to 2.6. and 3.1 to 3.6 above, place the belt around the test dummy and fasten the latch. Remove all slack from the lap belt. Pull the**

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upper torso webbing out of the retractor horizontally at a position via the centre of the dummy and allow it to retract. Repeat this operation four times. The shoulder belt should be at the position between the area which shall not be taken off from shoulder and shall not contact with the neck. The seat belt path shall be positioned: for HIII 50th Male, the hole of the outer side dummy jacket shall not be fully hidden by the seat belt. For HIII 5th Female, the seat belt shall lie between the breasts. Apply a 9 to 18 N tension load to the lap belt. If the belt system is equipped with a tension-relieving device, introduce the maximum amount of slack into the upper torso belt that is recommended by the manufacturer for normal use in the owner's manual for the vehicle. If the belt system is not equipped with a tension-relieving device, allow the excess webbing in the shoulder belt to be retracted by the rewind force of the retractor.

Where the safety belt and safety belt anchorages are located such that the belt does not lie as required above then the safety belt may be manually adjusted and retained by tape.

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## Annex 6 PROCEDURE FOR DETERMINING THE "H" POINT AND THE ACTUAL TORSO ANGLE FOR SEATING POSITIONS IN MOTOR VEHICLES

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New paragraph 2.12 to add:  
2.12. "'H 5<sup>th</sup>' point"

means H-point for H III 5F dummy calculated using the procedure described in [Annex 6. 4.16].

Paragraph 4.16 to insert, and paragraphs 4.16, 4.16.1, 4.16.2 to renumber:

4.16. The longitudinal and vertical dimension of "H" point are described as ( $X_{50thM}$ ,  $Z_{50thM}$ ) and the longitudinal and vertical dimension of "H 5<sup>th</sup>" point are described as ( $X_{5thF}$ ,  $Z_{5thF}$ ). XSCL is defined as the horizontal distance between the "H" point and the most forward point on the seat cushion (see Fig). Use the following formula to calculate the "H 5<sup>th</sup>" point. Note that  $X_{5thF}$  should always be more forward than the  $X_{50thM}$ .

$$X_{5thF} = X_{50thM} + (93\text{mm} - 0.323 \times \text{XSCL})$$

$$Z_{5thF} = Z_{50thM}$$

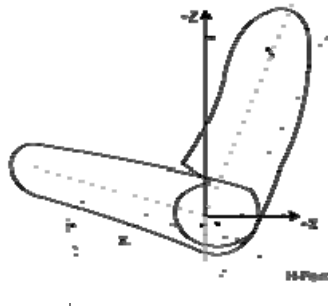


Fig.

4.16.17. If the seats in the same row can be regarded as similar (bench seat, identical seats, etc.) only one "H" point and one "actual torso angle" shall be determined for each row of seats, the 3-D H machine described in appendix 1 to this annex being seated in a place regarded as representative for the row. This place shall be:

4.16.17.1. in the case of the front row, the driver's seat;

4.16.17.2. in the case of the rear row or rows, an outer seat.



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## **II. Justification**

Following the last IG Frontal Impact meeting, some amendments were agreed for the draft ECE R13x regarding:

- **the position of the front passenger.**
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