

**PROPOSAL FOR DRAFT AMENDMENT TO REGULATION No. 17
VEHICLE SEATS, THEIR ANCHORAGES AND ANY HEAD RESTRAINTS**

A. PROPOSAL

Section 2., is replaced by the following:

"2. DEFINITIONS

For the purposes of this Regulation

- 2.1. "Actual torso angle" means the angle measured between a vertical line through the H-point and the torso line using the back angle quadrant on the 3-D H-machine. The actual torso angle corresponds theoretically to the design torso angle.
- 2.2. "Adjustable head restraint" means a head restraint that is capable of movement independent of the seatback between at least two positions of adjustment intended for occupant use.
- 2.3. "Adjustment system" means the device by which the seat or its parts can be adjusted to a position suited to the morphology of the seated occupant. This device may, in particular, permit:
 - 2.3.1. longitudinal displacement;
 - 2.3.2. vertical displacement;
 - 2.3.3. angular displacement;
- 2.4. "Anchorage" means the system by which the seat assembly is secured to the vehicle structure, including the affected parts of the vehicle structure.
- 2.5. "Approval of a vehicle" means the approval of a vehicle type with regard to the strength of the seats and their anchorages, the design of the rear parts of the seat-backs and the characteristics of their head restraints.
- 2.6. "Backlight" means rearward-facing window glazing located at the rear of the roof panel.
- 2.7. "Backset" means the minimum horizontal distance between the front surface of the head restraint and the rear surface of the head restraint measurement device, as measured in accordance with Annex 3.
- 2.8. "Bench seat" means a structure complete with trim, intended to seat more than one adult person.
- 2.9. "Centre plane of occupant" (C/LO) means the median plane of the 3-D H-machine positioned in each designated seating position; it is represented by the co-ordinate of the H-point on the "Y" axis. For individual seats, the centre plane of the seat coincides with the centre plane of the occupant. For other seats, the centre plane of the occupant is specified by the manufacturer.

- 2.10. "Design torso angle" means the angle measured between a vertical line through the R-point and the torso line in a position which corresponds to the design position of the seat-back established by the vehicle manufacturer.
- 2.11. "Detachable head restraint" means a head restraint consisting of a component separable from the seat designed for insertion and positive retention in the seat-back structure.
- 2.12. "Displacement system" means a device by which the seat or one of its parts can be displaced and/or rotated, without a fixed intermediate position, to permit easy access of occupants to the space behind the seat concerned.
- 2.13. "Fiducial marks" are physical points (holes, surfaces, marks or indentations) on the vehicle body as defined by the manufacturer.
- 2.14. "Folding seat" means an auxiliary seat intended for occasional use and normally folded.
- 2.15. "Front contact surface" of a head restraint means the surface that catches the seated occupant's head to limit rearward displacement.
- 2.16. "H-point" means the pivot centre of the torso and thigh of the 3-D H-machine installed in the vehicle seat in accordance with Annex 13. The H-point is located in the centre of the centreline of the device which is between the H-point sight buttons on either side of the 3-D H-machine. Once determined in accordance with the procedure described in Annex 13, the H-point is considered fixed in relation to the seat-cushion structure and to move with it when the seat is adjusted.
- 2.17. "Head Restraint" means, at any designated seating position, a device that limits rearward displacement of a seated occupant's head relative to the occupant's torso that has a height equal to or greater than 700 mm at any point between two vertical longitudinal planes passing at 85 mm on either side of the torso reference line, in any position of height adjustment and backset, as measured in accordance with Annexes 1 and 3 respectively.
- 2.18. "Head Restraint Height" means the distance from the R-point, measured parallel to the torso reference line to the top of the head restraint on a plane normal to the torso reference line.
- 2.19. "Head Restraint Measurement Device" (HRMD) means a separate head-shaped device used with the H-point machine with the head form, as defined in Annex 10, attached with sliding scale at the back of the head for the purpose of measuring backset.
- 2.20. "Integrated Head Restraint" means a head restraint formed by the upper part of the seat-back. Head restraints meeting the definitions of paragraphs 2.11. or 2.29. but which can only be detached from the seat or the vehicle structure by the use of tools or by partial or complete removal of the seat covering, meet the present definition.
- 2.21. "Intended for occupant use" means, when used in reference to the adjustment of a seat and head restraint, adjustment positions used by seated occupants while the vehicle is in motion, and not those intended solely for the purpose of allowing ease of ingress and egress of occupants; access to cargo storage areas; and storage of cargo in the vehicle.

- 2.22. "Locking system" means a device ensuring that the seat and its parts are maintained in the position of use.
- 2.23. "Longitudinal plane" means a plane parallel to the median longitudinal plane of the vehicle.
- 2.24. "Partitioning system" means parts or devices which, in addition to the seat-backs, are intended to protect the occupants from displaced luggage; in particular, a partitioning system may be constituted by netting or wire mesh located above the level of the seat-backs in their upright or folded down position. Head restraints fitted as standard equipment for vehicles equipped with such parts or devices shall be considered as part of the partitioning system. However, a seat equipped with a head restraint shall not be considered as being on its own a partitioning system.
- 2.25. "R-point" or Seating Reference Point (SRP) means a design point defined by the vehicle manufacturer for each designated seating position and established with respect to the three-dimensional reference system as defined by Annex 13, Appendix 2.
- The R-point:
- 2.25.1. Establishes the rearmost normal design driving or riding position of each designated seating position in a vehicle;
- 2.25.2. Has coordinates established relative to the designed vehicle structure;
- 2.25.3. Simulates the position of the centre pivot of the human torso and thigh;
- 2.26. "Reference data" means one or several of the following characteristics of a seating position:
- 2.26.1. the H-point and the R-point and their relationship,
- 2.26.2. the actual torso angle and the design torso angle and their relationship.
- 2.27. "Reference line" means the line 'r' on the manikin reproduced in Annex 7, Figure 7-1 to this Regulation.
- 2.28. "Seat" means a structure which may or may not be integral with the vehicle structure complete with trim, intended to seat one adult person. The term covers both an individual seat or part of a bench seat intended to seat one person;
- 2.29. "Separate Head Restraint" means a head restraint consisting of a component separate from the seat, designed for insertion and/or positive retention in the structure of the vehicle;
- 2.30. "Three-dimensional H-point machine" (H-point machine) means the device used for the determination of "H-points" and actual torso angles. This device is defined in Annex 13.
- 2.31. "Three-dimensional reference system" means a system as described in Annex 13, Appendix 2;
- 2.32. "Top of the Head Restraint" means the point on the head restraint centreline with the greatest height.
- 2.33. "Torso-line" means the centreline of the probe of the 3-D H-machine with the probe in the fully rearward position;

- 2.34. "Transverse plane" means a vertical plane perpendicular to the median longitudinal plane of the vehicle;
- 2.35. "Vehicle measuring attitude" means the position of the vehicle as defined by the coordinates of fiducial marks in the three-dimensional reference system.
- 2.36. "Vehicle type" means a category of motor vehicles which do not differ in such essential respects as:
- 2.36.1. the structure, shape, dimensions, materials and the mass of the seats, although the seats may differ in covering and colour; differences not exceeding 5 per cent in the mass of the approved seat type shall not be considered significant;
 - 2.36.2. the type and dimensions of the adjustment, displacement and locking systems of the seat-back and seats and their parts;
 - 2.36.3. the type and dimensions of the seat anchorages;
 - 2.36.4. the dimensions, frame, materials and padding of head restraints, although they may differ in colour and covering;
 - 2.36.5. the type and dimensions of the attachments of the head restraint and the characteristics of the part of the vehicle to which the head restraint is attached, in the case of a separate head restraint;"

Paragraph 4.3 is amended to read as:

".....conforming to the model in Annex 11 to this Regulation."

Paragraph 4.4.3 is amended to read as:

".....conforming to the model in Annex 11 to this Regulation"

Paragraph 4.8. is amended to read as:

".....are given in Annex 12 to"

Paragraph 5.1.2. is amended to read as:

".....referred to in paragraph 2.22 shall be"

Paragraph 5.1.3. is amended to read as:

".....the requirements of Annex 14 to"

Paragraph 5.1.3.1. is amended to read as:

".....procedure specified in Annex 14 the"

Paragraph 5.1.4.1. is amended to read as:

"5.1.4.1. This requirement does not apply to:

- (a) the parts of the different areas exhibiting a projection of less than 3.2 mm from the surrounding surface, which shall exhibit blunted edges, provided that the height of the projection is not more than half its width;
- (b) rearmost seats and back-to-back seats;
- (c) Rear parts of seats situated below a horizontal plane passing through the lowest R-point in each row of seats. (Where rows of seats have different heights, starting from the rear, the plane shall be turned up or down forming a vertical step passing through the R-point of the row of seats immediately in front);
- (d) parts such as "flexible wire mesh".

Paragraph 5.1.4.2. is amended to read as:

".....prescribed in Annex 14 to"

Paragraph 5.1.4.3. is amended to read as:

".....the requirements of Annex 14, shall"

Paragraph 5.1.6. is amended to read as:

".....and in Annex 16, paragraph 2.1."

Paragraph 5.4.2.1. is amended to read as:

".....procedure specified in Annex 14 the"

Sections 5.5. through 5.10. are replaced by the following new Sections:

"5.5 Performance Requirements

5.5.1. Each front outboard head restraint shall conform to paragraphs 5.5.2. through 5.5.7. of this regulation; each front centre head restraint shall conform to paragraphs 5.5.2. through 5.5.6. of this regulation; each rear outboard head restraint shall conform to paragraphs 5.5.2. through 5.5.6. of this regulation; each rear centre head restraint shall conform to paragraphs 5.5.2.5. through 5.5.6. of this regulation:

5.5.2. Minimum Height:

Each front outboard head restraint shall conform to paragraph 5.5.2.1. of this regulation; each front centre head restraint shall conform to paragraph 5.5.2.2. of this regulation; each rear outboard head restraint shall conform to paragraph 5.5.2.4. of this regulation; each rear centre head restraint shall conform to paragraph 5.5.2.5. of this regulation:

5.5.2.1. Front outboard designated seating positions. When measured in accordance with Annex 1, the top of a head restraint located in a front outboard designated seating position shall have a height of: (a) not less than [850/800] mm in at least one position

of head restraint adjustment; and (b) not less than 750 mm in any position of head restraint adjustment. See exception in paragraph 5.5.2.3 of this regulation.

5.5.2.2. Front centre designated seating positions equipped with head restraints. When measured in accordance with Annex 1, the top of a head restraint located in the front centre designated seating position shall have a height not less than 750 mm in any position of adjustment. See exception in paragraph 5.5.2.3 of this regulation.

5.5.2.3. Exception.

The requirements of paragraphs 5.5.2.1. and 5.5.2.2 of this regulation do not apply if the interior surface of the vehicle roofline, including the headliner, physically prevents a head restraint, located in the front outboard designated seating position, from attaining the required height. In those instances in which this head restraint cannot attain the required height, when measured in accordance with Annex 1, the maximum vertical distance between the top of the head restraint and the interior surface of the roofline, including the headliner, shall not exceed 25 mm in the lowest position of seat adjustment; in any horizontal position of seat adjustment; and the highest position of head restraint adjustment intended for occupant use. Notwithstanding this exception, when measured in accordance with Annex 1, the top of a head restraint located in a front outboard designated seating position shall have a height of not less than 750 mm in the lowest position of adjustment intended for occupant use.

5.5.2.4. Rear outboard designated seating positions equipped with head restraints. Except as provided in paragraph 5.5.2.5. of this regulation, when measured in accordance with Annex 1, the top of a head restraint located in a rear outboard designated seating position shall have a height not less than 750 mm in any position of adjustment.

5.5.2.5. Exception.

The requirements of paragraph 5.5.2.4 of this regulation do not apply if the interior surface of the vehicle roofline, including the headliner, or backlight physically prevent a head restraint, located in the rear outboard designated seating position, from attaining the required height. In those instances in which this head restraint cannot attain the required height, when measured in accordance with Annex 1, the maximum vertical distance between the top of the head restraint and interior surface of the roofline, including the headliner, or the backlight shall not exceed 25 mm in the lowest position of seat adjustment; in any horizontal position of seat adjustment; and the highest position of head restraint adjustment intended for occupant use.

5.5.2.6. When measured in accordance with Annex 1, the top of any head restraint designed to be provided in rear centre seats or seating positions shall be not less than 700 mm.

5.5.3. When measured in accordance with Annex 2, Appendix 1, the outer edges of the front contact surface of a head restraint shall enclose, as a minimum, an area on the front of the restraint defined by the intersections of the following planes with the head restraint:

- two vertical longitudinal planes set at 85 mm on either side of the vertical median plane of the seat,
- two horizontal planes 100 mm vertically apart.

Within this defined area any point must be no further rearwards than [either the centre of the area or, on those restraints on front outboard seats,] the point at which the maximum allowed backset is measured.

5.5.4. Minimum width.

When measured in accordance with Annex 2, the lateral width of a head restraint shall be not less than 170 mm between two vertical longitudinal planes passing at 85 mm on either side of the torso reference line.

5.5.5. Gaps within head restraint.

If a head restraint has any gap greater than 60 mm when measured in accordance with Annex 4, the maximum rearward displacement X of the headform shall be less than 102 mm when the head restraint is tested at that gap in accordance with Annex 7.

5.5.6. Gaps between head restraint and the top of the seat back.

5.5.6.1. When measured in accordance with Annex 4, there shall not be a gap greater than 60 mm between the head restraint and the seat if the head restraint is not adjustable vertically between in-use positions. When measured in accordance with Annex 4, there shall not be a gap greater than 25 mm between a vertically adjustable head restraint and the seat, with the head restraint adjusted to its lowest height position.

In the case of head restraints integral with the seat-back, the area to be considered is:

- above a plane perpendicular to the reference line at 540 mm from the R-point.
- between two vertical longitudinal planes passing at 85 mm on either side of the reference line.

In this area, one or more gaps which regardless of their shape can show a distance "a" of more than 60 mm, when measured as described in paragraph 6.7. below, are permitted provided that, after the additional test under paragraph 6.4.3. below, the requirements of paragraph 5.10. below are still met.

5.5.6.2. In the case of head restraints adjustable for height, one or more gaps which, regardless of their shape, can show a distance "a" of more than 60 mm when measured as described in paragraph 6.7. below, are permitted on the part of the device serving as a head restraint provided that, after the additional test under paragraph 6.4.3. below, the requirements of paragraph 5.10. below are still met.

5.5.7. Minimum backset for front outboard designated seating positions.

5.5.7.1. For adjustable restraints, the requirements of this regulation shall be met with the top of the head restraint in all height positions of adjustment between 750 mm and [850/800] mm, inclusive. If the top of the head restraint, in its lowest position of adjustment, is above [850/800] mm, the requirements of this regulation shall be met at that position. If the front outboard head restraint is not attached to the seat back, the head restraint cannot be adjusted such that the backset is more than [55] mm when the seat back inclination is positioned closer to vertical than the position specified in Annex 3.

5.5.7.2. The backset, when measured as specified in Annex 3, shall not be more than [55] mm.

5.6. Non-use positions.

A driver head restraint shall not have a non-use position.

- 5.6.1. A front outboard passenger head restraint may be adjusted to a position at which its height does not comply with the requirements of paragraph 5.5.2.1. of this regulation. However, in any such position, the front outboard passenger head restraint shall meet paragraph 5.6.3.1 of this regulation.
- 5.6.2. All rear head restraints and any front centre head restraint may be adjusted to a position at which its height does not comply with the requirements of paragraphs 5.5.2.2., 5.5.2.4. and 5.5.2.5. of this regulation. However, in any such position, the head restraint shall also meet one additional requirement from a set of several alternative test requirements. Based on a determination by each Contracting Party or regional economic integration organization, the set of alternative test requirements may be:
- (a) At the choice of the manufacturer: paragraph 5.6.3.1 or paragraph 5.6.3.2 or paragraph 5.6.3.3 or paragraph 5.6.3.4 of this regulation, or
 - (b) At the choice of the manufacturer: paragraph 5.6.3.1 or paragraph 5.6.3.2 or paragraph 5.6.3.3 or paragraph 5.6.3.4. or paragraph 5.6.3.5 of this regulation.

5.6.3. Alternative Requirements.

All of the items described in paragraphs 5.6.3.1 through 5.6.3.5 are permitted as additional features in accordance with paragraphs 5.6.1. and 5.6.2.

- 5.6.3.1. The head restraint shall automatically return from a non-use position to a position in which its minimum height is not less than that specified in paragraphs 5.5.2.2. and 5.5.2.4. of this regulation when a 5th percentile female Hybrid III test dummy is positioned in the seat in accordance with Annex 9. At the option of the manufacturer, instead of using a 5th percentile female Hybrid III test dummy, human surrogates may be used as specified in Annex 9.
- 5.6.3.2. The head restraint shall, when tested in accordance with Annex 9, be capable of manually rotating either forward or rearward by not less than 60 degrees from any position of adjustment intended for occupant use in which its minimum height is not less than that specified in paragraphs 5.5.2.2 or 5.5.2.4. of this regulation.
- 5.6.3.3. When measured in accordance with Annex 9, the lower edge of the head restraint (H_{LE}) shall be not more than 400 mm, but not less than 250 mm from the R-Point and the thickness (S) shall not be less than 25 mm.
- 5.6.3.4. When tested in accordance with Annex 9, the head restraint shall cause the torso reference line angle to be at least 10 degrees closer to vertical than when the head restraint is in any position of adjustment in which its height is not less than that specified in paragraphs 5.5.2.1., 5.5.2.2., or 5.5.2.4. of this regulation and its backset is not more than that specified in paragraph 5.5.6. of this regulation.
- 5.6.3.5. The head restraint shall be marked with a label in the form of a pictogram which may include explanatory text. The label shall either provide an indication when the head restraint is in a non-use position or provide information to enable an occupant to determine whether the head restraint is in a non-use position. The label shall be

durably affixed and located such that it is clearly visible by an occupant when entering the vehicle to the designated seating position. Examples of possible designs of pictograms are shown in Figure 1.

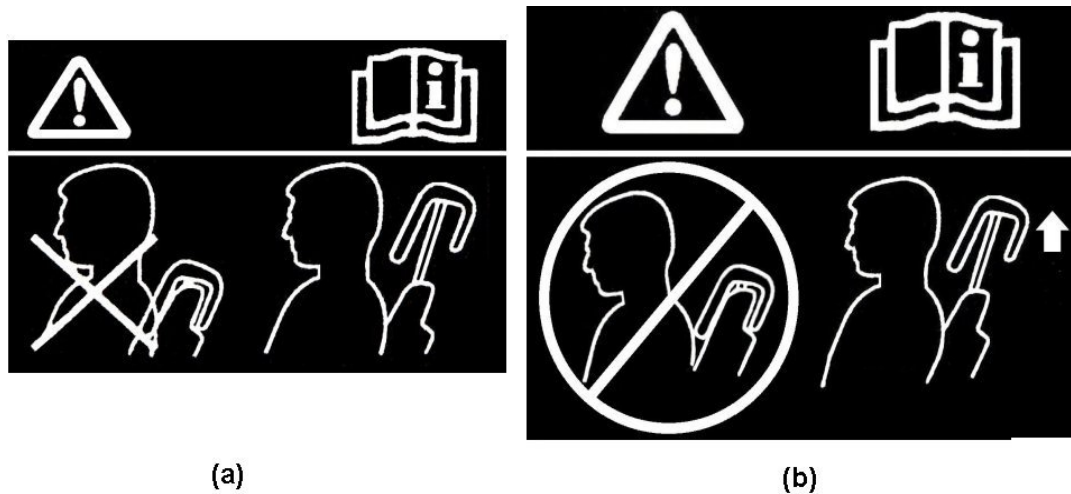


Figure 1

- 5.6.4. Removable Head Restraints. A head restraint shall not be removable without a deliberate action distinct from any action necessary for upward height adjustment of the head restraint.
- 5.7. In the case of a seat capable of being fitted with a head restraint, the provisions of paragraphs 5.1.3. and 5.4.2. above shall be verified.
- 5.8. Static performance requirements.
- Each head restraint shall conform with paragraphs 5.8.1. through 5.8.4. of this regulation:
- 5.8.1. Energy absorption.
- When the front surface of the head restraint is impacted in accordance with Annex 5, the deceleration of the headform shall not exceed 785 m/s^2 (80 g) continuously for more than 3 milliseconds.
- 5.8.2. Adjustable head restraint height retention.
- When tested in accordance with Annex 6, the mechanism of the adjustable head restraint shall not fail in such a way as to allow downward movement of the head restraint by more than 25 mm.
- 5.8.3. Displacement and Backset Retention.
- If a head restraint has a fixed backset then the head restraint shall conform to paragraph 5.8.3.1. If a head restraint has an adjustable backset the head restraint shall conform, based on the determination of each Contracting Party or regional economic integration organization, to either paragraph 5.8.3.1. or paragraph 5.8.3.2.
- 5.8.3.1. Displacement.
- When the head restraint is tested in the rearmost (relative to the seat) position of horizontal adjustment in accordance with Annex 7, the headform shall not be displaced more than 102 mm perpendicularly and rearward of the displaced extended

torso reference line during the application of a 373 ± 7.5 Nm moment about the R-point.

5.8.3.2. Displacement and Backset Retention.

When the head restraint is tested in any position of backset adjustment in accordance with Annex 7, the headform shall:

- (a) Not be displaced more than 25 mm during the application of the initial reference moment of 37 ± 0.7 Nm;
- (b) Not be displaced more than 102 mm perpendicularly and rearward of the displaced extended torso reference line during the application of a 373 ± 7.5 Nm moment about the R-point; and
- (c) Return to within 13 mm of its initial reference position after the following sequence occurs: application of a 373 ± 7.5 Nm moment about the R-point; reduction of the moment to 0 Nm; and re-application of the initial reference load 37 ± 0.7 Nm.

5.8.4. Head restraint strength.

When the head restraint is tested in accordance with Annex 7, the load applied to the head restraint shall reach $885 \text{ N} \pm 5 \text{ N}$ and remain at this load for a minimum period of 5 seconds unless any breakage of the seat or head restraint occurs.

5.9. Dynamic performance requirements:

When tested during forward acceleration of the dynamic test platform, in accordance with Annex 8, at each designated seating position equipped with a [non-static] head restraint, the head restraint shall conform to paragraph 5.9.1. Based on a determination by each Contracting Party or regional economic integration organization, either a Hybrid III 50th percentile male dummy or a BioRID-2 50th percentile male dummy shall be used to determine compliance.

5.9.1. Injury criteria.

If a Hybrid III dummy is used the head restraint shall meet the requirement of paragraph 5.9.1.1.

If a BioRID-2 dummy is used, the head restraint shall meet the requirements of paragraph 5.9.1.2.

5.9.1.1. Hybrid III Requirements.

- (a) Angular rotation. Limit posterior angular rotation between the head and torso of the 50th percentile male Hybrid III test dummy to 20 degrees for the dummy in all outboard designated seating positions;
- (b) Head injury criteria. Limit the maximum HIC_{15} value to 500. HIC_{15} is calculated as follows: For any two points in time, t_1 and t_2 , during the event which are separated by not more than a 15 millisecond time interval and where t_1 is less than t_2 , the head injury criterion (HIC_{15}) is determined using the resultant head acceleration at the centre of gravity of the dummy head, a_r , expressed as a multiple of g (the acceleration of gravity) and is calculated using the expression:

$$\text{HIC} = \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a_r dt \right]^{2.5} (t_2 - t_1)$$

5.9.1.2. BioRID II Requirements. [To be provided]"

Sections 5.11 through 5.15 are renumbered 5.10 through 5.14 respectively:

Renumbered paragraph 5.11 is amended to read as follows:

".....the load specified in Annex 7, paragraph 1.2."

Paragraph 5.13 is amended to read as follows:

".....in accordance with Annex 7, paragraph 1.2,in paragraph 6.2. below without breakage."

Paragraph 5.14.1 is amended to read as follows:

1st paragraph: ".....the test described in Annex 16, the seat-backs"

4th paragraph: "During the test described in Annex 16, the test blocks"

Paragraph 5.14.2 is amended to read as follows:

1st paragraph: ".....test described in Annex 16 may be"

2nd paragraph: "..... according to paragraph 2.2. of Annex 16."

4th paragraph: "..... one defined in paragraph 5.14.1. All measurements"

Paragraph 5.14.3 is amended to read as follows:

".....mentioned in paragraphs 5.14.1. and 5.14.2..... described in paragraphs 5.14.1. and 5.14.2."

Paragraph 6.1.1 is amended to read as follows:

".....the torso reference line, 'r', of the manikin described in Annex 7, unless"

Paragraph 6.2.1 is amended to read as follows:

".....manikin shown in Annex 13 to this Regulation."

Paragraph 6.3.1 is amended to read as follows:

".....the requirements of Annex 15, paragraph 1..... pulse described in Annex 16, Appendix 1,"

Paragraph 6.3.5 is amended to read as follows:

".....laid down in paragraph 2. of Annex 15 to"

Paragraph 6.4.3. is amended to read as follows:

"6.4.3. Test for determining rearward displacement for head restraint

The procedures for testing rearward displacement and strength are as specified in Annex 7."

Paragraphs 6.4.3.1 to 6.4.3.6. inclusive are deleted:

Paragraph 6.5.1 is amended to read as follows:

".....of the seat-back (see Figure 1-1 of Annex 1 to this Regulation)."

Paragraph 6.5.2 is amended to read as follows:

".....described in Annex 13 to this"

Paragraph 6.5.3 is amended to read as follows:

".....the manikin shown in Annex 1 to this Regulation is then, in the seat concerned, drawn in the vertical median plane of the seat concerned.
....."

Paragraph 6.5.4 is amended to read as follows:

".....the requirements of paragraphs 5.5.2. and 5.5.3. above."

Paragraph 6.6 is amended to read as follows:

".....the head restraint (see Figure 2-1 of Annex 2 to this Regulation)"

Paragraph 6.6.3 is amended to read as follows:

".....in implementing the requirements, is the"

Paragraph 6.7 is amended to read as follows:

".....restraint gaps.
(see Annex 4 to this Regulation)"

Paragraph 6.7.3 is amended to read as follows:

".....under paragraphs 5.5.6.1. and 5.5.6.2. above."

Paragraph 6.8.1.3.1. is amended to read as follows:

"..... defined in paragraph 5.1.4.1.(c) above,"

Paragraph 6. 9. is amended to read as follows:

".....and Annex 14 is used,"

Paragraph 7.1. is amended to read as follows:

".....as defined in paragraphs 2.11. and 2.29 above,"

Paragraph 8.2. is amended to read as follows:

".....to the model in Annex 11 to this Regulation."

Paragraph 9.3. is amended to read as follows:

".....to the model in Annex 11 to this Regulation."

Paragraph 10.1. is amended to read as follows:

".....the model in Annex 11 to this Regulation."

Section 13 is replaced by the following:

"13. TRANSITIONAL PROVISIONS

- 13.1 As from the official date of entry into force of the 07 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approvals under this Regulation as amended by the 07 series of amendments.
- 13.2 As from [1 October 2010], Contracting Parties applying this Regulation shall grant ECE approvals only if the requirements of this Regulation, as amended by the 07 series of amendments, are satisfied.
- 13.3 As from [1 October 2012], Contracting Parties applying this Regulation may refuse to recognize approvals which were not granted in accordance with the 07 series of amendments to this Regulation.
- 13.4 As from the official date of entry into force of the 08 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approvals under this Regulation as amended by the 08 series of amendments.
- 13.5 As from [24] months after the date of entry into force of the 08 series of amendments, Contracting Parties applying this Regulation shall grant ECE approval only if the vehicle type to be approved complies with the requirements of this Regulation as amended by the 08 series of amendments.
- 13.6 As from [48] months after the date of entry into force of the 08 series of amendments, existing approvals to this Regulation shall cease to be valid, except in the case of vehicle types which comply with the requirements of this Regulation as amended by the 08 series of amendments."

New Annexes 1 through 10 are inserted to read as follows:

"Annex 1

Minimum Height Measurement Test Procedure

1. Height measuring apparatus. The height measurement apparatus consists of (see Figure 1-1 below):
 - 1.1. A straight edge AE. The lower point A is placed at the R-point location. The line AE shall be parallel to the design torso angle.
 - 1.2. A straight edge FG, perpendicular to the line AE and in contact with the top of the head restraint.
2. Procedure for height measurement. Demonstrate compliance with paragraph 5.5.2. of the regulation in accordance with paragraphs 3. and 4. of this annex, using the height measurement apparatus defined in paragraph 1 of this Annex. The seat shall be adjusted such that its H-point coincides with the R-point, in accordance with the requirements of Annex 13, paragraph 2.2.2. If the seat back is adjustable, it is set at the design seat back angle. The height of the head restraint shall be the distance between point A and the intersection of lines AE and FG.
3. Height measurement for front outboard head restraints
 - 3.1. If adjustable, adjust the top of the head restraint to the highest position and measure the height. If adjustable, adjust the top of the head restraint to the lowest position intended for normal use and measure the height
 - 3.2. For head restraints that are prevented by the interior surface of the vehicle roofline from meeting the required height as specified in paragraph 5.5.2. of this regulation, the requirements of paragraphs 5.5.2.3. and 5.5.2.5. of this regulation shall be assessed by the following procedures:
 - 3.2.1. Adjust the head restraint to its maximum height and measure the clearance between the top of the head restraint and the interior surface of the roofline or the rear backlight, by attempting to pass a 25 mm sphere between them.
 - 3.2.2. Adjust the top of the head restraint to the lowest position of adjustment intended for normal use and measure the height in accordance with paragraph 2. of this Annex.
4. Height measurement for front centre and rear outboard head restraints
 - 4.1. For head restraints in all designated seating positions equipped with head restraints, if adjustable, adjust the top of the head restraint to the lowest position of adjustment intended for normal use, other than any non-use position described in paragraph 5.6 of this regulation, and measure the height in accordance with paragraph 2. of this Annex.
 - 4.2. For head restraints that are prevented by the interior surface of the vehicle roofline or rear backlight from meeting the required height as specified in paragraph 5.5.2. of the regulation, the requirements of paragraphs 5.5.2.3 and 5.5.2.5 shall be assessed by the following procedure:
 - 4.2.1. Adjust the head restraint to its maximum height and measure the clearance between the top of the head restraint or the seat back and the interior surface of the roofline or the rear backlight, by attempting to pass a 25 mm sphere between them.

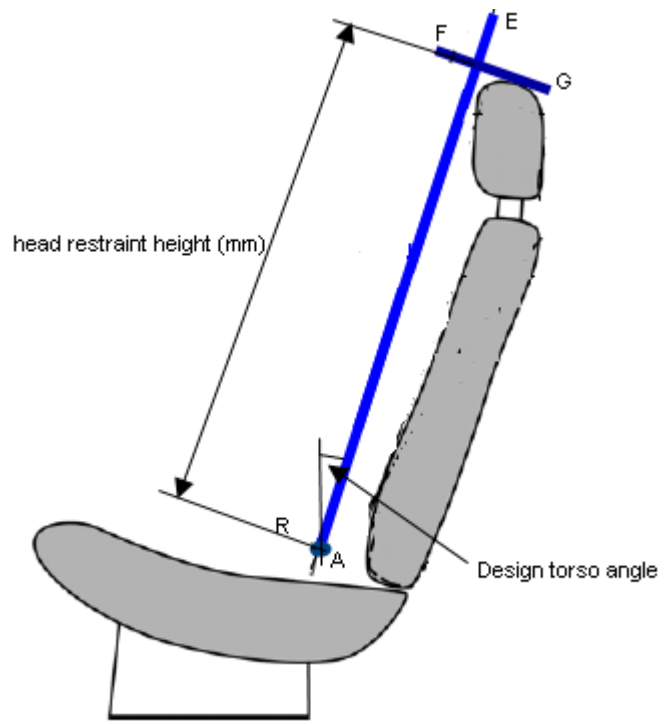


Figure 1-1

Annex 2
Minimum Width Measurement Test procedure

1. Purpose:
To demonstrate compliance with paragraph 5.5.4. of this regulation.
2. Procedure for width measurement Using calipers, measure the maximum dimension perpendicular to the vehicle vertical longitudinal plane of the intersection of the head restraint with a plane that is perpendicular to the manikin torso reference line 'r', defined in Annex 7, and 68 ± 3 mm below the top of the head restraint, as shown in Figure 2-1.

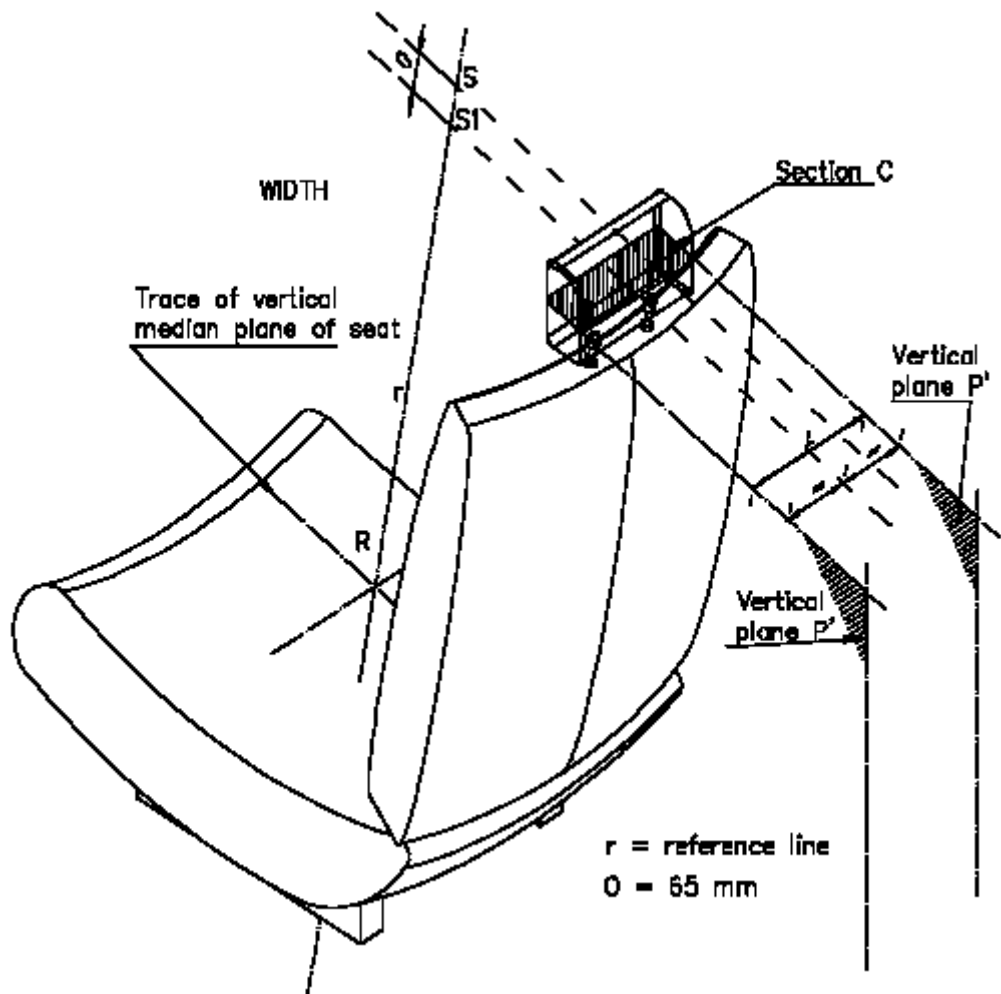


Figure 2-1

Annex 2 – Appendix 1
Measurement Test Procedure for Front Contact Surface

1. The seat shall be adjusted as stated in Annex 13, paragraph 2.2.
- 1.1. The head restraint shall be adjusted to any height position of use and to the most rearward position.
- 1.2. Determine, making use of a CCM (Coordinate Measuring Machine), that the front contact surface of the head restraint complies with the requirements defined in paragraph 5.5.3. of this regulation.

Annex 3
Minimum Backset Measurement Test Procedure
Using R-point as the Reference Point

1. Backset measuring apparatus.

The backset measurement apparatus consists of (see Figure 3-1):
- 1.1. A straight edge (lower arm) AB. The lower point A is placed at the R-point location. Point B is located at a distance of 505mm from the R-point. The line AB shall be parallel to the design torso angle.
- 1.2. A straight edge (upper arm) BC. Point C is located at a distance of 205mm vertically above point B.
2. Procedure for backset measurement. Demonstrate compliance with paragraph 5.5.7. of this regulation using the backset measurement apparatus defined in paragraph 1. of this Annex and the following procedures:
 - 2.1. Adjust the seat such that its H-point coincides with the R-point, in accordance with the requirements of Annex 13, paragraph 2.2.2. of this regulation.
 - 2.2. Adjust the seat back to its design angle.
 - 2.3. Adjust the front head restraint so that its top is at any height between and inclusive of 750mm and [850/800]mm. If the lowest position of adjustment is above [850/800]mm, adjust the head restraint to that lowest position of adjustment.
 - 2.4. In the case of head restraint with adjustable backset, adjust the head restraint to the most rearward position, such that the backset is at maximum.
 - 2.5. Establish point D on the head restraint, point D being the intersection of a line drawn, from point C horizontally in the X direction, with the front surface of the head restraint.
 - 2.6. Measure the distance CD. The backset shall be the measured distance CD minus 73mm.

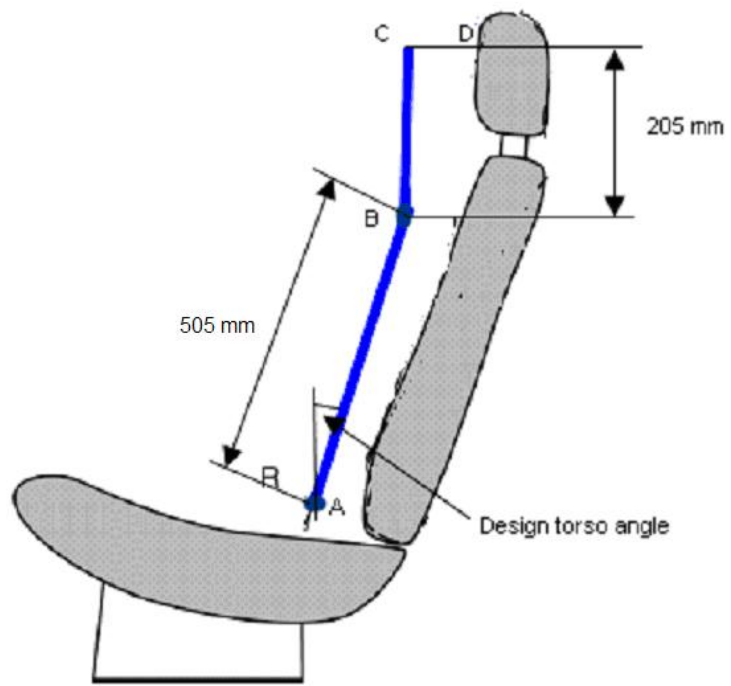


Figure 3-1

Annex 4
Gap and Rearward Displacement Evaluation Test Procedures

1. Purpose.

To evaluate the gaps within a head restraint and between the bottom of the head restraint and the top of the seat back and demonstrate compliance with paragraphs 5.5.5. and 5.5.6. with the head restraint adjusted, at the manufacturer's option, to any backset position intended for occupant use and to its lowest height position, respectively.

2. Gap measurement using a sphere.

The area of measurement is anywhere on the front surface of the head restraint between two vertical longitudinal planes passing at 85 mm on either side of the torso reference line.

2.1. Place a 165 ± 2 mm diameter spherical headform against any gap such that at least two points of contact are made within the area specified above and apply a load of no more than 5 N. The surface roughness of the headform shall less than $1.6 \mu\text{m}$, root mean square.

2.2. Determine the gap dimension by measuring the straight line distance between the inner edges of the two furthest contact points, as shown in Figures 4-1 and 4-2.

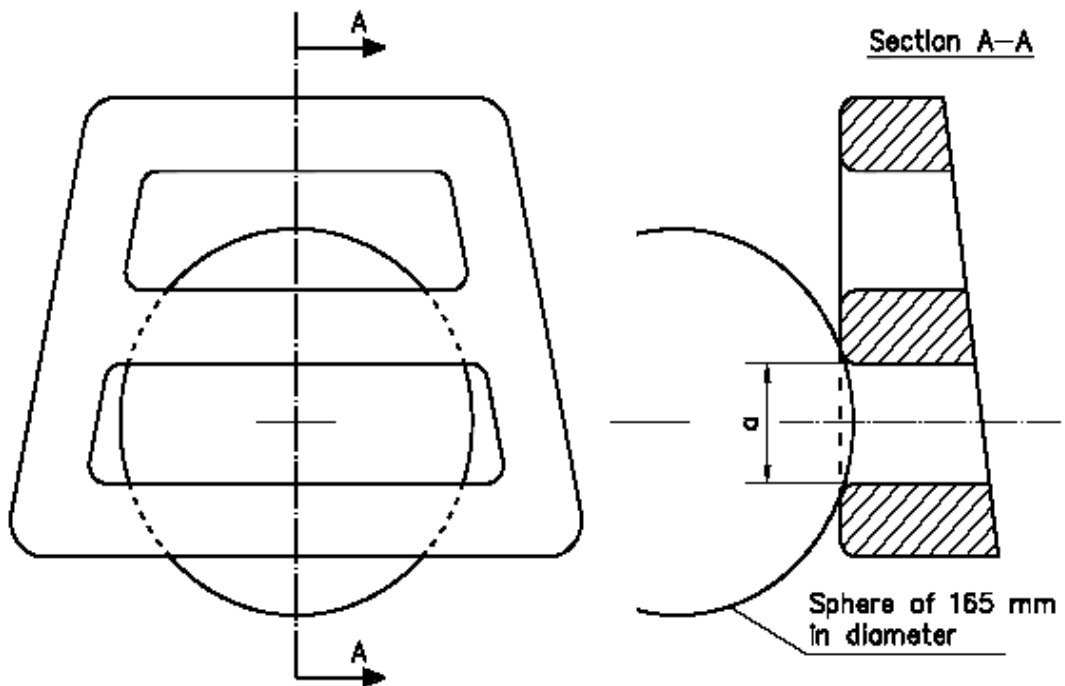


Figure 4-1 - Measurement of a vertical gap "a".

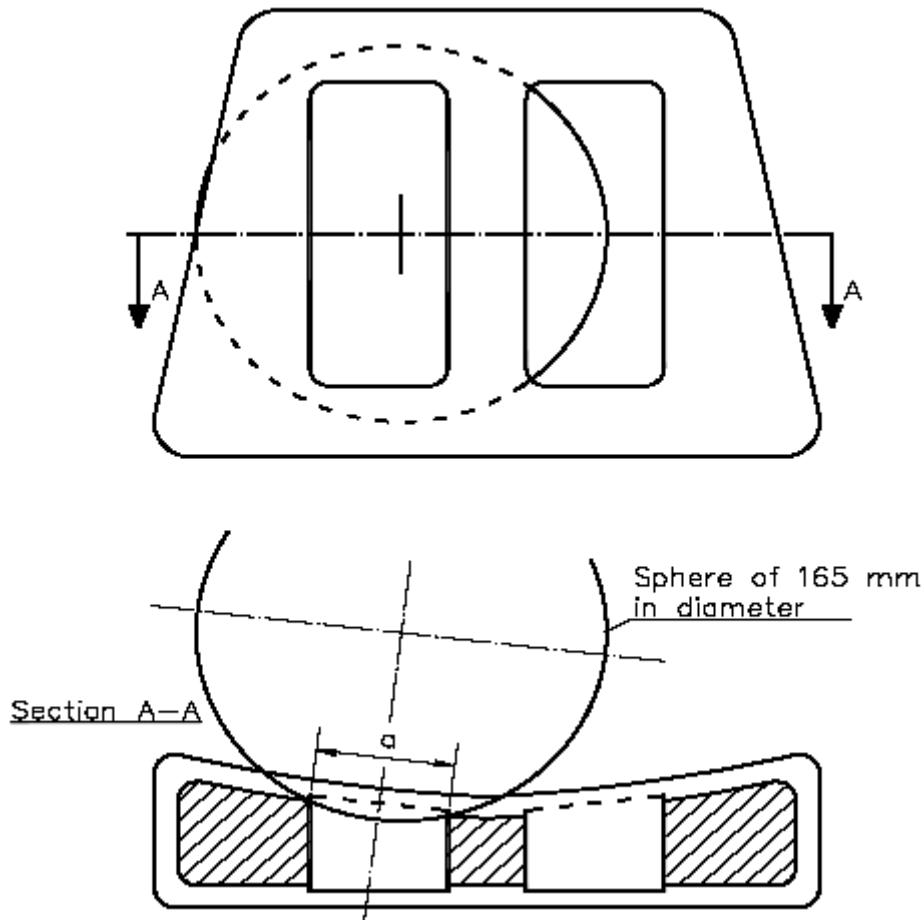


Figure 4-2 - Measurement of a horizontal gap “a”.

3. Vertical measurement of gap between seat back and head restraint.
 - 3.1. Measure the gap between the bottom of the head restraint and the top of the seat back using the scale incorporated in the manikin specified in Annex 13, or an equivalent scale, which is positioned laterally within 15 mm of the head restraint centreline. The seat back is adjusted as specified in paragraph 6.1.1. If there is more than one inclination position close to the position specified by the manufacturer, set the seat back inclination to the position closest to and rearward of the manufacturers specified position. If the head restraint position is independent of the seat back inclination position, compliance is determined at a seat back inclination position specified by the manufacturer.
 - 3.2. Adjust the top of the head restraint to the lowest position and measure the maximum vertical gap.
4. Procedure for determining rearward displacement for head restraint
 - 4.1. Seat set-up.

The seat back is adjusted as specified in paragraph 6.1.1. If there is more than one inclination position close to the position specified by the manufacturer, set the seat back inclination to the position closest to and rearward of the manufacturer specified position. If the head restraint position is independent of the seat back inclination position, compliance is determined at a seat back inclination position specified by the

manufacturer. Adjust the head restraint to the highest position of vertical adjustment intended for occupant use. If adjustable, adjust the head restraint to the rearmost backset position.

- 4.2. In the seat, place a test device having, when viewed laterally, the back pan dimensions and torso reference line (on vertical centre line) of the three dimensional H-point machine as specified in Annex 13 with the headroom probe in the full back position;
- 4.3. Establish the displaced torso reference line by creating a rearward moment of 373 ± 7.5 Nm about the R-point by application of a force to the seat back through the back pan at a rate between 2.5 Nm/second and 37.3 Nm/second (see Figures 7-1 and 7-2). The initial location on the back pan of the moment generating force vector has a height of $290 \text{ mm} \pm 13 \text{ mm}$. Apply the force vector normal to the torso reference line and maintain it within 2 degrees of a vertical plane parallel to the vehicle longitudinal centreline. Constrain the back pan to rotate about the R-point. Rotate the force vector direction with the back pan.
- 4.4. Maintain the position of the back pan as established in paragraph 4.3 of this Annex. Using a 165 ± 2 mm diameter spherical headform with a surface roughness of less than $1.6 \text{ }\mu\text{m}$ root mean square, establish the headform initial reference position by applying, perpendicular to the displaced torso reference line, a rearward initial load passing through the centre of gravity of the smallest of the sections of the gap, along transversal planes parallel to the reference line that will produce a 36.5 ± 0.5 Nm moment about the R-point (see Figure 7-2).
- 4.5. Increase the initial load at the rate between 2.5 Nm/second and 37.3 Nm/second until a 373 ± 7.5 Nm moment about the R-point is produced. Maintain the load level producing that moment for not less than 5 seconds and then measure the rearward displacement of the headform relative to the displaced torso reference line.

Annex 5
Energy Absorption Test Procedure

1. Purpose:

Evaluate the energy absorption ability of the head restraint by demonstrating compliance with paragraph 5.8.1. of this regulation in accordance with this Annex.

2. Seat set-up:

The seat shall be either mounted in the vehicle or firmly secured to the test bench, as mounted in the vehicle with the attachment parts provided by the manufacturer, so as to remain stationary when the impact is applied. The seat back is adjusted as specified in paragraph 6.1.1. If the seat is fitted with a head restraint, the head restraint shall be mounted on the seat-back as in the vehicle. Where the head restraint is separate, it shall be secured to the part of the vehicle structure to which it is normally attached.

3. Procedures for energy absorption.

The adjustable head restraints shall be measured in any height and backset position of adjustment.

3.1. Test equipment

3.1.1. Use an impactor with a semispherical head form of a 165 ± 2 mm diameter and a surface roughness of less than $1.6 \mu\text{m}$, root mean square for the impacting part of the impactor. The head form and associated base have a combined mass such that at a speed of 24.1 ± 0.5 km/h at the time of impact an energy of 152 ± 6 Joule will be reached.

3.1.2. Instrument the impactor with an acceleration sensing device whose output is recorded in a data channel that conforms to the requirements for a 600 Hz channel class filter as specified in ISO Standard 6487 (2002); The axis of the acceleration-sensing device coincides with the geometric center of the head form and the direction of impact. As an alternative the impactor can be equipped with 2 accelerometers sensing in the direction of impact and placed symmetrically in comparison to the geometric centre of the spherical head form. In this case the deceleration rate shall be taken as the simultaneous average of the readings on the two accelerometers.

3.2. Accuracy of the test equipment. The recording instruments used shall be such that measurements can be made with the following degrees of accuracy:

3.2.1. Acceleration:

Accuracy = + 5 % of the actual value;

Cross-axis sensitivity = < 5 % of the lowest point on the scale.

3.2.2. Speed:

Accuracy: + 2.5 % of the actual value;

Sensitivity: 0.5 km/h.

3.2.3. Time recording:

The instrumentation shall enable the action to be recorded throughout its duration and readings to be made to within one one-thousandth of a second;

the beginning of the impact at the moment of first contact between the headform and the item being tested shall be detected on the recordings used for analyzing the test.

3.3. Test procedure

- 3.3.1. Propel the impactor toward the head restraint. At the time of impact, the longitudinal axis of the impactor is within ± 2 degrees of being horizontal and parallel to the vehicle longitudinal axis and the impactor speed is not more than 24,1 km/h.
- 3.3.2. Impact the front surface of the seat or head restraint at any point with a height greater than 635 mm from the R-point and within a distance of the head restraint vertical centreline of 70 mm and measure the acceleration.

Annex 6
Height Retention Test Procedure

1. Purpose.

Demonstrate compliance with paragraph 5.8.2 of this regulation in accordance with this annex.
2. Procedures for test.
 - 2.1. Seat set-up.

Adjust the adjustable head restraint so that its top is at any of the following height positions at any backset position:

 - 2.1.1. For front outboard designated seating positions:
 - 2.1.1.1. The highest position; and
 - 2.1.1.2. Not less than, but closest to, [850/800] mm;
 - 2.1.2. For rear outboard and front centre designated seating positions
 - 2.1.2.1. The highest position; and
 - 2.1.2.2. Not less than, but closest to 750 mm.
 - 2.2. Mark an initial reference position for the head restraint.
 - 2.3. Orient a cylindrical test device having a 165 ± 2 mm diameter in plane view (perpendicular to the axis of revolution), and a 152 mm length in profile (through the axis of revolution) with a surface roughness of less than $1.6 \mu\text{m}$, root mean square, such that the axis of the revolution is horizontal and in the longitudinal vertical plane through the longitudinal centreline of the head restraint. Position the midpoint of the bottom surface of the cylinder in contact with the head restraint.
 - 2.4. Increase the load at the rate of 250 ± 50 N/minute to at least 500 N and maintain this load for not less than 5 seconds.
 - 2.5. Reduce the load to 0 N and determine the position of the cylindrical device with respect to its initial reference position.
 - 2.6. Measure the vertical distance measured between the lowest point on the underside of the head restraint and the top of the seat back.
 - 2.7. If the design of the head restraint is such that it is not possible to measure to the top of the seat then the vertical measurement shall be taken by marking a horizontal line across the front of the seat back at least 25 mm below the lowest point of the head restraint and the measurement shall be taken from this line to the underside of the head restraint.

Annex 7
Displacement, Backset Retention, and Strength Test Procedures

1. Purpose.

To demonstrate compliance with paragraphs 5.8.3. and 5.8.4 of this regulation.

1.1. Procedures for displacement.

The load vectors that generate moment on the head restraint are initially contained in a vertical plane parallel to the vehicle longitudinal centreline.

1.1.1. Seat set-up. Adjust the head restraint to the highest position of vertical adjustment intended for occupant use. Adjust the head restraint to the rearmost (relative to the seat) backset position.

1.1.2. In the seat, place a test device having, when viewed laterally, the back pan dimensions and torso reference line (vertical centre line) of the three dimensional H-point machine, as specified in Annex 13, with the head room probe in the full back position.

1.1.3. Establish the displaced torso reference line 'r₁' by creating a rearward moment of 373 ± 7.5 Nm about the R-point by applying a force to the seat back through the back pan at the rate of 2.5 Nm/second to 37.3 Nm/second. The initial location on the back pan of the moment generating force vector has a height of $290 \text{ mm} \pm 13 \text{ mm}$. Apply the force vector normal to the torso reference line and maintain it within 2 degrees of a vertical plane parallel to the vehicle longitudinal centreline. Constrain the back pan to rotate about the R-point. Rotate the force vector direction with the back pan. (see Figure 7-1)

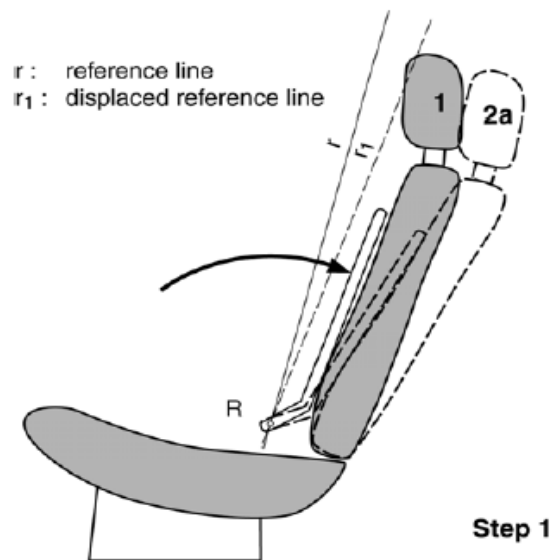


Figure 7-1.

Notes

(1) Position 1.

– Original unloaded position.

(2) Position 2a.

- Displaced position by applying to the manikin's back a moment of 373 Nm about the R-point, defining the position of the displaced torso reference line 'r₁'.
- 1.1.4. Maintain the position of the back pan as established in paragraph 1.1.3. of this Annex. Using a 165 ± 2 mm diameter spherical head form with a surface roughness of less than 1.6 μm, root mean square, establish the headform initial reference position by applying, perpendicular to the displaced torso reference line, a rearward initial load at the seat centreline at a height 65 ± 3 mm below the top of the head restraint that will produce a 36.5 ± 0.5 Nm moment about the R-point. (see Figure 7-2)

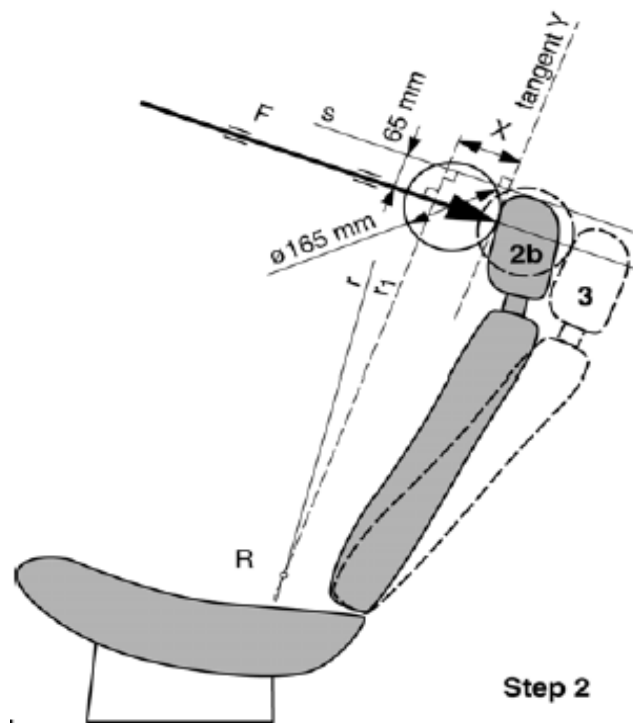


Figure 7-2.

- (3) Position 2b.
- Displaced position by applying to the 165 mm sphere a force F producing a moment of 373 Nm about the R-point, keeping the displaced torso reference line 'r₁' in place.
- (4) Position 3.
- Position after displacement by the force F increased to 890 N.
- 1.1.5. If the presence of gaps prevents the application of the force, as described in paragraph 1.1.4 of this Annex at 65 ± 3 mm from the top of the head restraint, the distance may be reduced so that the axis of the force passes through the centre line of the frame element nearest to the gap.
- 1.1.6. Increase the initial load at the rate between 2.5 Nm/second and 37.3 Nm/second until a 373 ± 7.5 Nm moment about the R-point is produced. Maintain the load level

producing that moment for not less than 5 seconds and then measure the rearward displacement of the headform relative to the displaced torso reference line.

- 1.2. Procedures for backset retention and displacement.
 - 1.2.1. Adjust the head restraint to the highest position of vertical adjustment intended for occupant use.
 - 1.2.2. Adjust the head restraint to any backset position.
 - 1.2.3. In the seat, place a test device having, when viewed laterally, the back pan dimensions and torso reference line (vertical centre line) of the three dimensional H-point machine, as specified in Annex 13, with the head room probe in the full back position.
 - 1.2.4. Establish the displaced torso reference line 'r' by creating a rearward moment of 373 ± 7.5 Nm about the R-point by applying a force to the seat back through the back pan at the rate of 2.5 Nm/second to 37.3 Nm/second. The initial location on the back pan of the moment generating force vector has a height of 290 mm \pm 13 mm. Apply the force vector normal to the torso reference line and maintain it within 2 degrees of a vertical plane parallel to the vehicle longitudinal centreline. Constrain the back pan to rotate about the R-point. Rotate the force vector direction with the back pan. (see Figure 7-1)
 - 1.2.5. Maintain the position of the back pan as established in paragraph 1.1.3. of this Annex. Using a 165 ± 2 mm diameter spherical head form with a surface roughness of less than 1.6 μ m, root mean square, establish the headform initial reference position by applying, perpendicular to the displaced torso reference line, a rearward initial load at the seat centreline at a height 65 ± 3 mm below the top of the head restraint that will produce a 36.5 ± 0.5 Nm moment about the R-point. (see Figure 7-2). Measure the rearward displacement of the headform during the application of the load.
 - 1.2.6. If the presence of gaps prevents the application of the force, as described in paragraph 1.1.4 of this Annex at 65 ± 3 mm from the top of the head restraint, the distance may be reduced so that the axis of the force passes through the centre line of the frame element nearest to the gap.
 - 1.2.7. Increase the initial load at the rate between 2.5 Nm/second and 37.3 Nm/second until a 373 ± 7.5 Nm moment about the R-point is produced. Maintain the load level producing that moment for not less than 5 seconds and then measure the rearward displacement of the headform relative to the displaced torso reference line.
 - 1.2.8. Reduce the load at the rate of 2.5 Nm/second to 37.3 Nm/second until 0 Nm. Wait 2 minutes and re-load to 37 ± 0.7 Nm about the R-point. While maintaining the load producing that moment, measure the rearward displacement of the headform position with respect to its initial reference position.
- 1.3. Strength.

Increase the load specified in paragraph 1.1.7. of this Annex at a rate between 5 N/second and 200 N/second to 885 ± 5 N and maintain the applied load for not less than 5 seconds without any breakage of the seat or head restraint.

Annex 8
Dynamic Performance Test Procedure

1. Purpose.

To demonstrate compliance with paragraph 5.9, using a 50th percentile male Hybrid III test dummy or the BioRID 2 dummy.
2. Test Equipment.
 - 2.1. An acceleration or deceleration test sled.
 - 2.2. 50th percentile male test dummy.
 - 2.2.1. Hybrid III.
 - 2.2.1.1. Three accelerometers shall be in the head cavity to measure orthogonal accelerations at the centre of gravity of the head assembly. The three accelerometers shall be mounted in an orthogonal array, and the intersection of the planes containing the sensitivity axis of the three sensors will be the origin of the array.
 - 2.2.1.2. Angular Displacement sensor.
 - 2.2.2. BioRID-2.

[Specifications to be provided]
 - 2.3. Equipment for measuring and recording sled accelerations.
3. Procedures for test set-up.
 - 3.1. Mount the vehicle on a dynamic test platform so that the longitudinal centreline of the vehicle is parallel to the direction of the test platform travel and so that movement between the base of the vehicle and the test platform is prevented. Instrument the platform with accelerometers and data processing system. Position the accelerometer sensitive axis parallel to the direction of test platform travel.
 - 3.2. As necessary, remove the tyres, wheels, fluids, and all unsecured components. Remove or rigidly secure the engine, transmission, axles, exhaust, vehicle frame and any other vehicle component to assure that all points on the acceleration vs. time plot measured by an accelerometers on the dynamic test platform fall within the corridor described in Figure 8-1 and Table 8-1.
 - 3.3. Place any moveable windows in the fully open position.
 - 3.4. Seat Adjustment.

At each designated seating position, using any control that primarily moves the entire seat vertically, place the seat in the lowest position. Using any control that primarily moves the entire seat in the fore and aft directions, place the seat midway between the most forward and most rearward position. If an adjustment position does not exist midway, the closest adjustment position to the rear of the midpoint is used. Adjust the seat cushion and seat back to the manufacturers specified design position. If the specified position of the R-point can be achieved with a range of seat cushion inclination angles, adjust the seat inclination such that the most forward part of the seat cushion is at its lowest position with respect to the most rearward part. If the head restraint is adjustable, adjust the top of the head restraint to a position midway between the lowest position of adjustment and the highest position of adjustment. If

an adjustment position midway between the lowest and the highest position does not exist, adjust the head restraint to a position below and nearest to midway between the lowest position of adjustment and the highest position of adjustment. Adjustable lumbar supports are positioned so that the lumbar support is in its lowest position.

3.5. Seat Belt Adjustment.

Prior to placing the seat belt around the test dummy, fully extend the webbing from the seat belt retractor(s) and release it three times to remove slack. If an adjustable seat belt D-ring anchorage exists, place it in the adjustment position closest to the mid-position. If an adjustment position does not exist midway between the highest and lowest position, the closest adjustment position above the midpoint is used.

3.6. Dress and adjust each test dummy as follows:

Each test dummy is clothed in a form fitting cotton stretch short sleeve shirt with above-the-elbow sleeves and above-the-knee length pants. The weight of the shirt or pants shall not exceed 0.06 kg each. Each foot of the test dummy is equipped [with a shoe] whose weight is 0.51 ± 0.09 kg.

Limb joints are set at 1g, barely restraining the weight of the limb when extended horizontally. Leg joints are adjusted with the torso in the supine position.

3.7. Hybrid III Test dummy positioning procedure.

Place a test dummy at the designated seating position equipped with a head restraint.

3.7.1. Head.

The transverse instrumentation platform of the head is level within 1/2 degree. To level the head of the test dummy, the following sequence is used. First, adjust the position of the H point¹ 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. If the transverse instrumentation platform of the head is still not level, then adjust the neck bracket of the dummy the minimum amount necessary from the non-adjusted "0" setting to ensure that the transverse instrumentation platform of the head is horizontal within 1/2 degree. The test dummy remains within the limits specified⁽¹⁾ after any adjustment of the neck bracket.

3.7.2. Upper arms and hands.

Position each test dummy as specified below:

3.7.2.1. The driver's upper arms shall be adjacent to the torso with the centrelines as close to a vertical plane as possible.

3.7.2.2. The passenger's upper arms shall be in contact with the seat back and the sides of the torso.

3.7.2.3. The palms of the drivers test dummy shall be in contact with the outer part of the steering wheel rim at the rim's horizontal centreline. The thumbs shall be over the

¹ The H-points of the driver and passenger test dummies shall coincide within 12.5mm in the vertical dimension and 12.5mm in the horizontal dimension of a point 6.25mm below the position of the H-point determined by using the equipment and procedures specified in SAE J826 (APR 1980) except that the length of the lower leg and thigh segments of the H-point machine shall be adjusted to 417mm and 432mm, respectively, instead of the 50th percentile values specified in Table 1 of SAE J826.

steering wheel rim and shall be lightly taped to the steering wheel rim so that if the hand of the test dummy is pushed upward by a force of not less than 2 pounds and not more than 5 pounds, the tape shall release the hand from the steering wheel rim.

3.7.2.4. The palms of the passenger test dummy shall be in contact with the outside of the thigh. The little finger shall be in contact with the seat cushion.

3.7.3. Upper Torso.

Position each test dummy such that the upper torso rests against the seat back. The midsagittal plane of the dummy shall be aligned within 15 mm of the head restraint centreline. If the midsagittal plane of the dummy cannot be aligned within 15 mm of the head restraint centreline then align the midsagittal plane of the dummy as close as possible to the head restraint centreline.

3.7.4. Lower Torso.

The H-points of the driver and passenger test dummies shall coincide within 13 mm in the vertical dimension and 13 mm in the horizontal dimension of a point 6.5 mm below the position of the H-point determined by the manikin defined in Annex 13.

3.7.5. Pelvic Angle.

As determined using the pelvic angle gage which is inserted into the H-point gauging hole of the dummy, the angle measured from the horizontal on the 76 mm flat surface of the gauge shall be 22.5 ± 2.5 degrees.

3.7.6. Legs.

Position each test dummy as follows:

The upper legs of the driver and passenger test dummies 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 269 mm. To the extent practicable, the left leg of the driver dummy and both legs of the passenger dummy shall be in vertical longitudinal planes. To the extent practicable, the right leg of the driver dummy shall be in a vertical plane. Final adjustment to accommodate the placement of feet in various passenger compartment configurations is permitted.

3.7.7. Feet.

3.7.7.1. Driver's position.

3.7.7.1.1. If the vehicle has an adjustable acceleration pedal, adjust it to the full forward position. Rest the right foot of the test dummy on the un-depressed accelerator pedal with the rearmost point of the heel on the floor pan in the plane of the pedal. If the foot cannot be placed on the accelerator pedal, set it initially perpendicular to the lowest leg and then place it as far forward as possible in the direction of the pedal centreline with the rearmost point of the heel resting on the floor pan. If the vehicle has an adjustable accelerator pedal and the right foot is not touching the accelerator pedal when positioned as above, move the pedal rearward until it touches the right foot. If the accelerator pedal still does not touch the foot in the full rearward position, leave the pedal in that position.

3.7.7.1.2. Place the left foot on the toe-board with the rearmost point of the heel resting on the floor pan as close as possible to the point of intersection of the planes described by the toe-board and the floor pan and not on the wheel-well projection. If

the foot cannot be positioned on the toe-board, set it initially perpendicular to the lower leg and place it as far forward as possible with the heel resting on the floor pan. If necessary to avoid contact with the vehicle's brake or clutch pedal, rotate the test dummy's left foot about the lower leg. If there is still pedal interference, rotate the left leg outboard about the hip the minimum distance necessary to avoid the pedal interference. For vehicles with a foot rest that does not elevate the left foot above the level of the right foot, place the left foot on the foot rest so that the upper and lower leg centrelines fall in a vertical plane.

3.7.7.2. Front Passenger's position.

3.7.7.2.1 Vehicles with a flat floor pan/toe-board. Place the right and left feet on the vehicle's toe-board with the heels resting on the floor pan as close as possible to the intersection point with the toe-board. If the feet cannot be placed flat on the toe-board, set them perpendicular to the lower leg centrelines and place them as far forward as possible with the heels resting on the floor pan.

3.7.7.2.2 Vehicles with wheelhouse projections in passenger compartment. Place the right and left feet in the well of the floor pan/toe-board and not on the wheelhouse projection. If the feet cannot be placed flat on the toe-board, initially set them perpendicular to the lower leg centrelines and then place them as far forward as possible with the heels resting on the floor pan.

3.7.7.3. Rear Passenger's position.

Place the feet of the test dummy flat on the floor pan and beneath the front seat as far forward as possible without front seat interference. If necessary, the distance between the knees can be changed in order to place the feet beneath the seat.

4. Test

4.1. Accelerate the dynamic test platform to 17.3 ± 0.6 km/h.

All of the points on the acceleration vs. time curve fall within the corridor described in Figure 8-1 and Table 8-1 when filtered to channel class 60, as specified in the [SAE Recommended Practice J211/1 (rev. Mar 95)]. Measure the maximum rearward angular displacement.

4.2. [An active head restraint is to be activated at $_X \pm x$ ms from the time that 0.25 g is measured on the dynamic test platform.]

5. Results

5.1. Calculate the angular displacement from the output of instrumentation placed in the torso and head of the test dummy and an algorithm capable of determining the relative angular displacement to within one degree and conforming to the requirements of a 600 Hz channel class, [as specified in SAE Recommended Practice J211/1, (rev. Mar 95)]. No data generated after 200 ms from the beginning of the forward acceleration are used in determining angular displacement of the head with respect to the torso.

Calculate the HIC_{15} from the output of instrumentation placed in the head of the test dummy, using the equation in paragraph 5.9.1.1. of this regulation and conforming to the requirements for a 1000 Hz channel class as specified in [SAE Recommended Practice J211/1 (rev. Mar 95)]. No data generated after 200 ms from the beginning of the forward acceleration are used in determining HIC.

Reference Point	Time (ms)	Acceleration (m/s ²)
A	0	10
B	28	94
C	60	94
D	92	0
E	4	0
F	38.5	80
G	49.5	80
H	84	0

Table 8-1 Sled pulse corridor reference point locations.

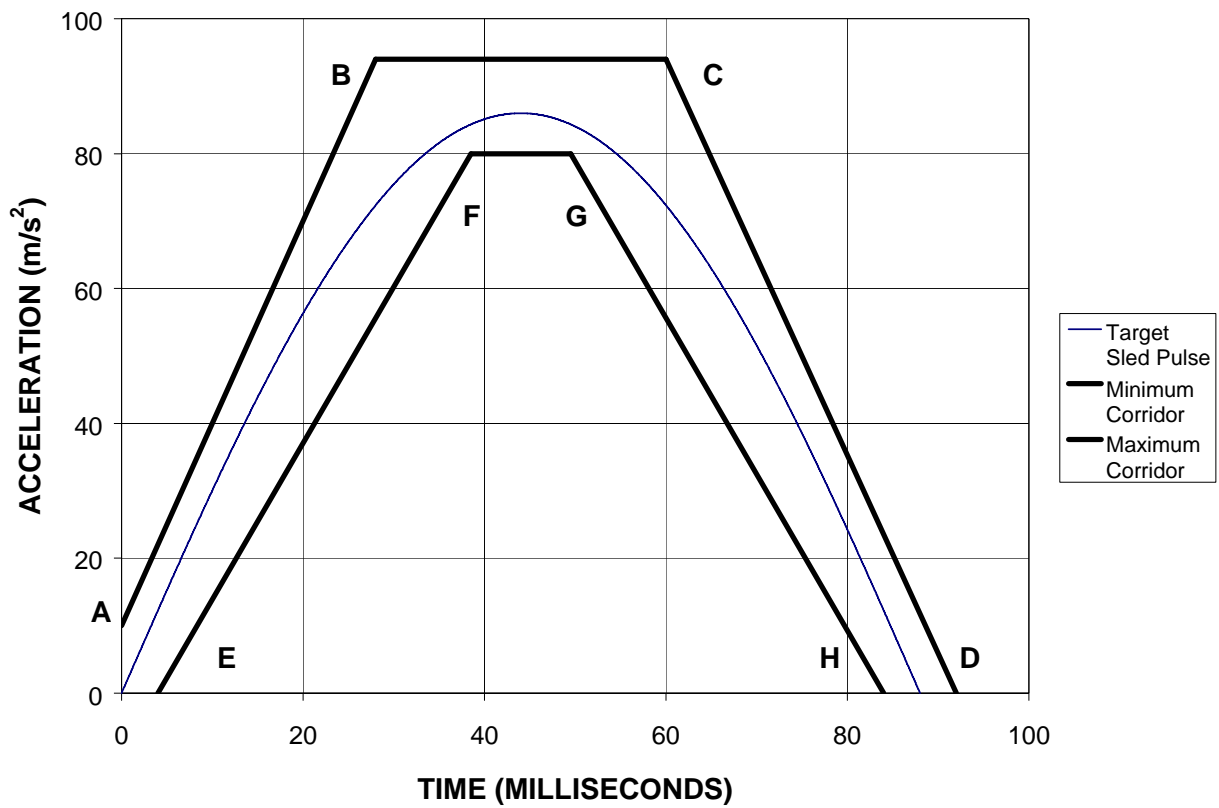


Figure 8-1 Sled pulse acceleration corridor.

The target acceleration with time expressed in milliseconds is $a = 86 \sin(\pi t/88) \text{ m/s}^2$, for $V = 17.3 \pm 0.6 \text{ km/h}$. The time zero for the test is defined by the point when the sled acceleration achieves 2.5 m/s^2 (0.25 G's).

Annex 9

Non-use position Test Procedure

1. Purpose.

Procedures for folding or retracting head restraints in all designated seating positions equipped with head restraints, except the driver's designated seating position.

2. Procedures to test automatic return head restraints and demonstrate compliance with paragraph 5.6.

The procedure is completed with the ignition switched "on", and using a 5th percentile female Hybrid III test dummy in accordance with paragraph 2.1. of this Annex, or a human surrogate in accordance with paragraph 2.2. of this Annex. Compliance shall be determined at a temperature of 21°C to 22°C.

2.1. 5th percentile Hybrid III Dummy.

2.1.1. Position the test dummy in the seat such that the dummy's midsagittal plane is aligned within the 15 mm of the seating position centreline and is parallel to a vertical plane parallel to the vehicle longitudinal centreline.

2.1.2. Hold the dummy's thighs down and push rearward on the upper torso to maximize the dummy's pelvic angle.

2.1.3. Place the legs as close as possible to 90 degrees to the thighs. Push rearward on the dummy's knees to force the pelvis into the seat so there is no gap between the pelvis and the seat back or until contact occurs between the back of the dummy's calves and the front of the seat cushion such that the angle between the dummy's thighs and legs begins to change.

2.1.4. Note the position of the head restraint. Remove the dummy from the seat. If the head restraint returns to a retracted position upon removal of the dummy, manually place it in the noted position. Determine compliance with the height requirements of paragraph 5.5.2. by using the test procedures of Annex 1.

2.2. Human surrogate.

A human being who weighs between 47 and 51 kg, and who is between 140 and 150 cm tall may be used. The human surrogate shall be dressed in a cotton T-shirt, full length cotton trousers, and sneakers. Specified weights and heights include clothing.

2.2.1. Position the human in the centre of the seat with the pelvis touching the seat back and the back against the seat back.

2.2.2. Verify the human's midsagittal plane is vertical and within ± 15 mm of the seating position centreline.

2.2.3. Verify the transverse distance between the centres of the front of the knees is 160 to 170 mm. Centre the knee separation with respect to the seat centreline.

2.2.4. If needed, extend the legs until the feet do not contact the floor pan. The thighs are resting on the seat cushion.

- 2.2.5. If the human contacts the interior move the seat rearward until a maximum clearance of 5 mm is achieved or the seat is in the closest detent position which does not cause human contact.
- 2.2.6. Passenger foot positioning.
 - 2.2.6.1. Place feet flat on the toe board, or
 - 2.2.6.2. If the feet cannot be placed flat on the toe board, the feet are perpendicular to the lower leg, and the heel is as far forward as possible and resting on the floor pan, or
 - 2.2.6.3. If the heels do not touch the floor pan, the legs are vertical and the feet parallel to the floor pan.
- 2.2.7. Passenger arm/hand positioning.
 - 2.2.7.1. Place the human's upper arms adjacent to the torso with the arm centrelines as close to a vertical longitudinal plane as possible.
 - 2.2.7.2. Place the palms of the human in contact with the outer part of the thighs.
 - 2.2.7.3. Place the little fingers in contact with the seat cushion.
- 2.3. Start the vehicle engine or place the ignition in the "on" position, whichever will turn on the suppression system, and close all vehicle doors. Wait 10 seconds, and then check whether the air bag is suppressed.
- 2.4. Return the ignition switch to the "off" position.
3. 60° Rotation evaluation.

Procedures for the rear and front centre designated seating positions to demonstrate compliance with paragraph 5.6.3.2.

 - 3.1. Place the head restraint in any position meeting the requirements of paragraph 5.5.2.2. or paragraph 5.5.2.4;
 - 3.1.1. Mark a line on the head restraint with one end at the point of rotation. Measure the angle or range of angles of the head restraint reference line as projected onto a vertical longitudinal vehicle plane;
 - 3.1.2. Fold or retract the head restraint to a position in which its minimum height is less than that specified in paragraph 5.5.2.2. or paragraph 5.5.2.4;
 - 3.1.3.** Determine the minimum change in the head restraint reference line angle as projected onto a vertical longitudinal vehicle plane from the angle or range of angles measured in paragraph 3.1.1. of this Annex.
4. Discomfort Metric.

Procedures for the rear and front centre designated seating positions to demonstrate compliance with paragraph 5.6.3.3. of this regulation.

 - 4.1. The H_{LE} and S dimensions are defined in Figure 9-1. which shows a vertical fore-aft plane passing through the R-point (i.e. at the mid point of the designated seating position) intersecting the seat cushion, seat back and the head restraint.
 - 4.2. Adjust the head restraint to the non-use position.
 - 4.2.1. H_{LE} is the distance from the R-point to the lower edge of the head restraint measured along the torso line.

- 4.2.2. S is the maximum thickness of the lower edge of the head restraint (within 25mm of the head restraint lower edge) measured perpendicular to the torso line between T_H and T_S from line P.
- 4.2.3. P is a line parallel to the torso line which intersects the head restraint at T_S
- 4.2.4. T_H is the line perpendicular to the torso line and tangent to the lower edge of the head restraint.
- 4.2.5. T_S is the line parallel to and 25 mm from T_H .

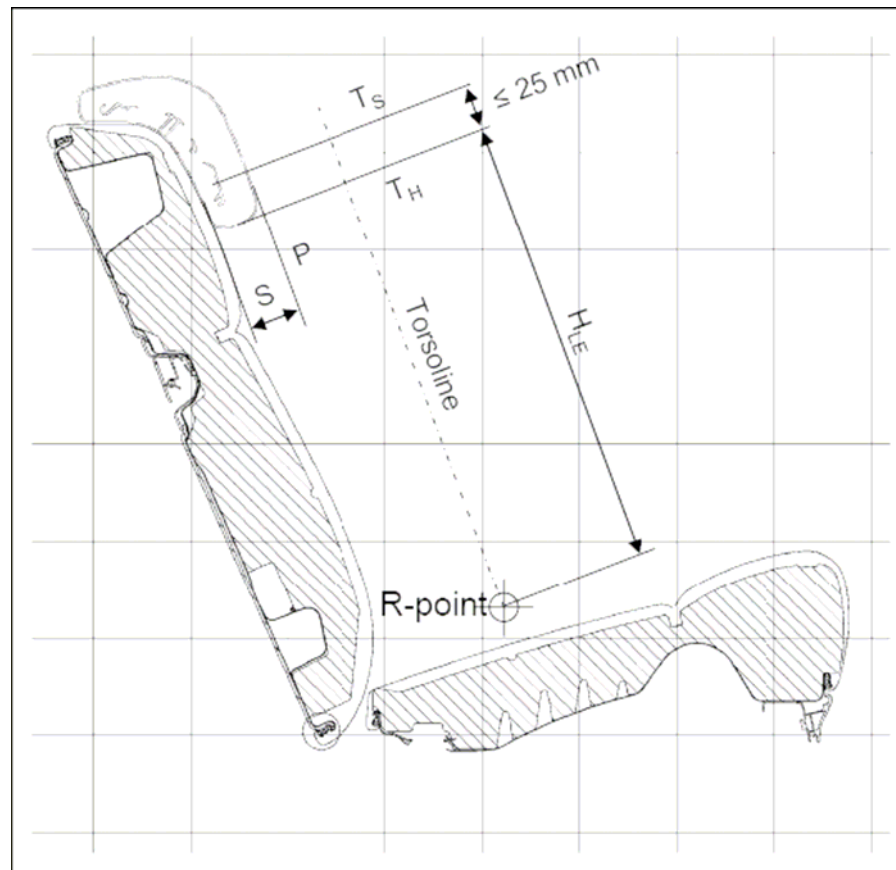
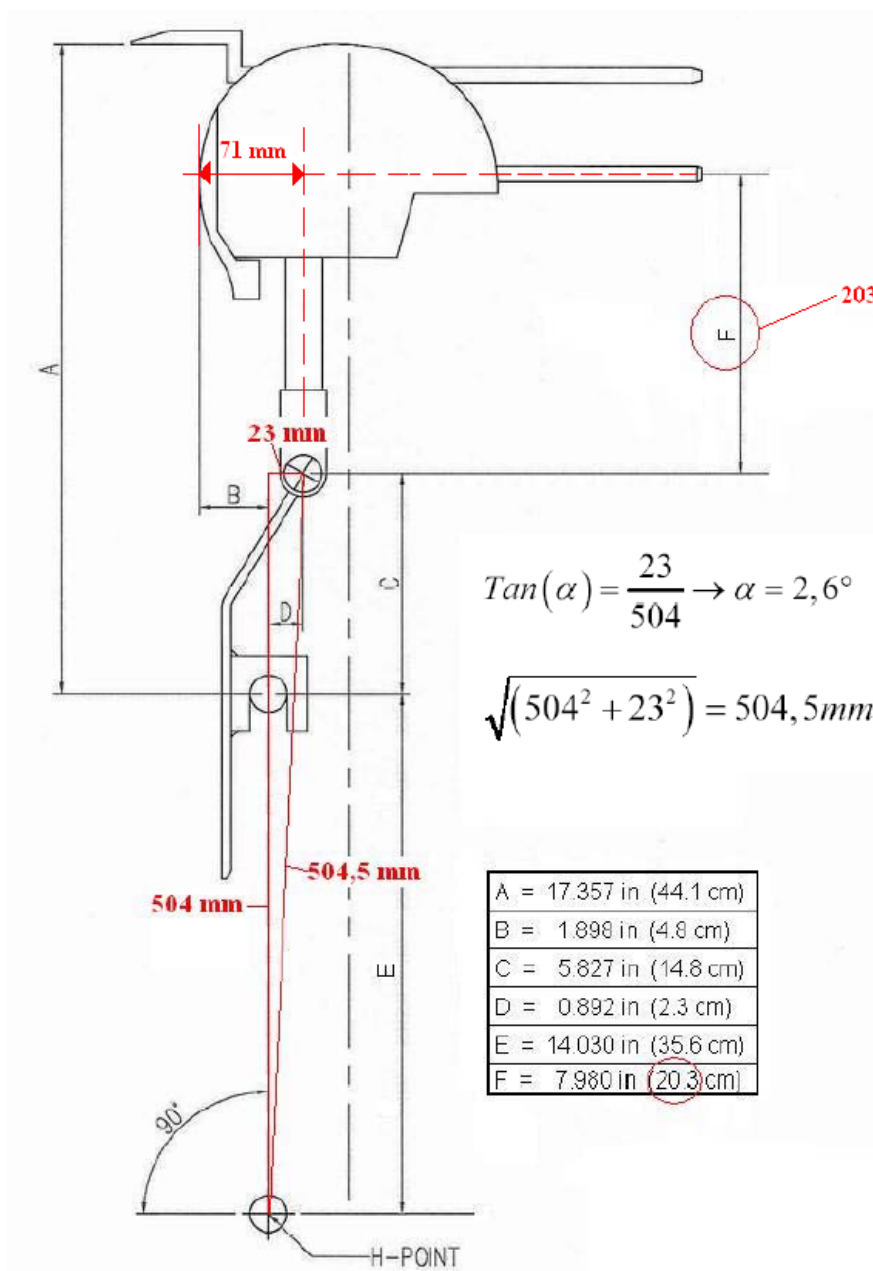


Figure 9-1.

- 5. 10° Torso Reference Line Change.
Procedures for the rear and front centre designated seating positions to demonstrate compliance with paragraph 5.6.3.4.
- 5.1. Place the head restraint into any position meeting the requirements of paragraph 5.6.3.4. of this regulation;
- 5.2. Measure the torso reference line angle with the three dimensional H-point machine defined in Annex 13;
- 5.3. Fold or retract the head restraint to any position in which its minimum height is less than that specified in paragraph 5.5.2. of this regulation or in which its backset is more than that specified in paragraph 5.5.7 of this regulation; and
- 5.4. Again measure the torso reference line angle.

Annex 10

Head Restraint Measuring Device (HRMD)



"

Existing Annexes 1, 2 and 3 are renumbered as Annexes 11, 12 and 13 respectively:

The Note to renumbered Annex 11 is amended to read as follows:

"Note: In the case of seats fitted with head restraints as defined in paragraphs 2.12. and 2.29. of this Regulation, the head restraint shall be shown on all drawings, diagrams and photographs."

In renumbered Annex 12 all references to series 07 of amendments are replaced by reference to 08 series, - six instances in the text and four instances in the diagrams.

Renumbered Annex 13, Section 2 is deleted and Sections 3 and 4 renumbered as Sections 2 and 3 respectively.

Renumbered Annex 13, Paragraph 2.1.3 of Annex 13 is amended to read as:

".....set out in paragraph 3.3. below."

Renumbered Annex 13, Paragraph 2.2.1 of Annex 13 is amended to read as:

".....procedure set out in paragraph 3. below"

Renumbered Annex 13, Paragraph 2.2.4. is amended to read as:

".....requirements of paragraph 2.2.2. above, conditions of paragraph 2.2.3. above shall apply."

Renumbered Annex 13, Paragraph 2.2.5. is amended to read as:

".....described in paragraph 2.2.4. above do not satisfy the requirements of paragraph 2.2.2. above, or"

Renumbered Annex 13, Paragraph 3.2. is amended to read as:

"3.2. The vehicle shall be in the vehicle measuring attitude."

Paragraph 3.7.2. is amended to read as:

"Designated seating position: outboard rear. For rear seats"

Paragraph 3.7.3. is amended to read as:

".....indicated in paragraph 3.7.1. above"

Renumbered Annex 13, Paragraph 3.12. is amended to read as:

1st paragraph: ".....side to side through a 10 degrees arc"

Paragraph 3.13 (b) is amended to read as:

".....re-level, and repeat the procedure from paragraph 3.12."

Existing Annexes 4 and 5 are deleted.

Existing Annexes 6 and 7 are renumbered as Annexes 14 and 15 respectively.

Annex 14, Paragraph 1.4.1 is amended to read as:

1st paragraph: ".....towards the front shall be on a longitudinal plane at a downwards angle of 45° from the vertical."

Annex 14, Paragraph 1.4.2.1 is amended to read as:

".....towards the front shall be on a longitudinal plane at a downwards angle of 45° from the vertical."

Annex 15, Paragraph 1.4 is amended to read as:

".....in the sense of paragraph 2.36. of this Regulation, the tests"

Existing Annex 8 is deleted.

Existing Annex 9 is renumbered as Annex 16.

References to diagrams and titles numbers of the diagrams in Annex 16 are changed to 'Figure 16-1' and '16-2' respectively.

Annex 16, Paragraph 3.1 is amended to read as:

".....shall be accelerated as shown in Appendix 1, so that"

B. JUSTIFICATION

- 1) Progress is being made with the development of a Global Technical Regulation(gtr) on the subject of vehicle head restraints and a completed proposal is expected to be adopted by WP.29 by the end of this year. It is the intention of the European Commission to propose that the existing Regulation No.17 be amended to reflect the requirements of the gtr and thus allow its 'transposition' into the UN/ECE type-approval system as soon as it becomes a reality.

The proposed amendment requires to update all requirements of the present Regulation No. 17 with respect to head restraints on the basis of the present proposal for a Global Technical Regulation on the subject.

Members of GRSP are invited to review the proposed amendments in the light of the present discussions, and any decisions made at the 41st meeting of GRSP.

- 2) Comments on the amendments proposed, and any possible omissions, should be brought forward as soon as possible so as to ensure that a complete document may be formally presented for the next meeting of WP.29.

Under the terms of the 1998 Agreement a Contracting Party that votes in favour of establishing a Global Technical Regulation under Article 6 of the Agreement is obligated to submit the technical Regulation to the process used by that Contracting Party to adopt such a technical Regulation into its own laws or regulations and shall seek to make a final decision expeditiously.

The European Commission will thus seek to ensure that such gtr as it has voted in favour of are incorporated into the European or UN/ECE Type-Approval systems as soon as possible, and so will propose amendments to its relevant Directives and associated UNECE Regulations, under the 1958 agreement, which are accepted as alternatives.
