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Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other acts are printed in bold type and preceded by an asterisk.

II

*(Non-legislative acts)***ACTS ADOPTED BY BODIES CREATED BY
INTERNATIONAL AGREEMENTS**

Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at:
<http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29docstts.html>

**Regulation No 14 of the Economic Commission for Europe of the United Nations (UN/ECE) —
Uniform provisions concerning the approval of vehicles with regard to safety-belt anchorages,
Isofix anchorages systems and Isofix top-tether anchorages**

Incorporating all valid text up to:

Supplement 1 to the 07 series of amendments — Date of entry into force: 19 August 2010

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1. SCOPE

This Regulation applies to:

- (a) vehicles of categories M and N ⁽¹⁾ with regard to their anchorages for safety-belts intended for adult occupants of forward-facing or rearward-facing seats;
- (b) vehicles of category M₁ with regard to their Isofix anchorage systems and their Isofix top-tether anchorages intended for child restraint systems other categories of vehicles fitted with Isofix anchorages have also to comply with the provisions of this Regulation.

2. DEFINITIONS

For the purposes of this Regulation:

- 2.1. 'approval of a vehicle' means the approval of a vehicle type equipped with anchorages for given types of safety-belts;
- 2.2. 'vehicle type' means a category of power-driven vehicles, which do not differ in such essential respects as the dimensions, lines and materials of components of the vehicle structure or seat structure to which the safety-belts anchorages and the Isofix anchorages systems and Isofix top-tether anchorages if any are attached and, if the anchorages strength is tested according to the dynamic test, the characteristics of any component of the restraint system, especially the load limiter function, having an influence on the forces applying to the safety-belt anchorages.
- 2.3. 'belt anchorages' means the parts of the vehicle structure or the seat structure or any other part of the vehicle to which the safety-belt assemblies are to be secured;
- 2.4. 'effective belt anchorage' means the point used to determine conventionally, as specified in paragraph 5.4, the angle of each part of the safety-belt in relation to the wearer, that is, the

⁽¹⁾ As defined in Annex 7 to the Consolidated Resolution on the Construction of vehicles (R.E.3), document TRANS/WP29/78/Rev.1/Amend.2, as last amended by Amendment 4.

point to which a strap would need to be attached to provide the same lie as the intended lie of the belt when worn, and which may or may not be the actual belt anchorage depending on the configuration of the safety-belt hardware at its attachment to the belt anchorage.

- 2.4.1. For example, in the case
 - 2.4.1.1. where a strap guide is used on the vehicle structure or on the seat structure, the middle point of the guide at the place where the strap leaves the guide on the belt wearer's side, shall be considered as the effective belt anchorage; and
 - 2.4.1.2. where the belt runs directly from the wearer to a retractor attached to the vehicle structure or the seat structure without an intervening strap guide, the effective belt anchorage shall be considered as being the intersection of the axis of the reel for storing the strap with the plane passing through the centre line of the strap on the reel;
- 2.5. 'floor' means the lower part of the vehicle body-work connecting the vehicle side walls. In this context it includes ribs, swages and possibly other reinforcements, even if they are below the floor, such as longitudinal and transverse members;
- 2.6. '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 as well as part of a bench seat intended to seat one person;
 - 2.6.1. 'front passenger seat' means any seat where the 'foremost H point' of the seat in question is in or in front of the vertical transverse plane through the driver's R point;
- 2.7. 'group of seats' means either a bench-type seat, or seats which are separate but side by side (i.e. with the foremost anchorages of one seat in line with or forward of the rearmost anchorages and in line with or behind the foremost anchorages of another seat) and accommodate one or more seated adult person;
- 2.8. 'bench seat' means a structure complete with trim, intended to seat more than one adult person;
- 2.9. 'seat type' means a category of seats which do not differ in such essential respects as:
 - 2.9.1. the shape, dimensions and materials of the seat structure,
 - 2.9.2. the types and dimensions of the adjustment systems and all locking systems,
 - 2.9.3. the type and dimensions of the belt anchorages on the seat, of the seat anchorage and of the affected parts of the vehicle structure;
- 2.10. 'seat anchorage' means the system by which the seat assembly is secured to the vehicle structure, including the affected parts of the vehicle structure;
- 2.11. '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 of:
 - 2.11.1. longitudinal displacement,
 - 2.11.2. vertical displacement,
 - 2.11.3. angular displacement;
- 2.12. 'displacement system' means a device enabling the seat or one of its parts to be displaced or rotated without a fixed intermediate position, to permit easy access to the space behind the seat concerned;
- 2.13. 'locking system' means any device ensuring that the seat and its parts are maintained in any position of use and includes devices to lock both the seat back relative to the seat and the seat relative to the vehicle.

- 2.14. 'reference zone' means the space between two vertical longitudinal planes, 400 mm apart and symmetrical with respect to the H point, and defined by rotation from vertical to horizontal of the head-form apparatus, as described in Regulation No 21, Annex 1. The apparatus shall be positioned as described in that Annex to Regulation No 21 and set to the maximum length of 840 mm.
- 2.15. 'thorax load limiter function' means any part of the safety-belt and/or the seat and/or the vehicle intended to limit the level of the restraint forces applying to the occupant thorax in case of a collision.
- 2.16. 'Isofix' is a system for the connection of child restraint systems to vehicles which has two vehicle rigid anchorages, two corresponding rigid attachments on the child restraint system and a mean to limit the pitch rotation of the child restraint system.
- 2.17. 'Isofix position' means a system which allows installing:
- (a) either a universal Isofix forward facing child restraint system as defined in Regulation No 44;
 - (b) or a semi-universal Isofix forward facing child restraint system as defined in Regulation No 44;
 - (c) or a semi-universal Isofix rearward facing child restraint system as defined in Regulation No 44;
 - (d) or a semi-universal Isofix lateral facing position child restraint system as defined in Regulation No 44;
 - (e) or a specific vehicle Isofix child restraint system as defined in Regulation No 44.
- 2.18. 'Isofix low anchorage' means one 6 mm diameter rigid round horizontal bar, extending from vehicle or seat structure to accept and restrain an Isofix child restraint system with Isofix attachments.
- 2.19. 'Isofix anchorages system' means a system made up of two Isofix low anchorages which is designed for attaching an Isofix child restraint system in conjunction with an anti-rotation device.
- 2.20. 'Isofix attachment' means one of the two connections, fulfilling the requirements of Regulation No 44, extending from the Isofix child restraint system structure, and compatible with an Isofix low anchorage.
- 2.21. 'Isofix child restraint system' means a child restraint system, fulfilling the requirements of Regulation No 44, which has to be attached to an Isofix anchorages system.
- 2.22. 'static force application device (SFAD)' means a test fixture that engages the vehicle Isofix anchorages systems and that is used to verify their strength and the ability of the vehicle or seat structure to limit the rotation in a static test. The test fixture is described in the figures 1 and 2 of Annex 9.
- 2.23. 'anti-rotation device'
- (a) an anti-rotation device for an Isofix universal child restraint system consists of the Isofix top-tether;
 - (b) an anti-rotation device for an Isofix semi-universal child restraint system consists of either a top-tether, the vehicle dashboard or a support leg intended to limit the rotation of the restraint during a frontal impact;
 - (c) for Isofix, universal and semi-universal, child restraint systems the vehicle seat itself does not constitute an anti-rotation device.

- 2.24. 'Isofix top-tether anchorage' means a feature, such as a bar, located in a defined zone, designed to accept an Isofix top-tether strap connector and transfer its restraint force to the vehicle structure.
- 2.25. 'Isofix top-tether connector' means a device intended to be attached to an Isofix top-tether anchorage.
- 2.26. 'Isofix top-tether hook' means an Isofix top-tether connector typically used to attach an Isofix top-tether strap to an Isofix top-tether anchorage as defined in figure 3 of Annex 9 to this Regulation.
- 2.27. 'Isofix top-tether strap' means a webbing strap (or equivalent) which extends from the top of an Isofix child restraint system to the Isofix top-tether anchorage, and which is equipped with an adjustment device, a tension-relieving device, and an Isofix top-tether connector.
- 2.28. 'a guidance device' is intended to help the person installing the Isofix child restraint system by physically guiding the Isofix attachments on the Isofix child restraint into correct alignment with the Isofix low anchorages to facilitate engagement.
- 2.29. 'Isofix marking fixture' means something that informs someone wishing to install an Isofix child restraint system of the Isofix positions in the vehicle and the position of each Isofix corresponding Isofix anchorages systems.
- 2.30. 'a child restraint fixture' means a fixture according to one out of the seven Isofix size classes defined in paragraph 4 of Annex 17 — Appendix 2 to Regulation No 16 and particularly whose dimensions are given from figure 1 to figure 7 in the previous mentioned paragraph 4. Those child restraint fixtures (CRF) are used in Regulation No 16, to check what are the Isofix child restraint systems size classes which can be accommodated on the vehicle Isofix positions. Also one of the CRF, the so-called ISO/F2 (B) which is described in figure 2 of the previous mentioned paragraph 4, is used in this Regulation to check the location and the possibility of access to any Isofix anchorages system.
3. APPLICATION FOR APPROVAL
- 3.1. The application for approval of a vehicle type with regard to the belt anchorages, the Isofix anchorages systems and the Isofix top-tether anchorages if any shall be submitted by the vehicle manufacturer or by his duly accredited representative.
- 3.2. It shall be accompanied by the undermentioned documents in triplicate and by the following particulars:
- 3.2.1. drawings of the general vehicle structure on an appropriate scale, showing the positions of the belt anchorages, of the effective belt anchorages (where appropriate), of the Isofix anchorages systems and of Isofix top-tether anchorages if any and detailed drawings of the belt anchorages, of the Isofix anchorages systems if any, of the Isofix top-tether anchorage if any, and of the points to which they are attached;
- 3.2.2. a specification of the materials used which may affect the strength of the belt anchorages, of the Isofix anchorages systems and Isofix top-tether anchorages if any;
- 3.2.3. a technical description of the belt anchorages, of the Isofix anchorages systems and Isofix top-tether anchorages if any;
- 3.2.4. in the case of belt anchorages, of the Isofix anchorages systems and of Isofix top-tether anchorages if any affixed to the seat structure:
- 3.2.4.1. detailed description of the vehicle type with regard to the design of the seats, of the seat anchorages and of their adjustment and locking systems;

- 3.2.4.2. drawings, on an appropriate scale and in sufficient detail, of the seats, of their anchorage to the vehicle, and of their adjustment and locking systems;
- 3.2.5. evidence that the safety-belt or the restraint system used in the anchorages approval test complies with Regulation No 16, in the case where the car manufacturer chooses the alternative dynamic strength test.
- 3.3. At the option of the manufacturer, a vehicle representative of the vehicle type to be approved or the parts of the vehicle considered essential for the belt anchorages test, for the Isofix anchorages systems and for Isofix top-tether anchorages test if any, by the technical service conducting approval tests shall be submitted to the service.
4. APPROVAL
- 4.1. If the vehicle submitted for approval pursuant to this Regulation meets the relevant requirements of this Regulation, approval of that vehicle type shall be granted.
- 4.2. An approval number shall be assigned to each type approved. Its first two digits (at present 07, corresponding to the 07 series of amendments) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another vehicle type as defined in paragraph 2.2 above.
- 4.3. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation by means of a form conforming to the model in Annex 1 to the Regulation.
- 4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation an international approval mark consisting of:
- 4.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽²⁾;
- 4.4.2. the number of this Regulation, to the right of the circle prescribed in paragraph 4.4.1;
- 4.4.3. the letter 'e', to the right of the number of this Regulation in the case of type approval according to the dynamic test of Annex 7.
- 4.5. If the vehicle conforms to a vehicle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.4.1 need not be repeated; in such a case the additional numbers and symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.4.1.
- 4.6. The approval mark shall be clearly legible and be indelible.
- 4.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.

⁽²⁾ 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Serbia and Montenegro, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33 (vacant), 34 for Bulgaria, 35 (vacant), 36 for Lithuania, 37 for Turkey, 38 (vacant), 39 for Azerbaijan, 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (approvals are granted by its Member States using their respective ECE symbol), 43 for Japan, 44 (vacant), 45 for Australia, 46 for Ukraine, 47 for South Africa, 48 for New Zealand, 49 for Cyprus, 50 for Malta, 51 for the Republic of Korea, 52 for Malaysia and 53 for Thailand. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

- 4.8. Annex 2 to this Regulation gives examples of arrangements of the approval mark.
5. SPECIFICATIONS
- 5.1. Definitions (see Annex 3)
- 5.1.1. The H point is a reference point as defined in paragraph 2.3 of Annex 4 of this Regulation, which must be determined in accordance with the procedure set out in that Annex.
- 5.1.1.1. Point H is a reference point corresponding to H as defined in paragraph 5.1.1 which shall be determined for every normal position in which the seat is used.
- 5.1.1.2. The R point is the seating reference point defined in paragraph 2.4 of Annex 4 of this Regulation.
- 5.1.2. The three-dimensional reference system is defined in Appendix 2 of Annex 4 of this Regulation.
- 5.1.3. Points L_1 and L_2 are the lower effective belt anchorages.
- 5.1.4. Point C is a point situated 450 mm vertically above the R point. However, if the distance S as defined in paragraph 5.1.6 is not less than 280 mm and if the alternative formula $BR = 260 \text{ mm} + 0,8 S$ specified in paragraph 5.4.3.3 is chosen by the manufacturer, the vertical distance between C and R shall be 500 mm.
- 5.1.5. The angles α_1 and α_2 are respectively the angles between a horizontal plane and planes perpendicular to the median longitudinal plane of the vehicle and passing through the point H_1 and the points L_1 and L_2 .
- 5.1.6. S is the distance in millimetres of the effective upper belt anchorages from a reference plane P parallel to the longitudinal median plane of the vehicle defined as follows:
- 5.1.6.1. if the seating position is well-defined by the shape of the seat, the plane P shall be the median plane of this seat.
- 5.1.6.2. in the absence of a well-defined position:
- 5.1.6.2.1. the plane P for the driver's seat is a vertical plane parallel to the median longitudinal plane of the vehicle which passes through the centre of the steering-wheel in the plane of the steering-wheel rim when the steering-wheel, if adjustable, is in its central position;
- 5.1.6.2.2. the plane P for the front outboard passenger shall be symmetrical with that of the driver.
- 5.1.6.2.3. The plane P for the rear outboard seating position shall be that specified by the manufacturer on condition the following limits for distance A between the longitudinal median plane of the vehicle and plane P are respected:
- A is equal or more than 200 mm if the bench seat has been designed to accommodate two passengers only;
- A is equal or more than 300 mm if the bench seat has been designed to accommodate more than two passengers.
- 5.2. General specifications
- 5.2.1. Anchorages for safety-belts shall be so designed, made and situated as to:
- 5.2.1.1. enable the installation of a suitable safety-belt. The belt anchorages of the front outboard positions shall be suitable for safety-belts incorporating a retractor and pulley, taking into consideration in particular the strength characteristics of the belt anchorages, unless the manufacturer supplies the vehicle equipped with other types of safety-belts which incorporate retractors. If the anchorages are suitable only for particular types of safety-belts, these types shall be stated on the form mentioned in paragraph 4.3 above;

- 5.2.1.2. reduce to a minimum the risk of the belt's slipping when worn correctly;
- 5.2.1.3. reduce to a minimum the risk of strap damage due to contact with sharp rigid parts of the vehicle or seat structures;
- 5.2.1.4. enable the vehicle, in normal use, to comply with the provisions of this Regulation;
- 5.2.1.5. for anchorages which take up different positions to allow persons to enter the vehicle and to restrain the occupants, the specifications of this Regulation shall apply to the anchorages in the effective restraint position.
- 5.2.2. Any Isofix anchorages system and any Isofix top-tether anchorage, installed or intended to be installed, for Isofix child restraint systems shall be so designed, made and situated as to:
 - 5.2.2.1. Any Isofix anchorages system and any top-tether anchorage shall enable the vehicle, in normal use, to comply with the provisions of this Regulation.

Any Isofix anchorages system and Isofix top-tether anchorage which could be added on any vehicle shall also comply with the provisions of this Regulation. Consequently, such anchorages shall be described on the application document for type approval.
 - 5.2.2.2. Isofix anchorages system and Isofix top-tether anchorage resistance are designed for any Isofix child restraint systems of group of mass 0; 0+; 1 as defined in Regulation No 44.
- 5.2.3. Isofix anchorage systems, design and positioning:
 - 5.2.3.1. Any Isofix anchorages system shall be 6 mm $\pm$ 0,1 mm diameter transverse horizontal rigid bar(s) which cover(s) two zones of 25 mm minimum effective length located on the same axis as defined in figure 4 Annex 9.
 - 5.2.3.2. Any Isofix anchorages system installed on a vehicle seating position shall be located not less than 120 mm behind the design H-point as determined in Annex 4 to this Regulation, measured horizontally and up to the centre of the bar.
 - 5.2.3.3. For any Isofix anchorages system installed in the vehicle, it shall be verified the possibility to attach the Isofix child restraint fixture 'ISO/F2' (B) described in Regulation No 16 (Annex 17, Appendix 2, figure 2).
 - 5.2.3.4. The bottom surface of the fixture 'ISO/F2' (B) as defined in Regulation No 16 (Annex 17, Appendix 2, figure 2), shall have attitude angles within the following limits, angles measured relatively to the vehicle reference planes as defined in Annex 4 Appendix 2 to this Regulation:
 - (a) Pitch: 15° $\pm$ 10°;
 - (b) Roll: 0° $\pm$ 5°;
 - (c) Yaw: 0° $\pm$ 10°.
 - 5.2.3.5. Isofix anchorage systems shall be permanently in position or storable. In case of storable anchorages, the requirements relating to Isofix anchorages system shall be fulfilled in the deployed position.
 - 5.2.3.6. Each Isofix low anchorage bar (when deployed for use) or each permanently installed guidance device shall be visible, without the compression of the seat cushion or seat back, when the bar or the guidance device is viewed, in a vertical longitudinal plane passing through the centre of the bar or of the guidance device, along a line making an upward angle of 30 degrees with a horizontal plane.

As an alternative to the above requirement, the vehicle shall be permanently marked adjacent to each bar or guidance device. This marking shall consist in one of the following, at the choice of the manufacturer.

- 5.2.3.6.1. As a minimum, the symbol of Annex 9, figure 12 consisting of a circle with a diameter of minimum 13 mm and containing a pictogram, meeting the following conditions:

- (a) the pictogram shall contrast with the background of the circle;
- (b) the pictogram shall be located close to each bar of the system;

- 5.2.3.6.2. The word 'Isofix' in capital letters of at least 6 mm height.

- 5.2.4. Isofix top-tether anchorages, design and positioning:

At the request of the car manufacturer, methods described in paragraphs 5.2.4.1 and 5.2.4.2 can be used alternatively.

Method described in paragraph 5.2.4.1 can only be used if the Isofix position is located on a vehicle seat.

- 5.2.4.1. Subject to paragraphs 5.2.4.3 and 5.2.4.4, the portion of each Isofix top-tether anchorage that is designed to bind with an Isofix top-tether connector shall be located not further than 2 000 mm far from the shoulder reference point and within the shaded zone, as shown in figures 6 to 10 of Annex 9, of the designated seating position for which it is installed, with the reference of a template described in SAE J 826 (July 1995) and shown in Annex 9, figure 5, according to the following conditions:

- 5.2.4.1.1. The 'H' point of the template is located at the unique design 'H' point of the full downward and full rearward position of the seat, except that the template is located laterally midway between the two Isofix lower anchorages;

- 5.2.4.1.2. The torso line of the template is at the same angle to the transverse vertical plane as the seat back in its most upright position, and

- 5.2.4.1.3. The template is positioned in the vertical longitudinal plane that contains the H point of the template.

- 5.2.4.2. The Isofix top-tether anchorage zone may be alternatively located with the aid of the Fixture 'ISO/F2' (B), as defined in Regulation No 16 (Annex 17, Appendix 2, figure 2), in an Isofix position equipped with Isofix low anchorages as shown in figure 11 of Annex 9.

The seating position shall be the seat's rearmost, downmost position with the seat back in its nominal position, or as recommended by the vehicle manufacturer.

In the side view, the Isofix top-tether anchorage shall lie behind the 'ISO/F2' (B) fixture rear face.

The intersection between the 'ISO/F2' (B) fixture rear face and the horizontal line (Annex 9, figure 11, reference 3) containing the last rigid point of a hardness greater than 50 Shore A at the top of the seat back defines the reference point 4 (Annex 9, figure 11) on the centreline of the 'ISO/F2' (B) fixture. At this reference point, a maximum angle of 45° above the horizontal line defines the upper limit of the top-tether anchorage zone.

In the top view, at the reference point 4 (Annex 9, figure 11), a maximum angle of 90° extending rearward and laterally and in the rear view, a maximum angle of 40° defines 2 volumes which limit the anchorage zone for the Isofix top-tether.

The origin of the Isofix top-tether strap (5) is located at the intersection of the 'ISO/F2' (B) fixture with a plane 550 mm distant above the 'ISO/F2' (B) fixture horizontal face (1) on the 'ISO/F2' (B) fixture centreline (6).

Further, the Isofix top-tether anchorage shall be more than 200 mm but not more than 2 000 mm from the origin of the Isofix top-tether strap on the rear face of the 'ISO/F2' (B) fixture, measured along the strap when it is drawn over the seat back to the Isofix top-tether anchorage.

- 5.2.4.3. The portion of the Isofix top-tether anchorage in a vehicle that is designed to bind with the Isofix top-tether connector may be located outside the shaded zones referred to paragraphs 5.2.4.1 or 5.2.4.2 if a location within a zone is not appropriate and the vehicle is equipped with a routing device that:
- 5.2.4.3.1. ensures that the Isofix top-tether strap functions as if the portion of the anchorage designed to bind with the Isofix top-tether anchorage were located within the shaded zone; and
- 5.2.4.3.2. is at least 65 mm behind the torso line, in case of a non-rigid webbing-type routing device or a deployable routing device, or at least 100 mm behind the torso line, in the case of a fixed rigid routing device; and
- 5.2.4.3.3. when tested after being installed as it is intended to be used, the device is of sufficient strength to withstand, with the Isofix top-tether anchorage the load referred to in paragraph 6.6 of this Regulation.
- 5.2.4.4. A tether anchorage may be recessed in the seat back, provided that it is not in the strap wrap-around area at the top of the vehicle seat back.
- 5.2.4.5. The Isofix top-tether anchorage shall have dimensions to permit the attachment of an Isofix top-tether hook as specified in figure 3.

Clearance shall be provided around each Isofix top-tether anchorage to allow latching and unlatching to it. For each Isofix top-tether anchorage under a cover, the cover shall be identified by for example one of the symbols or the mirror image of one of the symbols set out in figure 13 of Annex 9; the cover shall be removable without the use of tools.

- 5.3. Minimum number of belt and Isofix anchorages to be provided
- 5.3.1. Any vehicle in categories M and N (except those vehicles of categories M₂ or M₃ which belong to Classes I or A ⁽³⁾) shall be equipped with safety-belt anchorages which satisfy the requirements of this Regulation.
- 5.3.1.1. The anchorages of a harness belt system approved as a S-type belt (with or without retractor(s)) according to Regulation No 16 shall comply with the requirements of Regulation No 14, but the additional anchorage or anchorages provided for the fitting of a crotch strap (assembly) are exempted from the strength and location requirements of this Regulation.
- 5.3.2. The minimum number of safety-belt anchorages for each forward and rearward directed seating position shall be those specified in Annex 6.
- 5.3.3. However, for outboard seating positions, other than front, of vehicles of category N₁, shown in Annex 6 and marked with the symbol Ø, two lower anchorages are allowed, where there exists a passage between a seat and the nearest side-wall of the vehicle intended to permit access of passengers to other parts of the vehicle.

A space between a seat and the side-wall is considered as a passage if the distance between that side-wall, with all doors closed, and a vertical longitudinal plane passing through the centre line of the seat concerned, measured at the R point position and perpendicularly to the median longitudinal plane of the vehicle is more than 500 mm.

- 5.3.4. For the front centre seating positions shown in Annex 6 and marked with the symbol *, two lower anchorages shall be considered adequate where the windscreen is located outside the reference zone defined in Annex 1 to Regulation No 21; if located inside the reference zone, three anchorages are required.

⁽³⁾ See footnote 1.

As regards belt anchorages, the windscreen is considered as part of the reference zone when it is capable of entering into static contact with the test apparatus according to the method described in Annex 1 to Regulation No 21.

- 5.3.5. In every seating position marked in Annex 6 with symbol $\frac{1}{2}$, three anchorages shall be provided. Two anchorages may be provided if one of the following conditions is fulfilled:
- 5.3.5.1. there is a seat or other parts of the vehicle conforming to Regulation No 80, Appendix 1, paragraph 3.5 directly in front, or
- 5.3.5.2. no part of the vehicle is in the reference zone, or capable of being in the reference zone when the vehicle is in motion, or
- 5.3.5.3. parts of the vehicle within the said reference zone comply with the energy absorbing requirements set out in Regulation No 80, Appendix 6.
- 5.3.6. For all folding seats, or seating intended solely for use when the vehicle is stationary as well as for all the seats of any vehicle which are not covered by paragraphs 5.3.1 to 5.3.4, no belt anchorages are required. However, if the vehicle is fitted with anchorages for such seats, these anchorages must comply with the provisions of this Regulation. Any anchorage intended solely for use in conjunction with a disabled person's belt, or any other restraint system according to Regulation No 107, 02 series of amendments, Annex 8, do not need to conform to the requirements of this Regulation.
- 5.3.7. In the case of the upper deck of a double-deck vehicle, the requirements for the centre front seating position shall apply also in the outboard front seating positions.
- 5.3.8. Minimum number of Isofix positions to be provided.
- 5.3.8.1. Any vehicle of category M₁ shall be equipped at least with two Isofix positions which satisfy the requirements of this Regulation.
- At least two of the Isofix positions shall be equipped both with an Isofix anchorages system and an Isofix top-tether anchorage.
- The type and number of Isofix fixtures, defined in Regulation No 16, which can be installed on each Isofix position are defined in Regulation No 16.
- 5.3.8.2. Notwithstanding paragraph 5.3.8.1 if a vehicle is only equipped with one seat row, no Isofix position is required.
- 5.3.8.3. Notwithstanding paragraph 5.3.8.1 at least one of the two Isofix positions systems shall be installed at the second seat row.
- 5.3.8.4. If an Isofix anchorages system is installed at a front seating position protected with a frontal airbag, a de-activation device for this airbag shall be fitted.
- 5.3.8.5. Notwithstanding paragraph 5.3.8.1 in case of integrated 'built in' child restraint system(s) the number of Isofix positions to be provided shall be at least two minus the number of the integrated 'built in' child restraint system(s) of mass groups 0, or 0+, or 1.
- 5.3.8.6. Notwithstanding the provision of the paragraph 5.3.8.1, convertible vehicles as defined in Annex 7, paragraph 8.1 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) ⁽⁴⁾ with more than one seat row shall be fitted with at least two Isofix low anchorages. In case where an Isofix top-tether anchorage is provided on such vehicles, it shall comply with the suitable provisions of this Regulation.
- 5.3.9. In the case of seats capable of being turned to or placed in other orientations, for use when the vehicle is stationary, the requirements of paragraph 5.3.1 shall apply only to those orientations designated for normal use when the vehicle is travelling on a road, in accordance with this Regulation. A note to this effect shall be included in the information document.

⁽⁴⁾ Document TRANS/WP29/78/Rev.1/Amend.2, as last amended by Amend.4.

5.4. Location of belt anchorages (see Annex 3, figure 1)

5.4.1. General

5.4.1.1. The belt anchorages for any one belt may be located either wholly in the vehicle structure or in the seat structure or any other part of the vehicle or dispersed between these locations.

5.4.1.2. Any one belt anchorage may be used for attaching the ends of two adjacent safety-belts, provided that the test requirements are met.

5.4.2. Location of the effective lower belt anchorage

5.4.2.1. Front seats, vehicle category M_1

In motor vehicles of category M_1 the angle α_1 (other than buckle side) shall be within the range of 30 to 80 degrees and the angle α_2 (buckle side) shall be within the range of 45 to 80 degrees. Both angle requirements shall be valid for all normal travelling positions of the front seats. Where at least one of the angles α_1 and α_2 is constant (e.g. anchorage fixed at the seat) in all normal positions of use, its value shall be $60 \pm 10^\circ$. In the case of adjustable seats with an adjusting device as described in paragraph 2.12 with a seatback angle of less than 20° (see Annex 3, figure 1), the angle α_1 may be below the minimum value (30°) stipulated above, provided it is not less than 20° in any normal position of use.

5.4.2.2. Rear seats, vehicle category M_1

In motor vehicles of category M_1 the angles α_1 and α_2 shall be within the range of 30 to 80 degrees for all rear seats. If rear seats are adjustable the above angles shall be valid for all normal travelling positions.

5.4.2.3. Front seats, vehicle categories other than M_1

In motor vehicles of categories other than M_1 the angles α_1 and α_2 must be between 30 and 80 degrees for all normal travelling positions of the front seats. Where in the case of front seats of vehicles having a maximum vehicle mass not exceeding 3,5 tonnes at least one of the angles α_1 and α_2 is constant in all normal positions of use, its value shall be $60 \pm 10^\circ$ (e.g. anchorage fixed at the seat).

5.4.2.4. Rear seats and special front or rear seats, vehicle categories other than M_1

In vehicles of categories other than M_1 , in the case of:

(a) bench seats;

(b) adjustable seats (front and rear) with an adjusting device as described in paragraph 2.12 with a seatback angle of less than 20° (see Annex 3, figure 1); and

(c) other rear seats;

angles α_1 and α_2 may be between 20° and 80° in any normal position of use. Where in the case of front seats of vehicles having a maximum vehicle mass not exceeding 3,5 tonnes at least one of the angles α_1 and α_2 is constant in all normal positions of use, its value shall be $60 \pm 10^\circ$ (e.g. anchorage fixed at the seat).

In the case of seats, other than front seats, of vehicles in categories M_2 and M_3 , the angles α_1 and α_2 shall be between 45 and 90 degrees for all normal positions of use.

5.4.2.5. The distance between the two vertical planes parallel to the median longitudinal plane of the vehicle and each passing through a different one of the two effective lower belt anchorages L_1 and L_2 of the same safety-belt shall not be less than 350 mm. In the case of any central seating positions in rear rows of seats of vehicles of category M_1 and N_1 , the abovementioned distance shall be not less than 240 mm, provided that it is not possible to exchange the centre rear seat with any of the other seats of the vehicle. The median longitudinal plane of the seat shall pass between points L_1 and L_2 and shall be at least 120 mm from these points.

5.4.3. Location of the effective upper belt anchorages (see Annex 3)

5.4.3.1. If a strap guide or similar device is used which affects the location of the effective upper belt anchorage, this location shall be determined in a conventional way by considering the position of the anchorage when the longitudinal centre line of the strap passes through a point J_1 defined successively from the R point by the following three segments:

RZ: a segment of the torso line measured in an upward direction from R and 530 mm long;

ZX: a segment perpendicular to the median longitudinal plane of the vehicle, measured from point Z in the direction of the anchorage and 120 mm long;

X J_1 : a segment perpendicular to the plane defined by segments RZ and ZX, measured in a forward direction from point X and 60 mm long.

Point J_2 is determined by symmetry with point J_1 about the longitudinal vertical plane passing through the torso line described in paragraph 5.1.2 of the manikin positioned in the seat in question.

Where a two-door configuration is used to provide access to both the front and rear seats and the upper anchorage is fitted to the 'B' post, the system must be designed so as not to impede access to or egress from the vehicle.

5.4.3.2. The effective upper anchorage shall lie below the plane FN, which runs perpendicular to the longitudinal median plane of the seat and makes an angle of 65° with the torso line. The angle may be reduced to 60° in the case of rear seats. The plane FN shall be so placed as to intersect the torso line at a point D such that $DR = 315 \text{ mm} + 1,8 S$. However, when $S \leq 200 \text{ mm}$, then $DR = 675 \text{ mm}$.

5.4.3.3. The effective upper belt anchorage shall lie behind a plane FK running perpendicular to the longitudinal median plane of the seat and intersecting the torso line at an angle of 120° at a point B such that $BR = 260 \text{ mm} + S$. Where $S \geq 280 \text{ mm}$, the manufacturer may use $BR = 260 \text{ mm} + 0,8 S$ at his discretion.

5.4.3.4. The value of S shall not be less than 140 mm.

5.4.3.5. The effective upper belt anchorage shall be situated to the rear of a vertical plane perpendicular to the median longitudinal plane of the vehicle and passing through the R point as shown in Annex 3.

5.4.3.6. The effective upper belt anchorage shall be situated above a horizontal plane passing through point C defined in paragraph 5.1.4.

5.4.3.7. In addition to the upper anchorage specified in paragraph 5.4.3.1 other effective upper anchorages may be provided if one of the following conditions is satisfied:

5.4.3.7.1. The additional anchorages comply with the requirements of paragraphs 5.4.3.1 to 5.4.3.6.

5.4.3.7.2. The additional anchorages can be used without the aid of tools, comply with the requirements of paragraphs 5.4.3.5 and 5.4.3.6 and are located in one of the areas determined by shifting the area shown in figure 1 of Annex 3 of this Regulation, 80 mm upwards or downwards in a vertical direction.

- 5.4.3.7.3. The anchorage(s) is/are intended for a harness belt, complies/comply with the requirements laid down in paragraph 5.4.3.6 if it lie(s) behind the transverse plane passing through the reference line and is/are located:
- 5.4.3.7.3.1. In the case of a single anchorage, within the area common to two dihedrals defined by the verticals passing through points J_1 and J_2 as defined in paragraph 5.4.3.1 and whose horizontal sections are shown in figure 2 of Annex 3 to this Regulation;
- 5.4.3.7.3.2. In the case of two anchorages, within whichever of the above defined dihedrals is suitable, provided that each anchorage is not more than 50 mm distant from the symmetrically-located, mirror-image position of the other anchorage about plane P, as defined in paragraph 5.1.6 of the seat in question.
- 5.5. Dimensions of threaded anchorage holes
- 5.5.1. An anchorage shall have a threaded hole of 7/16 inch (20 UNF 2B).
- 5.5.2. If the vehicle is fitted by the manufacturer with safety-belts which are attached to all anchorages prescribed for the seat in question, these anchorages need not meet the requirement set out in paragraph 5.5.1, provided that they comply with the other provisions of this Regulation. In addition, the requirement set out in paragraph 5.5.1 shall not apply to additional anchorages which meet the requirement set out in paragraph 5.4.3.7.3.
- 5.5.3. It shall be possible to remove the safety-belt without damaging the anchorage.
6. TESTS
- 6.1. General tests for seat belt anchorages
- 6.1.1. Subject to application of the provisions of paragraph 6.2, and at the request of the manufacturer;
- 6.1.1.1. the tests may be carried out either on a vehicle structure or on a completely finished vehicle;
- 6.1.1.2. The tests may be restricted to the anchorages relating to only one seat or one group of seats on the condition that:
- (a) the anchorages concerned have the same structural characteristics as the anchorages relating to the other seats or group of seats; and
- (b) where such anchorages are fitted totally or partially on the seat or group of seats, the structural characteristics of the seat or group of seats are the same as those for the other seats or groups of seats;
- 6.1.1.3. windows and doors may be fitted or not and closed or not;
- 6.1.1.4. any fitting normally provided and likely to contribute to the rigidity of the vehicle structure may be fitted.
- 6.1.2. The seats shall be fitted and placed in the position for driving or use chosen by the technical service responsible for conducting approval tests to give the most adverse conditions with respect to the strength of the system. The position of the seats shall be stated in the report. The seat-back shall, if its inclination is adjustable, be locked as specified by the manufacturer or, in the absence of any such specification, in a position corresponding to an effective seat-back angle as close as possible to 25° for vehicles of categories M_1 and N_1 and to 15° for vehicles of all other categories.
- 6.2. Securing the vehicle for seat belt anchorages tests and for Isofix anchorages tests
- 6.2.1. The method used to secure the vehicle during the test shall not be such as to strengthen the seat belt anchorages or the Isofix anchorages and their anchorage area or to lessen the normal deformation of the structure.

- 6.2.2. A securing device shall be regarded as satisfactory if it produces no effect on an area extending over the whole width of the structure and if the vehicle or the structure is blocked or fixed in front at a distance of not less than 500 mm from the anchorage to be tested and is held or fixed at the rear not less than 300 mm from that anchorage.
- 6.2.3. It is recommended that the structure should rest on supports arranged approximately in line with the axes of the wheels or, if that is not possible, in line with the points of attachment of the suspension.
- 6.2.4. If a securing method other than that prescribed in paragraphs 6.2.1 to 6.2.3 of this Regulation is used, evidence must be furnished that it is equivalent.
- 6.3. General test requirements for seat belt anchorages
- 6.3.1. All the belt anchorages of the same group of seats shall be tested simultaneously. However, if there is a risk that non-symmetrical loading of the seats and/or anchorages may lead to failures, an additional test may be carried out with non-symmetrical loading.
- 6.3.2. The tractive force shall be applied in a direction corresponding to the seating position at an angle of 10 degrees $\pm$ 5° above the horizontal in a plane parallel to the median longitudinal plane of the vehicle.
- A preload of 10 per cent with a tolerance of $\pm$ 30 per cent of the target load shall be applied; the load shall be increased to 100 per cent of the relevant target load.
- 6.3.3. Full application of the load shall be achieved as rapidly as possible, and within a maximum load application time of 60 seconds.
- However, the manufacturer may request the application of the load to be achieved within 4 seconds.
- The belt anchorages must withstand the specified load for not less than 0,2 second.
- 6.3.4. Traction devices to be used in the tests described in paragraph 6.4 below are shown in Annex 5. The devices shown in Annex 5, figure 1 are placed onto the seat cushion and then, when possible, pushed back into the seat back while the belt strap is pulled tight around it. The device shown in Annex 5, figure 2 is placed in position, the belt strap is fitted over the device and pulled tight. No preload beyond the minimum necessary for correct positioning of the test device shall be introduced to safety-belt anchorages during this operation.
- The traction device of either 254 mm or 406 mm used at each seating position shall be such that its width is as close as possible to the distance between the lower anchorages.
- The positioning of the traction device shall avoid any mutual influences during the pull test which adversely affects the load and load distribution.
- 6.3.5. The belt anchorages for seats for which upper belt anchorages are provided shall be tested under the following conditions:
- 6.3.5.1. Front outboard seats:
- The belt anchorages shall be submitted to the test prescribed in paragraph 6.4.1 in which the loads are transmitted to them by means of a device reproducing the geometry of a three-point belt equipped with a retractor having a pulley or strap guide at the upper belt anchorage. In addition, if the number of anchorages is more than that prescribed in paragraph 5.3, these anchorages shall be subjected to the test specified in paragraph 6.4.5, in which the loads shall be transmitted to the anchorages by means of a device reproducing the geometry of the type of safety-belt intended to be attached to them.

- 6.3.5.1.1. In the case where the retractor is not attached to the required outboard lower belt anchorage or in the case where the retractor is attached to the upper belt anchorage, the lower belt anchorages shall also be submitted to the test prescribed in paragraph 6.4.3.
- 6.3.5.1.2. In the above case the tests prescribed in paragraphs 6.4.1 and 6.4.3 can be performed on two different structures if the manufacturer so requests.
- 6.3.5.2. Rear outboard seats and all centre seats:
- The belt anchorages shall be subjected to the test prescribed in paragraph 6.4.2 in which the loads are transmitted to them by means of a device reproducing the geometry of a three-point safety-belt without a retractor, and to the test prescribed in paragraph 6.4.3, in which the loads are transmitted to the two lower belt anchorages by means of a device reproducing the geometry of a lap belt. The two tests can be performed on two different structures if the manufacturer so requests.
- 6.3.5.3. When a manufacturer supplies his vehicle with safety-belts, the corresponding belt anchorages may, at the request of the manufacturer, be submitted only to a test in which the loads are transmitted to them by means of a device reproducing the geometry of the type of belts to be attached to these anchorages.
- 6.3.6. If no upper belt anchorages are provided for the outboard seats and the centre seats, the lower belt anchorages shall be submitted to the test prescribed in paragraph 6.4.3, in which the loads are transmitted to these anchorages by means of a device reproducing the geometry of a lap belt.
- 6.3.7. If the vehicle is designed to accept other devices which do not enable the straps to be directly attached to belt anchorages without intervening sheaves, etc or which require belt anchorages supplementary to those mentioned in paragraph 5.3, the safety-belt or an arrangement of wires, sheaves, etc. representing the equipment of the safety-belt, shall be attached by such a device to the belt anchorages in the vehicle and the belt anchorages shall be subjected to the tests prescribed in paragraph 6.4, as appropriate.
- 6.3.8. A test method other than those prescribed in paragraph 6.3 may be used, but evidence must be furnished that it is equivalent.
- 6.4. Particular test requirements for seat belt anchorages
- 6.4.1. Test in configuration of a three-point belt incorporating a retractor having a pulley or strap guide at the upper belt anchorage
- 6.4.1.1. A special pulley or guide for the wire or strap appropriate to transmit the load from the traction device, or the pulley or strap guide supplied by the manufacturer shall be fitted to the upper belt anchorage.
- 6.4.1.2. A test load of $1\,350\text{ daN} \pm 20\text{ daN}$ shall be applied to a traction device (see Annex 5, figure 2) attached to the belt anchorages of the same belt, by means of a device reproducing the geometry of the upper torso strap of such a safety-belt. In the case of vehicles of categories other than M_1 and N_1 , the test load shall be $675 \pm 20\text{ daN}$, except that for M_3 and N_3 vehicles the test load shall be $450 \pm 20\text{ daN}$.
- 6.4.1.3. At the same time a tractive force of $1\,350\text{ daN} \pm 20\text{ daN}$ shall be applied to a traction device (see Annex 5, figure 1) attached to the two lower belt anchorages. In the case of vehicles of categories other than M_1 and N_1 , the test load shall be $675 \pm 20\text{ daN}$, except that for M_3 and N_3 vehicles the test load shall be $450 \pm 20\text{ daN}$.
- 6.4.2. Test in configuration of a three-point belt without retractor or with a retractor at the upper belt anchorage

- 6.4.2.1. A test load of $1\,350 \pm 20$ daN shall be applied to a traction device (see Annex 5, figure 2) attached to the upper belt anchorage and to the opposite lower belt anchorage of the same belt using, if supplied by the manufacturer, a retractor fixed at the upper belt anchorage. In the case of vehicles of categories other than M_1 and N_1 , the test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.
- 6.4.2.2. At the same time a tractive force of $1\,350 \pm 20$ daN shall be applied to a traction device (see Annex 5, figure 1) attached to the lower belt anchorages. In the case of vehicles of categories other than M_1 and N_1 , the test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.
- 6.4.3. Test in configuration of a lap belt
- A test load of $2\,225 \pm 20$ daN shall be applied to a traction device (see Annex 5, figure 1) attached to the two lower belt anchorages. In the case of vehicles of categories other than M_1 and N_1 , the test load shall be $1\,110 \pm 20$ daN, except that for M_3 and N_3 vehicles the test load shall be 740 ± 20 daN.
- 6.4.4. Test for belt anchorages located wholly within the seat structure or dispersed between the vehicle structure and the seat structure
- 6.4.4.1. The test specified in paragraphs 6.4.1, 6.4.2 and 6.4.3 above shall be performed, as appropriate, at the same time superimposing for each seat and for each group of seats a force as stated below.
- 6.4.4.2. The loads indicated in paragraphs 6.4.1, 6.4.2 and 6.4.3 above shall be supplemented by a force equal to 20 times the mass of the complete seat. The inertia load shall be applied to the seat or to the relevant parts of the seat corresponding to the physical effect of the mass of the seat in question to the seat anchorages. The determination of the additional applied load or loads and the load distribution shall be made by the manufacturer and agreed by the technical service.
- In the case of vehicles in categories M_2 and N_2 , this force must be equal to 10 times the mass of the complete seat; for categories M_3 and N_3 it shall be equal to 6,6 times the mass of the complete seat.
- 6.4.5. Test in configuration of a special-type belt
- 6.4.5.1. A test load of $1\,350 \pm 20$ daN shall be applied to a traction device (see Annex 5, figure 2) attached to the belt anchorages of such a safety-belt by means of a device reproducing the geometry of the upper torso strap or straps.
- 6.4.5.2. At the same time, a tractive force of $1\,350 \pm 20$ daN shall be applied to a traction device (see Annex 5, figure 3) attached to the two lower belt anchorages.
- 6.4.5.3. In the case of vehicles of categories other than M_1 and N_1 , this test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.
- 6.4.6. Test in the case of rearward-facing seats
- 6.4.6.1. The anchorage points shall be tested according to the forces prescribed in paragraphs 6.4.1, 6.4.2 or 6.4.3, as appropriate. In each case the test load shall correspond to the load prescribed for M_3 or N_3 vehicles.
- 6.4.6.2. The test load shall be directed forward in relation to the seating position in question, corresponding to the procedure prescribed in paragraph 6.3.
- 6.5. In the case of a group of seats as described in paragraph 1 of Annex 7, the dynamic test of Annex 7 can be performed, at the option of the car manufacturer, as an alternative to the static test prescribed in paragraphs 6.3 and 6.4.

- 6.6. Static test requirements.
- 6.6.1. The strength of the Isofix anchorage systems shall be tested applying the forces, as prescribed in paragraph 6.6.4.3, to the static force application device (SFAD) with Isofix attachments well engaged.
- In case of Isofix top-tether anchorage an additional test shall be performed as prescribed in paragraph 6.6.4.4.
- All the Isofix positions of a same seat row, which can be used simultaneously, shall be tested simultaneously.
- 6.6.2. The test may be carried out either on a completely finished vehicle or on sufficient parts of the vehicle so as to be representative of the strength and rigidity of the vehicle structure.
- Windows and doors may be fitted or not and closed or not.
- Any fitting normally provided and likely to contribute to the vehicle structure may be fitted.
- The test may be restricted to the Isofix position relating to only one seat or group of seats on the condition that:
- (a) the Isofix position concerned have the same structural characteristics as the Isofix position relating to the other seats or group of seats; and
 - (b) where such Isofix positions are fitted totally or partially on the seat or group of seats, the structural characteristics of the seat or group of seats are the same as those for the other seats or groups of seats.
- 6.6.3. If the seats and head restraint are adjustable, they shall be tested in the position defined by the technical service within the limited range prescribed by the car manufacturer as provided in Appendix 3 of Annex 17 of Regulation No 16.
- 6.6.4. Forces, directions and excursion limits.
- 6.6.4.1. A force of $135 \text{ N} \pm 15 \text{ N}$ shall be applied to the centre of the lower front crossbar of the SFAD in order to adjust the fore-aft position of the SFAD rearward extension to remove any slack or tension between the SFAD and its support.
- 6.6.4.2. Forces shall be applied to the static force application device (SFAD) in forward and oblique directions according to table 1.

Table 1

Directions of test forces

Forward	$0^\circ \pm 5^\circ$	$8 \text{ kN} \pm 0,25 \text{ kN}$
Oblique	$75^\circ \pm 5^\circ$ (to both sides of straight forward, or if any worst case side, or if both side are symmetric, only one side)	$5 \text{ kN} \pm 0,25 \text{ kN}$

Each of these tests may be performed on different structures if the manufacturer so requests.

Forces in the forward direction shall be applied with an initial force application angle of $10 \pm 5^\circ$ above the horizontal. Oblique forces shall be applied horizontally $0^\circ \pm 5^\circ$. A pre-load force of $500 \text{ N} \pm 25 \text{ N}$ shall be applied at the prescribed loading point X indicated in figure 2 Annex 9. Full application of the load shall be achieved as rapidly as possible, and within a maximum load application time of 30 seconds. However, the manufacturer may request the application of the load to be achieved within 2 seconds. The force shall be maintained for a minimum period of 0,2 s.

All measurements shall be made according to ISO 6487 with CFC of 60 Hz or any equivalent method.

6.6.4.3. Tests of Isofix anchorages system only:

6.6.4.3.1. Forward direction force test:

Horizontal longitudinal excursion (after pre-load) of point X of SFAD during application of the $8 \text{ kN} \pm 0,25 \text{ kN}$ force shall be limited to 125 mm and permanent deformation including partial rupture or breakage of any Isofix low anchorage or surrounding area shall not constitute failure if the required force is sustained for the specified time.

6.6.4.3.2. Oblique direction force test:

Excursion in the direction of the force (after pre-load) of point X of SFAD during application of the $5 \text{ kN} \pm 0,25 \text{ kN}$ force shall be limited to 125 mm and permanent deformation including partial rupture or breakage of any Isofix low anchorage or surrounding area shall not constitute failure if the required force is sustained for the specified time.

6.6.4.4. Test of Isofix anchorages systems and Isofix top-tether anchorage:

A tension pre-load of $50 \text{ N} \pm 5 \text{ N}$ must be applied between the SFAD and the top-tether anchorage. Horizontal excursion (after pre-load) of point X during application of the $8 \text{ kN} \pm 0,25 \text{ kN}$ force shall be limited to 125 mm and permanent deformation including partial rupture or breakage of any Isofix low anchorage and top-tether anchorage, or surrounding area shall not constitute failure if the required force is sustained for the specified time.

Table 2

Excursion limits

Force direction	Maximum excursion of point X of SFAD
Forward	125 mm longitudinal
Oblique	125 mm force direction

6.6.5. Additional forces.

6.6.5.1. Seat inertia forces.

For the installation position where the load is transferred into a vehicle seat assembly, and not directly into the vehicle structure, a test shall be carried out to ensure that the strength of the vehicle seat anchorages to the vehicle structure is sufficient. In this test, a force equal to 20 times the mass of the relevant parts of the seat assembly shall be applied horizontally and longitudinally in a forward direction to the seat or the relevant part of the seat assembly corresponding to the physical effect of the mass of the seat in question to the seat anchorages. The determination of the additional applied load or loads and the load distribution shall be made by the manufacturer and agreed by the technical service.

At the request of the manufacturer, the additional load can be applied at the X point of SFAD during the static tests described above.

If the top-tether anchorage is integrated to the vehicle seat, this test shall be performed with the Isofix top-tether strap.

No breakage shall occur and excursion requirements given in the table 2 have to be fulfilled.

Note: This test does not have to be performed in case of any anchorage of the vehicle safety-belt system is integrated to the vehicle seat structure, and the vehicle seat is already tested and approved to meet the anchorage load tests required by this Regulation for adult passenger restraint.

7. INSPECTION DURING AND AFTER STATIC TESTS FOR SAFETY-BELT ANCHORAGES

- 7.1. All the anchorages shall be capable of withstanding the test prescribed in paragraphs 6.3 and 6.4. Permanent deformation, including partial rupture or breakage of any anchorage or surrounding area, shall not constitute failure if the required force is sustained for the specified time. During the test, the minimum spacings for the effective lower belt anchorages specified in paragraph 5.4.2.5 and the requirements of paragraph 5.4.3.6 for effective upper belt anchorages shall be respected.

- 7.1.1. For vehicles of category M₁ of a total permissible mass not exceeding 2,5 tonnes, if the upper safety-belt anchorage is attached to the seat structure, the effective upper safety-belt anchorage shall not be displaced during the test forward of a transverse plane passing through the R point and point C of the seat in question (see figure 1 of Annex 3 to this Regulation)

For vehicles other than mentioned above, the effective upper safety-belt anchorage shall not be displaced during the test forward of a transverse plane inclined 10° in forward direction and passing through the R point of the seat.

The maximum displacement of the effective upper anchorage point shall be measured during the test.

If the displacement of the effective upper anchorage point exceeds the abovementioned limitation, the manufacturer shall demonstrate to the satisfaction of the technical service that there is no danger to the occupant. As an example, the test procedure according to Regulation No 94 or a sled test with corresponding pulse may be carried out to demonstrate a sufficient survival space.

- 7.2. In vehicles where such devices are used, the displacement and locking devices enabling the occupants of all seats to leave the vehicle must still be operable by hand after the tractive force was removed.
- 7.3. After testing any damage to the anchorages and structures supporting load during tests shall be noted.
- 7.4. By derogation, the upper anchorages fitted to one or more seats of vehicles of category M₃ and those of category M₂ with a maximum mass exceeding 3,5 tonnes, which meet the requirements of Regulation No 80, need not to comply with the requirements of paragraph 7.1 concerning compliance with paragraph 5.4.3.6.

8. MODIFICATIONS AND EXTENSION OF APPROVAL OF THE VEHICLE TYPE

- 8.1. Every modification of the vehicle type shall be notified to the administrative department which approved the vehicle type. The department may then either:
- 8.1.1. consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the vehicle still complies with the requirements; or
- 8.1.2. require a further test report from the technical service responsible for conducting the tests.
- 8.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 4.3 above to the Parties to the Agreement which apply this Regulation.

- 8.3. The competent authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.
9. CONFORMITY OF PRODUCTION
- The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2), with the following requirements:
- 9.1. Every vehicle bearing an approval mark as prescribed under this Regulation shall conform to the vehicle type approved with regard to details affecting the characteristics of the safety-belt anchorages and the Isofix anchorages system and Isofix top-tether anchorage.
- 9.2. In order to verify conformity as prescribed in paragraph 9.1 above, a sufficient number of serially-produced vehicles bearing the approval mark required by this Regulation shall be subjected to random checks.
- 9.3. As a general rule the checks as aforesaid shall be confined to the taking of measurements. However, if necessary, the vehicles shall be subjected to some of the tests described in paragraph 6 above, selected by the technical service conducting approval tests.
10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 10.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 9.1 above is not complied with or if its safety-belt anchorages or the Isofix anchorages system and Isofix top-tether anchorage failed to pass the checks prescribed in paragraph 9 above.
- 10.2. If a Contracting Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in Annex 1 to this Regulation.
11. OPERATING INSTRUCTIONS
- The national authorities may require the manufacturers of vehicles registered by them to state clearly in the instructions for operating the vehicle
- 11.1. where the anchorages are; and
- 11.2. for what types of belts the anchorages are intended (see Annex 1, item 5).
12. PRODUCTION DEFINITELY DISCONTINUED
- If the holder of the approval completely ceases to manufacture a type of safety-belt anchorages or a type of Isofix anchorages system and Isofix top-tether anchorage approved in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication that authority shall inform thereof the other Parties to the 1958 Agreement, which apply this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.
13. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS
- The Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension, or refusal or extension or withdrawal of approval, issued in other countries, are to be sent.

14. TRANSITIONAL PROVISIONS

- 14.1. As from the official date of entry into force of the 06 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approvals under this Regulation as amended by the 06 series of amendments.
- 14.2. As from two years after the enter into force of the 06 series of amendments to this Regulation, Contracting parties applying this Regulation shall grant ECE type approvals only if the requirements of this Regulation, as amended by the 06 series of amendments, are satisfied.
- 14.3. As from seven years after the enter into force of the 06 series of amendments to this Regulation, Contracting parties applying this Regulation may refuse to recognise approvals which were not granted in accordance with the 06 series of amendments to this Regulation. However, existing approvals of the vehicle categories which are not affected by the 06 series of amendments to this Regulation shall remain valid and Contracting Parties applying this Regulation shall continue to accept them.
- 14.4. For vehicles not affected by paragraph 7.1.1 above, approvals granted according to the 04 series of amendments to this Regulation shall remain valid.
- 14.5. For vehicles not affected by Supplement 4 to the 05 series of amendments to this Regulation the existing approvals shall remain valid, if they had been granted in compliance with the 05 series of amendments, up to its Supplement 3.
- 14.6. As from the official date of entry into force of Supplement 5 to the 05 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approvals under this Regulation as modified by Supplement 5 to the 05 series of amendments.
- 14.7. For vehicles not affected by Supplement 5 to the 05 series of amendments to this Regulation the existing approvals shall remain valid, if they had been granted in compliance with the 05 series of amendments, up to its Supplement 3.
- 14.8. As from 20 February 2005 for vehicles of category M1, Contracting Parties applying this Regulation shall grant ECE approvals only if the requirements of this Regulation, as amended by Supplement 5 to the 05 series of amendments, are satisfied.
- 14.9. As from 20 February 2007 for vehicles of category M1, Contracting Parties applying this Regulation may refuse to recognise approvals which were not granted in accordance with Supplement 5 to the 05 series of amendments to this Regulation.
- 14.10. As from 16 July 2006 for vehicles of category N, Contracting Parties applying this Regulation shall grant approval only if the vehicle type satisfies the requirements of this Regulation as amended by the Supplement 5 to the 05 series of amendments.
- 14.11. As from 16 July 2008 for vehicles of category N, Contracting Parties applying this Regulation may refuse to recognise approvals not granted in accordance with Supplement 5 to the 05 series of amendments to this Regulation.
- 14.12. 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.
- 14.13. As from 24 months after the date of entry into force of the 07 series of amendments, 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.
- 14.14. As from 36 months after the date of entry into force of the 07 series of amendments, Contracting Parties applying this Regulation may refuse to recognise approvals which were not granted in accordance with the 07 series of amendments to this Regulation.

- 14.15. Notwithstanding paragraphs 14.13 and 14.14, approvals of the vehicle categories to the preceding series of amendments to the Regulation which are not affected by the 07 series of amendments shall remain valid and Contracting Parties applying the Regulation shall continue to accept them.
- 14.16. As long as there are no requirements concerning the compulsory fitting of safety-belt anchorages for folding seats in their national requirements at the time of acceding to this Regulation, Contracting Parties may continue to allow this non-fitment for the purpose of national approval and in this case these bus categories cannot be type approved under this Regulation.
-

ANNEX 1

COMMUNICATION

(maximum format: A4 (210 × 297 mm))



issued by: Name of administration

.....

.....

.....

concerning ⁽²⁾: APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a vehicle type with regard to safety-belt anchorages and Isofix anchorages systems and Isofix top-tether anchorage if any pursuant to Regulation No 14

Approval No: Extension No:

1. Trade name or mark of the power-driven vehicle:
2. Type of vehicle:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Designation of the type of belts and retractors authorised for fitting to the anchorages with which the vehicle is equipped:

				Anchorage on (*)	
				vehicle structure	seat structure
Front	Right-hand seat	{	lower anchorages { outboard upper anchorage inboard		
	Middle seat	{	lower anchorages { right upper anchorage left		
	Left-hand seat	{	lower anchorages { outboard upper anchorage inboard		
Rear	Right-hand seat	{	lower anchorages { outboard upper anchorage inboard		
	Middle seat	{	lower anchorages { right upper anchorage left		
	Left-hand seat	{	lower anchorages { outboard upper anchorage inboard		

(*) Insert in the actual position the following letter(s):

'A' for a three-point belt,
 'B' for lap belts,
 'S' for special-type belts; in this case the type shall be stated under 'Remarks',
 'Ar', 'Br' or 'Sr' for belts with retractors,
 'Ae', 'Be' or 'Se' for belts with an energy absorption device,
 'Are', 'Bre' or 'Sre' for belts with retractors and energy-absorption devices on at least one anchorage.

Remarks:

6. Description of seats ⁽³⁾:
7. Description of the adjustment, displacement and locking systems either of the seat or of its parts ⁽³⁾:
8. Description of seat anchorage ⁽³⁾:
9. Description of particular type of safety-belt required in the case of an anchorage located in the seat structure or incorporating an energy-dissipating device:
10. Vehicle submitted for approval on:
11. Technical service responsible for conducting approval tests:.....
12. Date of report issued by that service:
13. Number of report issued by that service:
14. Approval granted/extended/refused/withdrawn ⁽²⁾:
15. Position of approval mark on vehicle:
16. Place:
17. Date:
18. Signature:
19. The following documents, filed with the administration service which has granted approval and available on request are annexed to this communication:
 - drawings, diagrams and plans of the belt anchorages, Isofix anchorages systems, of the top-tether anchorages if any, and of the vehicle structure;
 - photographs of the belt anchorages, of the Isofix anchorages systems, of the top-tether if any, and of the vehicle structure;
 - drawings, diagrams and plans of the seats, of their anchorage on the vehicle, of the adjustment and displacement systems of the seats and of their parts and of their locking devices ⁽³⁾;
 - photographs of the seats, of their anchorage, of the adjustment and displacement systems of the seats and of their parts, and of their locking devices ⁽³⁾.

⁽¹⁾ Distinguishing number of the country, which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

⁽²⁾ Strike out what does not apply.

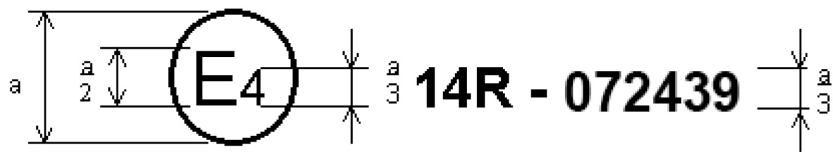
⁽³⁾ Only if the anchorage is affixed on the seat or if the seat supports the belt strap.

ANNEX 2

ARRANGEMENTS OF THE APPROVAL MARK

MODEL A

(see paragraph 4.4 of this Regulation)

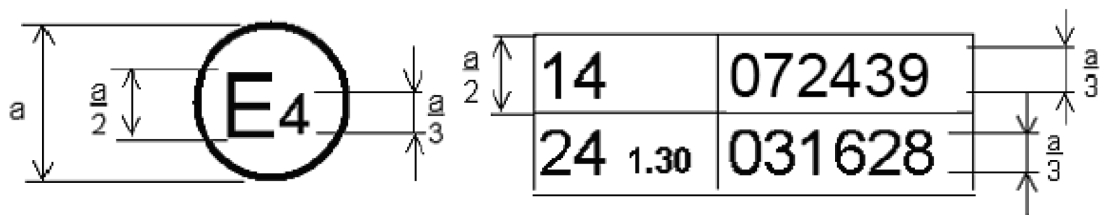


a = 8 mm min.

The above approval mark affixed to a vehicle shows that the vehicle type concerned has, with regard to safety-belt anchorages, been approved in the Netherlands (E 4), pursuant to Regulation No 14, under the number 072439. The first two digits of the approval number indicate that Regulation No 14 already included the 07 series of amendments when the approval was given.

MODEL B

(see paragraph 4.5 of this Regulation)



a = 8 mm min.

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 14 and 24 (*). (In the case of the latter Regulation the corrected absorption co-efficient is 1,30 m⁻¹). The approval numbers indicate that on the dates on which these approvals were granted, Regulation No 14 included the 07 series of amendments and Regulation No 24 was in its 03 series of amendments.

(*) The second number is given merely as an example.

ANNEX 4

PROCEDURE FOR DETERMINING THE 'H' POINT AND THE ACTUAL TORSO ANGLE FOR SEATING POSITIONS IN MOTOR VEHICLES**1. PURPOSE**

The procedure described in this Annex is used to establish the 'H' point location and the actual torso angle for one or several seating positions in a motor vehicle and to verify the relationship of measured data to design specifications given by the vehicle manufacturer ⁽¹⁾.

2. DEFINITIONS

For the purposes of this Annex:

- 2.1. 'reference data' means one or several of the following characteristics of a seating position:
 - 2.1.1. the 'H' point and the 'R' point and their relationship,
 - 2.1.2. the actual torso angle and the design torso angle and their relationship.
- 2.2. 'three-dimensional 'H' point machine' (3-D H machine) means the device used for the determination of 'H' points and actual torso angles. This device is described in Appendix 1 to this Annex;
- 2.3. '“H” point' means the pivot centre of the torso and the thigh of the 3-D H machine installed in the vehicle seat in accordance with paragraph 4 below. 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. The 'H' point corresponds theoretically to the 'R' point (for tolerances see paragraph 3.2.2 below). Once determined in accordance with the procedure described in paragraph 4, the 'H' point is considered fixed in relation to the seat-cushion structure and to move with it when the seat is adjusted;
- 2.4. '“R” point' or 'seating reference point' means a design point defined by the vehicle manufacturer for each seating position and established with respect to the three-dimensional reference system;
- 2.5. 'torso-line' means the centreline of the probe of the 3-D H machine with the probe in the fully rearward position;
- 2.6. '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 (for tolerances see paragraph 3.2.2 below);
- 2.7. 'design torso angle' means the angle measures 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;
- 2.8. 'centreplane 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 coordinate of the 'H' point on the 'Y' axis. For individual seats, the centreplane of the seat coincides with the centreplane of the occupant. For other seats, the centreplane of the occupant is specified by the manufacturer;
- 2.9. 'three-dimensional reference system' means a system as described in Appendix 2 to this Annex;
- 2.10. 'fiducial marks' are physical points (holes, surfaces, marks or indentations) on the vehicle body as defined by the manufacturer;
- 2.11. 'vehicle measuring attitude' means the position of the vehicle as defined by the coordinates of fiducial marks in the three-dimensional reference system.

⁽¹⁾ In any seating position other than front seats where the 'H' point cannot be determined using the 'Three-dimensional “H” point machine' or procedures, the 'R' point indicated by the manufacturer may be taken as a reference at the discretion of the competent authority.

3. REQUIREMENTS

3.1. Data presentation

For each seating position where reference data are required in order to demonstrate compliance with the provisions of the present Regulation, all or an appropriate selection of the following data shall be presented in the form indicated in Appendix 3 to this Annex:

- 3.1.1. the coordinates of the 'R' point relative to the three-dimensional reference system;
- 3.1.2. the design torso angle;
- 3.1.3. all indications necessary to adjust the seat (if it is adjustable) to the measuring position set out in paragraph 4.3 below.

3.2. Relationship between measured data and design specifications

- 3.2.1. The coordinates of the 'H' point and the value of the actual torso angle obtained by the procedure set out in paragraph 4 below shall be compared, respectively, with the coordinates of the 'R' point and the value of the design torso angle indicated by the vehicle manufacturer.
- 3.2.2. The relative positions of the 'R' point and the 'H' point and the relationship between the design torso angle and the actual torso angle shall be considered satisfactory for the seating position in question if the 'H' point, as defined by its coordinates, lies within a square of 50 mm side length with horizontal and vertical sides whose diagonals intersect at the 'R' point, and if the actual torso angle is within 5° of the design torso angle.
- 3.2.3. If these conditions are met, the 'R' point and the design torso angle shall be used to demonstrate compliance with the provisions of this Regulation.
- 3.2.4. If the 'H' point or the actual torso angle does not satisfy the requirements of paragraph 3.2.2 above, the 'H' point and the actual torso angle shall be determined twice more (three times in all). If the results of two of these three operations satisfy the requirements, the conditions of paragraph 3.2.3 above shall apply.
- 3.2.5. If the results of at least two of the three operations described in paragraph 3.2.4 above do not satisfy the requirements of paragraph 3.2.2 above, or if the verification cannot take place because the vehicle manufacturer has failed to supply information regarding the position of the 'R' point or regarding the design torso angle, the centroid of the three measured points or the average of the three measured angles shall be used and be regarded as applicable in all cases where the 'R' point or the design torso angle is referred to in this Regulation.

4. PROCEDURE FOR 'H' POINT AND ACTUAL TORSO ANGLE DETERMINATION

- 4.1. The vehicle shall be preconditioned at the manufacturer's discretion, at a temperature of 20 ± 10 °C to ensure that the seat material reached room temperature. If the seat to be checked has never been sat upon, a 70 to 80 kg person or device shall sit on the seat twice for one minute to flex the cushion and back. At the manufacturer's request, all seat assemblies shall remain unloaded for a minimum period of 30 min prior to installation of the 3-D H machine.
- 4.2. The vehicle shall be at the measuring attitude defined in paragraph 2.11 above.
- 4.3. The seat, if it is adjustable, shall be adjusted first to the rearmost normal driving or riding position, as indicated by the vehicle manufacturer, taking into consideration only the longitudinal adjustment of the seat, excluding seat travel used for purposes other than normal driving or riding positions. Where other modes of seat adjustment exist (vertical, angular, seat-back, etc.) these will then be adjusted to the position specified by the vehicle manufacturer. For suspension seats, the vertical position shall be rigidly fixed corresponding to a normal driving position as specified by the manufacturer.
- 4.4. The area of the seating position contacted by the 3-D H machine shall be covered by a muslin cotton, of sufficient size and appropriate texture, described as a plain cotton fabric having 18,9 threads per cm² and weighing 0,228 kg/m² or knitted or non-woven fabric having equivalent characteristics. If test is run on a seat outside the vehicle, the floor on which the seat is placed shall have the same essential characteristics⁽¹⁾ as the floor of the vehicle in which the seat is intended to be used.

⁽¹⁾ Tilt angle, height difference with a seat mounting, surface texture, etc.

- 4.5. Place the seat and back assembly of the 3-D H machine so that the centreplane of the occupant (C/LO) coincides with the centreplane of the 3-D H machine. At the manufacturer's request, the 3-D H machine may be moved inboard with respect to the C/LO if the 3-D H machine is located so far outboard that the seat edge will not permit levelling of the 3-D H machine.
- 4.6. Attach the foot and lower leg assemblies to the seat pan assembly, either individually or by using the T-bar and lower leg assembly. A line through the 'H' point sight buttons shall be parallel to the ground and perpendicular to the longitudinal centreplane of the seat.
- 4.7. Adjust the feet and leg positions of the 3-D H machine as follows:
 - 4.7.1. Designated seating position: driver and outside front passenger
 - 4.7.1.1. Both feet and leg assemblies shall be moved forward in such a way that the feet take up natural positions on the floor, between the operating pedals if necessary. Where possible the left foot shall be located approximately the same distance to the left of the centreplane of the 3-D H machine as the right foot is to the right. The spirit level verifying the transverse orientation of the 3-D H machine is brought to the horizontal by readjustment of the seat pan if necessary, or by adjusting the leg and foot assemblies towards the rear. The line passing through the 'H' point sight buttons shall be maintained perpendicular to the longitudinal centreplane of the seat.
 - 4.7.1.2. If the left leg cannot be kept parallel to the right leg and the left foot cannot be supported by the structure, move the left foot until it is supported. The alignment of the sight buttons shall be maintained.
 - 4.7.2. Designated seating position: outboard rear

For rear seats or auxiliary seats, the legs are located as specified by the manufacturer. If the feet then rest on parts of the floor, which are at different levels, the foot which first comes into contact with the front seat shall serve as a reference and the other foot shall be so arranged that the spirit level giving the transverse orientation of the seat of the device indicates the horizontal.
 - 4.7.3. Other designated seating positions:

The general procedure indicated in paragraph 4.7.1 above shall be followed except that the feet shall be placed as specified by the vehicle manufacturer.
- 4.8. Apply lower leg and thigh weights and level the 3-D H machine.
- 4.9. Tilt the back pan forward against the forward stop and draw the 3-D H machine away from the seat-back using the T-bar. Reposition the 3-D H machine on the seat by one of the following methods:
 - 4.9.1. If the 3-D H machine tends to slide rearward, use the following procedure. Allow the 3-D H machine to slide rearward until a forward horizontal restraining load on the T-bar is no longer required i.e. until the seat pan contacts the seat-back. If necessary, reposition the lower leg.
 - 4.9.2. If the 3-D H machine does not tend to slide rearward, use the following procedure. Slide the 3-D H machine rearwards by applying a horizontal rearward load to the T-bar until the seat pan contacts the seat-back (see figure 2 of Appendix 1 to this Annex).
- 4.10. Apply a 100 ± 10 N load to the back and pan assembly of the 3-D H machine at the intersection of the hip angle quadrant and the T-bar housing. The direction of load application shall be maintained along a line passing by the above intersection to a point just above the thigh bar housing (see figure 2 of Appendix 1 to this Annex). Then carefully return the back pan to the seat-back. Care must be exercised throughout the remainder of the procedure to prevent the 3-D H machine from sliding forward.
- 4.11. Install the right and left buttock weights and then, alternately, the eight torso weights. Maintain the 3-D H machine level.
- 4.12. Tilt the back pan forward to release the tension on the seat-back. Rock the 3-D H machine from side to side through 10° arc (5° to each side of the vertical centreplane) for three complete cycles to release any accumulated friction between the 3-D H machine and the seat.

During the rocking action, the T-bar of the 3-D H machine may tend to diverge from the specified horizontal and vertical alignment. The T-bar must therefore be restrained by applying an appropriate lateral load during the rocking motions. Care shall be exercised in holding the T-bar and rocking the 3-D H machine to ensure that no inadvertent exterior loads are applied in a vertical or fore and aft direction.

The feet of the 3-D H machine are not to be restrained or held during this step. If the feet change position, they should be allowed to remain in that attitude for the moment.

Carefully return the back pan to the seat-back and check the two spirits levels for zero position. If any movement of the feet has occurred during the rocking operation of the 3-D H machine, they must be repositioned as follows:

Alternately, lift each foot off the floor the minimum necessary amount until no additional foot movement is obtained. During this lifting, the feet are to be free to rotate; and no forward or lateral loads are to be applied. When each foot is placed back in the down position, the heel is to be in contact with the structure designed for this.

Check the lateral spirit level for zero position; if necessary, apply a lateral load to the top of the back pan sufficient to level the 3-D H machine's seat pan on the seat.

4.13. Holding the T-bar to prevent the 3-D H machine from sliding forward on the seat cushion, proceed as follows:

- (a) return the back pan to the seat-back;
- (b) alternately apply and release a horizontal rearward load, not to exceed 25 N, to the back angle bar at a height approximately at the centre of the torso weights until the hip angle quadrant indicates that a stable position has been reached after load release. Care shall be exercised to ensure that no exterior downward or lateral loads are applied to the 3-D H machine. If another level adjustment of the 3-D H machine is necessary, rotate the back pan forward, re-level, and repeat the procedure from paragraph 4.12.

4.14. Take all measurements:

4.14.1. The coordinates of the 'H' point are measured with respect to the three-dimensional reference system.

4.14.2. The actual torso angle is read at the back angle quadrant of the 3-D H machine with the probe in its fully rearward position.

4.15. If a re-run of the installation of the 3-D H machine is desired, the seat assembly should remain unloaded for a minimum period of 30 min prior to the re-run. The 3-D H machine should not be left loaded on the seat assembly longer than the time required to perform the test.

4.16. 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:

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

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

Appendix 1

DESCRIPTION OF THE THREE DIMENSIONAL 'H' POINT MACHINE (*)

(3-D H machine)

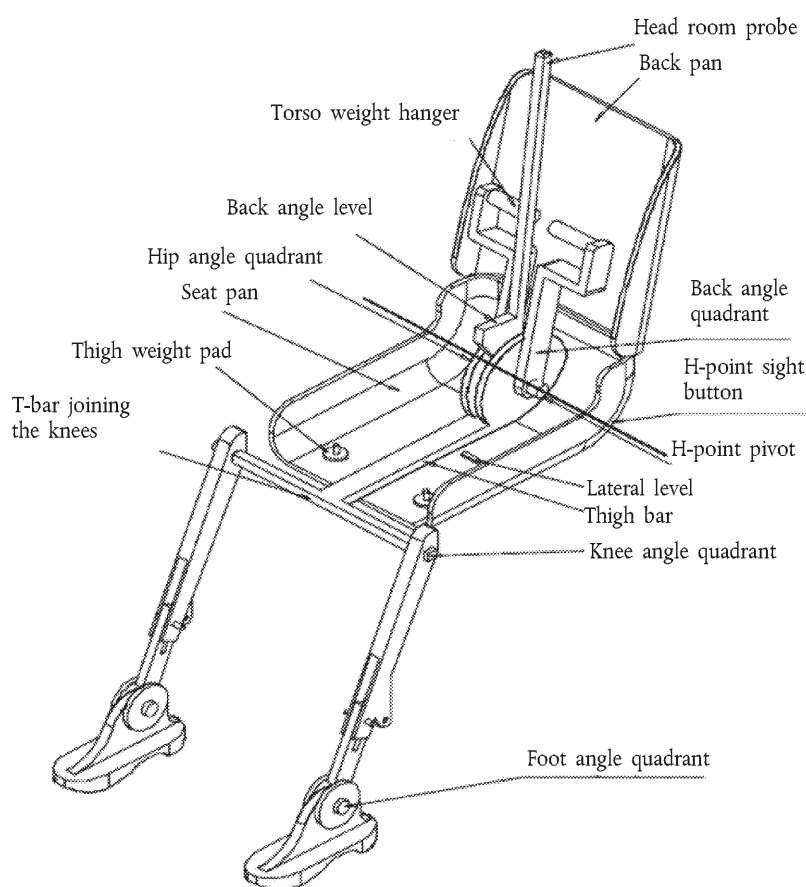
1. Back and seat pans

The back and seat pans are constructed of reinforced plastic and metal; they simulate the human torso and thigh and are mechanically hinged at the 'H' point. A quadrant is fastened to the probe hinged at the 'H' point to measure the actual torso angle. An adjustable thigh bar, attached to the seat pan, establishes the thigh centreline and serves as a baseline for the hip angle quadrant.

2. Body and leg elements

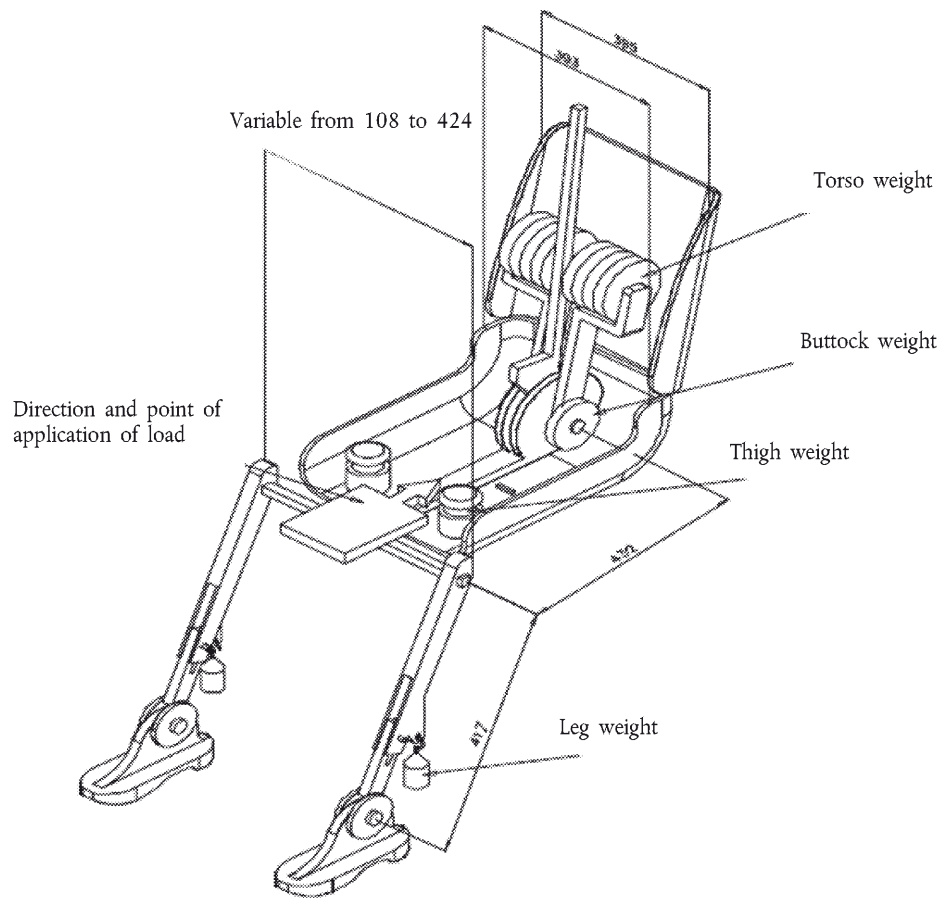
Lower leg segments are connected to the seat pan assembly at the T-bar joining the knees, which is a lateral extension of the adjustable thigh bar. Quadrants are incorporated in the lower leg segments to measure knee angles. Shoe and foot assemblies are calibrated to measure the foot angle. Two spirit levels orient the device in space. Body element weights are placed at the corresponding centres of gravity to provide seat penetration equivalent to a 76 kg male. All joints of the 3-D H machine should be checked for free movement without encountering noticeable friction.

Figure 1

3-D H machine elements designation

(*) For details of the construction of the 3-D H machine refer to Society of Automobile Engineers (SAE), 400 Commonwealth Drive, Warrendale, Pennsylvania 15096, United States of America.
The machine corresponds to that described in ISO Standard 6549:1980.

Figure 2

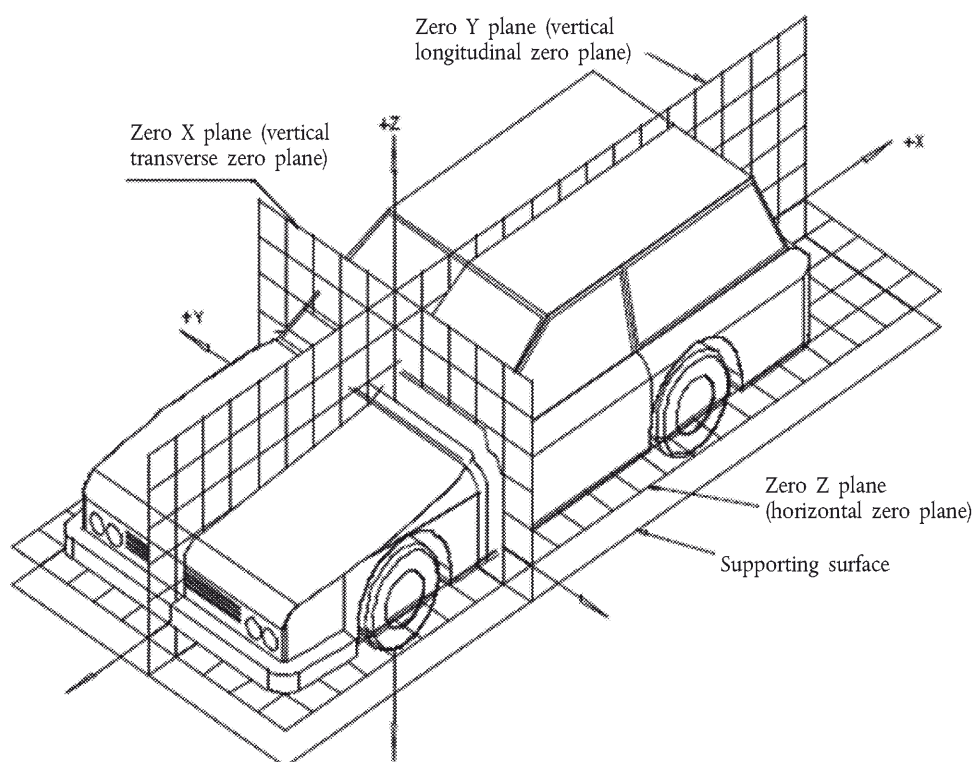
Dimensions of the 3-D H machine elements and load distribution

Appendix 2

THREE-DIMENSIONAL REFERENCE SYSTEM

1. The three-dimensional reference system is defined by three orthogonal planes established by the vehicle manufacturer (see figure) (*).
2. The vehicle measuring attitude is established by positioning the vehicle on the supporting surface such that the coordinates of the fiducial marks correspond to the values indicated by the manufacturer.
3. The coordinates of the 'R' point and the 'H' point are established in relation to the fiducial marks defined by the vehicle manufacturer.

Figure

Three-dimensional reference system

(*) The reference system corresponds to standard ISO 4130:1978.

Appendix 3

REFERENCE DATA CONCERNING SEATING POSITIONS

1. Coding of reference data

Reference data are listed consecutively for each seating position. Seating positions are identified by a two-digit code. The first digit is an Arabic numeral and designates the row of seats, counting from the front to the rear of the vehicle. The second digit is a capital letter, which designates the location of the seating position in a row, as viewed in the direction of forward motion of the vehicle; the following letters shall be used:

L = left

C = centre

R = right

2. Description of vehicle measuring attitude

2.1. Coordinates of fiducial marks

X

Y

Z

3. List of reference data

3.1. Seating position:

3.1.1. Coordinates of 'R' point

X

Y

Z

3.1.2. Design torso angle:

3.1.3. Specifications for seat adjustment (*)

horizontal:

vertical:

angular:

torso angle:

Note: List reference data for further seating positions under 3.2, 3.3, etc.

(*) Strike out what does not apply.

ANNEX 5

TRACTION DEVICE

Figure 1

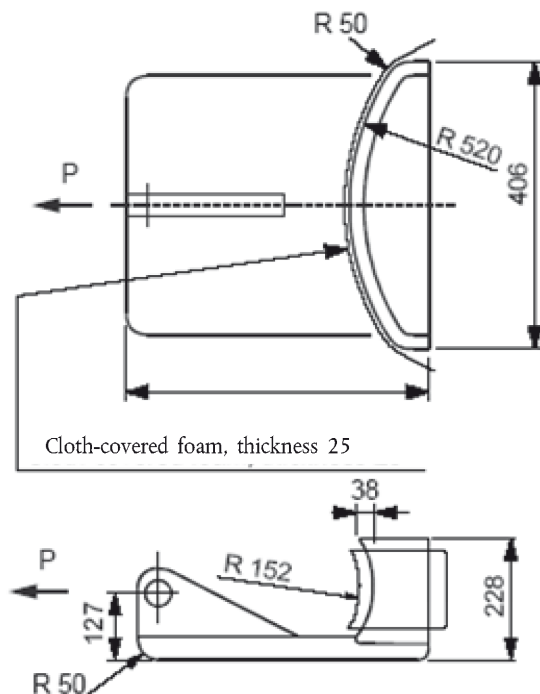
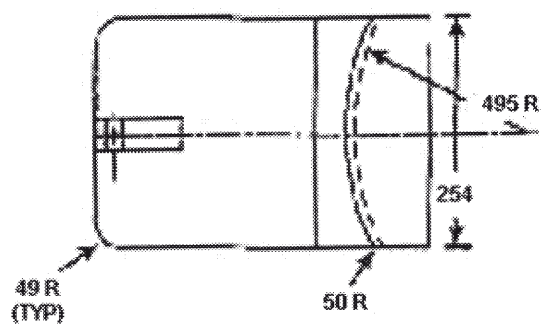


Figure 1a



NOTES

1. Block covered by 25 medium density canvas covered foam rubber
2. All dimensions are in millimetres (mm)

19 diameter through hole

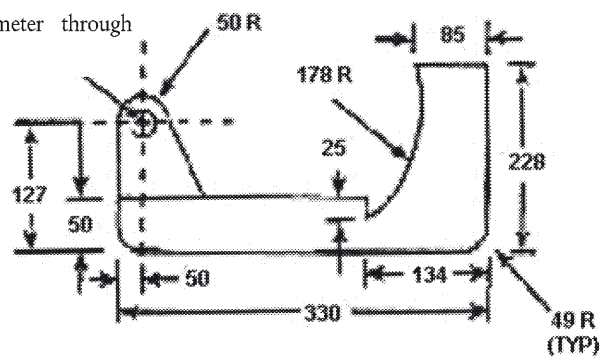
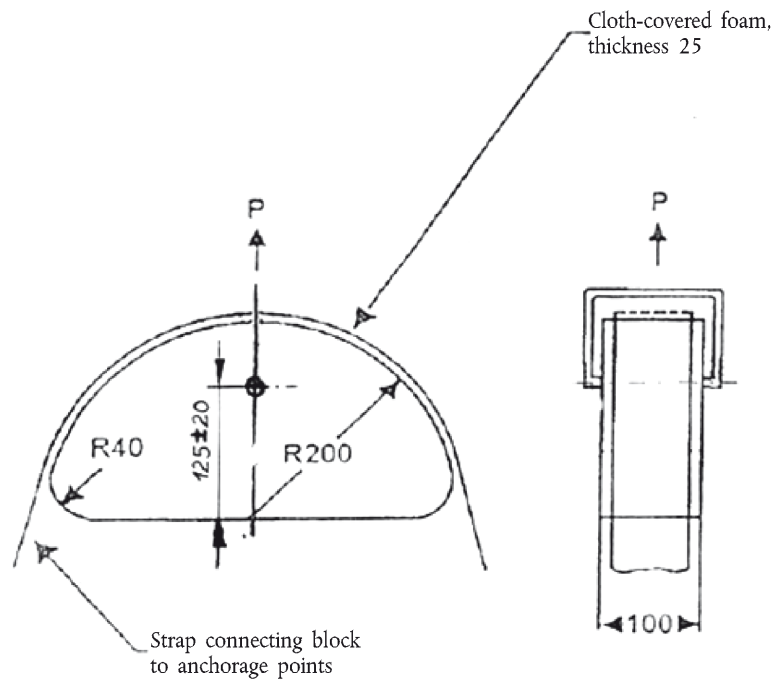


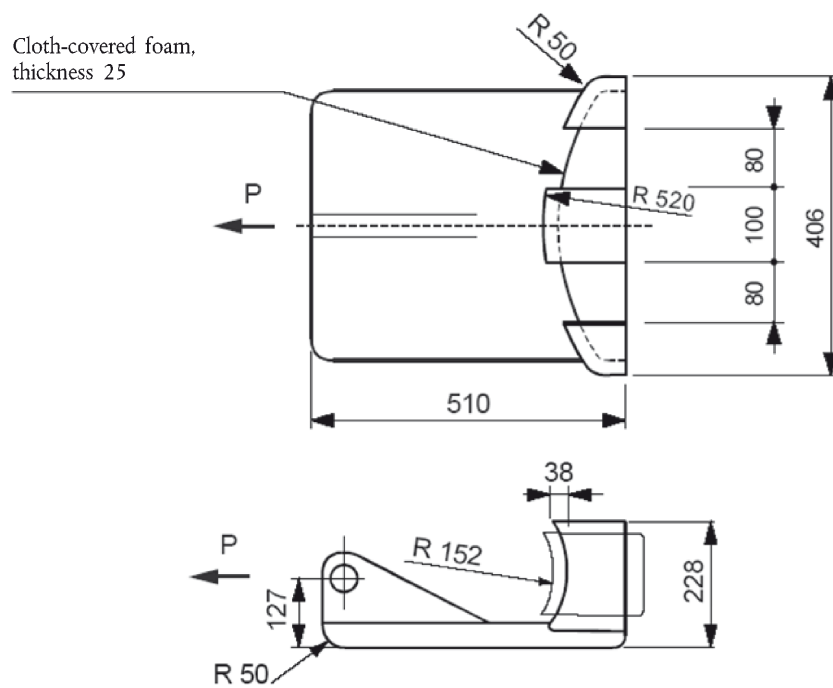
Figure 2



All dimensions are in millimetres

For the fixing of the strap the shoulder belt traction device may be modified by adding of two land edges and/or some bolts to avoid any drop off of the strap during the pull test.

Figure 3



All dimensions are in millimetres

ANNEX 6

MINIMUM NUMBER OF ANCHORAGE POINTS AND LOCATION OF LOWER ANCHORAGES

Vehicle category	Forward-facing seating positions				Rear-facing
	Outboard		Centre		
	Front	Other	Front	Other	
M ₁	3	3	3	3	2
M ₂ ≤ 3,5 tonnes	3	3	3	3	2
M ₃ & M ₂ > 3,5 tonnes	3 ⊕	3 or 2 	3 or 2 	3 or 2 	2
N ₁	3	3 or 2 ∅	3 or 2 *	2	2
N ₂ & N ₃	3	2	3 or 2 *	2	2

Key to symbols:

2: two lower anchorages, which allow the installation of a safety-belt type B, or of safety-belts types Br, Br3, Br4m or Br4Nm, where required by the Consolidated Resolution on the Construction of Vehicles (R.E.3), Annex 13, Appendix 1.

3: two lower anchorages and one upper anchorage which allow the installation of a three-point safety-belt type A, or of safety-belts types Ar, Ar4m or Ar4Nm, where required by the Consolidated Resolution on the Construction of Vehicles (R.E.3), Annex 13, Appendix 1.

∅: refers to paragraph 5.3.3 (two anchorages permitted if a seat is inboard of a passageway).

*: refers to paragraph 5.3.4 (two anchorages permitted if the windscreen is outside reference zone).

: refers to paragraph 5.3.5 (two anchorages permitted if nothing is in the reference zone).

⊕: refers to paragraph 5.3.7 (special provision for the upper deck of a vehicle).

Appendix

LOCATION OF LOWER ANCHORAGES — ANGLE REQUIREMENTS ONLY

Seat		M ₁	Other than M ₁
Front (*)	buckle side (α_2)	45° – 80°	30° – 80°
	other than buckle side (α_1)	30° – 80°	30° – 80°
	angle constant	50° – 70°	50° – 70°
	bench — buckle side (α_2)	45° – 80°	20° – 80°
	bench — other than buckle side (α_1)	30° – 80°	20° – 80°
	adjustable seat with seat back angle < 20°	45° – 80° (α_2) (*) 20° – 80° (α_1) (*)	20° – 80°
Rear ‡		30° – 80°	20° – 80° Ψ
Folding	No belt anchorage required. If anchorage fitted: see angle requirements Front and Rear.		

Notes:

*: outboard and centre.

(*) if angle is not constant see paragraph 5.4.2.1.

Ψ: 45° – 90° in the case of seats on M₂ and M₃ vehicles.

ANNEX 7

DYNAMIC TEST AS AN ALTERNATIVE TO THE SAFETY-BELT ANCHORAGES STATIC STRENGTH TEST**1. SCOPE**

This Annex describes a dynamic sled test that can be performed as an alternative to the safety-belt anchorages static strength test prescribed in paragraphs 6.3 and 6.4 of this Regulation.

This alternative can apply at the request of the car manufacturer in the case of a group of seats where all the seating positions are equipped with 3-point safety-belts to which thorax load limiter functions are associated and when the group of seats additionally comprises a seating position for which the upper safety-belt anchorage is located on the seat structure.

2. PRESCRIPTIONS

- 2.1. In the dynamic test prescribed in paragraph 3 of this Annex, there shall be no rupture of any anchorage or surrounding area. A programmed rupture necessary for the functioning of the load limiter device is however permitted.

The minimum spacings for the effective lower anchorages specified in paragraph 5.4.2.5 of this Regulation, and the requirements for the effective upper anchorages specified in paragraph 5.4.3.6 of this Regulation and, when applicable, completed by the following paragraph 2.1.1, shall be respected.

- 2.1.1. For vehicles of category M₁ of a total permissible mass not exceeding 2,5 tonnes, the upper safety-belt anchorage, if attached to the seat structure, shall not be displaced forward of a transverse plane passing through the R point and point C of the seat in question (see figure 1 of Annex 3 to this Regulation).

For vehicles other than mentioned above, the upper safety-belt anchorage shall not be displaced forward of a transverse plane inclined 10° in forward direction and passing through the R point of the seat.

- 2.2. In vehicles where such devices are used, the displacement and locking devices enabling the occupants of all seats to leave the vehicle must still be operable by hand after the test.
- 2.3. The vehicle owner's manual shall include indications that each safety-belt shall only be replaced by an approved safety-belt for the considered seating position in the vehicle, and shall in particular identify those seating positions which may only be fitted with an appropriate safety-belt equipped with a load limiter.

3. DYNAMIC TEST CONDITIONS**3.1. General conditions**

The general conditions described in paragraph 6.1 of this Regulation apply to the test described in this Annex.

3.2. Installation and preparation**3.2.1. Sled**

The sled must be so constructed that no permanent deformation appears after the test. It must be so guided that, during the impact phase, the deviation does not exceed 5° in the vertical plane and 2° in the horizontal plane.

3.2.2. Securing of the vehicle structure

The part of the vehicle structure considered essential for the vehicle rigidity regarding the seat anchorages and the safety-belt anchorages shall be secured on the sled, according to the disposals described in paragraph 6.2 of this Regulation.

3.2.3. Restraint systems

- 3.2.3.1. The restraint systems (the complete seats, the safety-belt assemblies and the load limiter devices) shall be mounted on the vehicle structure according to the series production vehicle specifications.

The vehicle environment facing the tested seat (dashboard, seat, etc., depending on the tested seat) can be mounted on the test sled. If there were a frontal airbag, it has to be deactivated.

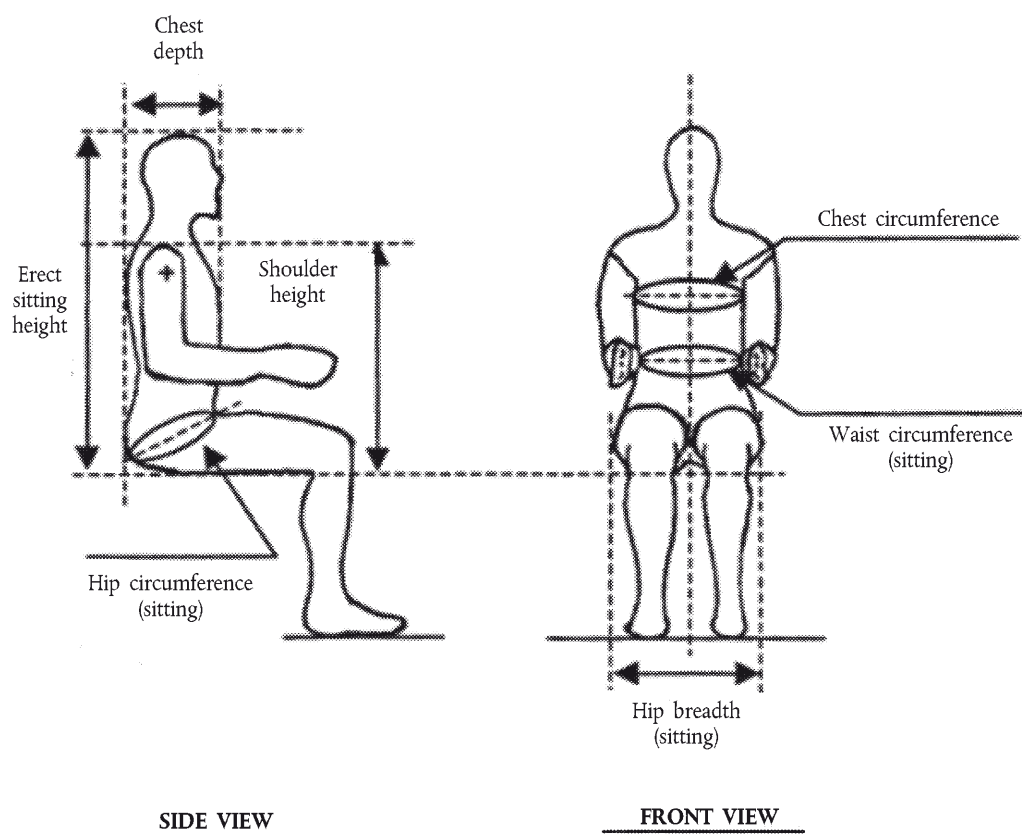
- 3.2.3.2. At the request of the car manufacturer and in agreement with the technical service in charge of the tests, some components of the restraint systems other than the complete seats, the safety-belt assemblies and the load limiter devices, may not be mounted on the test sled or may be replaced by components having equivalent or lower stiffness and whose dimensions are comprised in the vehicle interior fittings dimensions, provided that the tested configuration is at least as unfavourable as the series configuration regarding the forces applying to the seat and safety-belt anchorages.
- 3.2.3.3. The seats shall be adjusted as required in paragraph 6.1.2 of this Regulation, in the position for use chosen by the technical service in charge of the tests as the one giving the most adverse conditions regarding the anchorages strength and compatible with the installation of the dummies in the vehicle.
- 3.2.4. Dummies
- A dummy whose dimensions and mass are defined in Annex 8 shall be positioned on each seat and restrained by the safety-belt provided in the vehicle.
- No dummy instrumentation is required.
- 3.3. Test
- 3.3.1. The sled shall be so propelled that, during the test, its speed variation is 50 km/h. The sled deceleration shall be within the corridor specified in Annex 8 of Regulation No 16.
- 3.3.2. If applicable, the activation of additional restraining devices (preloading devices, etc., except airbags) is triggered according to the car manufacturer's indications.
- 3.3.3. It shall be checked that the safety-belt anchorages' displacement does not exceed the limits specified in paragraphs 2.1 and 2.1.1 of this Annex.
-

ANNEX 8

DUMMY SPECIFICATIONS (*)

Mass	97,5 ± 5 kg
Erect sitting height	965 mm
Hip breadth (sitting)	415 mm
Hip circumference (sitting)	1 200 mm
Waist circumference (sitting)	1 080 mm
Chest depth	265 mm
Chest circumference	1 130 mm
Shoulder height	680 mm
Tolerance on all length dimensions	± 5 per cent

Remark: A sketch explaining the dimensions is given in the figure below.



(*) Devices described in the Australian Design Rule (ADR) 4/03 and Federal Motor Vehicle Safety Standard (FMVSS) No. 208 are considered equivalent.

ANNEX 9

ISOFIX ANCHORAGES SYSTEMS AND ISOFIX TOP-TETHER ANCHORAGES

Figure 1

Static force application device (SFAD), isometric views

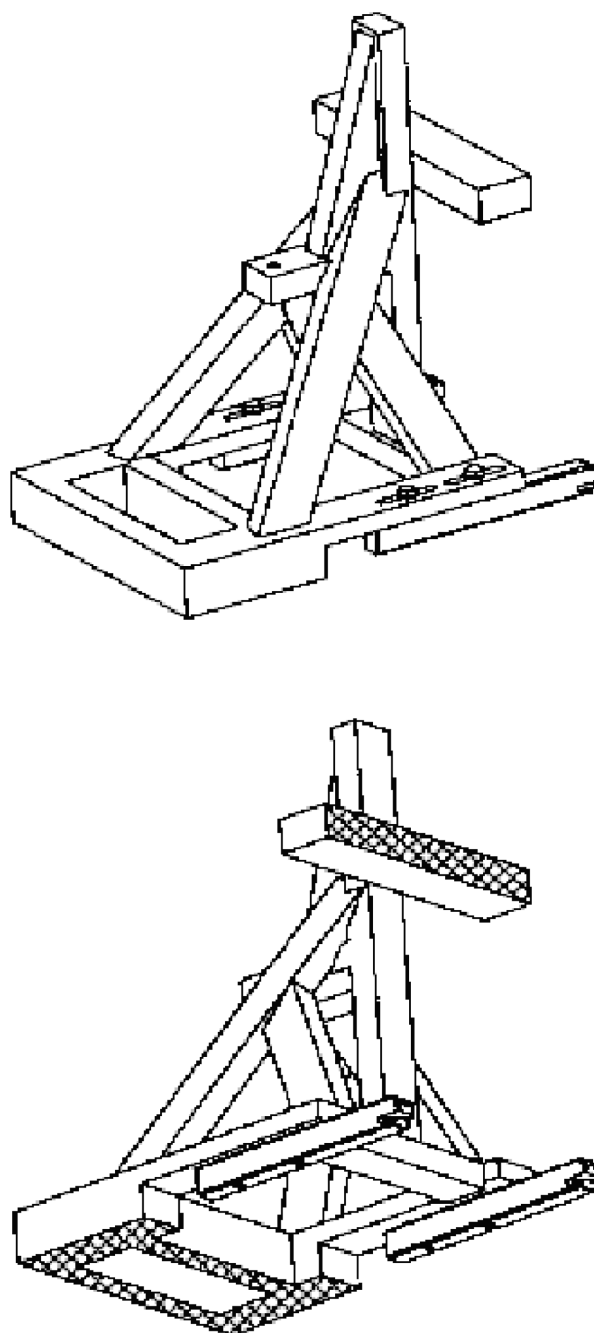
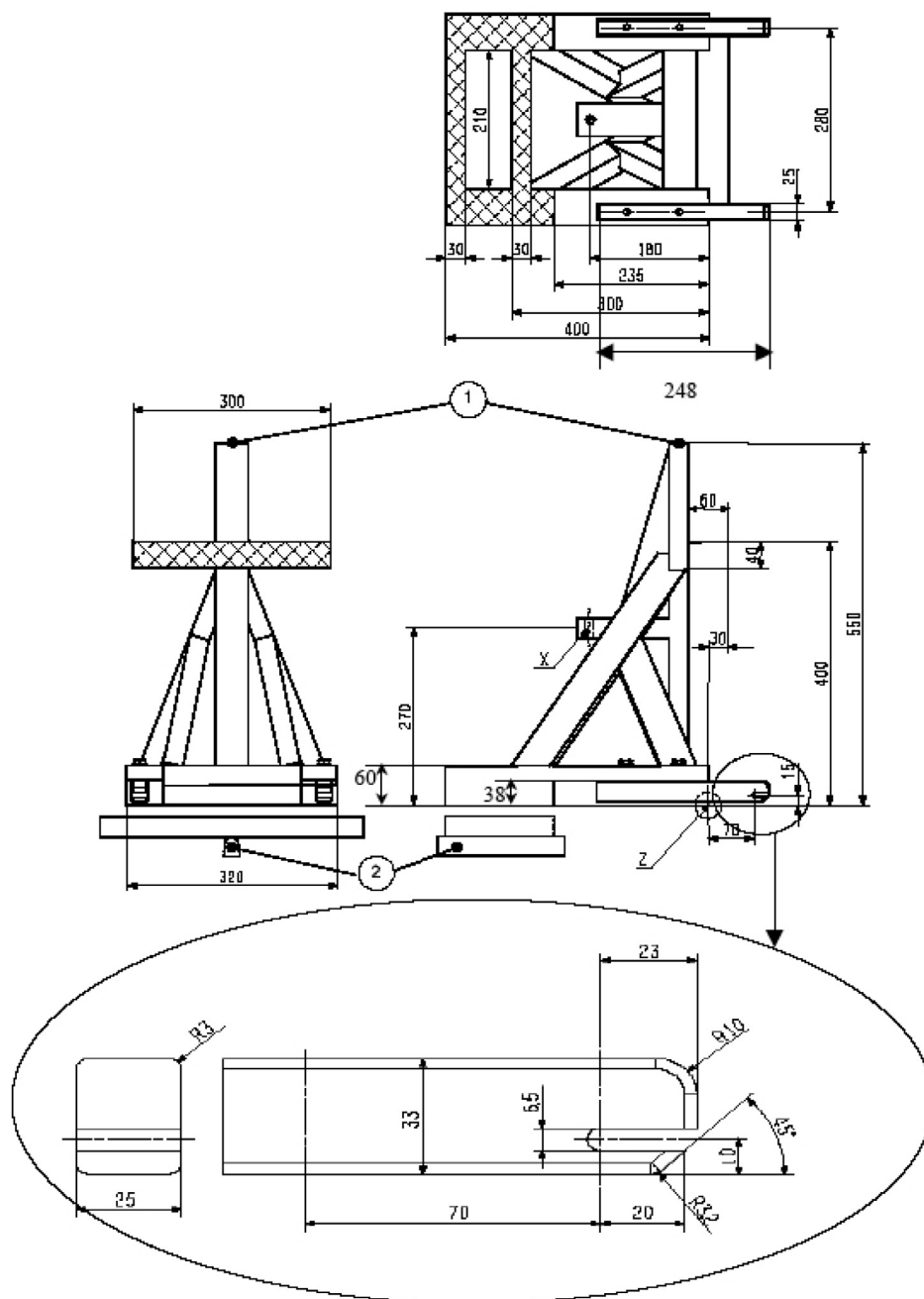


Figure 2

Static force application device (SFAD), dimensions



Dimensions are in millimetres

Key:

1. Top-tether attachment point.
2. Pivot attachment for stiffness testing as described below.

Stiffness of SFAD: When attached to rigid anchorage bar(s) with the front cross member of the SFAD supported by a rigid bar that is held at the centre by a longitudinal pivot 25 mm below the SFAD base (to allow bending and twisting of the SFAD base) the movement of point X shall not be greater than 2 mm in any direction when forces are applied in accordance with table No 1 of paragraph 6.6.4 of this Regulation. Any deformation of the Isofix anchorages system shall be excluded from the measurements.

Figure 5

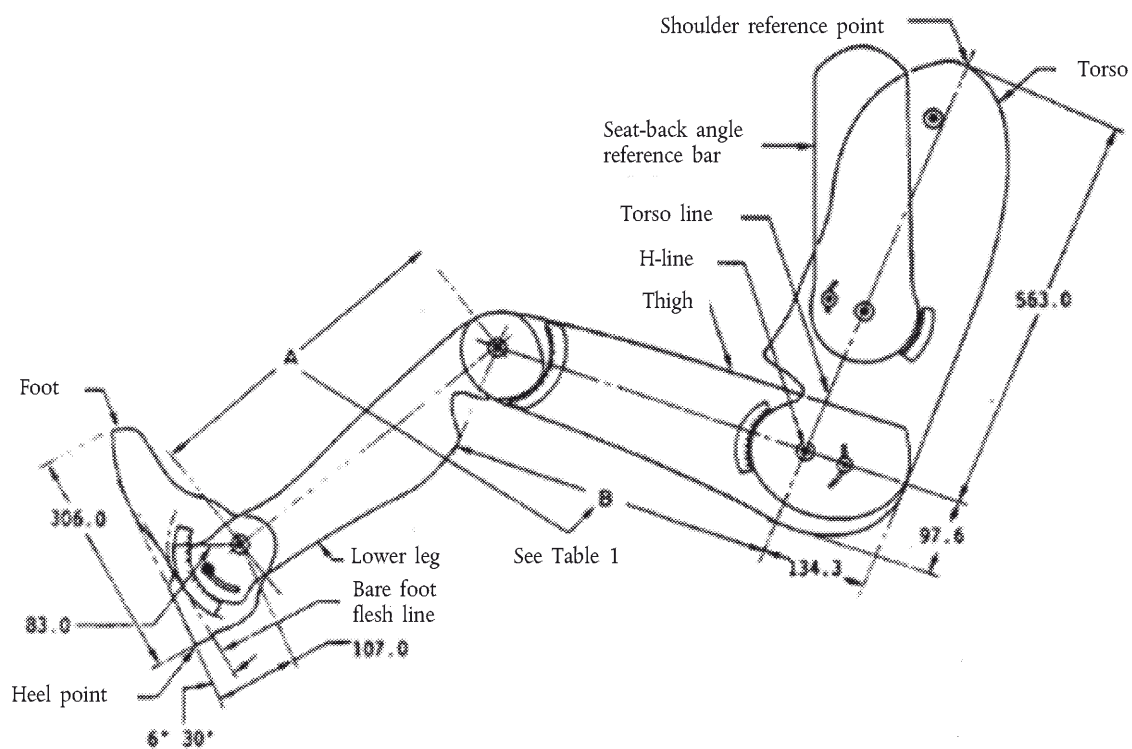
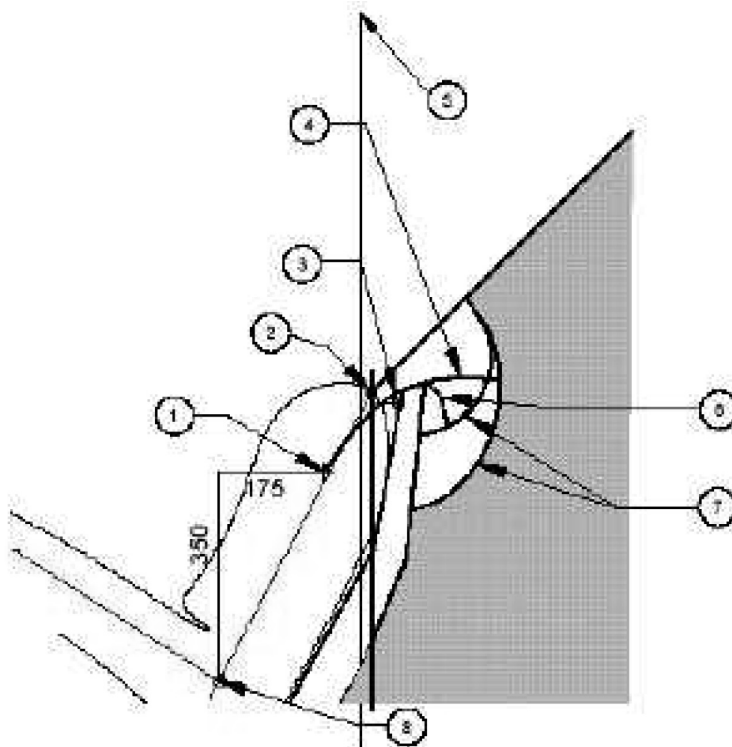
Two dimensions template

Figure 7

Isofix top-tether anchorage location, Isofix zone — enlarged side view of wrap-around area

Dimensions are in millimetres



1. 'V' point
2. 'R' point
3. 'W' point
4. Strap wrap-around length from 'V' point: 250 mm
5. Vertical longitudinal plane
6. Strap wrap-around length from 'W' point: 200 mm
7. Arcs created by wrap-around lengths
8. H-point

Note 1: Portion of top-tether anchorage that is designed to bind with the top-tether hook to be located within shaded zone.

Note 2: 'R' point: Shoulder reference point.

Note 3: 'V' point: V-reference point, 350 mm vertically above and 175 mm horizontally back from H-point.

Note 4: 'W' point: W-reference point, 50 mm vertically below and 50 mm horizontally back from 'R' point.

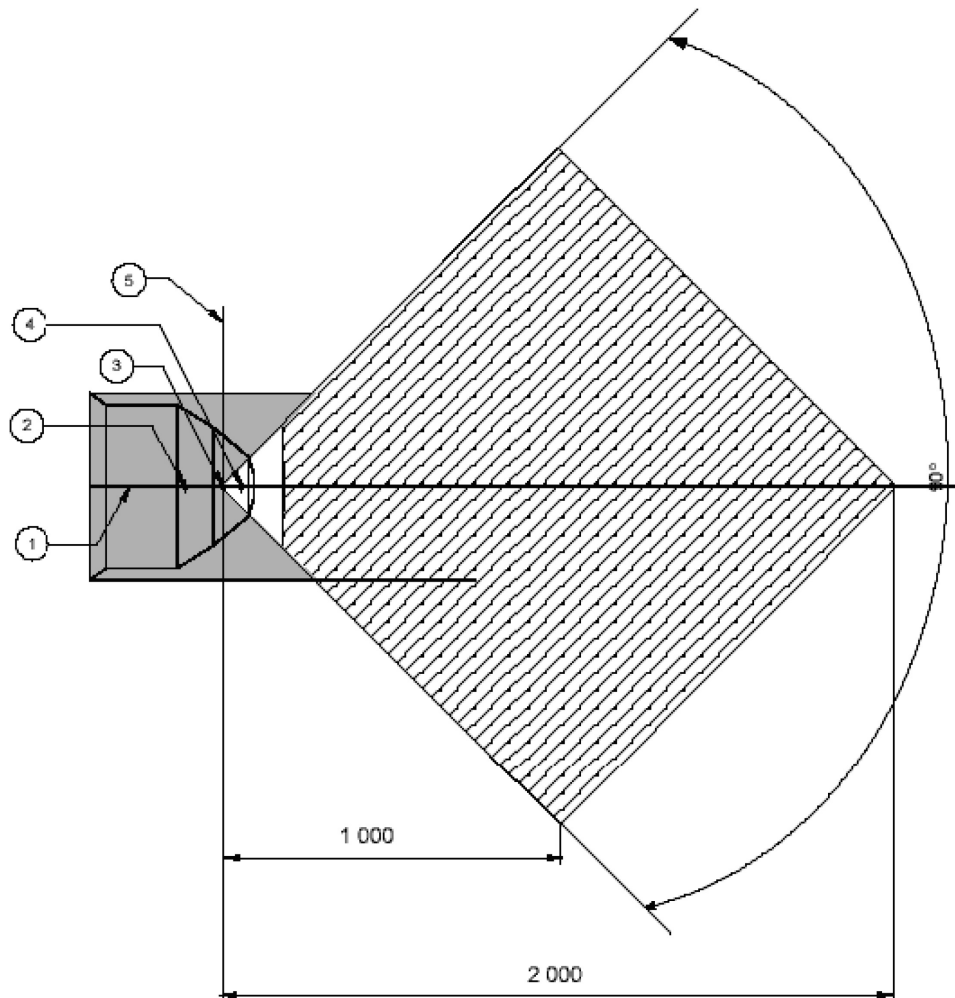
Note 5: 'M' plane: M-reference plane, 1 000 mm horizontally back from 'R' point.

Note 6: The forward-most surfaces of the zone are generated by sweeping the two wraparound lines throughout their extended range in the front part of the zone. The wraparound lines represent the minimum adjusted length of typical top-tether straps extending from either the top of the CRS (W-point) or lower on the back of the CRS (V-point).

Figure 8

**ISOFIX top-tether anchorage location, ISOFIX zone — plan view
(R-plane cross section)**

Dimensions are in millimetres



1. Median plane
2. 'V' point
3. 'R' point
4. 'W' point
5. Vertical longitudinal plane

Note 1: Portion of top-tether anchorage that is designed to bind with the top-tether hook to be located within shaded zone.

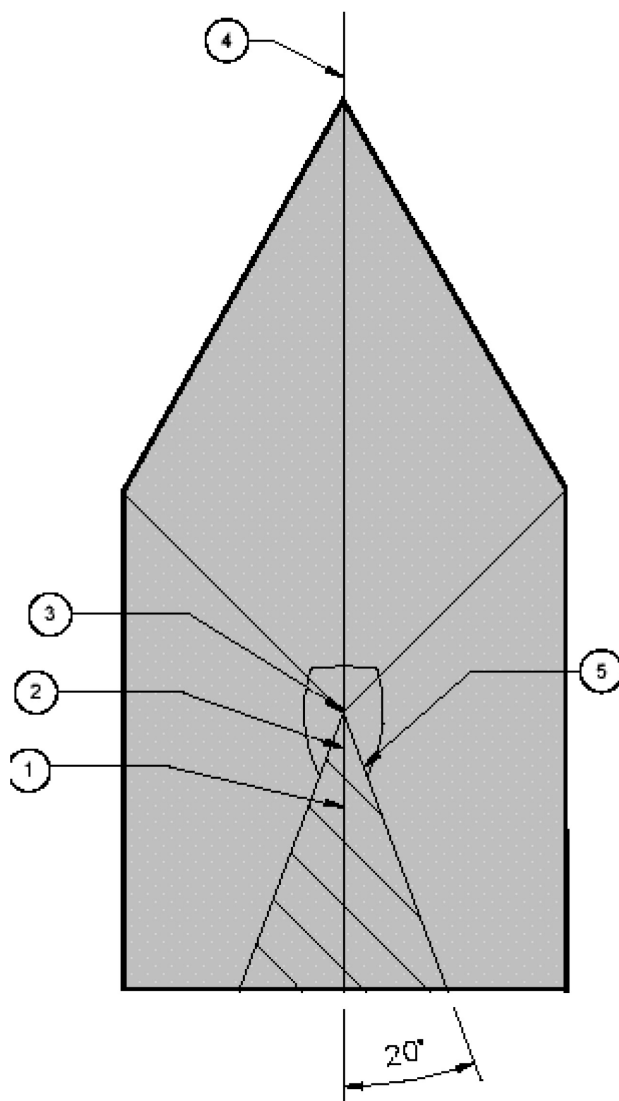
Note 2: 'R' point: Shoulder reference point.

Note 3: 'V' point: V-reference point, 350 mm vertically above and 175 mm horizontally back from H-point.

Note 4: 'W' point: W-reference point, 50 mm vertically below and 50 mm horizontally back from 'R' point.

Figure 9

ISOFIX top-tether anchorage location, ISOFIX zone — front view



1. 'V' point
2. 'W' point
3. 'R' point
4. Median plane
5. Area view along torso reference plane

Note 1: Portion of top-tether anchorage that is designed to bind with the top-tether hook to be located within shaded zone.

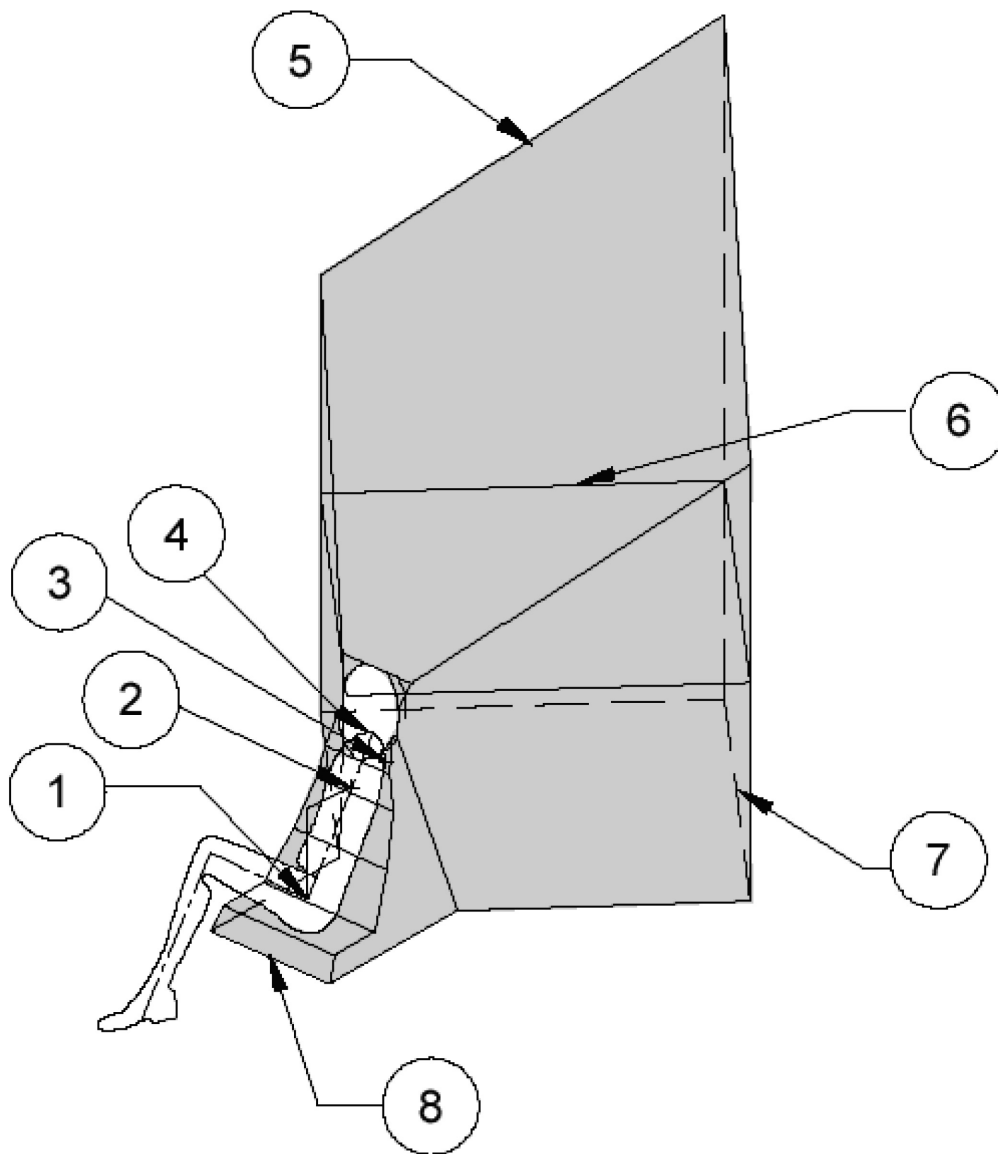
Note 2: 'R' point: Shoulder reference point.

Note 3: 'V' Point: V-reference point, 350 mm vertically above and 175 mm horizontally back from H-point.

Note 4: 'W' point: W-reference point, 50 mm vertically below and 50 mm horizontally back from 'R' point.

Figure 10

ISOFIX top-tether anchorage location, ISOFIX zone — three-dimensional schematic view



1. H-point
2. 'V' point
3. 'W' point
4. 'R' point
5. 45° plane
6. 'R' plane cross-section
7. Floor pan surface
8. Front edge of zone

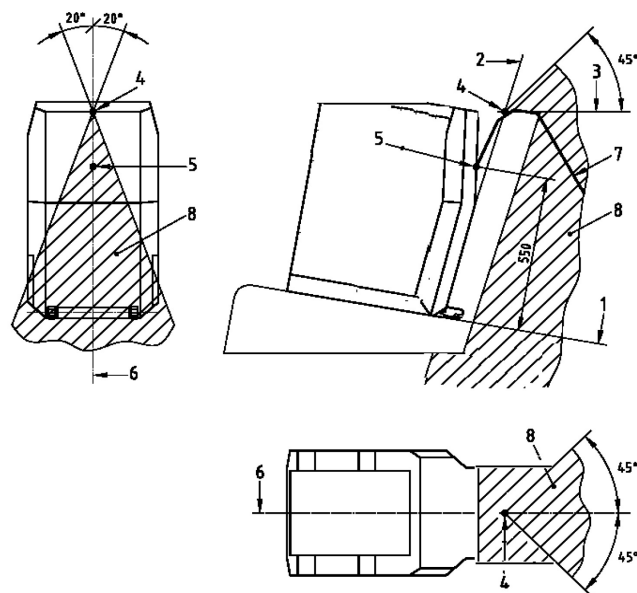
Note 1: Portion of top-tether anchorage that is designed to bind with the top-tether hook to be located within shaded zone.

Note 2: 'R' point: Shoulder reference point.

Figure 11

Alternative method of locating the top-tether anchorage using the 'ISO/F2' (B) fixture, Isofix zone — side, top and rear views

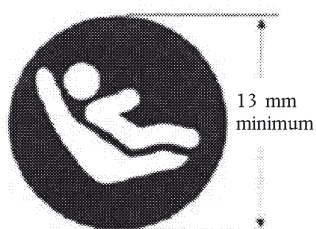
Dimensions are in millimetres



1. 'ISO/F2' (B) fixture horizontal face
2. 'ISO/F2' (B) fixture rear face
3. horizontal line tangent to top of seat back (last rigid point of a hardness greater than 50 Shore A)
4. intersection between 2 and 3
5. tether reference point
6. 'ISO/F2' (B) fixture centreline
7. top-tether strap
8. limits of anchorage zone

Figure 12

ISOFIX low anchorage symbol

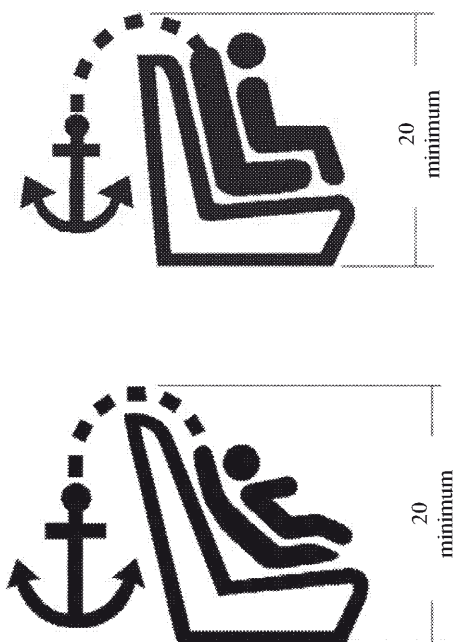


Notes:

1. Drawing not to scale.
2. Symbol may be shown in mirror image.
3. Colour of the symbol at choice of manufacturer.

Figure 13

Symbol used to identify the location of a top-tether anchorage that is under a cover



Notes:

1. Dimensions in mm
2. Drawing not to scale
3. The symbol shall be clearly visible either by means of contrast colours or by adequate relief if it is moulded or embossed.

Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at:
<http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29fdocstts.html>

Regulation No 34 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of vehicles with regard to the prevention of fire risks

Incorporating all valid text up to:

Supplement 3 to the 02 series of amendments — Date of entry into force: 24 October 2009

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ANNEXES

Annex 1 — Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a vehicle type with regard to the tank for liquid fuel and to the prevention of fire risks in the event of a frontal/lateral/rear collision and to a type of tank for liquid fuel pursuant to Regulation No 34

Annex 2 — Arrangements of approval marks

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Annex 4 — Procedure for rear-end collision test

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1. SCOPE

This Regulation applies:

- 1.1. PART I: to the approval of vehicles of categories M, N and O ⁽¹⁾ with regard to the tank(s) for liquid fuel;
- 1.2. PART II: at the request of the manufacturer to the approval of vehicles of categories M, N and O approved to Part I or IV of this Regulation fitted with liquid fuel tank(s) with regard to the prevention of fire risks in the event of a frontal and/or lateral and/or rear collision;
- 1.3. PART III: to the approval of tanks for liquid fuel as technical units;
- 1.4. PART IV: to the approval of vehicles with regard to the installation of approved tanks for liquid fuel.

2. APPLICATION FOR APPROVAL

- 2.1. Application for approval pursuant to Part I and/or Part II of this Regulation.
 - 2.1.1. The application for approval of a vehicle type to Part I or II of this Regulation shall be submitted by the vehicle manufacturer or by his duly accredited representative.
 - 2.1.2. It shall be accompanied by the undermentioned documents in triplicate and by the following particulars:
 - 2.1.2.1. a detailed description of the vehicle type with respect to the items specified in paragraph 4.2 and/or 7.2. The numbers and/or symbols identifying the engine type and the vehicle type shall be specified;
 - 2.1.2.2. drawing(s) showing the characteristics of the fuel tank and specifying the material from which it is made;
 - 2.1.2.3. a diagram of the entire fuel feed systems, showing the site of each component on the vehicle; and
 - 2.1.2.4. for application pursuant to Part II of this Regulation, a diagram of the electrical installation showing its siting and its mode of attachment to the vehicle.
 - 2.1.3. The following shall be submitted to the technical service responsible for conducting the type-approval tests:
 - 2.1.3.1. a vehicle representative of the vehicle type to be approved or the parts of the vehicle which the technical service deems necessary for approval tests;
 - 2.1.3.2. in the case of a vehicle equipped with a tank made of a plastic material: seven additional tanks, with their accessories;

⁽¹⁾ As defined in Annex 7 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), (document TRANS/WP.29/78/Rev.1/Amend.2 as last amended by Amend.4).

- 2.1.3.3. in the case of a vehicle equipped with a tank made of another material: two additional tanks, with their accessories.
- 2.2. Application for approval pursuant to Part III of this Regulation
 - 2.2.1. The application for approval of a type of tank for liquid fuel pursuant to Part III of this Regulation shall be submitted by the tank manufacturer or by his duly accredited representative.
 - 2.2.2. It shall be accompanied by the under-mentioned documents in triplicate and by the following particulars:
 - 2.2.2.1. a detailed description of the type of fuel tank with respect to the items specified in paragraph 10.2; it should be specified whether the application applies to a type of tank with or without its accessories and whether it applies for a universal use or for a specific vehicle use. In the case of an approval of a type of tank without its accessories, clear identification of the accessories used for the tests shall be included;
 - 2.2.2.2. drawing(s) showing the characteristics of the fuel tank and specifying the material of which it is made and, in the case of a tank for specific vehicle use, characteristics of the vehicle parts used during the tests.
 - 2.2.3. The following shall be submitted to the technical service responsible for conducting the type-approval tests:
 - 2.2.3.1. in the case of a tank made of plastic material: seven tanks, with their accessories. In the case of a tank to be approved without its accessories, seven sets of accessories of a type normally fitted to the vehicle shall be submitted;
 - 2.2.3.2. in the case of a tank made of another material: two tanks, with their accessories. In the case of a tank to be approved without its accessories, two sets of accessories of a type normally fitted to the vehicle shall be submitted;
 - 2.2.3.3. in the case of a tank made of plastic for a specific vehicle use, vehicle parts as indicated in paragraph 5.3.2 of Annex 5 shall be submitted.
- 2.3. Application for approval pursuant to Part IV of this Regulation
 - 2.3.1. The application for approval of a type of vehicle pursuant to Part IV of this Regulation shall be submitted by the vehicle manufacturer or by his duly accredited representative.
 - 2.3.2. It shall be accompanied by the below-mentioned documents in triplicate and by the following particulars:
 - 2.3.2.1. a detailed description of the vehicle type with respect to the items specified in paragraph 12.2. The numbers and/or symbols identifying the engine type and the vehicle type shall be specified;
 - 2.3.2.2. a diagram of the entire fuel feed system, showing the site of each component on the vehicle;
 - 2.3.2.3. a list of all types of tanks for liquid fuel approved pursuant to Part III of this regulation and intended to be fitted to the type of vehicle.
 - 2.3.3. The following shall be submitted to the technical service responsible for conducting the type-approval tests:
 - 2.3.3.1. a vehicle representative of the type of vehicle to be approved;
 - 2.3.3.2. if necessary, two additional tanks with their accessories in the case of each type of fuel tank approved without its accessories.

3. APPROVAL
- 3.1. Approval pursuant to Part I and/or Part II of this Regulation.
- 3.1.1. If the vehicle submitted for approval pursuant to this Regulation meets the requirements of Part I and/or Part II below, approval of that vehicle type shall be granted.
- 3.1.2. Each type approved shall be assigned an approval number whose first two digits shall constitute the number of the most recent series of amendments incorporated in the Regulation on the date of issue of the approval. A Contracting Party may however assign the same approval number to several vehicle types as defined in paragraph 4.2 and/or 7.2 if the types are variants of the same basic model and provided that each type is separately tested and found to comply with the conditions of this Regulation.
- 3.1.3. Notice of approval or of refusal of approval of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in Annex 1, Appendix 1 to this Regulation and of drawings, giving the particulars referred to in paragraphs 2.1.2.2, 2.1.2.3 and 2.1.2.4 above (supplied by the applicant for approval) in a format not exceeding A 4 (210 × 297 mm) or folded to that format and on an appropriate scale.
- 3.1.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark consisting of:
 - 3.1.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽²⁾;
 - 3.1.4.2. the number of this Regulation, followed by 'RI', if the vehicle is approved pursuant to Part I of the Regulation, or by 'RII' if the vehicle is approved pursuant to Part I or IV and to Part II of the Regulation, a dash and the approval number to the right of the circle prescribed in paragraph 3.1.4.1.
- 3.1.5. If the vehicle conforms to a vehicle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 3.1.4.1 need not be repeated; in such a case the additional numbers, approval numbers and symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 3.1.4.1.
- 3.1.6. The approval mark shall be clearly legible and indelible.
- 3.1.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 3.1.8. Annex 2 to this Regulation gives examples of arrangements of the approval mark.
- 3.2. Approval pursuant to Part III of this Regulation
- 3.2.1. If the tank submitted for approval pursuant to this Regulation meets the requirements of Part III below, approval of that type of tank shall be granted.

⁽²⁾ 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Serbia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33 (vacant), 34 for Bulgaria, 35 (vacant), 36 for Lithuania, 37 for Turkey, 38 (vacant), 39 for Azerbaijan, 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (Approvals are granted by its Member States using their respective ECE symbol), 43 for Japan, 44 (vacant), 45 for Australia, 46 for Ukraine, 47 for South Africa, 48 for New Zealand, 49 for Cyprus, 50 for Malta, 51 for the Republic of Korea, 52 for Malaysia, 53 for Thailand, 54 (vacant), 55 (vacant), 56 for Montenegro and 58 for Tunisia. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

- 3.2.2. Each type approved shall be assigned an approval number whose first two digits shall constitute the number of the most recent series of amendments incorporated in the Regulation on the date of issue of the approval.
- 3.2.3. Notice of approval or of refusal of approval of a type of tank pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in Annex 1, Appendix 2 to this Regulation and of drawings, giving the particulars referred to in paragraphs 2.2.2.1 and 2.2.2.2 above (supplied by the applicant for approval) in a format not exceeding A 4 (210 × 297 mm) or folded to that format and on an appropriate scale.
- 3.2.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every tank conforming to a type of tank approved under this Regulation, an international approval mark consisting of:
 - 3.2.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽²⁾;
 - 3.2.4.2. the number of this Regulation, followed by 'RIII', the mention 'U' if the tank is approved for a universal use or 'S' if the tank is approved for a specific vehicle use, the mention '+A' if the tank is approved with its accessories or '#A' if the tank is approved without its accessories, a dash and the approval number to the right of the circle prescribed in paragraph 3.2.4.1.
- 3.2.5. The approval mark shall be clearly legible and indelible when the tank is installed in the vehicle.
- 3.2.6. Annex 2 to this Regulation gives examples of arrangements of the approval mark.
- 3.3. Approval pursuant to Part IV of this Regulation
 - 3.3.1. If the vehicle submitted for approval pursuant to this Regulation meets the requirements of Part IV below, approval of that vehicle type shall be granted.
 - 3.3.2. Each type approved shall be assigned an approval number whose first two digits shall constitute the number of the most recent series of amendments incorporated in the Regulation on the date of issue of the approval. A Contracting Party may however assign the same approval number to several vehicle types as defined in paragraph 12.2 if the types are variants of the same basic model and provided that each type is separately tested and found to comply with the conditions of this Regulation.
 - 3.3.3. Notice of approval or of refusal of approval of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in Annex 1, Appendix 1 to this Regulation and of drawings, giving the particulars referred to in paragraphs 2.3.2.1, 2.3.2.2 and 2.3.2.3 above (supplied by the applicant for approval) in a format not exceeding A 4 (210 × 297 mm) or folded to that format and on an appropriate scale.
 - 3.3.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark consisting of:
 - 3.3.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽²⁾;
 - 3.3.4.2. the number of this Regulation, followed by 'RIV', a dash and the approval number to the right of the circle prescribed in paragraph 3.3.4.1.
 - 3.3.5. If the vehicle conforms to a vehicle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 3.3.4.1 need not be repeated; in such a case the additional numbers, approval numbers and symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 3.3.4.1.

- 3.3.6. The approval mark shall be clearly legible and indelible.
- 3.3.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 3.3.8. Annex 2 to this Regulation gives examples of arrangements of the approval mark.

PART I — APPROVAL OF VEHICLES WITH REGARD TO THEIR FUEL TANKS

4. DEFINITIONS

For the purposes of this Part of the Regulation:

- 4.1. 'approval of a vehicle' means the approval of a vehicle type with regard to the liquid fuel tanks;
- 4.2. 'vehicle type' means vehicles which do not differ in such essential respects as:
 - 4.2.1. the manufacturer's type designation;
 - 4.2.2. in vehicles of category M1 ⁽¹⁾ the position of the tank(s) in the vehicle in so far as it has a negative effect on the requirements of paragraph 5.10;
- 4.3. 'passenger compartment' means the space for occupant accommodation bounded by the roof, floor, side walls, doors, outside glazing, front bulkhead, and the plane of the rear compartment bulkhead or the plane of the rear seat back support;
- 4.4. 'tank' means the tank(s) designed to contain the liquid fuel, as defined in paragraph 4.6, used primarily for the propulsion of the vehicle excluding its accessories (filler pipe, if it is a separate element, filler hole, cap, gauge, connections to the engine or to compensate interior excess pressure, etc.);
- 4.5. 'capacity of the fuel tank' means the fuel tank capacity as specified by the manufacturer; and
- 4.6. 'liquid fuel' means a fuel which is liquid in normal conditions of temperature and pressure.

5. REQUIREMENTS FOR LIQUID FUEL TANKS

- 5.1. Tanks shall be made so as to be corrosion-resistant.
- 5.2. Tanks shall satisfy, when equipped with all accessories, which are normally attached to them, the leakage tests carried out according to paragraph 6.1 at a relative internal pressure equal to double the working overpressure, but in any event not less than an overpressure of 0,3 bar.

Tanks made of a plastic material are considered as meeting this requirement if they have passed the test described in Annex 5, paragraph 2.

- 5.3. Any excess pressure or any pressure exceeding the working pressure shall be compensated automatically by suitable devices (vents, safety valves, etc.).
- 5.4. The vents shall be designed in such a way as to prevent any fire risk. In particular, any fuel, which may leak when the tank(s) is (are) being filled shall not be able to fall on the exhaust system. It shall be channelled to the ground.
- 5.5. The tank(s) shall not be situated in, or form, a surface (floor, wall, bulkhead) of the passenger compartment or other compartment integral with it.
- 5.6. A partition shall be provided to separate the occupant compartment from the tank(s). The partition may contain apertures (e.g. to accommodate cables) provided they are so arranged that fuel cannot flow freely from the tank(s) into the occupant compartment or other compartment integral with it during normal conditions of use.
- 5.7. Every tank shall be securely fixed and so placed as to ensure that any fuel leaking from the tank or its accessories will escape to the ground and not into the occupant compartment during normal conditions of use.

- 5.8. The filler hole shall not be situated in the occupant compartment, in the luggage compartment or in the engine compartment.
- 5.9. The fuel shall not escape through the tank cap or through the devices provided to compensate excess pressure during the foreseeable course of operation of the vehicle. In the case of overturning of the vehicle, a drip may be tolerated provided that it does not exceed 30 g/min; this requirement shall be verified during the test prescribed in paragraph 6.2.
- 5.9.1. The fuel filler cap shall be fixed to the filler pipe.
- 5.9.1.1. The requirements of paragraph 5.9.1 shall be deemed to be satisfied if provision is made to prevent excess evaporative emissions and fuel spillage caused by a missing fuel filler cap.
- This may be achieved using one of the following:
- 5.9.1.1.1. an automatically opening and closing, non-removable fuel filler cap;
- 5.9.1.1.2. design features which avoid excess evaporative emissions and fuel spillage in the case of a missing fuel filler cap;
- 5.9.1.1.3. any other provision which has the same effect. Examples may include, but are not limited to, a tether filler cap, a chained filler cap or one utilising the same locking key for the filler cap and for the vehicle's ignition. In this case, the key shall be removable from the filler cap only in the locked condition. However, the use of tethered or chained filler cap by itself is not sufficient for vehicles other than those of categories M1 and N1.
- 5.9.2. the seal between the cap and the filler pipe shall be retained securely in place. The cap shall latch securely in place against the seal and filler pipe when closed.
- 5.10. Tanks shall be installed in such a way as to be protected from the consequences of a collision to the front or the rear of the vehicle; there shall be no protruding parts, sharp edges, etc. near the tank.
- 5.11. The fuel tank and its accessory parts shall be designed and installed in the vehicle in such a way that any ignition hazard due to static electricity shall be avoided. If necessary, measure(s) for charge dissipation shall be provided. The manufacturer shall demonstrate to the technical service the measure(s) which guarantee the fulfilling of these requirements.
- 5.12. The fuel tank(s) shall be made of a fire-resistant metallic material. It (they) may be made of a plastic material provided the requirements of Annex 5 are complied with.

6. TESTS OF LIQUID FUEL TANKS

6.1. Hydraulic test

The tank shall be subjected to a hydraulic internal pressure test which shall be carried out on an isolated unit complete with all its accessories. The tank shall be completely filled with a non-flammable liquid (water, for example). After all communication with the outside has been cut off, the pressure shall be gradually increased, through the pipe connection through which fuel is fed to the engine, to a relative internal pressure equal to double the working pressure used and in any case to not less than an excess pressure of 0,3 bar (30 kPa), which shall be maintained for one minute. During this time the tank shell shall not crack or leak; however, it may be permanently deformed.

6.2. Overturn test

- 6.2.1. The tank and all its accessories shall be mounted on to a test fixture in a manner corresponding to the mode of installation on the vehicle for which the tank is intended; this also applies to systems for the compensation of the interior excess pressure.
- 6.2.2. The test fixture shall rotate about an axis lying parallel to the longitudinal vehicle axis.
- 6.2.3. The test shall be carried out with the tank filled to 90 per cent of its capacity and also 30 per cent of its capacity with a non-flammable liquid having a density and a viscosity close to those of the fuel normally used (water may be accepted).

- 6.2.4. The tank shall be turned from its installed position 90° to the right. The tank shall remain in this position for at least five minutes. The tank shall then be turned 90° further in the same direction. The tank shall be held in this position, in which it is completely inverted, for at least another five minutes. The tank shall be rotated back to its normal position. Testing liquid that has not flowed back from the venting system into the tank shall be drained and replenished if necessary. The tank shall be rotated 90° in the opposite direction and left for at least five minutes in this position.

The tank shall be rotated 90° further in the same direction. This completely inverted position shall be maintained for at least five minutes. Afterwards the tank shall be rotated back to its normal position.

The rotation rate for each successive increment of 90° shall take place in any time interval from 1 to 3 minutes.

PART II — APPROVAL OF VEHICLES WITH REGARD TO THE PREVENTION OF FIRE RISKS IN THE EVENT OF COLLISION

7. DEFINITIONS

For the purposes of this Part of the Regulation:

- 7.1. 'approval of a vehicle' means the approval of a vehicle type with regard to the prevention of fire risks;
- 7.2. 'vehicle type' means vehicles which do not differ in such essential respects as:
- 7.2.1. the structure, shape, dimensions and materials (metal/plastic) of the tank(s);
 - 7.2.2. In vehicles of category M1 ⁽¹⁾ the position of the tank(s) in the vehicle in so far as it has a negative effect on the requirements of paragraph 5.10;
 - 7.2.3. the characteristics and siting of the fuel feed system (pump, filters, etc.); and
 - 7.2.4. the characteristics and siting of the electrical installation in so far as they have an effect on the results of the collision tests prescribed in this Regulation;
- 7.3. 'transverse plane' means the vertical transverse plane perpendicular to the median longitudinal plane of the vehicle;
- 7.4. 'unladen mass' means the mass of the vehicle in running order, unoccupied and unladen but complete with fuel, coolant, lubricants, tools and a spare wheel (if provided as standard equipment by the vehicle manufacturer).

8. REQUIREMENTS FOR THE INSTALLATION OF LIQUID FUEL TANKS

8.1. Fuel installation

- 8.1.1. the vehicles shall be approved according to either Part I or IV of this Regulation.
- 8.1.2. The components of the fuel installation shall be adequately protected by parts of the frame or bodywork against contact with possible obstacles on the ground. Such protection shall not be required if the components beneath the vehicle are further from the ground than the part of the frame or bodywork in front of them.
- 8.1.3. The pipes and all other parts of the fuel installation shall be accommodated on the vehicle at sites protected to the fullest possible extent. Twisting and bending movements, and vibrations of the vehicle's structure or drive unit, shall not subject the components of the fuel installation to friction, compression or any other abnormal stress.
- 8.1.4. The connections of pliable or flexible pipes with rigid parts of components of the fuel installation shall be so designed and constructed as to remain leak-proof under the various conditions of use of the vehicle, despite twisting and bending movements and despite vibrations of the vehicle's structure or drive unit.
- 8.1.5. If the filler hole is situated on the side of the vehicle, the filler cap shall not, when closed, project beyond the adjacent surfaces of the bodywork.

8.2. Electrical installation

8.2.1. Electric wires other than wires accommodated in hollow components shall be attached to the vehicle's structure or walls or partitions near which they lead. The points at which they pass through walls or partitions shall be satisfactorily protected to prevent cutting of the insulation.

8.2.2. The electrical installation shall be so designed, constructed and fitted that its components are able to resist the corrosion phenomena to which they are exposed.

9. TESTS ON THE VEHICLE

In the frontal-impact test against a barrier carried out by the procedure specified in Annex 3 to this Regulation, in the lateral impact test performed according to the procedure described in Annex 4 of Regulation No 95, 01 series of amendments, and in the rear-end impact test carried out by the procedure specified in Annex 4 hereto,

9.1. no more than a slight leakage of liquid in the fuel installation shall occur on collision;

9.2. if there is continuous leakage in the fuel installation after the collision, the rate-of leakage shall not exceed 30 g/min; if the liquid from the fuel installation mixes with liquids from the other systems, and if the several liquids cannot be easily separated and identified, the continuous leakage shall be evaluated from all the fluids collected;

9.3. no fire maintained by the fuel shall occur.

9.4. During and after the impacts described in paragraph 9. above, the battery shall be kept in position by its securing device.

9.5. At the request of the manufacturer, the frontal collision test set out in Annex 3 of this Regulation can be replaced by the test procedure described in Annex 3 of Regulation No 94, 01 series of amendments.

PART III — APPROVAL OF TANKS FOR LIQUID FUEL AS SEPARATE TECHNICAL UNITS

10. DEFINITIONS

For the purposes of this Part of the Regulation:

10.1. 'Tank' means the tank(s) designed to contain the liquid fuel, as defined in paragraph 10.3, used primarily for the propulsion of the vehicle; the tank may be approved either with or without its accessories (filler pipe, if it is a separate element, filler hole, cap, gauge, connections to compensate interior excess pressure, etc.);

10.2. 'Capacity of the fuel tank' means the fuel tank capacity as specified by the tank manufacturer;

10.3. 'Liquid fuel' means a fuel which is liquid in normal conditions of temperature and pressure;

10.4. 'Approval of a tank' means the approval of a type of liquid fuel tank;

10.5. 'Type of tank' means tanks which do not differ in such essential respects as:

10.5.1. The structure, shape, dimensions and material (metal/plastic) of the tank(s);

10.5.2. The intended use of the tank: universal use or specific vehicle use;

10.5.3. The presence or absence of the accessories.

11. REQUIREMENTS FOR LIQUID FUEL TANKS

11.1. The requirements stated in paragraphs 5.1, 5.2, 5.3, 5.9, 5.12, 6.1 and 6.2 above shall be complied with when the tanks are equipped with the accessories that are normally attached to them.

11.2. In case the tanks are to be approved without their accessories the manufacturer's documentation shall clearly identify the accessories used for the test.

PART IV — APPROVAL OF VEHICLES WITH REGARD TO THE INSTALLATION OF APPROVED FUEL TANK(S)

12. DEFINITIONS

For the purposes of this Part of the Regulation:

12.1. 'Approval of a vehicle' means the approval of a vehicle type with regard to the installation of liquid fuel tank(s) approved pursuant to Part III of this Regulation;

12.2. 'Vehicle type' means vehicles which do not differ in such essential respects as:

12.2.1. the manufacturer's type designation;

12.2.2. in vehicles of category M1 ⁽¹⁾ the position of the tank(s) in the vehicle in so far as it has a negative effect on the requirements of paragraph 5.10.

13. REQUIREMENTS FOR THE INSTALLATION OF LIQUID FUEL TANK(S)

13.1. The requirements stated in paragraphs 5.4, 5.5, 5.6, 5.7, 5.8, 5.10, and 5.11 above shall be complied with.

13.2. In case the tanks are approved without their accessories, those accessories used during the tests on the tanks and identified in the manufacturer's documentation according to paragraph 11.2 above shall, at the request of the manufacturer, be included in the approval pursuant to Part IV of this Regulation. Additional accessories shall be included provided that the Technical Service is satisfied that the vehicle complies with the requirement of Parts III and IV of this Regulation.

14. MODIFICATIONS OF THE TYPE OF VEHICLE OR TANK

14.1. Every modification of the type of vehicle or tank shall be notified to the administrative department which approved the vehicle type. The department may then either:

14.1.1. consider that the modifications made are unlikely to have appreciable adverse effects, and that in any case the vehicle still meets the requirements; or

14.1.2. require a further test report from the technical service responsible for conducting the tests.

14.2. Without prejudice to the provisions of paragraph 14.1 above, a variant of the vehicle tested according to Part II of this Regulation whose unladen mass does not differ by more than ± 20 per cent from that of the approval-tested vehicle shall not be regarded as a modification of the vehicle type.

14.3. Notice of confirmation of approval or of refusal of approval, specifying the modifications shall be communicated by the procedure specified in paragraphs 3.1.3, 3.2.3 or 3.3.3 above to the Parties to the Agreement which apply this Regulation.

15. CONFORMITY OF PRODUCTION

The Conformity of Production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2), with the following requirements:

15.1. every vehicle or tank bearing an approval mark as prescribed under this Regulation shall conform to the vehicle type approved and satisfy the requirements of the respective Parts above;

15.2. in order to verify conformity as prescribed in paragraph 15.1 above, a sufficient number of serially-produced vehicles or tanks bearing the approval mark required by this Regulation shall be subjected to random checks;

15.3. as a general rule, the conformity of the vehicle or tank with the approved type shall be checked on the basis of the description given in the approval form and its annexes. However, the vehicle or tank shall if necessary be subjected to the checks prescribed in paragraph 6 above.

16. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 16.1. The approval granted in respect of a type of vehicle or tank pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 15.1 above is not complied with or if the vehicle has failed to pass the checks prescribe in paragraph 9 above.
- 16.2. If a Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith notify the other Parties to the Agreement which apply this Regulation thereof by means of a copy of the communication form conforming to the model in Annex 1 or 2 to this Regulation.

17. TRANSITIONAL PROVISIONS

- 17.1. As from the official date of entry into force of the 02 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approval under this Regulation as amended by the 02 series of amendments.
- 17.2. As from 12 months after the date of entry into force of the 02 series of amendments, Contracting Parties applying this Regulation shall grant ECE approvals only if vehicle type to be approved meets the requirements of this Regulation as amended by the 02 series of amendments.
- 17.3. Until 12 months after the date of entry into force of the 02 series of amendments to this Regulation, no Contracting Party applying this Regulation shall refuse national type approval of a vehicle type approved to the preceding series of amendments to this Regulation.
- 17.4. Starting 24 months after the entry into force of the 02 series of amendments to this Regulation, Contracting Parties applying this Regulation may refuse first national registration (first entry into service) of a vehicle which does not meet the requirements of the 02 series of amendments to this Regulation.
- 17.5. As from the official date of entry into force of the Supplement 3 to the 02 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approval under this Regulation as amended by Supplement 3 to the 02 series of amendments.
- 17.6. Even after the entry into force of the Supplement 3 to the 02 series of amendments to this Regulation, approvals of the vehicles to the preceding supplements to the 02 series of amendments shall remain valid and Contracting Parties applying this Regulation shall continue to grant extensions to such approvals and shall continue to accept them.

18. NAMES AND ADDRESSES OF TECHNICAL SERVICES CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

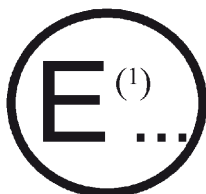
The Parties to the Agreement which apply this Regulation shall communicate to the Secretariat of the United Nations the names and addresses of the technical services conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or refusal or withdrawal of approval, issued in other countries, are to be sent.

ANNEX 1

Appendix 1

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration

.....

.....

.....

concerning ⁽²⁾: APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a vehicle type with regard ⁽²⁾: to the tank for liquid fuel
to the prevention of fire risks in the event of frontal/lateral/rear ⁽²⁾ collision

pursuant to Regulation No 34.

Approval No: Extension No:

1. Trade name or mark of the power-driven vehicle:
2. Vehicle type:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Kind of engine: positive-ignition/diesel ⁽²⁾
6. Site of engine: front/rear/centre ⁽²⁾
7. Brief description of fuel tank and fuel or approval number(s) of the approved fuel tank ⁽²⁾
- 7.1. Characteristics and site of fuel tank:
- 7.2. For fuel tanks made of a plastic material, state material and trade name or mark:
- 7.3. Characteristics of fuel installation (site, connections, etc.):
8. Description of electrical installation (site attachment, protection, etc.):
9. Description of the impact tests:
Frontal (Type/Approval or report number):
Side (Type/Approval or report number):
Rear (Type/Approval or report number):
10. Vehicle submitted for approval on:
11. Technical service responsible for conducting approval tests:
12. Date of report issued by that service:
13. Number of report issued by that service:
14. Approval granted/extended/refused/withdrawn ⁽²⁾

⁽¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn/the approval (see approval provisions in the Regulation)

⁽²⁾ Strike out what does not apply.

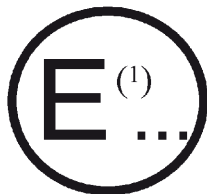
15. Position of approval mark on the vehicle:
16. Place:
17. Date:
18. Signature:
19. The following documents, bearing the approval number shown above, are annexed to this communication:

drawings and layout diagrams of the fuel tank, the fuel installation, the electrical installation, and other components of importance for the purposes of this Regulation.

Appendix 2

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by: Name of administration

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concerning ⁽²⁾: APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a fuel tank pursuant to Regulation No 34.

Approval No: Extension No:

1. Trade name or mark of the fuel tank:
2. Manufacturer's name for the type of fuel tank:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Brief description of fuel tank and fuel:
- 5.1. Characteristics of fuel tank:
- 5.2. For fuel tanks made of a plastic material, state material and trade name or mark:
6. Submitted for approval on:
7. Technical service responsible for conducting approval tests:
8. Date of report issued by that service:
9. Number of report issued by that service:
10. Reason(s) for extension (if applicable):
11. Approval granted/extended/refused/withdrawn ⁽²⁾
12. Position of approval mark on the fuel tank:
13. Place:
14. Date:
15. Signature:
16. The index to the information package lodged with the approval authority, which may be obtained on request, is attached.

⁽¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn the approval (see approval provisions in the Regulation).

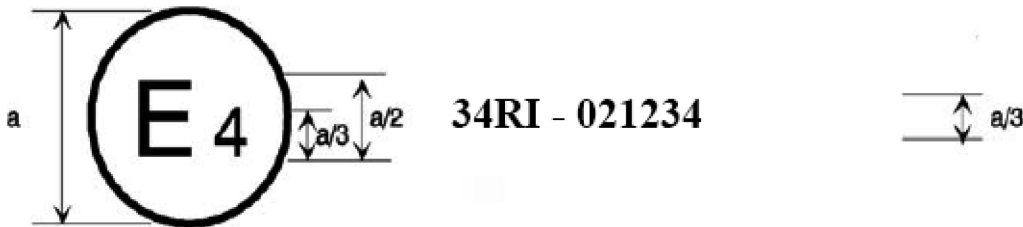
⁽²⁾ Strike out what does not apply.

ANNEX 2

ARRANGEMENTS OF APPROVAL MARKS

MODEL A

(see paragraph 3.1.4 of this Regulation)

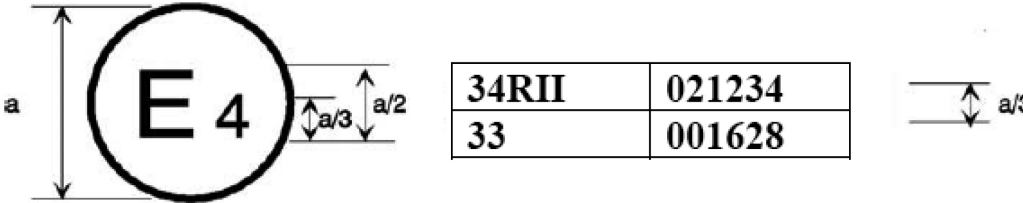


a = 8 mm min

The above approval mark affixed to a vehicle shows that the type concerned was approved in the Netherlands (E4) pursuant to Part I of Regulation No 34 under approval No 021234. The first two digits (02) of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 34 as amended by the 02 series of amendments.

MODEL B

(See paragraph 3.1.5 of this Regulation)

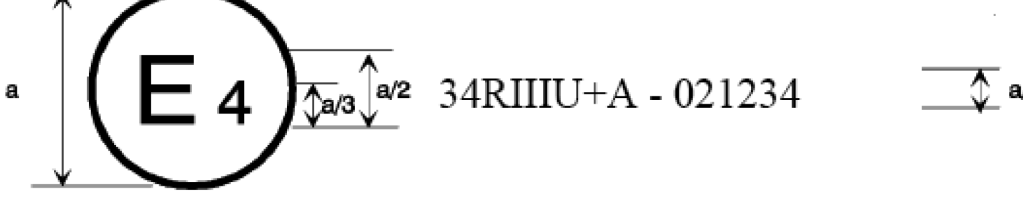


a = 8 mm min.

The above approval mark affixed to a vehicle shows that the type concerned was approved in the Netherlands (E4) pursuant to Regulations Nos 34, Part I or IV, and 33 (*). The approval numbers indicated that, at the date when the respective approvals were given, Regulation No 34 included the 02 series of amendments and Regulation No 33 was still in its original form.

MODEL C

(see paragraph 3.2.4 of this Regulation)

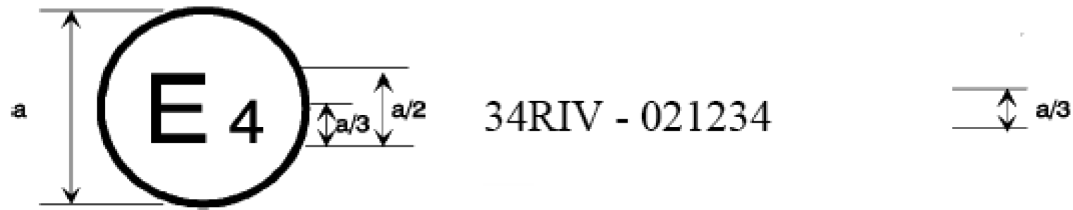


a = 8 mm min

The above approval mark affixed to a fuel tank shows that the type concerned was approved in the Netherlands (E4) pursuant to Part III of Regulation No 34, for a universal use including its accessories, under approval No 021234. The first two digits (02) of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 34 as amended by the 02 series of amendments.

MODEL D

(see paragraph 3.3.4 of this Regulation)

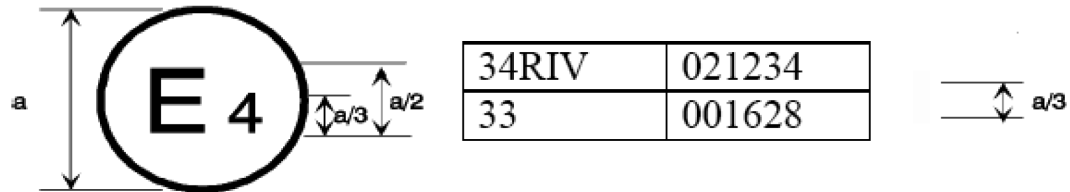


a = 8 mm min

The above approval mark affixed to a vehicle shows that the type concerned was approved in the Netherlands (E4) pursuant to Part IV of Regulation No 34 under approval No 021234. The first two digits (02) of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 34 as amended by the 02 series of amendments.

MODEL E

(See paragraph 3.3.5 of this Regulation)



a = 8 mm min

The above approval mark affixed to a vehicle shows that the type concerned was approved in the Netherlands (E4) pursuant to Regulations Nos 34, Part IV, and 33 (*). The approval numbers indicated that, at the date when the respective approvals were given, Regulation No 34 included the 02 series of amendments and Regulation No 33 was still in its original form.

(*) The second number is given merely as an example.

ANNEX 3

FRONTAL-COLLISION TEST AGAINST A BARRIER**1. PURPOSE AND SCOPE**

The purpose of this test is to simulate the conditions of frontal collision against a fixed obstacle or by another vehicle approaching from the opposite direction.

2. INSTALLATIONS, PROCEDURES AND MEASURING INSTRUMENTS**2.1. Testing ground**

The test area shall be large enough to accommodate the run-up track, barrier and technical installations necessary for the test. The last part of the track, for at least 5 m before the barrier, shall be horizontal, flat and smooth.

2.2. Barrier

The barrier consists of a block of reinforced concrete not less than 3 m wide in front and not less than 1,5 m high. The barrier shall be of such thickness that it weighs at least 70 tonnes. The front face shall be vertical, perpendicular to the axis of the run-up track, and covered with plywood boards 2 cm thick in good condition. The barrier shall be either anchored in the ground or placed on the ground with, if necessary, additional arresting devices to limit its displacement. A barrier with different characteristics, but giving results at least equally conclusive, may likewise be used.

2.3. Propulsion of vehicle

At the moment of collision, the vehicle shall no longer be subject to the action of any additional steering or propelling device. It shall reach the obstacle on a course perpendicular to the collision wall; the maximum lateral misalignment tolerated between the vertical median line of the front of the vehicle and the vertical median line of the collision wall is ± 30 cm.

2.4. State of vehicle

2.4.1. The vehicle under test shall either be fitted with all the normal components and equipment included in its unladen kerb weight or be in such condition as to fulfil this requirement so far as the components and equipment affecting fire risks are concerned.

2.4.2. If the vehicle is driven by external means, the fuel installation shall be filled to at least 90 per cent of its capacity either with fuel or with a non-inflammable liquid having a density and a viscosity close to those of the fuel normally used. All other systems (brake-fluid header tanks, radiator, etc.) may be empty.

2.4.3. If the vehicle is driven by its own engine, the fuel tank shall be at least 90 per cent full. All other liquid-holding tanks may be filled to capacity.

2.4.4. If the manufacturer so requests, the technical service responsible for conducting the tests may allow the same vehicle as is used for tests prescribed by other Regulations (including tests capable of affecting its structure) to be used also for the tests prescribed by this Regulation.

2.5. Velocity on collision

The velocity on collision shall be between 48,3 km/h and 53,1 km/h. However, if the test has been carried out at a higher collision velocity and the vehicle has satisfied the conditions prescribed, the test shall be considered satisfactory.

2.6. Measuring instruments

The instrument used to record the speed referred to in paragraph 2.5 above shall be accurate to within one per cent.

3. EQUIVALENT TEST METHODS

3.1. Equivalent test methods are permitted provided that the conditions referred to in this Regulation can be observed either entirely by means of the substitute test or by calculation from the results of the substitute test.

3.2. If a method other than that described in paragraph 2 above is used its equivalence shall be demonstrated.

ANNEX 4

PROCEDURE FOR REAR-END COLLISION TEST

1. PURPOSE AND SCOPE

- 1.1. The purpose of the test is to simulate the conditions of rear-end collision by another vehicle in motion.

2. INSTALLATIONS, PROCEDURES AND MEASURES INSTRUMENTS

2.1. Testing ground

The test area shall be large enough to accommodate the impactor (striker) propulsion system and to permit after-collision displacement of the vehicle struck and installation of the test equipment. The part in which vehicle collision and displacement occur shall be horizontal, flat and smooth and have a coefficient of friction of not less than 0,5.

2.2. Impactor (striker)

- 2.2.1. The impactor shall be of steel and of rigid construction.

- 2.2.2. The impacting surface shall be flat, not less than 2 500 mm wide, and 800 mm high, and its edges shall be rounded to a radius of curvature of between 40 and 50 mm. It shall be clad with a layer of plywood 20 mm thick.

- 2.2.3. At the moment of collision the following requirements shall be met:

- 2.2.3.1. the impacting surface shall be vertical and perpendicular to the median longitudinal plane of the vehicle struck;

- 2.2.3.2. the direction of movement of the impactor shall be substantially horizontal and parallel to the median longitudinal plane of the vehicle struck;

- 2.2.3.3. the maximum lateral deviation tolerated between the median vertical line of the surface of the impactor and the median longitudinal plane of the vehicle struck shall be 300 mm. In addition, the impacting surface shall extend over the entire width of the vehicle struck;

- 2.2.3.4. the ground clearance of the lower edge of the impacting surface shall be 175 ± 25 mm.

2.3. Propulsion of the impactor

The impactor may either be secured to a carriage (moving barrier) or form part of a pendulum.

2.4. Special provisions applicable where a moving barrier is used

- 2.4.1. If the impactor is secured to a carriage (moving barrier) by a restraining element, the latter shall be rigid and be incapable of being deformed by the collision; the carriage shall at the moment of collision be capable of moving freely and no longer be subject to the action of the propelling device.

- 2.4.2. The velocity of collision shall be between 35 and 38 km/h.

- 2.4.3. The aggregate weight (mass) of carriage and impactor shall be $1\,100 \pm 20$ kg

2.5. Special provisions applicable where a pendulum is used

- 2.5.1. The distance between the centre of the impacting face and the axis of rotation of the pendulum shall be not less than 5 m.

- 2.5.2. The impactor shall be freely suspended by rigid arms rigidly secured to it. The pendulum so constituted shall be substantially incapable of being deformed by the collision.

- 2.5.3. Arresting gear shall be incorporated in the pendulum to prevent any secondary collision by the impactor on the test vehicle.

- 2.5.4. At the moment of collision the velocity of the centre of percussion of the pendulum should be between 35 and 38 km/h.

- 2.5.5. The reduced mass ' m_r ' at the centre of percussion of the pendulum is defined as a function of the total mass ' m ', of the distance ' a '⁽¹⁾ between the centre of percussion and the axis of rotation, and of the distance ' l ' between the centre of gravity and the axis of rotation, by the following equation:

$$m_r = m (l/a)$$

- 2.5.6. The reduced mass m_r shall be $1\,100 \pm 20$ kg.

⁽¹⁾ It is recalled that the distance ' a ' is equal to the length of the synchronous pendulum under consideration.

- 2.6. General provisions relating to the mass and velocity of the impactor
- If the test has been conducted at a collision velocity higher than those prescribed in paragraphs 2.4.2 and 2.5.4 and/or with a mass greater than those prescribed in paragraphs 2.4.3 and 2.5.6, and the vehicle has met the requirements prescribed, the test shall be considered satisfactory.
- 2.7. State of vehicle under test
- 2.7.1. The vehicle under test shall either be fitted with all the normal components and equipment included in its unladen kerb weight or be in such condition as to fulfil this requirement so far as the components and equipment affecting fire risks are concerned.
- 2.7.2. The fuel tank shall be filled to at least 90 per cent of its capacity either with fuel or with a non-inflammable liquid having a density and a viscosity close to those of the fuel normally used. All other systems (brake-fluid header tanks, radiator, etc.) may be empty.
- 2.7.3. A gear may be engaged and the brakes may be applied.
- 2.7.4. If the manufacturer so requests, the following derogation shall be permitted:
- 2.7.4.1. the technical service responsible for conducting the tests may allow the same vehicle as is used for tests prescribed by other Regulations (including tests capable of affecting its structure) to be used also for the tests prescribed by this Regulation; and
- 2.7.4.2. the vehicle may be weighted to an extent not exceeding 10 per cent of its unladen kerb weight with additional weights rigidly secured to the structure in such a way as not to affect the behaviour of the structure of the passenger compartment during the test.
- 2.8. Measuring instruments
- The instruments used to record the speed referred to in paragraphs 2.4.2 and 2.5.4 above shall be accurate to within one per cent.
3. EQUIVALENT TEST METHODS
- 3.1. Equivalent test methods are permitted provided that the conditions referred to in this Regulation can be observed either entirely by means of the substitute test or by calculation from the results of the substitute test.
- 3.2. If a method other than that described in paragraph 2 above is used, its equivalence shall be demonstrated.
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ANNEX 5

TESTING OF FUEL TANKS MADE OF A PLASTIC MATERIAL**1. COLLISION RESISTANCE**

- 1.1. The tank shall be filled to its capacity with a water-glycol mixture or with another liquid having a low freezing point, which does not change the properties of the tank material, and shall then be subjected to a perforation test.
- 1.2. During this test the tank temperature shall be $233\text{ K} \pm 2\text{ K}$ ($-40\text{ °C} \pm 2\text{ °C}$).
- 1.3. A pendulum collision testing fixture shall be used for the test. The collision body shall be of steel and have the shape of a pyramid with equilateral-triangle faces and a square base, the summit and the edges being rounded to a radius of 3 mm. The centre of percussion of the pendulum shall coincide with the centre of gravity of the pyramid; its distance from the axis of rotation of the pendulum shall be 1 m. The total mass of the pendulum shall be 15 kg. The energy of the pendulum at the moment of collision shall be not less than 30 Nm and as close to that value as possible.
- 1.4. The tests shall be made on the points of the tank which are regarded as vulnerable to frontal or rear collisions. The points regarded as vulnerable are those which are most exposed or weakest having regard to the shape of the tank or the way in which it is installed on the vehicle. The points selected by the laboratories shall be indicated in the test report.
- 1.5. During the test, the tank shall be held in position by the fittings on the side or sides opposite the side of collision. No leak shall result from the test.
- 1.6. At the choice of the manufacturer, all the impact tests may be carried out on one tank or each may be carried out on a different tank.

2. MECHANICAL STRENGTH

The tank shall be tested under the conditions prescribed in paragraph 6.1 of this Regulation for leaks and for rigidity of shape. The tank and all its accessories shall be mounted onto a test fixture in a manner corresponding to the mode of installation on the vehicle for which the tank is intended or mounted in the vehicle itself or mounted in a test fixture made by a vehicle section. On request of the manufacturer and with the agreement of the technical service the tank may be tested without using any test fixture. Water at 326 K (53 °C) shall be used as the testing fluid and shall fill the tank to its capacity. The tank shall be subjected to a relative internal pressure equal to double the working pressure and in any case to not less than 30 kPa at a temperature of $326\text{ K} \pm 2\text{ K}$ ($53\text{ °C} \pm 2\text{ °C}$) for a period of 5 hours. During the test, the tank and its accessories shall not crack or leak; however, it may be permanently deformed.

3. FUEL PERMEABILITY

- 3.1. The fuel used for the permeability test shall be either the reference fuel specified in Regulation No 83, Annex 9 or a commercial premium-grade fuel. If the tank is only designed for installation on vehicles with a compression-ignition engine, the tank shall be filled with diesel fuel.
- 3.2. Prior to the test, the tank shall be filled to 50 per cent of its capacity with testing fuel and stored, without being sealed, at an ambient temperature of $313\text{ K} \pm 2\text{ K}$ ($40\text{ °C} \pm 2\text{ °C}$) until the weight loss per unit time becomes constant, but for not more than 4 weeks (preliminary storage time).
- 3.3. The tank shall then be emptied and refilled to 50 per cent of its capacity with test fuel, after which it shall be hermetically sealed and be stored at a temperature of $313\text{ K} \pm 2\text{ K}$ ($40\text{ °C} \pm 2\text{ °C}$). The pressure shall be adjusted when the contents of the tank have reached the testing temperature. During the ensuing test period of 8 weeks, the loss of weight due to diffusion during the test period shall be determined. The maximum permissible average loss of fuel is 20 g per 24 hours of testing time.
- 3.4. If the loss due to diffusion exceeds the value indicated in paragraph 3.3, the test described there shall be carried out again, on the same tank, to determine the loss by diffusion at $296\text{ K} \pm 2\text{ K}$ ($23\text{ °C} \pm 2\text{ °C}$) but under the same conditions otherwise. The loss so measured shall not exceed 10 g per 24 hours.

4. RESISTANCE TO FUEL

After the test referred to in paragraph 3, the tank shall still meet the requirements set out in paragraphs 1 and 2.

5. RESISTANCE TO FIRE

The tank shall be subjected to the following tests.

5.1. For two minutes, the tank, fixed as on the vehicle, shall be exposed to flame. There shall be no leakage of liquid fuel from the tank.

5.2. Three tests shall be made on different tanks filled with fuel as follows:

5.2.1. if the tank is designed for installation on vehicles equipped with either a positive ignition engine or a compression ignition engine, three tests shall be carried out with tanks filled with premium-grade gasoline;

5.2.2. if the tank is only designed for installation on vehicles equipped with a compression-ignition engine, three tests shall be carried out with tanks filled with diesel fuel;

5.2.3. for each test the tank and its accessories shall be installed in a testing fixture simulating actual mounting conditions as far as possible. The method whereby the tank is fixed in the fixture shall correspond to the relevant specifications for its installation. In the case of tanks designed for a specific vehicle use, vehicle parts which protect the tank and its accessories against exposure to flame or which affect the course of the fire in any way, as well as specified components installed on the tank and plugs shall be taken into consideration. All openings shall be closed during the test, but venting systems shall remain operative. Immediately prior to the test the tank shall be filled with the specified fuel to 50 per cent of its capacity.

5.3. The flame to which the tank is exposed shall be obtained by burning commercial fuel for positive-ignition engines (hereafter called 'fuel') in a pan. The quantity of fuel poured into the pan shall be sufficient to permit the flame, under free-burning conditions, to burn for the whole test procedure.

5.4. The pan dimensions shall be chosen so as to ensure that the sides of the fuel tank are exposed to the flame. The pan shall therefore exceed the horizontal projection of the tank by at least 20 cm, but not more than 50 cm. The sidewalls of the pan shall not project more than 8 cm above the level of the fuel at the start of the test.

5.5. The pan filled with fuel shall be placed under the tank in such a way that the distance between the level of the fuel in the pan and the tank bottom corresponds to the design height of the tank above the road surface at the unladen mass (see paragraph 7.4). Either the pan, or the testing fixture, or both, shall be freely movable.

5.6. During phase C of the test, the pan shall be covered by a screen placed $3\text{ cm} \pm 1\text{ cm}$ above the fuel level.

The screen shall be made of a refractory material, as prescribed in Appendix 2. There shall be no gap between the bricks and they shall be supported over the fuel pan in such a manner that the holes in the bricks are not obstructed. The length and width of the frame shall be 2 cm to 4 cm smaller than the interior dimensions of the pan so that a gap of 1 cm to 2 cm exists between the frame and the wall of the pan to allow ventilation.

5.7. When the tests are carried out in the open air, sufficient wind protection shall be provided and the wind velocity at fuel-pan level shall not exceed 2,5 km/h. Before the test the screen shall be heated to $308\text{ K} \pm 5\text{ K}$ ($35\text{ °C} \pm 5\text{ °C}$). The firebricks may be wetted in order to guarantee the same test conditions for each successive test.

5.8. The test shall comprise four phases (see Appendix 1).

5.8.1. Phase A: Pre-heating (Figure 1)

The fuel in the pan shall be ignited at a distance of at least 3 m from the tank being tested. After 60 seconds pre-heating, the pan shall be placed under the tank.

5.8.2. Phase B: Direct exposure to flame (Figure 2)

For 60 seconds the tank shall be exposed to the flame from the freely burning fuel.

5.8.3. Phase C: Indirect exposure to flame (Figure 3)

As soon as phase B has been completed, the screen shall be placed between the burning pan and the tank. The tank shall be exposed to this reduced flame for a further 60 seconds.

5.8.4. Phase D: End of test (Figure 4)

The burning pan covered with the screen shall be moved back to its original position (phase A). If, at the end of the test, the tank is burning, the fire shall be extinguished forthwith.

5.9. The results of the test shall be considered satisfactory if no liquid fuel is leaking from the tank.

6. RESISTANCE TO HIGH TEMPERATURE

6.1. The fixture used for the test shall match the manner of installation of the tank on the vehicle, including the way in which the tank vent works.

6.2. The tank filled to 50 per cent of its capacity with water at 293 K (20 °C) shall be subjected for 1 hour to an ambient temperature of $368\text{ K} \pm 2\text{ K}$ ($95\text{ °C} \pm 2\text{ °C}$).

6.3. The results of the test shall be considered satisfactory if, after the test, the tank is not leaking or seriously deformed.

7. MARKINGS ON THE FUEL TANK

The trade name or mark shall be affixed to the tank; it shall be indelible and clearly legible on the tank when the latter is installed on the vehicle.

Appendix 1

TEST OF RESISTANCE TO FIRE

Figure 1

Phase A: Pre-heating

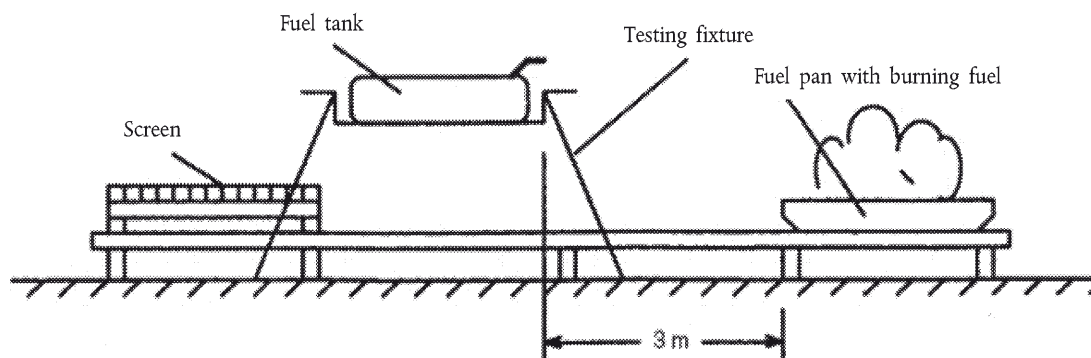


Figure 2

Phase B: Direct exposure to flame

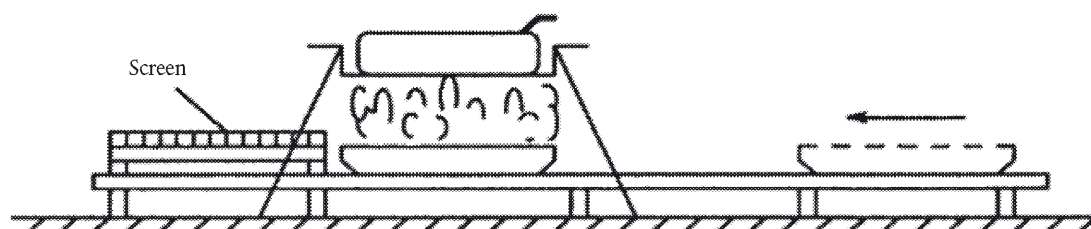


Figure 3

Phase C: Indirect exposure to the flame

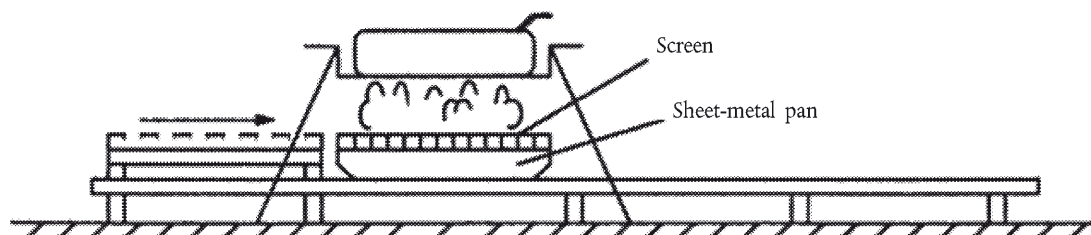
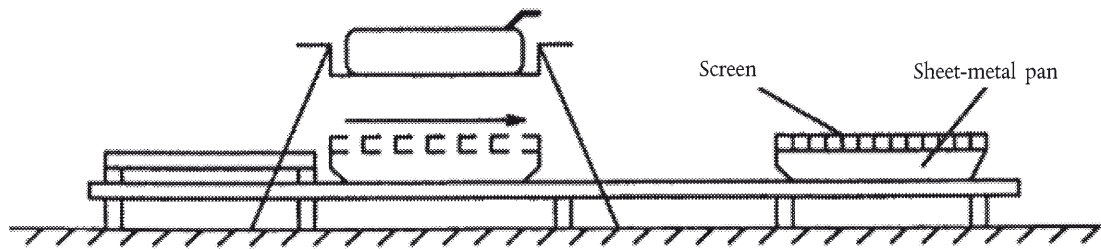


Figure 4

Phase D: End of test

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