

48-2 Safety belt anchorage : Effective date from 2016/1/1

Refer to: R14 07-S2, R16 06-R6/C2

48-2.1 Effective Date and Scope:

48-2.1.1 Effective date from 2016/1/1, the new vehicle variants of M and N category shall comply with this regulation.

48-2.1.2 Effective date from 2019/1/1, the all vehicle variants of M1 category conform to “48-1 Safety belt anchorage”, it shall comply with 48-2.7 in additional.

48-2.1.3 This regulation doesn't apply to the following seats used in M and N:

48-2.1.3.1 The lateral facing seats and rearward facing seats.

48-2.1.3.2 Folding seats (means an auxiliary seat intended for occasional use and normally folded).

48-2.1.3.3 The seats, for children, of the child-only vehicles.

48-2.1.4 The applicants applying for low volume safety approval or vehicle-by-vehicle low volume safety approval could exempt from Regulation of “anchorage” except large passenger vehicle and child-only vehicle.

48-2.2 Definitions

48-2.2.1 "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.

48-2.2.2 "ISOFIX position" means a system which allows to install:

48-2.2.2.1 an universal ISOFIX forward facing child restraint system, or

48-2.2.2.2 a semi-universal ISOFIX forward facing child restraint system, or

48-2.2.2.3 a semi-universal ISOFIX rearward facing child restraint system, or

48-2.2.2.4 a semi-universal ISOFIX lateral facing position child restraint system ,or

48-2.2.2.5 a specific vehicle ISOFIX child restraint system.

48-2.2.3 "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.

48-2.2.4 "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.

48-2.2.5 "ISOFIX attachment" means one of the two connections, extending from the ISOFIX child restraint system structure, and compatible with an ISOFIX low anchorage.

48-2.2.6 "ISOFIX child restraint system" means a child restraint system, which has to be attached to an ISOFIX anchorages system.

48-2.2.7 "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

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described in the figures 1 and 2 .

48-2.2.8 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.

48-2.2.9 "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.

48-2.2.10 "ISOFIX top tether connector" means a device intended to be attached to an ISOFIX top tether anchorage.

48-2.2.11 "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 this Regulation.

48-2.2.12 "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.

48-2.2.13 "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.

48-2.2.14 "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.

48-2.2.15 ISOFIX universal CRS means forward facing restraints for use in vehicles with positions equipped with ISOFIX anchorages system and a top tether anchorage.

48-2.2.16 ISOFIX semi universal CRS means:

- (1) forward facing restraints equipped with support leg or
- (2) rearward facing restraints equipped with a support leg or a top tether strap for use in vehicles with positions equipped with ISOFIX anchorages system and a top tether anchorage if needed or
- (3) rearward facing restraints, supported by the vehicle dashboard, for use in the front passenger seat equipped with ISOFIX anchorage system, or
- (4) lateral facing position restraint equipped if needed with an anti-rotation device for use in vehicles with positions equipped with ISOFIX anchorages system and top tether anchorage if needed.

48-2.2.17 "specific vehicle" category for use either;

48-2.2.17.1 on specific vehicle types, in accordance with the following regulations:

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(1) The use of child restraints in the "specific vehicle" category is permitted in all seat positions and also in the luggage area if the restraints are fitted in conformity with the manufacturer's instructions. In the case of a rear-facing restraint, the design must ensure that support for the child's head is provided whenever the restraint is ready to use. This is to be determined as a line perpendicular to the seat back through the eye line, the point of intersection shall be at least 40 mm below the start of radius of such a head support.

(2) For the "semi-universal" category: by means of the lower anchorages and additional anchorages.

48-2.2.17.2 as a "built in" child restraint.

48-2.3 The applicable variants and scope principles of safety belt anchorage are as below :

48-2.3.1 From 2008/1/1, it has to comply with this regulation as below:

48-2.3.1.1 The same vehicle category symbol.

48-2.3.1.2 The same brand and vehicle type.

48-2.3.1.3 The same chassis brand.

48-2.3.1.4 Chassis manufacturers announced that the same chassis vehicle type.

48-2.3.1.5 If use chassis vehicle instead of completed vehicle for entire or partial testing, which shall according to suitable variants and range of principle are as below :

48-2.3.1.5.1 The same chassis brand.

48-2.3.1.5.2 Chassis manufacturers announced that the same chassis vehicle type.

48-2.3.2 From 2009/1/1, it has to comply with this regulation as below:

48-2.3.2.1 The same brand.

48-2.3.2.2 The amount of fixed point (safety-belts anchorages and the ISOFIX anchorages systems and ISOFIX top tether anchorages) is the same.

48-2.3.2.3 The fixed device's (safety-belts anchorages and the ISOFIX anchorages systems and ISOFIX top tether anchorages) structures, dimensions and materials are the same.

48-2.3.2.4 The jointed methods, structures (including the slab thickness of jointed fixed) and materials of the fixed device (safety-belts anchorages and the ISOFIX anchorages systems and ISOFIX top tether anchorages) are the same.

48-2.4 Location and angles of belt anchorages

48-2.4.1 Upper Anchorage: The effective upper anchorage of 3-point Safety Belt must be placed on the location within the allowable region shown as figure 4. 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 degrees with the torso line. The angle may be reduced to 60 degrees 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  $DR = 315 \text{ mm} + 1.8 S$ .

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However, when  $S < 200$  mm, then  $DR = 675$  mm. The effective upper 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 degrees at a point B such that  $BR = 260$  mm +  $S$ . When  $S > 280$  mm, the manufacturer may use  $BR = 260$  mm +  $0.8 S$  at his discretion.  $S$  is the distance of the effective upper belt anchorages from upper belt anchorages to the longitudinal median plane of the vehicle. The value of  $S$  shall not be less than 140 mm, shown as diagram 5.

48-2.4.1.1 The additional anchorages can be used without the aid of tools, comply with the requirements above mention and are located in one of the areas determined by shifting the area shown in diagram 4, 80 mm upwards or downwards in a vertical direction.

48-2.4.1.2 The effective upper belt anchorage shall be situated above a horizontal plane passing through point C defined in figure 4.

#### 48-2.4.2 Lower Anchorage

48-2.4.2.1 Side-view areas of Location (shown as diagram 4), Location of angle requirements only ( shown as table 1 )

48-2.4.2.1.1 Vehicles of Category M1

48-2.4.2.1.1.1 Front Seats:

The angle  $\alpha_1$  (other than buckle side) shall be within the range of 30 to 80 degrees and the angle  $\alpha_2$  (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  $\alpha_1$  and  $\alpha_2$  is constant (e.g. anchorage fixed at the seat) in all normal positions of use, its value shall be 60 +/- 10 degrees. In the case of adjustable seats with an adjusting device with a seatback angle of less than 20 degrees, the angle  $\alpha_1$  may be below the minimum value (30 degrees) stipulated above, provided it is not less than 20 degrees in any normal position of use.

48-2.4.2.1.1.2 Rear Seats:

The angles  $\alpha_1$  and  $\alpha_2$  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.

48-2.4.2.1.2 Vehicles of Categories M2, M3 and N

48-2.4.2.1.2.1 Front Seats

48-2.4.2.1.2.1.1 The angles  $\alpha_1$  and  $\alpha_2$  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 tons at least one of the angles  $\alpha_1$  and  $\alpha_2$  is constant in all normal positions of use, its value shall be 60 +/- 10 degrees (e.g. anchorage fixed at the seat).

48-2.4.2.1.2.1.2 Bench Seats and adjustable seats with an adjusting device with a seatback angle of less than 20 degrees: The angles  $\alpha_1$  and  $\alpha_2$  shall be between 20 degrees and 80 degrees in any normal position of use. Where in the case of front seats of vehicles having a maximum vehicle mass not exceeding

3.5 tons at least one of the angles  $\alpha_1$  and  $\alpha_2$  is constant in all normal positions of use, its value shall be 60 +/- 10 degrees (e.g. anchorage fixed at the seat).

48-2.4.2.2 Top-view areas of location (shown as diagram 5): The distance between the two vertical planes parallel to the median longitudinal plane of the vehicle shall not be less than 350 mm. In the case of any central seating positions in rear rows of seats of vehicles of categories M1 and N1, the above-mentioned 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 be at least 120 mm from these points.

48-2.5 Performance Requirements for Anchorage: 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 degrees for vehicles of categories M1 and N1 and to 15 degrees for vehicles of all other categories.

48-2.5.1 Anchorages fitted to the body of vehicle: The tractive force shall be applied in a direction corresponding to the seating position at an angle of 10 degrees +/- 5 degrees 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 +/- 30 per cent of the target load shall be applied; the load shall be increased to 100 per cent of the relevant target load. 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.

48-2.5.1.1 3-Point Safety Belt (shown as diagram 6)

48-2.5.1.1.1 Vehicles of categories M1 and N1: A test load of 13500 N +/- 200 N shall be applied to a traction device attached to the belt anchorages of the same belt, At the same time a tractive force of 13500 N +/- 200 N shall be applied to a traction device attached to the two lower belt anchorages.

48-2.5.1.1.2 Vehicles of categories M2 and N2: the test load shall be 6750 N +/- 200 N.

48-2.5.1.1.3 Vehicles of categories M3 and N3: the test load shall be 4500 N +/- 200 N.

48-2.5.1.2 2-Point Safety Belt (shown as diagram 7)

48-2.5.1.2.1 Vehicles of categories M1 and N1: A test load of 22250 N +/- 200 N shall be applied to a traction device attached to the two lower belt anchorages.

48-2.5.1.2.2 Vehicles of categories M2 and N2: the test load shall be 11100 N +/- 200 N.

48-2.5.1.2.3 Vehicles of categories M3 and N3: the test load shall be 7400 N +/- 200 N.

48-2.5.2 Anchorages located wholly within the seat structure or dispersed between the vehicle structure and the seat structure. The test

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specified in paragraphs 1. 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:

48-2.5.2.1 Vehicles of categories M1 and N1: The loads indicated in paragraphs 1. above shall be supplemented by a force equal to 20 times the mass of the complete seat.

48-2.5.2.2 Vehicles of categories M2 and N2: The loads indicated in paragraphs 1. above shall be supplemented by a force equal to 10 times the mass of the complete seat;

48-2.5.2.3 Vehicles of categories M3 and N3: The loads indicated in paragraphs 1. above shall be supplemented by a force equal to 6.6 times the mass of the complete seat.

#### 48-2.6 Inspection during and after static tests for safety-belt anchorages

48-2.6.1 All the anchorages shall be capable of withstanding the test prescribed in paragraphs 48-1.5. 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 48-1.4.2.2. and the requirements of paragraph 48-1.4.1.2. for effective upper belt anchorages shall be respected.

48-2.6.1.1 For vehicles of category M1 of a total permissible mass not exceeding 2.5 t, 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 4).

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 degrees 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 above-mentioned 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 VSTD "The protection of the occupants in the event of a frontal collision" or a sled test with corresponding pulse may be carried out to demonstrate a sufficient survival space.

48-2.6.2 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.

48-2.6.3 After testing any damage to the anchorages and structures supporting load during tests shall be noted.

48-2.6.4 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 t, which meet the requirements of "Seats", need not to comply with the requirements of paragraph 48-1.6.1. concerning compliance with paragraph 48-1.4.1.2.

48-2.6.5 Securing the vehicle for seat belt anchorages tests and for ISOFIX anchorages tests

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48-2.6.5.1 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.

48-2.6.5.2 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.

48-2.6.5.3 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.

48-2.6.5.4 If a securing method other than that prescribed in paragraphs 48-2 6.5.1. to 48-2 6.5.3. of this Regulation is used, evidence must be furnished that it is equivalent.

48-2.7 Requirements for the installation of safety-belts and restraint systems (This requirement only suitable for vehicle variant of M1, which have to equip with ISOFIX that shall comply with this requirements.)

48-2.7.1 Declaration of design compliance of child restraint systems

48-2.7.1.1 The vehicle manufacturer shall include in the vehicle handbook advice on the suitability of each passenger seat position for the carriage of children up to 12 years old (or below 36 kilograms), or the fitting of child restraint systems. This information shall be given in Chinese language.

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

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

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

Tables in a suitable format for the above information are given in table2 and table3.

48-2.7.1.2 Seat positions, or ISOFIX positions, which are indicated by the vehicle manufacturer as being suitable for the installation of

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child restraints systems or ISOFIX child restraints systems shall comply with the paragraph 48-2 7.2.1. and 48-2 7.2.2. Where applicable any restriction on the simultaneous use on adjacent positions of ISOFIX child restraint systems and/or between ISOFIX positions and adult seating positions shall be reported in the table3.

48-2.7.2 For adult occupants of power-driven vehicles on forward facing seats and for the installation of isofix child restraint systems

48-2.7.2.1 Provisions concerning the installation of "universal" category child restraint systems installed with the safety-belt equipment of the vehicle

48-2.7.2.1.1 General

48-2.7.2.1.1.1 The test procedure and the requirements in this appendix shall be used to determine the suitability of seat positions for the installation of child restraints of the "universal" category.

48-2.7.2.1.1.2 The tests may be carried out in the vehicle or in a representative part of the vehicle.

48-2.7.2.1.2 Test procedure

48-2.7.2.1.2.1 Adjust the seat to its fully rearward and lowest position.

48-2.7.2.1.2.2 Adjust the seat-back angle to the manufacturer's design position. In the absence of any specification, an angle of 25 degrees from the vertical, or the nearest fixed position of the seat-back, should be used.

48-2.7.2.1.2.3 Set the shoulder anchorage to the lowest position.

48-2.7.2.1.2.4 Place a cotton cloth on the seat-back and cushion.

48-2.7.2.1.2.5 Place the fixture (as described in figure 8) on the vehicle seat.

48-2.7.2.1.2.6 If the seating position is intended to accommodate a forward-facing or rearward-facing universal restraint system, proceed according to paragraphs 48-2.7.2.1.2.6.1., 48-2.7.2.1.2.7., 48-2.7.2.1.2.8., 48-2.7.2.1.2.9. and 48-2.7.2.1.2.10. If the seating position is intended to accommodate only a forward-facing universal restraint system, proceed according to paragraphs 48-2.7.2.1.2.6.2., 48-2.7.2.1.2.7., 48-2.7.2.1.2.8., 48-2.7.2.1.2.9. and 48-2.7.2.1.2.10.

48-2.7.2.1.2.6.1 Arrange the safety-belt strap around the fixture in approximately the correct position as shown in figures 9 and 10, then latch the buckle.

48-2.7.2.1.2.6.2 Arrange the safety-belt lap strap approximately in the correct position around the lower part of the fixture of 150 mm radius as shown in figure 10, then latch the buckle.

48-2.7.2.1.2.7 Ensure that the fixture is located with its centreline on the apparent centreline of the seating position +/- 25 mm with its centreline parallel with the centreline of the vehicle.

48-2.7.2.1.2.8 Ensure that all webbing slack is removed. Use sufficient force to remove the slack, do not attempt to tension the webbing.

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48-2.7.2.1.2.9 Push rearwards on the centre of the front of the fixture with a force of 100 N +/- 10 N, applied parallel to the lower surface, and remove the force.

48-2.7.2.1.2.10 Push vertically downwards on the centre of the upper surface of the fixture with a force of 100 N +/- 10 N, and remove the force.

#### 48-2.7.2.1.3 Requirements

48-2.7.2.1.3.1 The base of the fixture shall contact both the forward and rearward parts of the seat cushion surface. If such contact does not occur due to the belt access gap in the test fixture, this gap may be covered in line with the bottom surface of the test fixture.

48-2.7.2.1.3.2 The lap portion of the belt shall touch the fixture on both sides at the rear of the lap belt path (see figure 10).

48-2.7.2.1.3.3 Should the above requirements not be met with the adjustments indicated in paragraphs 48-2 7.2.1.2.1., 48-2 7.2.1.2.2. and 48-2 7.2.1.2.3., the seat, seat-back and safety-belt anchorages may be adjusted to an alternative position designated by the manufacturer for normal use at which the above installation procedure shall be repeated and the requirements again verified and met.

This alternative position shall be included as an information in the table 2.

#### 48-2.7.2.2 Provisions concerning the installation of forward-facing and rearward-facing isofix child restraint systems of universal and semi-universal categories installed on isofix position

##### 48-2.7.2.2.1 General

48-2.7.2.2.1.1 The test procedure and the requirements in this appendix shall be used to determine the suitability of ISOFIX positions for the installation of ISOFIX child restraint systems of universal and semi-universal categories.

48-2.7.2.2.1.2 The tests may be carried out in the vehicle or in a representative part of the vehicle.

##### 48-2.7.2.2.2 Test procedure

For any ISOFIX position in the vehicle, as indicated by the car manufacturer, in table 3, it has to be checked that it is possible to accommodate the corresponding child restraint fixture(s) (CRF):

48-2.7.2.2.2.1 When checking a CRF on a seat, this seat may be adjusted longitudinally to its rearmost position and in its lowest position.

48-2.7.2.2.2.2 Adjust the seat-back angle to the manufacturer's design position and the head restraint in the lowest and rearmost position. In the absence of any specification an angle of the seat-back corresponding to a torso angle of 25 degrees from the vertical, or the nearest fixed position of the seat-back, shall be used.

When checking a CRF on a rear seat, the vehicle seat located in front of this rear seat may be adjusted longitudinally forward but not further than the mid position between its rearmost and fore most positions. The seat

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backrest angle may also be adjusted, but not to a more upright angle than corresponding to a torso angle of 15 degrees .

48-2.7.2.2.2.3 Place a cotton cloth on the seat-back and cushion.

48-2.7.2.2.2.4 Place the CRF on the ISOFIX position.

48-2.7.2.2.2.5 Push, towards ISOFIX anchorages system, on the center between the ISOFIX anchorages with a force of 100 N +/- 10 N, applied parallel to the lower surface, and remove the force.

48-2.7.2.2.2.6 Attach the CRF to the ISOFIX anchorages system.

48-2.7.2.2.2.7 Push vertically downwards on the centre of the upper surface of the fixture with a force of 100 N +/- 10 N, and remove the force.

#### 48-2.7.2.2.3 Requirements

The following testing conditions only apply for the CRF(s) when accommodated in the ISOFIX position. It is not required that the CRF(s) shall be possible to move in and out of the ISOFIX position under these conditions.

48-2.7.2.2.3.1 It has to be possible to accommodate the CRF(s) without interference with the vehicle interior. The CRF base shall have a pitch angle of 15 degrees +/- 10 degrees , above the horizontal plane passing through the ISOFIX anchorages system.

48-2.7.2.2.3.2 The ISOFIX top tether anchorage, if any, shall remain accessible.

48-2.7.2.2.3.3 Should the above requirements not be met with the adjustments indicated in paragraph 48-2 7.2.2.2. above, the seats, the seat-backs, the head restraints may be adjusted to alternative positions designated by the manufacturer for normal use following which the above installation procedure shall be repeated and the requirements verified and met. These alternative positions shall be included as information in table 3 .

48-2.7.2.2.3.4 Should the above requirements not be fulfilled when some removable interior fittings were present, such fittings may be removed and then requirements of paragraph 48-2 7.2.2.3. have to be verified again and fulfilled. In such a case corresponding information shall be included in table 3.

#### 48-2.7.2.3 ISOFIX child restraint system size classes and fixtures

A - ISO/F3: Full-Height Forward Facing toddler CRS

B - ISO/F2: Reduced-Height Forward Facing toddler CRS

B1 - ISO/F2X: Reduced-Height Forward Facing toddler CRS

C - ISO/R3: Full-Size Rearward Facing toddler CRS

D - ISO/R2: Reduced-Size Rearward Facing toddler CRS

E - ISO/R1: Rearward Facing infant CRS

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F - ISO/L1: Left Lateral Facing position CRS (carry-cot)

G - ISO/L2: Right Lateral Facing position CRS (carry-cot)

The fixtures below shall be constructed with a mass between 5 and 15 kg and shall be of suitable durability and stiffness to satisfy the functional requirements.

Mass group	ISOFIX size class	Fixture (CRF)
0 - up to 10 kg	F	ISO/L1
	G	ISO/L2
	E	ISO/R1
0+ - up to 13 kg	C	ISO/R3
	D	ISO/R2
	E	ISO/R1
I - 9 to 18 kg	A	ISO/F3
	B	ISO/
	B1	ISO/ F2X
	C	ISO/R3
	D	ISO/R2

ISOFIX child restraint system size classes and fixtures

#### 48-2.7.3 Minimum number of belt and ISOFIX anchorages to be provided

48-2.7.3.1 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.

48-2.7.3.2 Notwithstanding paragraph 48-2 7.3.1. if a vehicle is only equipped with one seat row, no ISOFIX position is required.

48-2.7.3.3 At least one of the two ISOFIX positions systems shall be installed at the second seat row.

48-2.7.3.4 The vehicles of category M1 need to have only one ISOFIX position system for vehicles with:

48-2.7.3.4.1 Not more than two passenger doors and

48-2.7.3.4.2 A rear designated seating position for which interference with transmission and/ or suspension components prevents

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the installation of ISOFIX anchorages according to the requirements of paragraph 48-2 7.4.2. and

48-2.7.3.4.3 Having a Power to mass ratio index (PMR) exceeding 140, and with the definition of the Power Mass Ratio (PMR):

$$PMR = (P_n / m_t) * 1000 \text{ kg/kW}$$

where:

$P_n$  = maximum (rated) engine power expressed in kW

$m_{ro}$  = mass of a vehicle in running order expressed in kg

$m_t$  =  $m_{ro}$  (for vehicles of category M1)

and

48-2.7.3.4.4 Having an engine developing a maximum (rated) engine power greater than 200 kW .

Such a vehicle needs to have only one ISOFIX anchorages system and an ISOFIX top tether anchorage at a front passenger designated seating position combined with an airbag deactivation device (if that seating position is fitted with an airbag) and a caution label indicating that there is no ISOFIX position system available at the second seat row.

48-2.7.3.5 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.

48-2.7.3.6 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 I.

48-2.7.3.7 The convertible vehicles 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.

#### 48-2.7.4 General specifications

48-2.7.4.1 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:

48-2.7.4.1.1 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.

48-2.7.4.1.2 ISOFIX anchorages system and ISOFIX top tether anchorage resistance are designed for any ISOFIX child restraint systems of group of mass 0; 0+; I.

48-2.7.4.2 ISOFIX anchorage systems, design and positioning:

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48-2.7.4.2.1 Any ISOFIX anchorages system shall be 6 mm +/- 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 11.

48-2.7.4.2.2 Any ISOFIX anchorages system installed on a vehicle seating position shall be located not less than 120 mm behind the design H-point, measured horizontally and up to the centre of the bar.

48-2.7.4.2.3 For any ISOFIX anchorages system installed in the vehicle, it shall be verified the possibility to attach the ISOFIX child restraint fixture either "ISO/F2" (B) or "ISO/ F2X(B1)" as defined by the vehicle manufacturer, as defined in figure 12 and figure13.

48-2.7.4.2.4 The bottom surface of the ISOFIX child restraint fixture as defined by vehicle manufacturer , shall have attitude angles within the following limits, angles measured relatively to the vehicle reference planes:

48-2.7.4.2.4.1 Pitch: 15 degrees +/- 10 degrees,

48-2.7.4.2.4.2 Roll: 0 degrees +/- 5 degrees,

48-2.7.4.2.4.3 Yaw: 0 degrees +/- 10 degrees

48-2.7.4.2.5 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.

48-2.7.4.2.6 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.

48-2.7.4.2.6.1 As a minimum, the symbol figure 14 consisting of a circle with a diameter of minimum 13 mm and containing a pictogram, meeting the following conditions:

48-2.7.4.2.6.1.1 the pictogram shall contrast with the background of the circle;

48-2.7.4.2.6.1.2 the pictogram shall be located close to each bar of the system;

48-2.7.4.2.6.2 The word "ISOFIX" in capital letters of at least 6 mm height.

48-2.7.4.3 ISOFIX top tether anchorages, design and positioning:

At the request of the car manufacturer, methods described in paragraphs 48-2 7.4.3.1. and 48-2 7.4.3.2. can be used alternatively.

Method described in paragraph 48-2 7.4.3.1. can only be used if the ISOFIX position is located on a vehicle seat.

48-2.7.4.3.1 Subject to paragraphs 48-2 7.4.3.3. and 48-2 7.4.3.4., the portion of each ISOFIX top tether anchorage that is

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designed to bind with an ISOFIX top tether connector shall be located not further than 2000 mm far from the shoulder reference point and within the shaded zone, as shown in figures 15 to 19, 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 figure 20, according to the following conditions:

48-2.7.4.3.1.1 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;

48-2.7.4.3.1.2 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

48-2.7.4.3.1.3 The template is positioned in the vertical longitudinal plane that contains the H-point of the template.

48-2.7.4.3.2 The ISOFIX top tether anchorage zone may be alternatively located with the aid of the Fixture "ISO/F2" (B), in an ISOFIX position equipped with ISOFIX low anchorages as shown in figure 21.

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.

Further, the ISOFIX top tether anchorage shall be more than 200 mm but not more than 2000 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.

48-2.7.4.3.3 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 48-2 7.4.3.1. or 48-2 7.4.3.2. if a location within a zone is not appropriate and the vehicle is equipped with a routing device that,

48-2.7.4.3.3.1 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,

48-2.7.4.3.3.2 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,

48-2.7.4.3.3.3 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 48-2 7.6. of this Regulation.

48-2.7.4.3.4 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.

48-2.7.4.3.5 The ISOFIX top tether anchorage shall have dimensions to permit the attachment of an ISOFIX top tether hook as specified in figure 3.

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Clearance shall be provided around each ISOFIX top tether anchorage to allow latching and unlatching to it.

All anchorages located rearward of any ISOFIX anchorages system and which could be used to attach an ISOFIX top tether hook or ISOFIX top tether connector shall be designed to prevent misuse by one or more of the following measures:

- 48-2.7.4.3.5.1 Designing all such anchorages in the ISOFIX top tether anchorage zone as ISOFIX top tether anchorages; or
- 48-2.7.4.3.5.2 Marking only the ISOFIX top tether anchorages using one of the symbols, or its mirror image, as set out in Figure 22; or
- 48-2.7.4.3.5.3 Marking such anchorages not in accordance with 48-2 7.4.3.5.1. or 48-2 7.4.3.5.2. above with a clear indication that these anchorages should not be used in combination with any ISOFIX anchorages system.

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 22; the cover shall be removable without the use of tools.

#### 48-2.7.5 Securing the vehicle for seat belt anchorages tests and for ISOFIX anchorages tests

48-2.7.5.1 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.

48-2.7.5.2 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.

48-2.7.5.3 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.

48-2.7.5.4 If a securing method other than that prescribed in paragraphs 48-2 7.5.1. to 48-2 7.5.3. of this Regulation is used, evidence must be furnished that it is equivalent.

#### 48-2.7.6 Static test requirements

48-2.7.6.1 The strength of the ISOFIX anchorage systems shall be tested applying the forces, as prescribed in paragraph 48-2 7.6.4.3., 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 48-2 7.6.4.4.

All the ISOFIX positions of a same seat row, which can be used simultaneously, shall be tested simultaneously.

48-2.7.6.2 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.

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The test may be restricted to the ISOFIX position relating to only one seat or group of seats on the condition that:

48-2.7.6.2.1 The ISOFIX position concerned have the same structural characteristics as the ISOFIX position relating to the other seats or group of seats and,

48-2.7.6.2.2 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.

48-2.7.6.3 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.

48-2.7.6.4 Forces, directions and excursion limits.

48-2.7.6.4.1 A force of 135 N +/- 15 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.

48-2.7.6.4.2 Forces shall be applied to the static force application device (SFAD) in forward and oblique directions according to table 4.

Forward	0 degrees +/- 5 degrees	8 kN +/- 0.25 kN
Oblique	75 degrees +/- 5 degrees (to both sides of straight forward, or if any worst case side, or if both side are symmetric, only one side)	5 kN +/- 0.25 kN

Table 4: Directions of test forces

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 +/- 5 degrees above the horizontal. Oblique forces shall be applied horizontally 0 degrees +/- 5 degrees. A pre-load force of 500 N +/- 25 N shall be applied at the prescribed loading point X indicated in figure 2 . 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.

48-2.7.6.4.3 Tests of ISOFIX anchorages system only:

48-2.7.6.4.3.1 Forward direction force test:

Horizontal longitudinal excursion (after pre-load) of point X of SFAD during application of the 8 kN +/- 0.25 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.

48-2.7.6.4.3.2 Oblique direction force test:

Excursion in the direction of the force (after pre-load) of point X of SFAD during application of the 5kN +/- 0.25 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.

48-2.7.6.4.4 Test of ISOFIX anchorages systems and ISOFIX top tether anchorage:

A tension pre-load of 50 N +/- 5 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 kN +/- 0.25 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.

48-2.7.6.4.5 Additional forces

48-2.7.6.4.5.1 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 5 have to be fulfilled.

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.

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

Table 5: Excursions limits

SEAT		M <sub>1</sub>	OTHER THAN M <sub>1</sub>
Front <sup>*/</sup>	buckle side (alpha <sub>2</sub> )	45 degrees - 80 degrees	30 degrees - 80 degrees
	other than buckle side (alpha <sub>1</sub> )	30 degrees - 80 degrees	30 degrees - 80 degrees
	angle constant	50 degrees - 70 degrees	50 degrees - 70 degrees
	bench - buckle side (alpha <sub>2</sub> )	45 degrees - 80 degrees	20 degrees - 80 degrees
	bench - other than buckle side (alpha <sub>1</sub> )	30 degrees - 80 degrees	20 degrees - 80 degrees
	adjustable seat with seat back angle < 20 degrees	45 degrees - 80 degrees (alpha <sub>2</sub> ) <sup>*/</sup> 20 degrees - 80 degrees(alpha <sub>1</sub> ) <sup>*/</sup>	20 degrees - 80 degrees
Rear		30 degrees - 80 degrees	20 degrees - 80 degrees
≠			Ψ
Folding	No belt anchorage required. If anchorage fitted: see angle requirements Front and Rear.		

Notes:

≠:

outboard and centre.

<sup>\*/</sup>: if angle is not constant see paragraph 5.4.2.1.

Ψ:

45 degrees - 90 degrees in the case of seats on M<sub>2</sub> and M<sub>3</sub> vehicles.

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Table 1: Location of lower anchorages-angle requirements only

Mass Group	Seating position (or other site)				
	Front Passenger	Rear Outboard	Rear Centre	Intermediate Outboard	Intermediate Centre
group 0 up to 10 kg					
group 0+ up to 13 kg					
group I 9 to 18 kg					
group II 15 to 25 kg					
group III 22 to 36 kg					

Key of letters to be inserted in the above table:

U = Suitable for "universal" category restraints approved for use in this mass group.

UF = Suitable for forward-facing "universal" category restraints approved for use in this mass group.

L = Suitable for particular child restraints given on attached list. These restraints may be of the "specific vehicle", "restricted" or "semi-universal" categories.

B Built-in restraint approved for this mass group.

X = Seat position not suitable for children in this mass group.

Table 2: Table of vehicle handbook information on child restraint systems installation suitability for various seating positions

Mass Group	Size class	Fixture	Vehicle ISOFIX positions					
			Front Passenger	Rear Outboard	Rear Centre	Intermediate Outboard	Intermediate Centre	Other sites
carrycot	F	ISO/L1						
	G	ISO/L2						
		(1)						
0 - up to 10 Kg	E	ISO/R1						
		(1)						
0+ - up to 13 kg	E	ISO/R1						
	D	ISO/R2						
	C	ISO/R3						
		(1)						
I - 9 to 18 kg	D	ISO/R2						
	C	ISO/R3						
	B	ISO/F2						
	B1	ISO/F2X						
	A	ISO/F3						
		(1)						
II - 15 to 25 kg		(1)						
III - 22 to 36 kg		(1)						

(1) = For the CRS which do not carry the ISO/XX size class identification (A to G), for the applicable mass group, the car manufacturer shall indicate the vehicle specific ISOFIX child restraint system(s) recommended for each position.

Key of letters to be inserted in the above table

IUF = suitable for ISOFIX forward child restraints systems of universal category approved for use in the mass group

IL = suitable for particular ISOFIX child restraint systems (CRS) given in the attached list. These ISOFIX CRS are those of the "specific vehicle", "restricted" or "semi-universal" categories.

X = ISOFIX position not suitable for ISOFIX child restraint systems in this mass group and / or this size class.

Table 3: Table of vehicle handbook information on ISOFIX child restraint systems installation suitability for various ISOFIX positions

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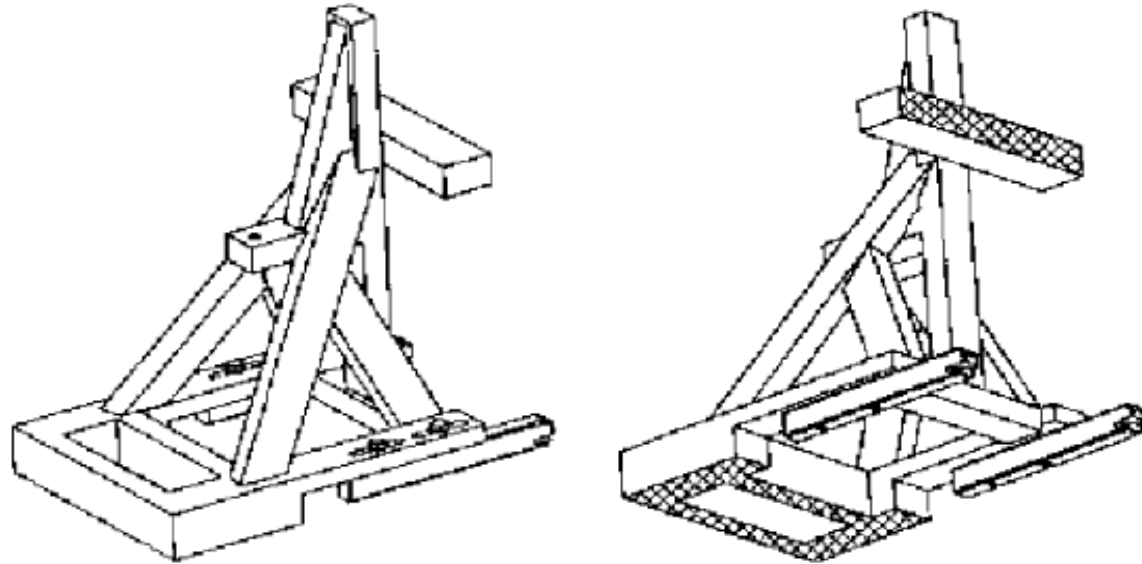
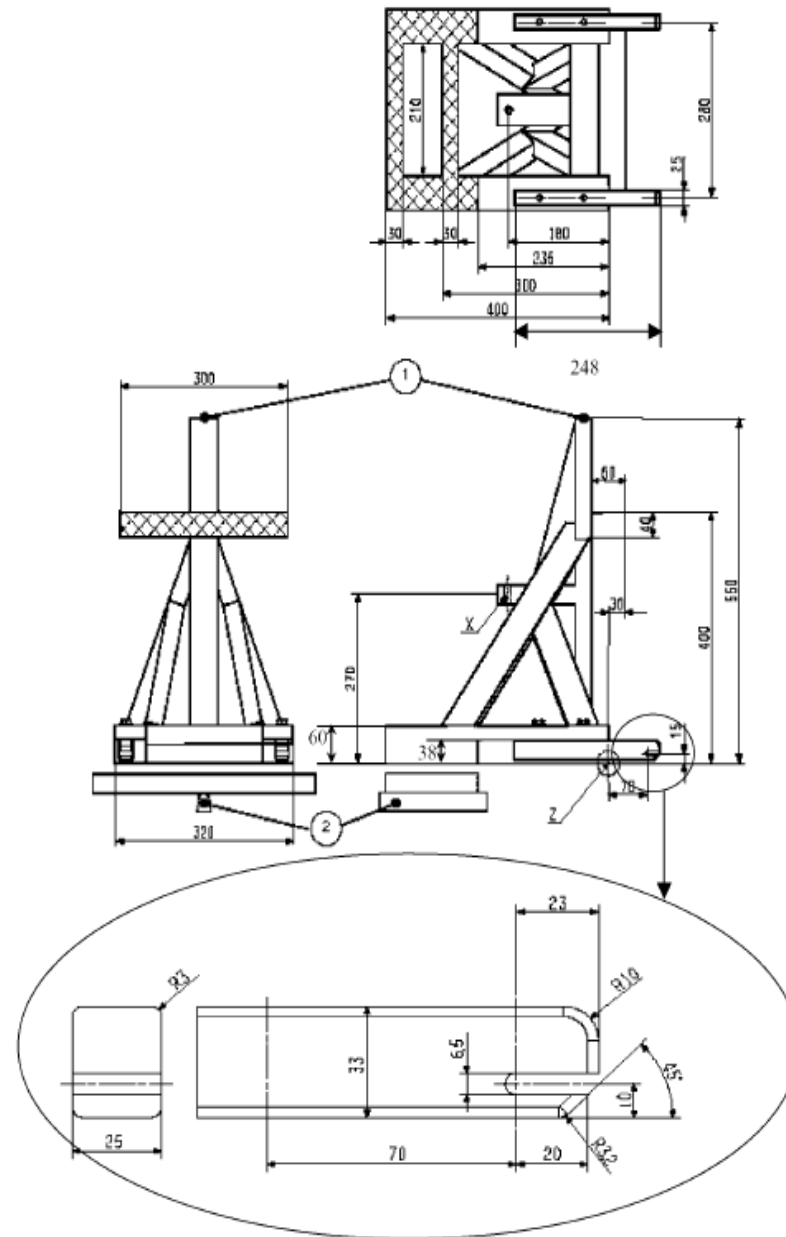


Figure 1: Static force application device (SFAD), isometric views



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Dimensions in mm

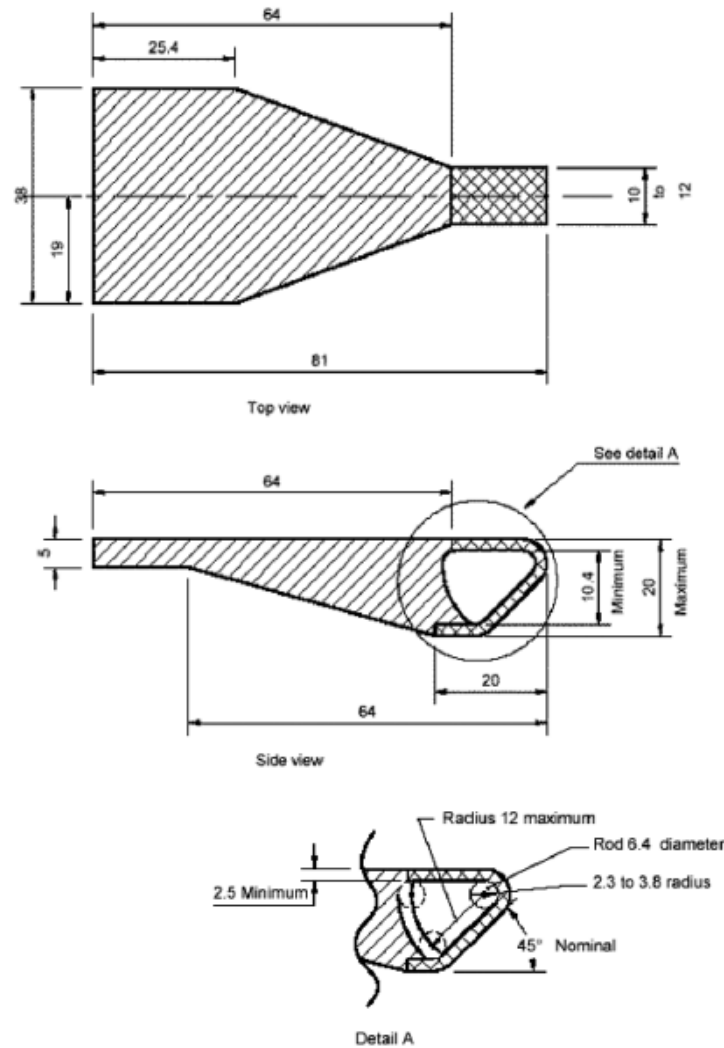
Key

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 4 of paragraph 48-2 7.5.4. of this Regulation. Any deformation of the ISOFIX anchorages system shall be excluded from the measurements

Figure 2: Static force application device (SFAD), dimensions



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Figure 3: ISOFIX Top tether connector (hook type) dimensions

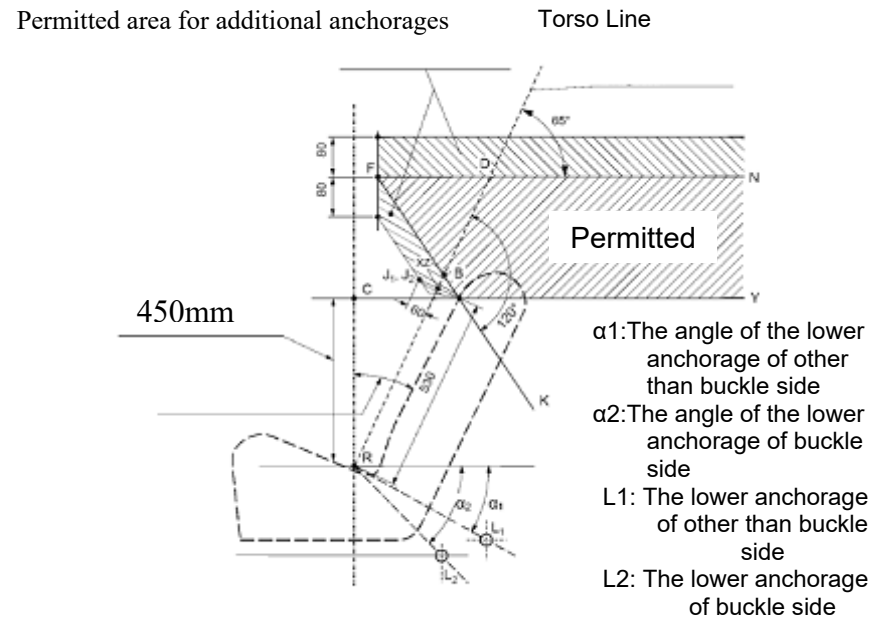


Figure 4: Side-view Areas Of Location Of Effective Belt Anchorages

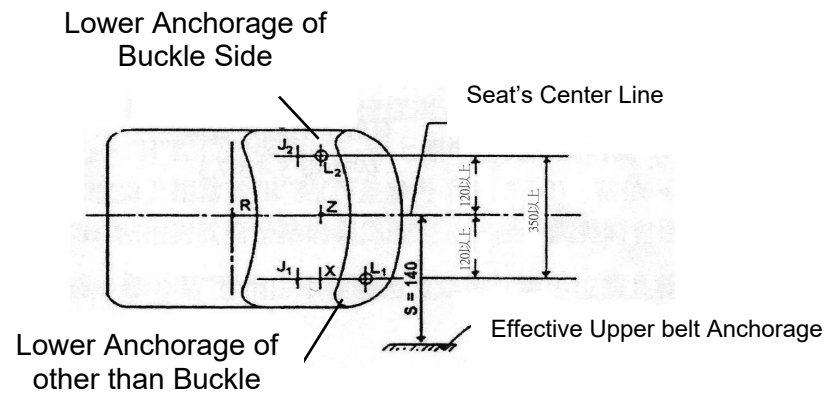


Figure 5: Top-view Areas Of Location Of Effective Belt Anchorages

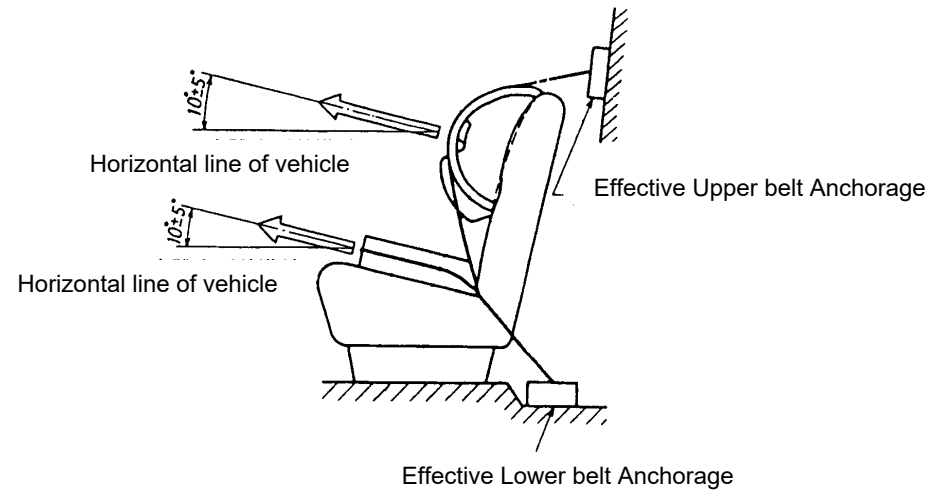


Figure 6: Performance Test of 3-Point Safety Belt Anchorage

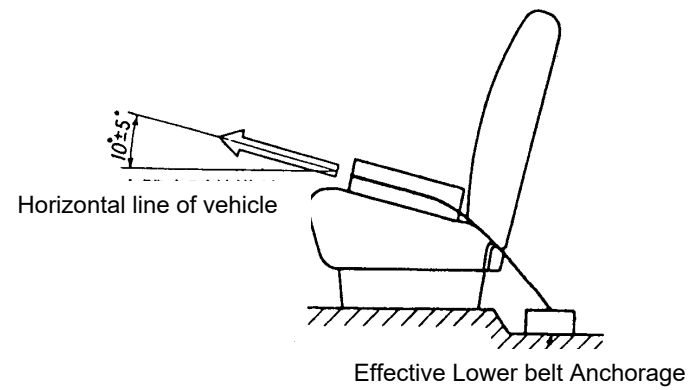


Figure 7: Performance Test of 2-Point Safety Belt Anchorage

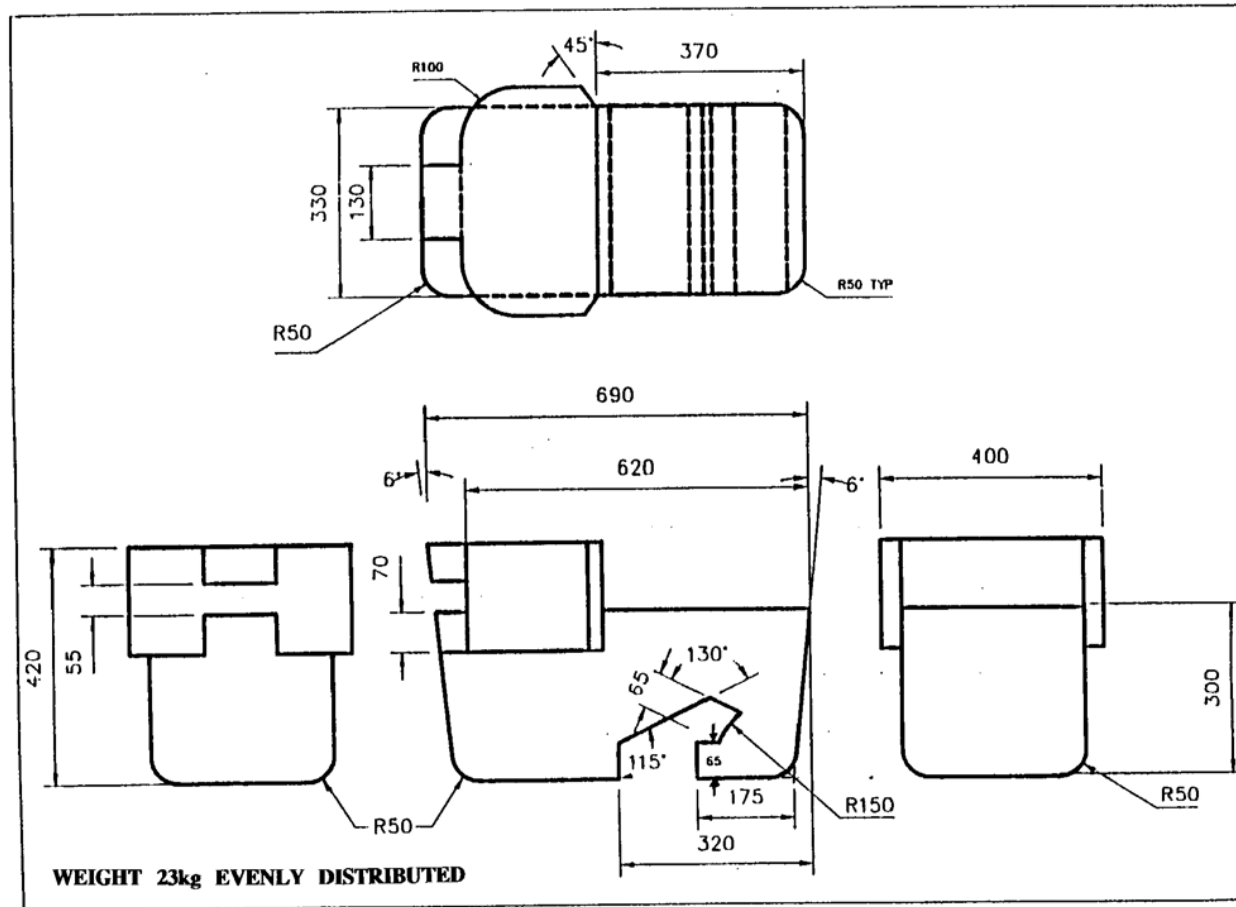


Figure 8: Specifications of the fixture

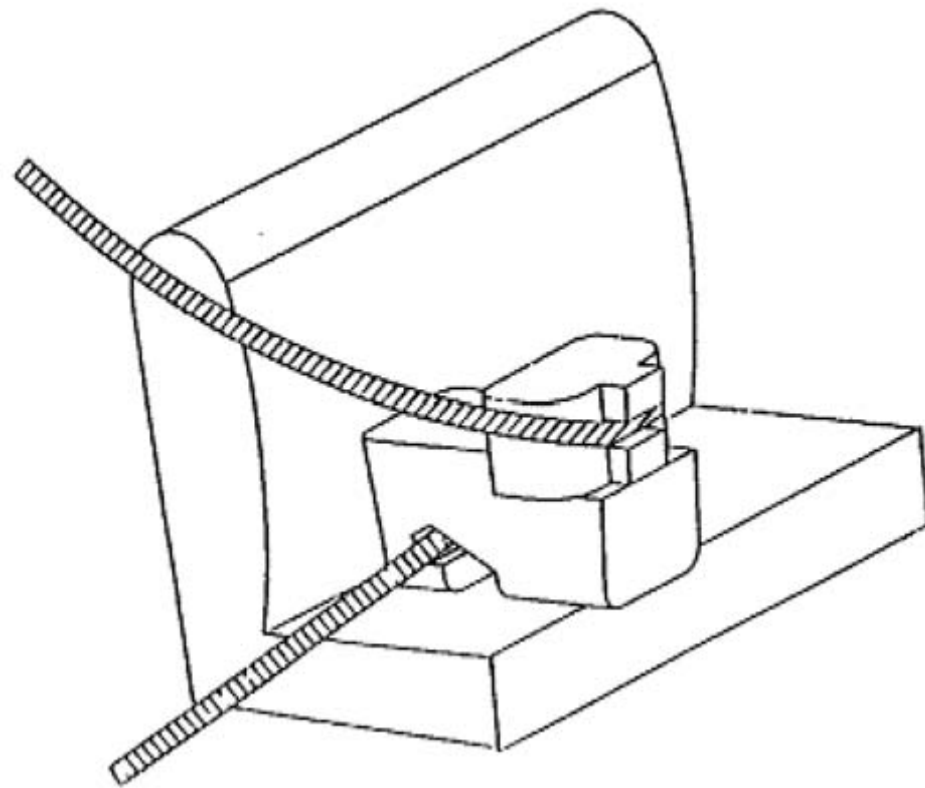


Figure 9: Installation of fixture onto vehicle seat

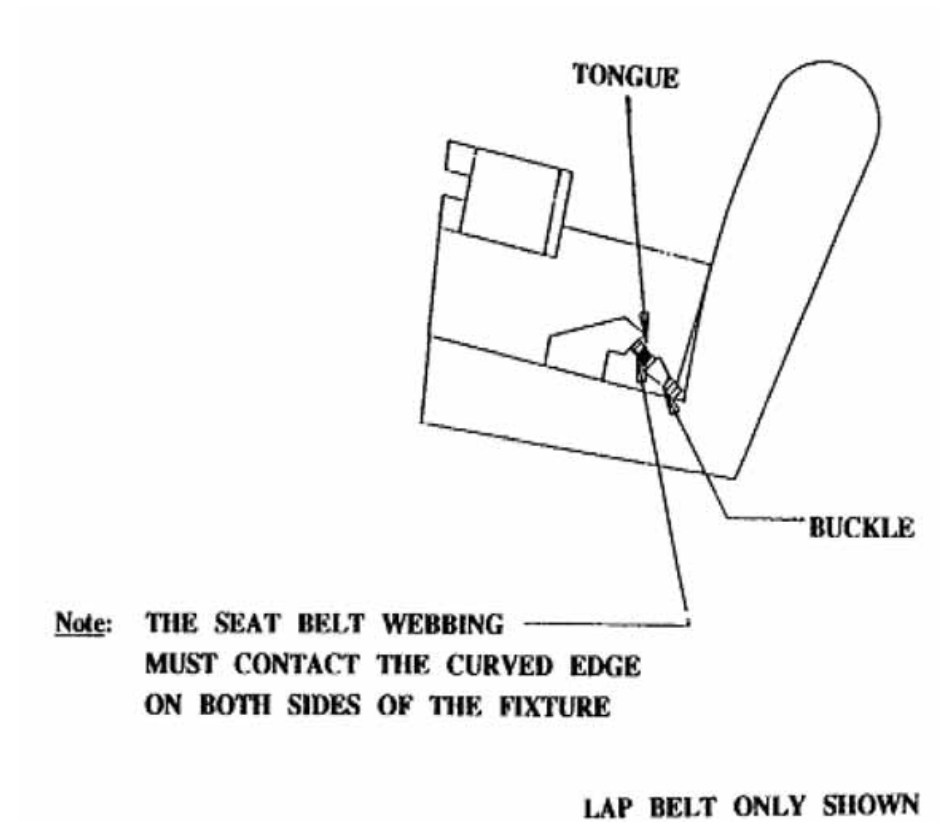


Figure 10: Check for compatibility (refer to 48-2 7.2.1.2.6.1. and 48-2 7.2.1.3.2.)

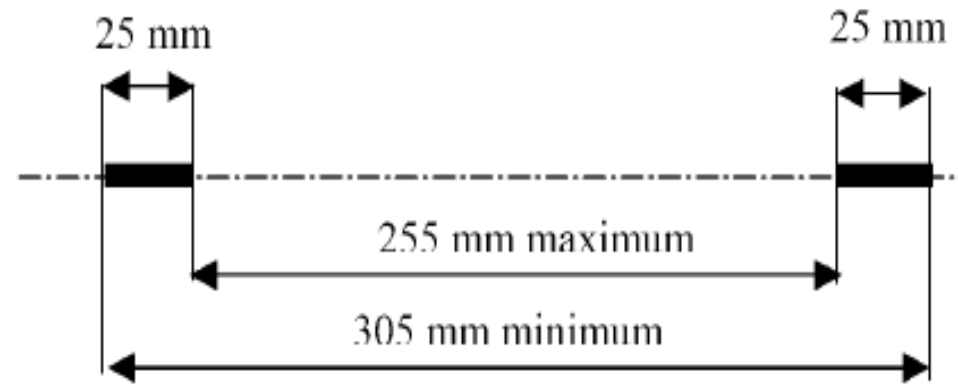
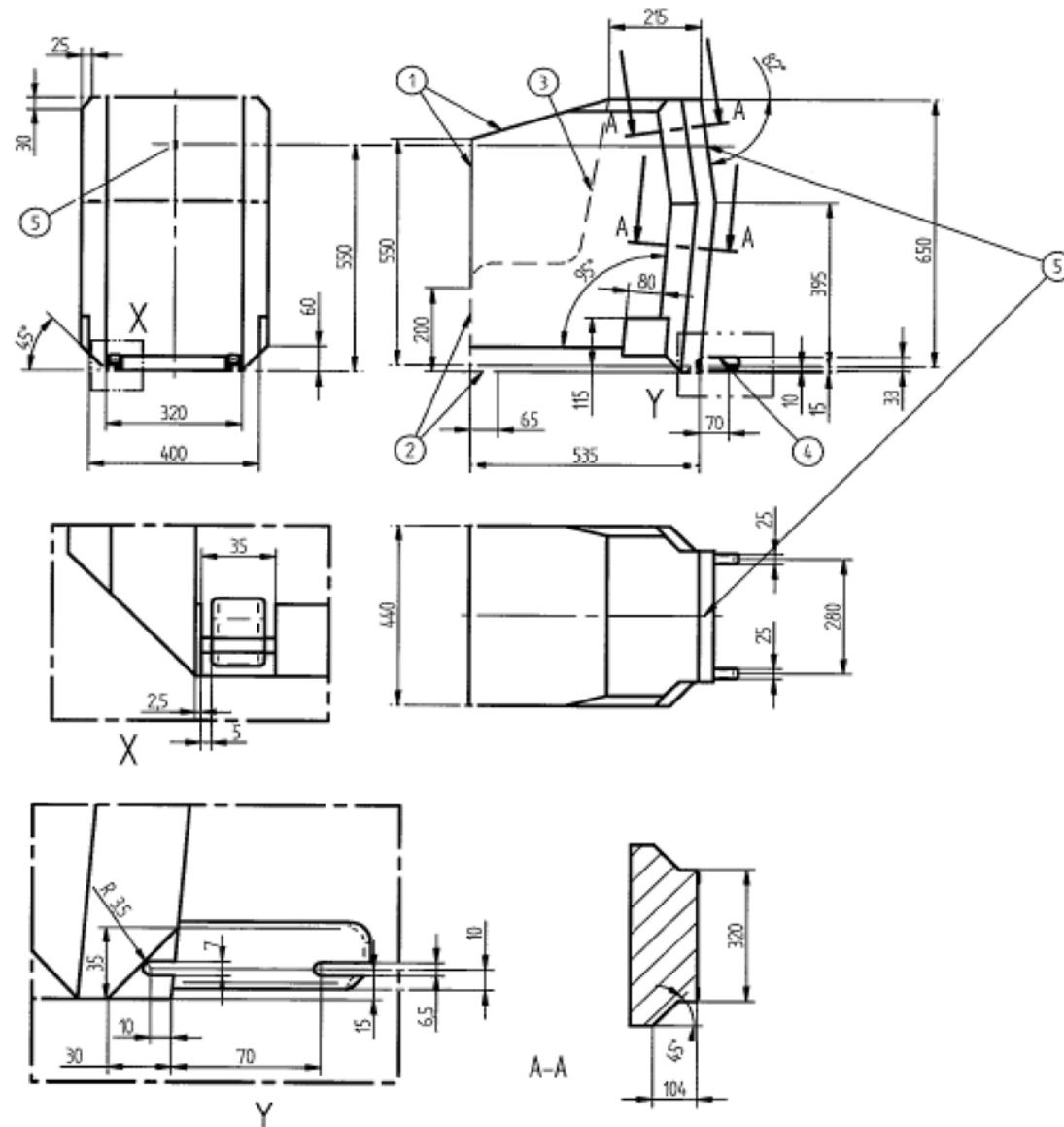


Figure 11: Distance between both low anchorage zones



Key

1 Limits in the forward and upwards directions

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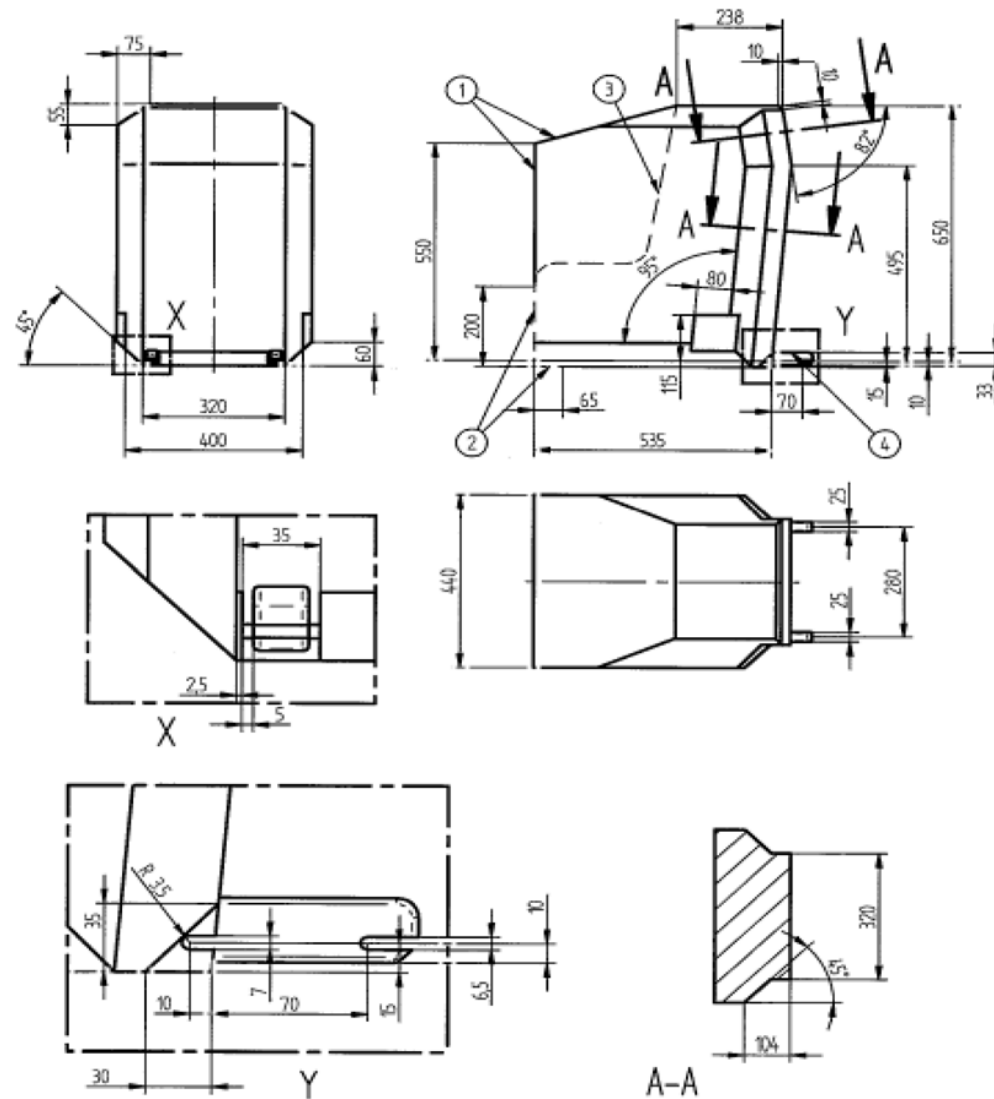
2 Dashed line marks area where a support leg, or similar, is allowed to protrude

3 N/A

4 Further specifications of the connector area are given in CNS 11497.

5 Attachment point for the top tether strap

Figure 12: ISO/F2 envelope dimensions for a reduced-height forward-facing toddler CRS, (height 650 mm) - ISOFIX SIZE CLASS B



#### Key

1 Limits in the forward and upwards directions

2 Dashed line marks area where a support leg, or similar, is allowed to protrude

3 N/A

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4 Further specifications of the connector area are given in CNS11497.

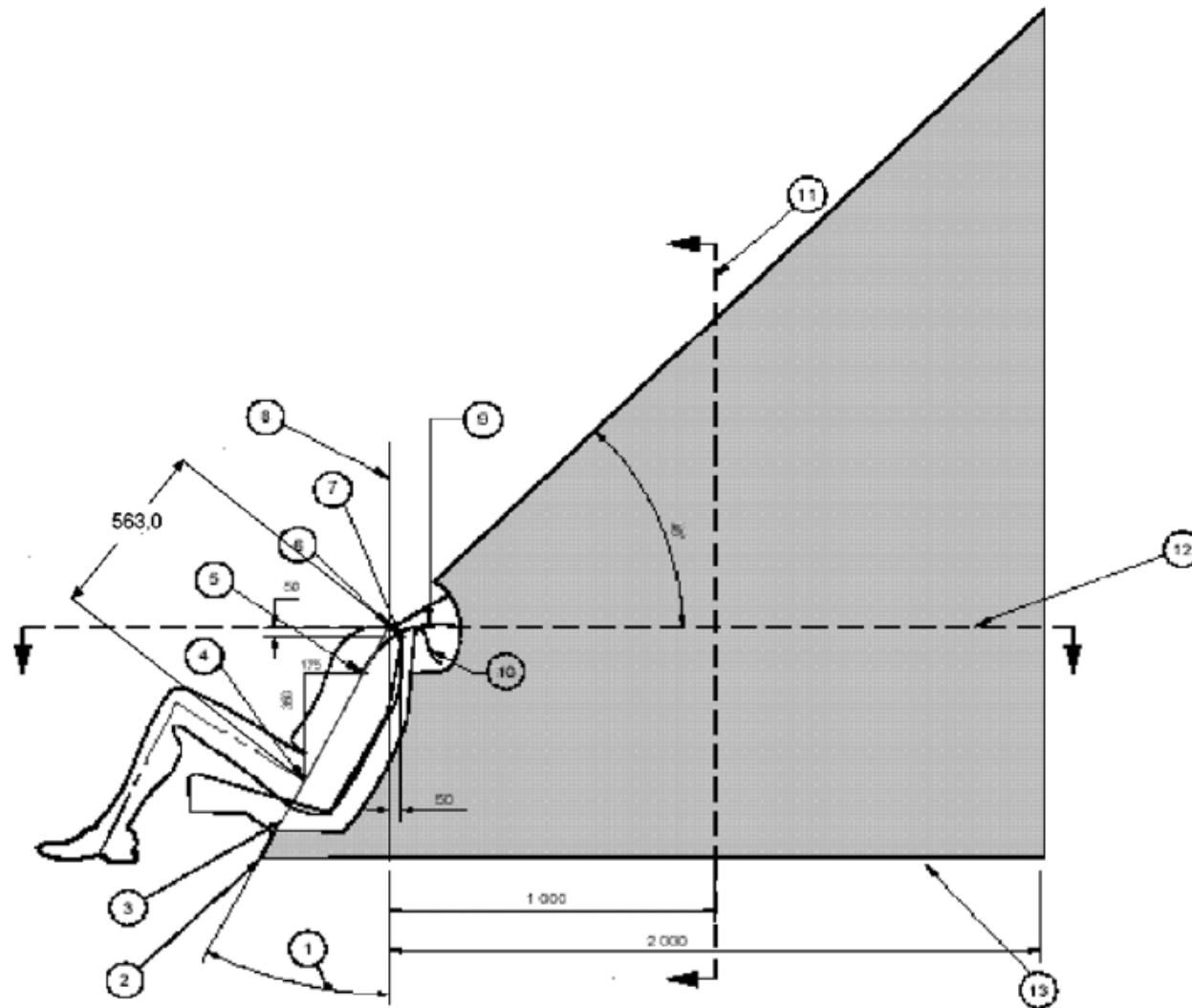
Figure 13: ISO/F2X envelope dimensions for a reduced-height second version back surface shape forward-facing toddler CRS, (height 650 mm) -  
ISOFIX SIZE CLASS B1



Notes:

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

Figure 14: ISOFIX low anchorage symbol



Dimensions in mm

Key

1 Back angle

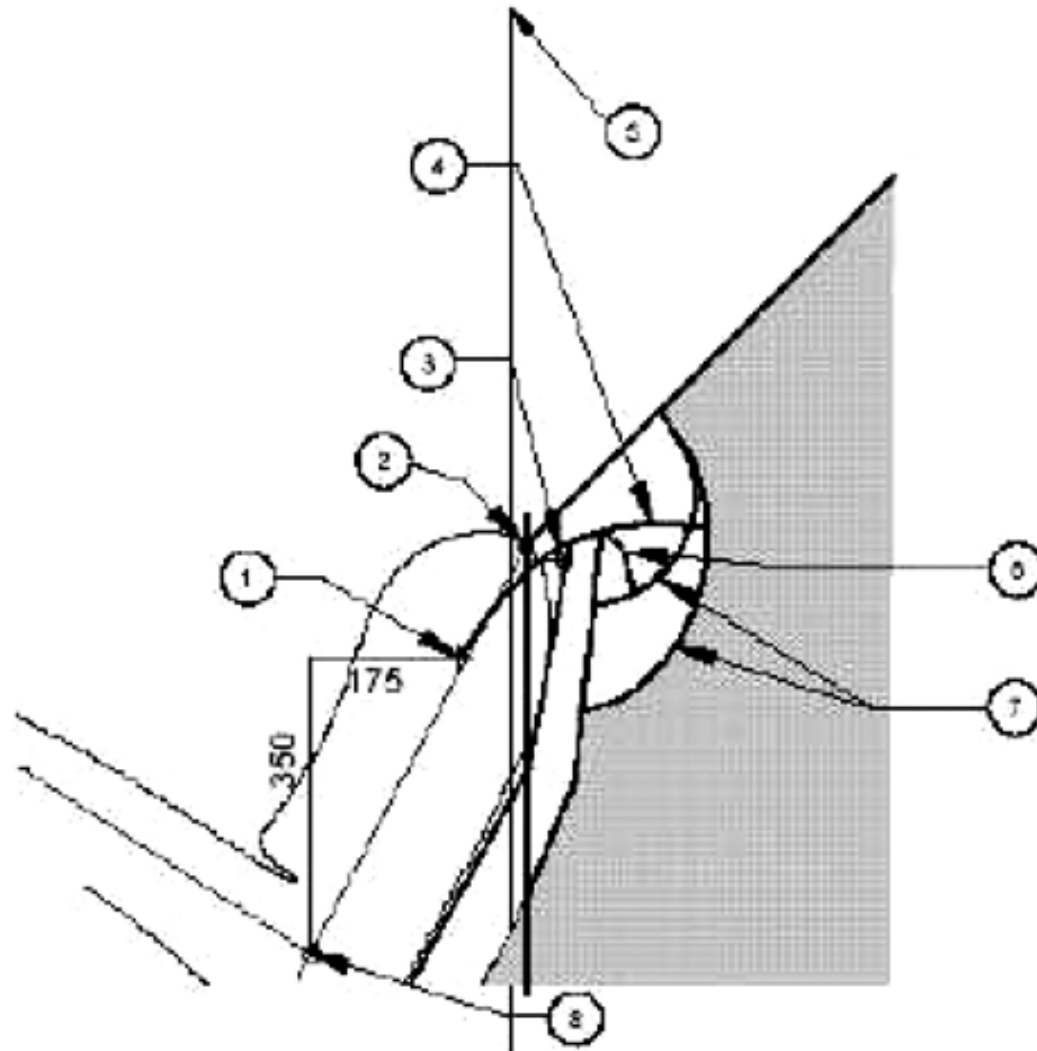
2 Intersection of torso line reference plane and floor pan

3 Torso line reference plane

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- 4 H-point
  - 5 "V" point
  - 6 "R" point
  - 7 "W" point
  - 8 Vertical longitudinal plane
  - 9 Strap wrap-around length from "V" point: 250 mm
  - 10 Strap wrap-around length from "W" point: 200 mm
  - 11 "M" plane cross-section
  - 12 "R" plane cross-section
  - 13 Line represents the vehicle specific floor pan surface within the prescribed 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
- 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, 1000 mm horizontally back from "R" Point
- NOTE 6 The forwardmost 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 15: ISOFIX Top tether anchorage location, ISOFIX zone - Side view



Dimensions in millimeters

Key

1 "V" point

2 "R" point

3 "W" point

4 Strap wrap-around length from "V" point: 250 mm

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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

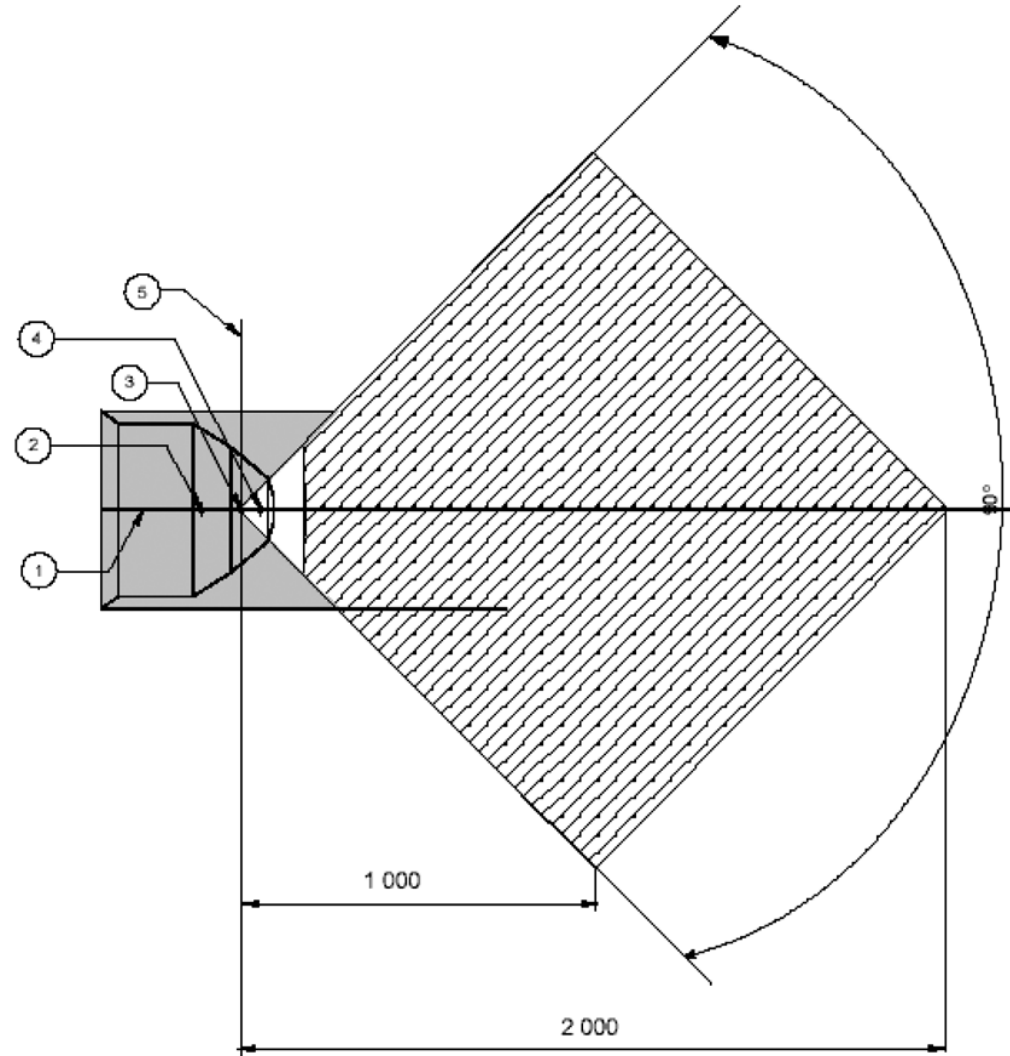
NOTE 3 "V" Point: V-reference point, 350 mm vertically above and 175 mm horizontally back from H-Point

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, 1000 mm horizontally back from "R" Point

NOTE 6 The forwardmost 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 16: ISOFIX Top tether anchorage location, ISOFIX zone - Enlarged side view of wrap-around area



Dimensions in mm

Key

1 Median plane

2 "V" point

3 "R" point

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4 "W" point

5 Vertical longitudinal plane

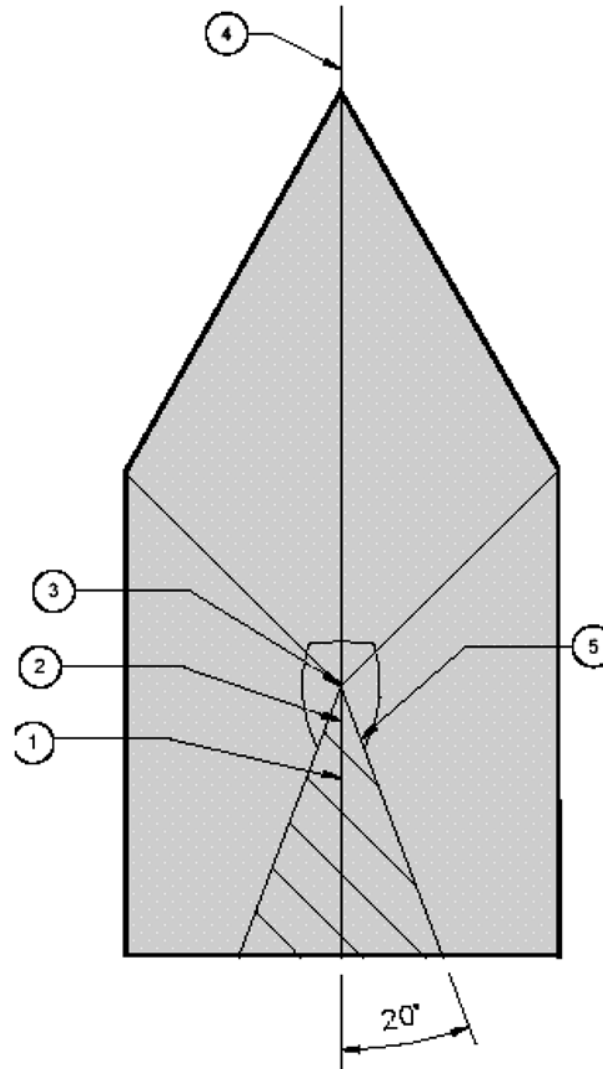
NOTE 1 Portion of top tether anchorage that is designed to bind with the top tether hook to be located within shaded zone

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 17: ISOFIX Top tether anchorage location, ISOFIX zone - Plan view (R-plane cross section)



Key  
 1 "V" point  
 2 "W" point  
 3 "R" point  
 4 Median plane

The official directions are written in Chinese, this English edition is for your reference only.

5 Area view along torso reference plane

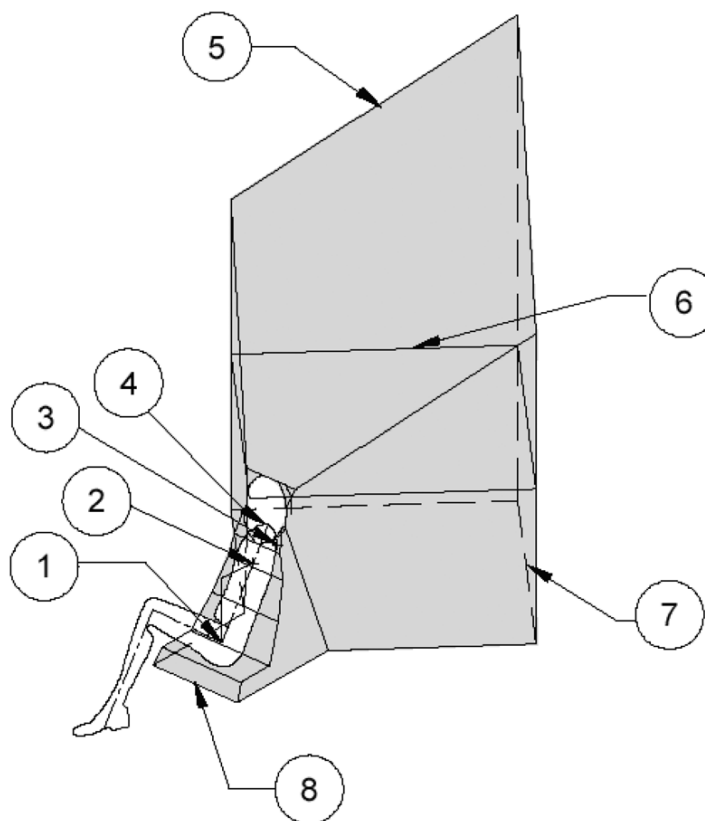
NOTE 1 Portion of top tether anchorage that is designed to bind with the top tether hook to be located within shaded zone

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 18: ISOFIX Top tether anchorage location, ISOFIX zone - Front view



Key

1 H-point

2 "V" point

3 "W" point

4 "R" point

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5 45 degrees plane

6 "R" plane cross-section

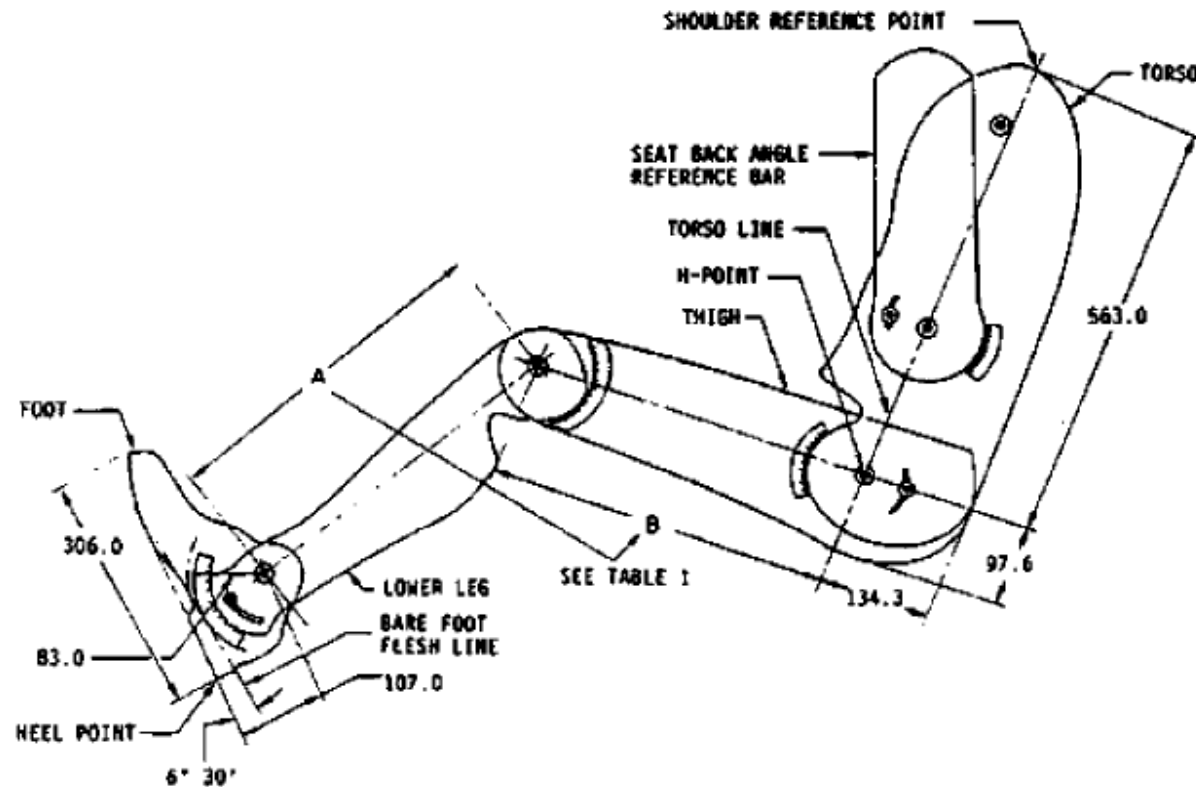
7 Floor pan surface

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

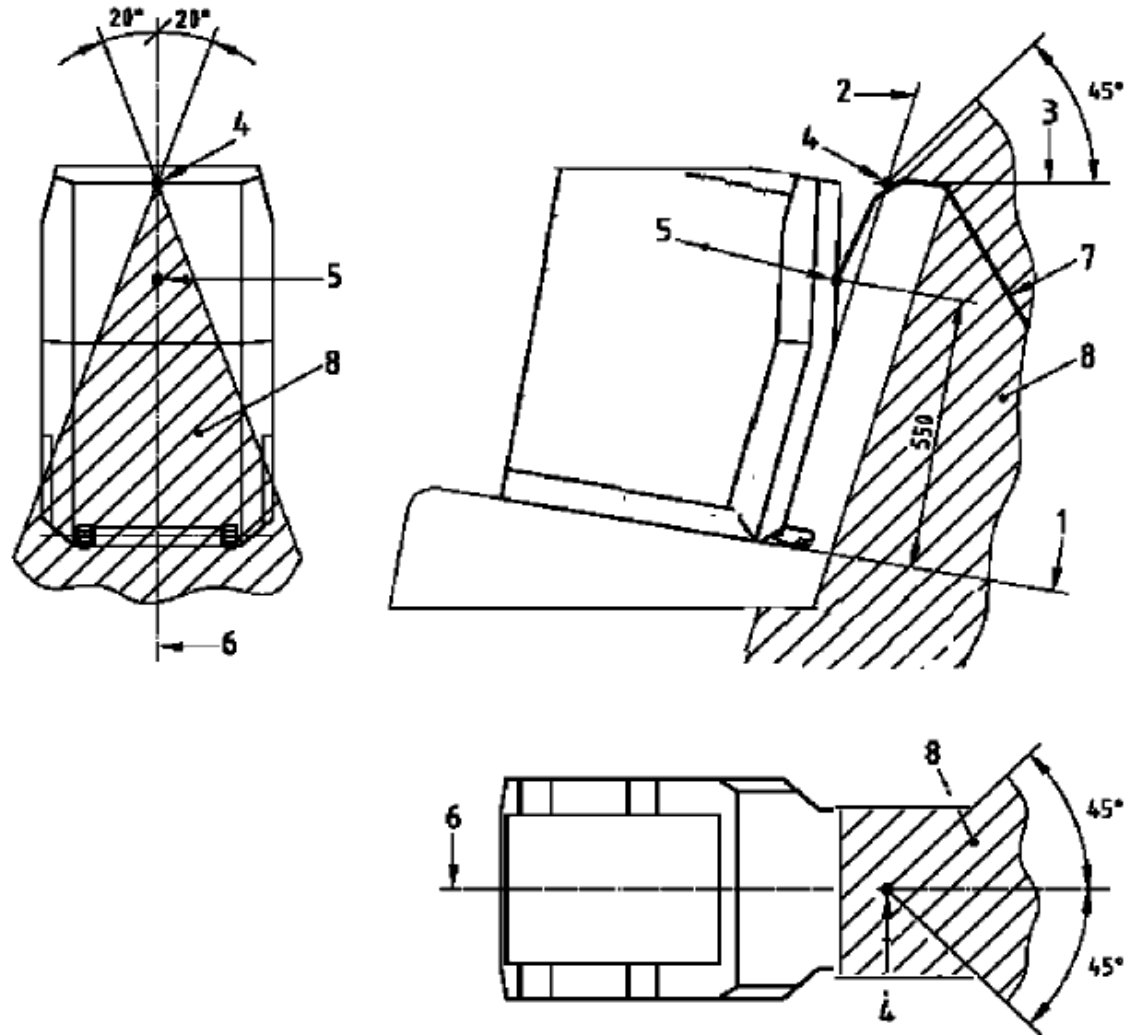
Figure 19: ISOFIX Top tether anchorage location, ISOFIX zone - Three-dimensional schematic view



NOTE: dimensions are mm

Figure 20: Two dimensions template

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Dimensions in mm

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)

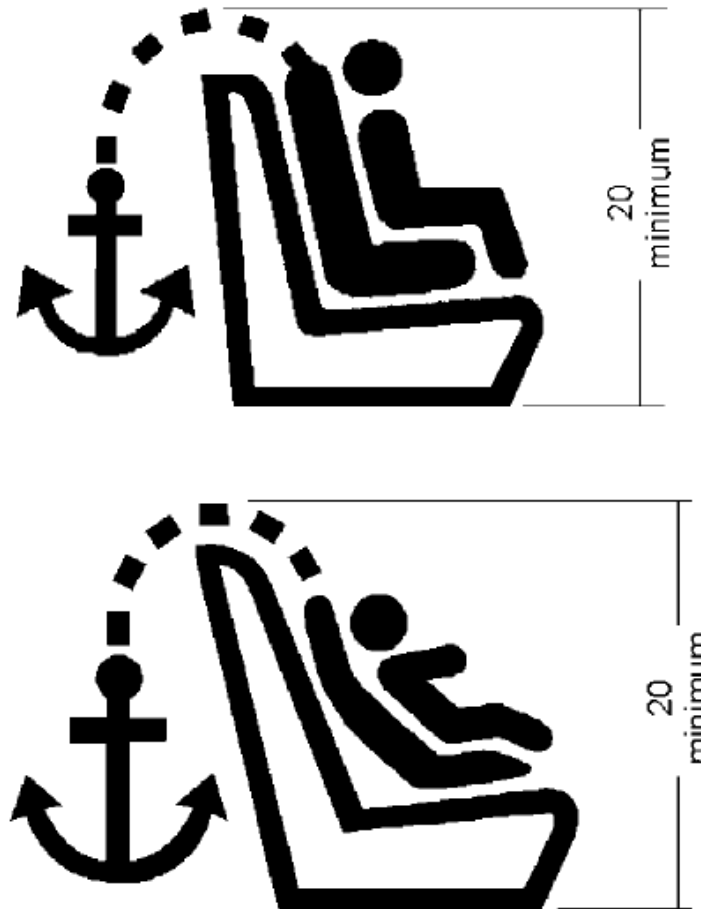
4 intersection between 2 and 3

5 tether reference point

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- 6 "ISO/F2" (B) fixture centreline
- 7 top tether strap
- 8 limits of anchorage zone

Figure 21: Alternative method of locating the top tether anchorage using the "ISO/F2" (B) fixture, isofix zone - side, top and rear views



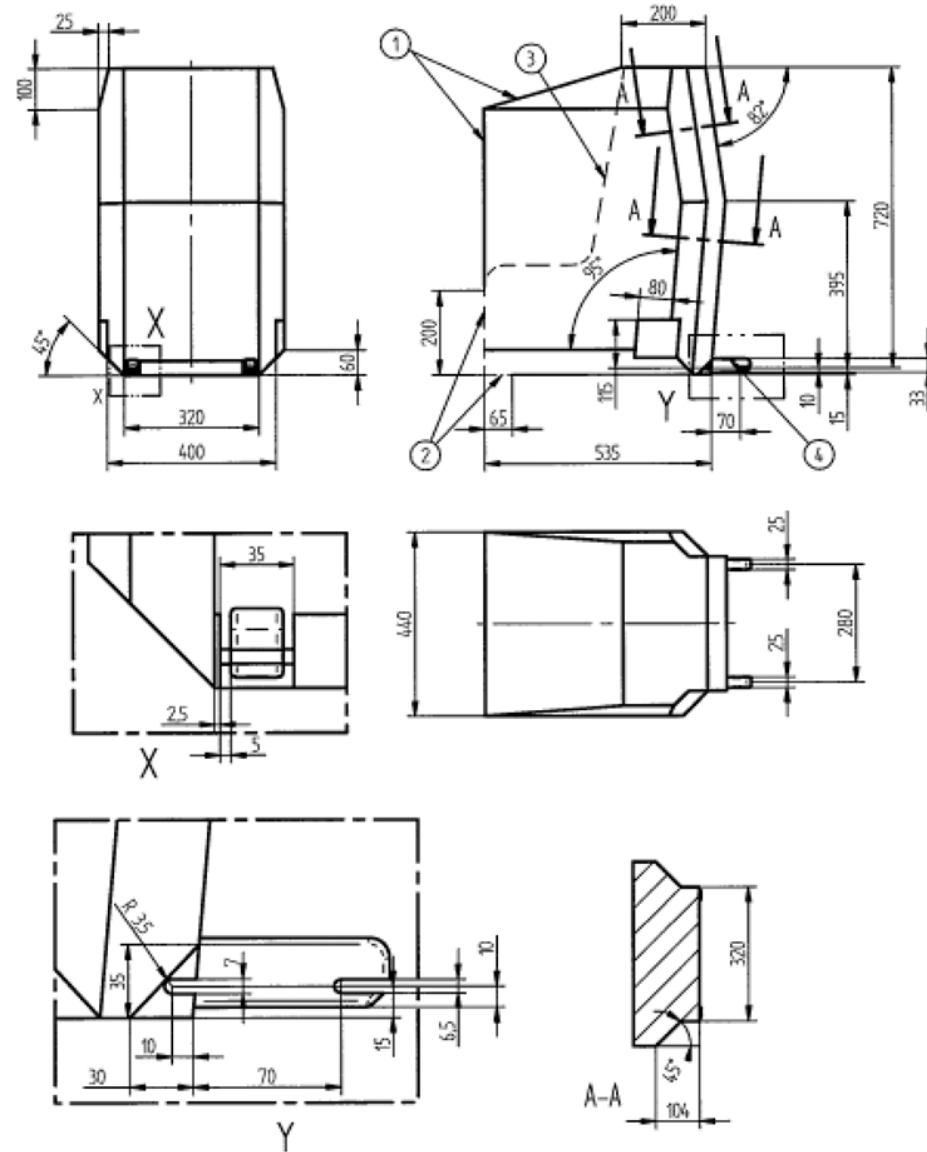
Notes:

- 1. Dimensions in mm
- 2. Drawing not to scale

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3. The symbol shall be clearly visible either by means of contrast colours or by adequate relief if it is moulded or embossed.

Figure 22: Symbol used to identify the location of a top tether anchorage that is under a cover



Key

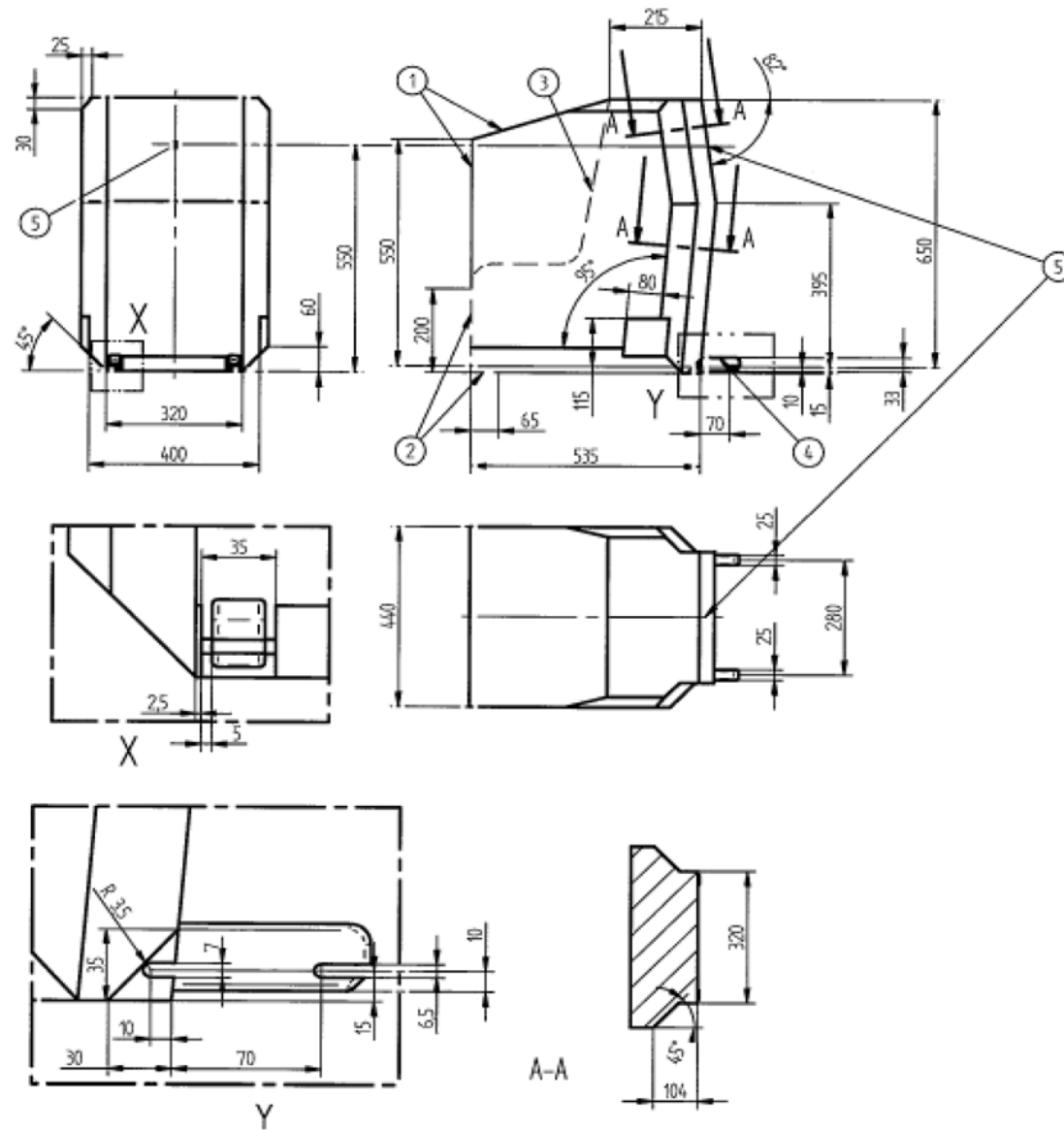
1 Limits in the forward and upwards directions

The official directions are written in Chinese, this English edition is for your reference only.



- 2 Dashed line marks area where a support leg, or similar, is allowed to protrude
- 3 N/A
- 4 Further specifications of the connector area are given in UN Regulation No. 44

Figure 23: ISO/F3 envelope dimensions for a full-height forward-facing toddler CRS (height 720 mm) - ISOFIX SIZE CLASS A



Key

1 Limits in the forward and upwards directions

The official directions are written in Chinese, this English edition is for your reference only.

- 2 Dashed line marks area where a support leg, or similar, is allowed to protrude
- 3 N/A
- 4 Further specifications of the connector area are given in UN Regulation No. 44
- 5 Attachment point for the top tether strap

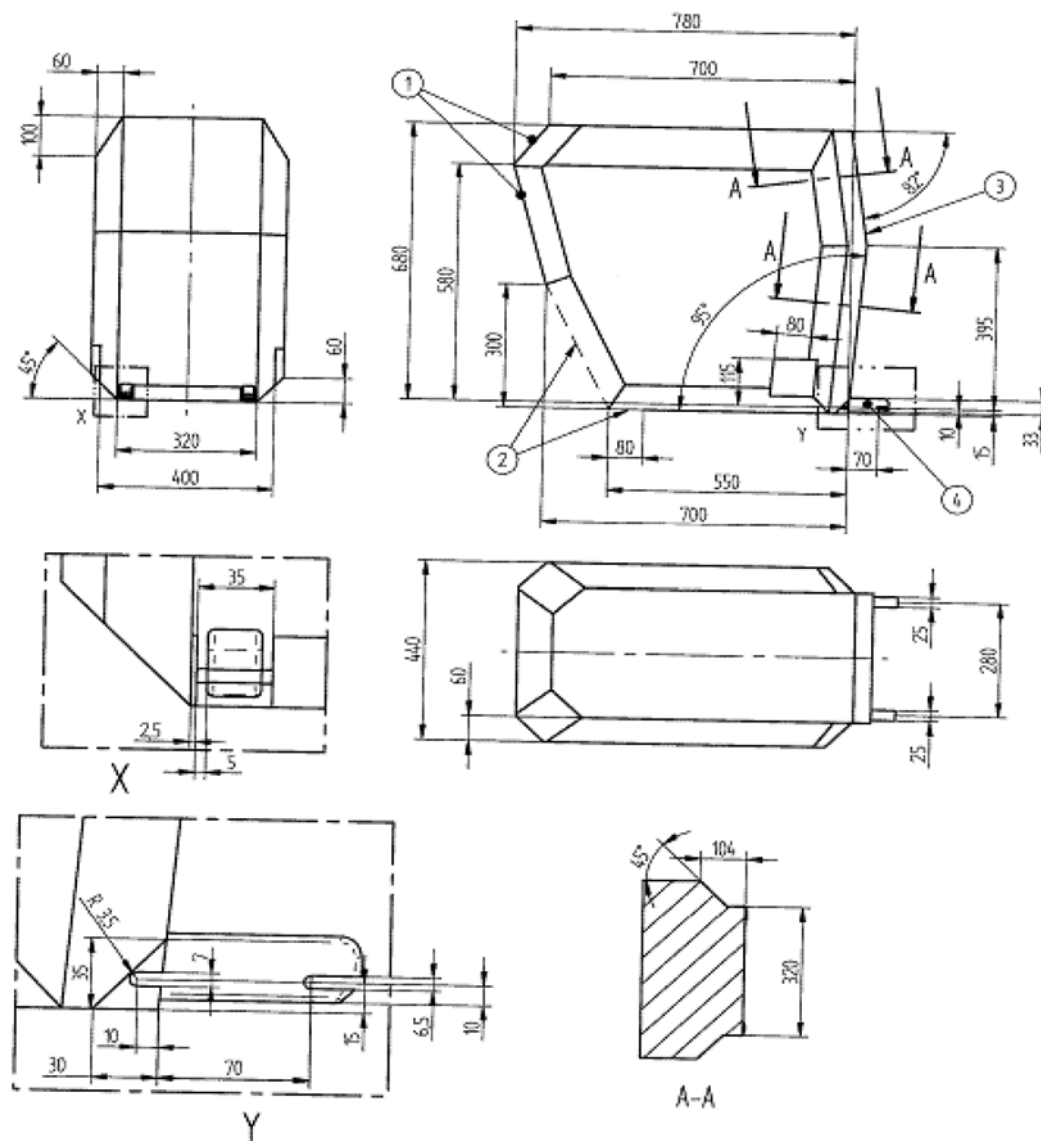
Figure 24: ISO/F2 envelope dimensions for a reduced-height forward-facing toddler CRS, (height 650 mm) - ISOFIX SIZE CLASS B



3 N/A

4 Further specifications of the connector area are given in Regulation No. 44

Figure 25: ISO/F2X envelope dimensions for a reduced-height second version back surface shape forward-facing toddler CRS, (height 650 mm) -  
ISOFIX SIZE CLASS B1



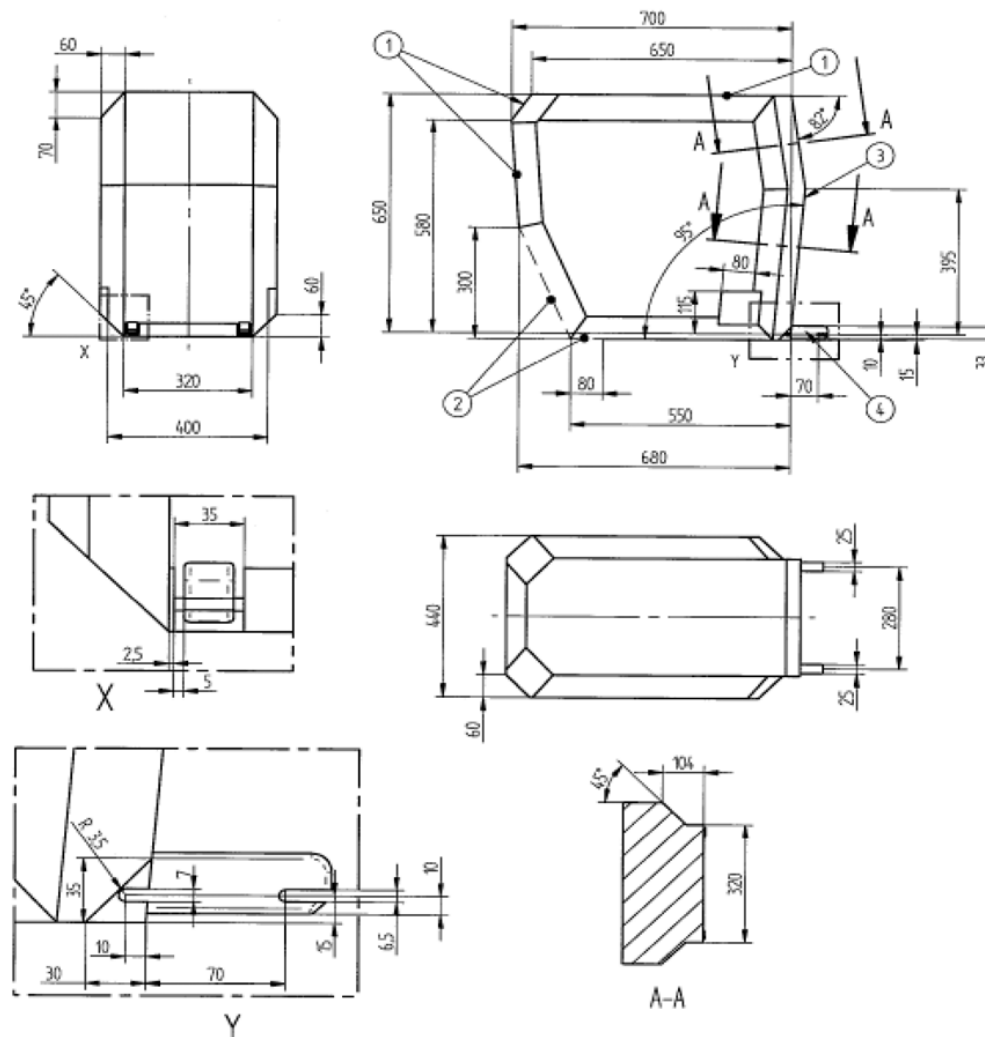
Key

1 Limits in the rearward and upwards directions

The official directions are written in Chinese, this English edition is for your reference only.

- 2 Dashed line marks area where a support leg, or similar, is allowed to protrude
- 3 The backwards limitation (to the right in the figure) is given by the forward-facing envelope in Figure 24
- 4 Further specifications of the connector area are given in UN Regulation No. 44

Figure 26: ISO/R3 envelope dimensions for a full-size rearward-facing toddler CRS ISOFIX SIZE CLASS C



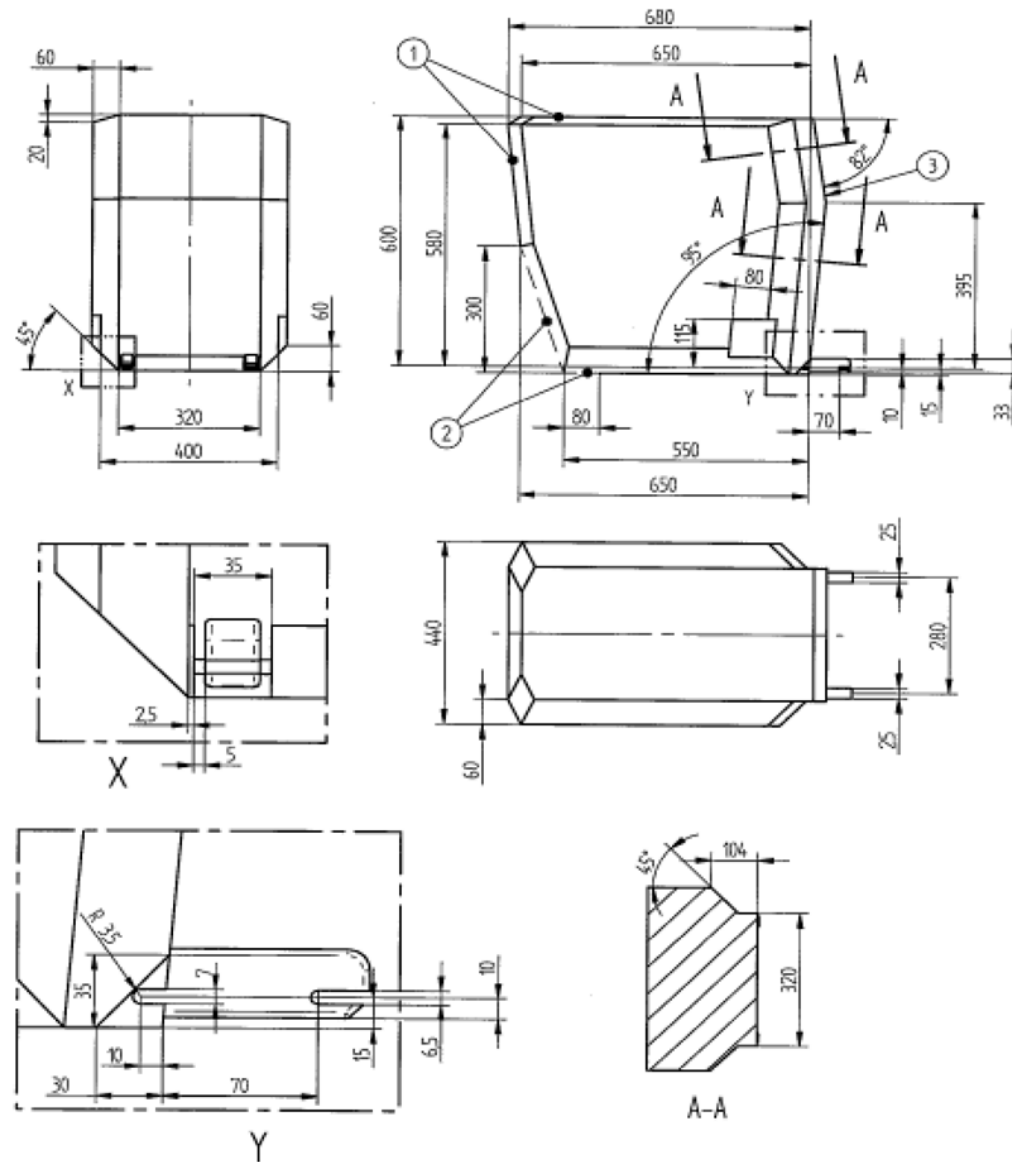
The official directions are written in Chinese, this English edition is for your reference only.

#### Key

- 1 Limits in the rearward and upwards directions
- 2 Dashed line marks area where a support leg, or similar, is allowed to protrude
- 3 The backwards limitation (to the right in the figure) is given by the forward-facing envelope in Figure 24
- 4 Further specifications of the connector area are given in UN Regulation No. 44

Figure 27: ISO/R2 envelope dimensions for a reduced-size rearward-facing toddler CRS ISOFIX SIZE CLASS D





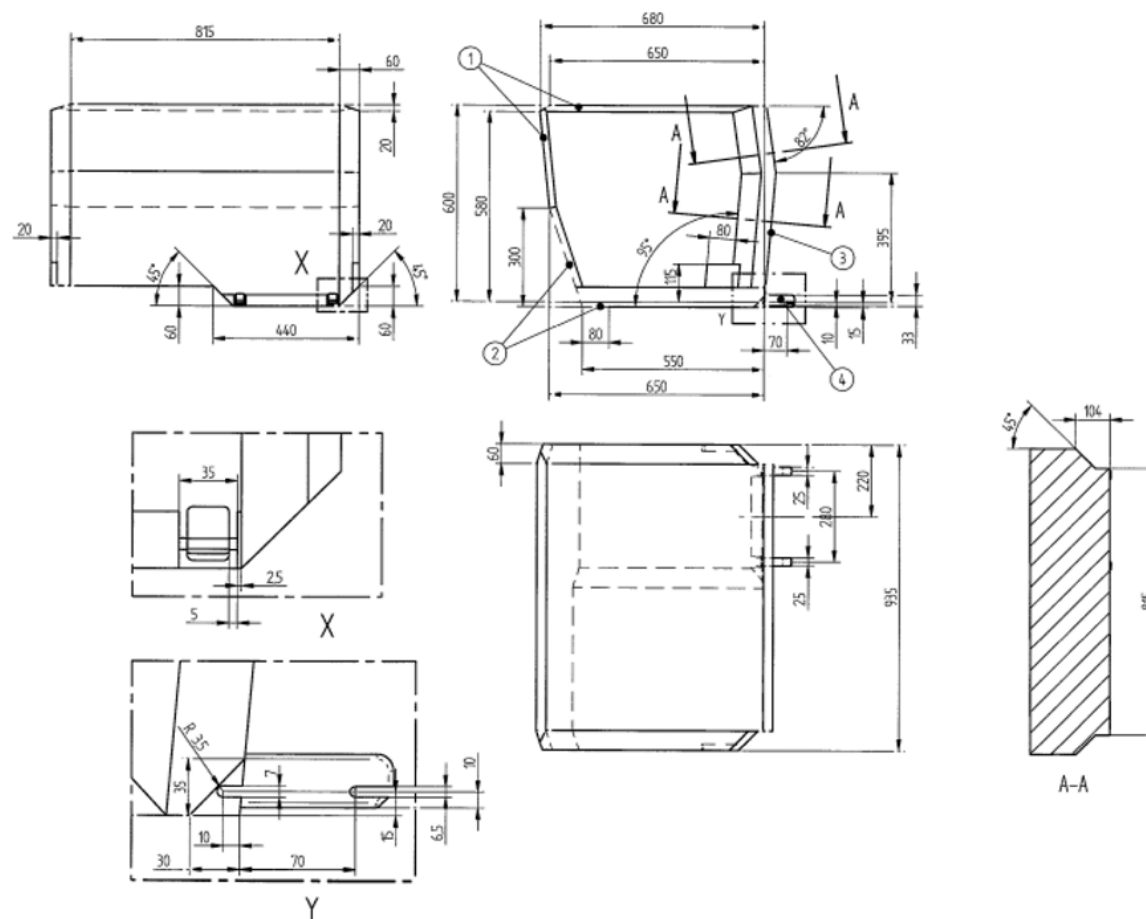
Key

1 Limits in the rearward and upward directions

The official directions are written in Chinese, this English edition is for your reference only.

- 2 Dashed line marks area where a support leg, or similar, is allowed to protrude
- 3 The backwards limitation (to the right in the figure) is given by the forward-facing envelope in Figure 24
- 4 Further specifications of the connector area are given in UN Regulation No. 44

Figure 28: ISO/R1 envelope dimensions for an infant-size rearward-facing CRS ISOFIX SIZE CLASS E



#### Key

- 1 Limits in the rearward and upward directions
- 2 Dashed line marks area where a support leg, or similar, is allowed to protrude

The official directions are written in Chinese, this English edition is for your reference only.

- 3 The backward limitation (to the right in the figure) is given by the forward-facing envelope in Figure 24  
4 Further specifications of the connector area are given in ISO 13216-1.

Figure 29: Envelope dimensions for lateral facing position CRS - ISO/L1- ISOFIX SIZE CLASS F or symmetrically opposite - ISO/L2 - ISOFIX CLASS  
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