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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 */

Regulation No. FRENCH DRAFT

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF CHILD RESTRAINT SYSTEM USED
ONBOARD OF MOTOR VEHICLES.



UNITED NATIONS

*/ Former title of the Agreement:

Agreement Concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958.

**/ For New Zealand, the entry into force is 20 April 2002.

Regulation No. FRENCH DRAFT
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 ONBOARD OF MOTOR VEHICLES.

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1. SCOPE

This Regulation applies to ISOFIX universal integral child restraint systems for child occupants of power driven vehicles.

2. DEFINITIONS

For the purposes of this Regulation,

- 2.1. "Child restraint system" means a device offering the child occupant the possibility to sit on, to sit in and/or to lay in. It is so designed as to diminish the risk of injury to the wearer, in the event of a collision or of abrupt deceleration of the vehicle, by limiting the mobility of the child's body.

Explanation: A *doing nothing scenario* will lead via Reg.44 to top tethers in all sold vehicles from 26-02-2011, alas a solution that is connected with much misuse! Therefore, the time seems ripe to incorporate in the New Regulation wider possibilities for ISOFIX (more configurations will be for universal use) but as return a fixation that is less sensible for misuse.

- 2.2. "ISOFIX" is an indication for the system of connection of a child restraint to vehicles. It is based on three vehicle rigid anchorages and three corresponding rigid attachments on the child restraint. The third anchorage point, meant to limit the pitch rotation of the child restraint system, must be attached to the corresponding third vehicle anchorage point located at the upper front of the seat cushion base. All three vehicle anchorages are to be approved according Regulation No.14.
- 2.3. "NON-ISOFIX" is an indication for the system of connection of a child restraint to vehicles meaning that for its fixation no use is made of the ISOFIX anchorage.
- 2.4. "Integral" is a class indication for the retention of the child occupant in the child restraint, meaning that the child is restrained by means that make part of the child restraint (strap harness, shield, etc.).
- 2.5. "Non-integral" is a class indication for the retention of the child occupant in the child restraint, meaning that the child has to be restrained by means not making part of this child restraint (adult safety belt, etc.).
- 2.6. "IUI" (Integral Universal Isofix CRS) is a category indication for a child restraint meaning it is for use in all vehicles, not necessarily on all vehicle positions, approved according Regulation No.16 including its suitability for such a category of child restraint.

To remind people that the New Regulation and Regulation.44 could be next to each other for some time (and certainly the child restraints on the market!), hereby is the suggestion to use for the category indication "UNIVERSAL" the word "IUI". Furthermore, having in mind that Reg.44 has 5 categories (Universal, Semi-Universal, Specific Vehicle, Restricted and Special Needs) hereby is also suggested to keep the New Regulation more simple

- 2.7. "Size" is a stature indication for a child restraint providing information for which range of child occupants it is meant. It is primarily based on stature, in order to facilitate proper use, but also based on maximum mass to provide manufacturers information that is related to expected maximum loads;
- 2.7.1. "Size 50-74" for children having a stature of 50 cm to 74 cm and a mass that reaches up to a maximum of 9.5 kg;
- 2.7.2. "Size 50-80" for children having a stature of 50 cm to 80 cm and a mass that reaches up to a maximum of 11 kg;
- 2.7.3. "Size 74-98" for children having a stature of 74 cm to 98 cm and a mass that reaches up to a maximum of 14.5 kg;
- 2.7.4. "Size 98-114" for children having a stature of 98 cm to 114 cm and a mass that reaches up to a maximum of 23 kg;
- 2.7.5. "Size 114-[140]" for children having a stature of 114 cm to [140] cm and a mass that reaches up to a maximum of [34] kg;
- 2.7.6. Child restraint systems may cover more than one size provided that all requirements are fulfilled.
- 2.8. "Orientation" is the indication that a child restraint system can be used forward-facing and/or rearward-facing, the following distinction is made:
- forward-facing means facing in the normal direction of travel of the vehicle;
 - rearward-facing means facing in the direction opposite to the normal direction of travel of the vehicle.

3. APPLICATION FOR APPROVAL

4. MARKINGS

5. APPROVAL

6. GENERAL SPECIFICATIONS

6.1. Positioning and securing on the vehicle

6.1.1. The use of child restraints in the "~~universal~~", "~~semi-universal~~" and "~~restricted~~UI" categories is permitted in the front and rear seat positions if the restraints are fitted in conformity with the manufacturer's instructions.

~~6.1.2.~~ The use of child restraints in the "specific vehicle" category is permitted only for ISOFIX CRS 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.~~

6.1.2. According to the category which it belongs to, the child restraint shall be secured to the vehicle structure or to the seat-test bench structure.

**POSSIBLE CONFIGURATIONS FOR APPROVAL
GROUPS / CATEGORIES TABLE**

GROUP CATEGORY		Universal (1)		Semi-universal (2)		Restricted		Specific Vehicle	
		CRS	ISOFIX CRS	CRS	ISOFIX CRS	CRS	ISOFIX CRS	CRS	ISOFIX CRS
0	Carry-cot	A	NA	A	A	A	NA	A	A
	Rearward facing	A	NA	A	A	A	NA	A	A
0+	Rearward facing	A	NA	A	A	A	NA	A	A
I	Rearward facing	A	NA	A	A	A	NA	A	A
	Forward facing (integral)	A	A	A	A	A	NA	A	A
	Rearward facing Forward facing (non-integral)	A NA	NA NA	A NA	A NA	A NA	NA NA	A NA	A NA
	Forward facing (integral) Forward facing (non-integral) — see point 6.1.12.)	A A	NA NA	A A	A NA	A A	NA NA	A A	A A
II	Forward facing (non-integral) Rearward facing	A A	NA NA	A A	A NA	A A	NA NA	A A	A A
	Rearward facing Forward facing (integral)	A A	NA NA	A A	A NA	A A	NA NA	A A	A A
	Forward facing (integral) Forward facing (non-integral)	A A	NA NA	A A	A NA	A A	NA NA	A A	A A
III	Forward facing (non-integral) Rearward facing	A A	NA NA	A A	A NA	A A	NA NA	A A	A A
	Forward facing (integral)	A	NA	A	NA	A	NA	A	A
	Forward facing (non-integral)	A	NA	A	NA	A	NA	A	A

With:
 CRS: Child restraint system
 A: Applicable
 NA: Not Applicable

⁽¹⁾ ~~ISOFIX universal~~ IUI CRS means forward, rearward or lateral facing restraints for use in vehicles with positions equipped with ISOFIX anchorages system and a top tether anchorage or a support leg.

⁽²⁾ ~~ISOFIX semi-universal CRS means:~~

- ~~• forward facing restraints equipped with support leg or~~
- ~~• 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 rearward facing restraints, supported by the vehicle dashboard, for use in the front passenger seat equipped with ISOFIX anchorages system,~~
- ~~• or 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.~~

~~6.1.3.1. For the "universal" and "restricted" categories, by means of an adult safety belt (with or without a retractor) meeting the requirements of Regulation No. 16 (or equivalent) fitted to anchorages meeting the requirements of Regulation No. 14 (or equivalent).~~

~~6.1.3.2.6.1.2.1.~~ For ISOFIX "universal" child restraint systems by means of ISOFIX attachments and ISOFIX top tether strap or support leg meeting the requirements of this Regulation fitted to ISOFIX anchorages system and ISOFIX top tether anchorage or vehicle floor meeting the requirements of Regulation No. 14.

~~6.1.3.3. For the "semi-universal" category: by means of the lower anchorages prescribed in Regulation No. 14 and additional anchorages meeting the recommendation of Annex 11 to this Regulation;~~

~~6.1.3.4. For ISOFIX "semi-universal" Child Restraint Systems by means of ISOFIX attachments and ISOFIX top tether strap or a support leg or vehicle dashboard, meeting the requirements of this Regulation fitted to ISOFIX anchorages and/or to ISOFIX top tether anchorage meeting the requirements of Regulation No. 14.~~

~~6.1.3.5.6.1.2.2.~~ For the "specific vehicle" category: by means of the ISOFIX anchorages designed by the manufacturer of the vehicle or the manufacturer of the child restraint;

~~6.1.3.6. In the case of child restraining straps or child restraint attachment strap utilizing belt anchorages to which are already fitted an adult belt or belts, the Technical Service shall check that:~~

~~The effective adult anchorage position is as approved under Regulation No. 14 or equivalent;~~

~~Effective operation of both devices is not hindered by the other;~~

~~The buckles of the adult and additional system must not be interchangeable.~~

~~In the case of child restraining devices utilizing bars, or extra devices attached to the anchorages approved under Regulation No. 14, which move the effective anchorage position outside the field of Regulation No. 14, the following points shall apply:~~

~~Such devices will only be approved as semi-universal or specific vehicle devices;~~

~~The Technical Service shall apply the requirements of Annex 11 to this Regulation to the bar and the fastenings;~~

~~The bar will be included in the dynamic test, with the loading being applied to the mid position and the bar and its greatest extension, if adjustable;~~

~~The effective position and operation of any adult anchorage by which the bar is fixed shall not be impaired.~~

~~6.1.3.7. Child restraints utilizing a support leg shall only be approved under the "semi-universal" or the "specific vehicle" category and the requirements of Annex 11 to this Regulation shall be applied. The manufacturer of the child restraint system shall take into account the needs of the support leg for their correct functioning in each vehicle and provide this information.~~

~~6.1.4. A booster cushion must be restrained by either an adult belt, using the test as specified in paragraph 8.1.4., or by separate means.~~

~~6.1.4.6.1.3. The child restraint manufacturer has to declare in written form that the toxicity of materials used in the manufacture of restraint systems and accessible to the restrained child is in conformity with the relevant parts of CEN Safety of Toys, part 3 (June 1982). ^{1/} Tests confirming the validity of the declaration may be carried out at the discretion of the test authority. This paragraph does not apply to restraint devices of groups II and III.~~

~~6.1.3.~~

~~6.1.4. The child restraint manufacturer has to declare in written form that the flammability of materials used to manufacture the restraint system is in conformity with the relevant paragraphs of the ECE Consolidated Resolution on the Construction of Vehicles (R.E.3) (document TRANS/WP.29/78/Rev.1, paragraph 1.20.). Tests confirming the validity of the declaration may be carried out at the discretion of the test authority.~~

~~6.1.7. In the case of rearward facing child restraints supported by the vehicle dashboard, for the purpose of approval to this Regulation the dashboard is assumed to be sufficiently rigid.~~

~~6.1.8. In the case of a child restraint system of the "universal" category, except ISOFIX universal child restraint systems, the main load bearing contact point, between the child restraint and the adult safety belt shall not be less than 150 mm from the Cr axis when measured with the child restraint on the dynamic test bench. This shall apply to all adjustment configurations. Additional alternative belt routes are allowed. Where an alternative belt route exists, the manufacturer must make specific reference to the alternative route in the user instructions, as required in paragraph 14. When tested, using such alternative belt route(s), the restraint shall comply with all the requirements of the Regulation with the exception of this paragraph.~~

~~6.1.9. If the adult belt is required to secure a "universal" category child restraint, its maximum length to be used on the dynamic test bench is defined in Annex 13 to this Regulation.~~

~~To check compliance with this requirement, the child restraint shall be secured onto the test bench using the appropriate standard seat belt described in Annex 13. The dummy shall not be installed unless the design of the restraint is such that the installation of a dummy would~~

^{1/} The address to obtain the relevant CEN standards is: CEN, 2 rue Bréderode, B.P. 5, B 1000 Bruxelles, Belgium.

~~increase the amount of belt used. With the child restraint in the installed position there shall be no tension in the belt apart from that exerted by the standard retractor, where fitted. Where the retractor belt is used, this condition shall be met with at least 150 mm of belt remaining on the spool.~~

Child restraints of groups 0 and 0+ shall not be used forward facing.

6.1.5. Child restraint systems of groups 0, ~~and~~ 0+, 1, with the exception of carry cots as defined in paragraph 2.4.1., shall belong to the integral class.

~~6.1.11. Child restraint systems of group I shall belong to the integral class unless they are fitted with an impact shield as defined in paragraph 2.7.~~

6.2 Configuration of the Child Restraint

6.2.1. The configuration of the child restraint shall be such that

6.2.1.1. The restraint of the child shall give the required protection in any intended position of the child restraint system; for "Special Needs Restraints" the primary means of restraint shall give the required protection in any intended position of the child restraint system without the use of the additional restraining devices which may be present.

6.2.1.2. The child is easily and quickly installed and removed; in the case of a child restraint system in which the child is restrained by means of a harness belt or a Y-shaped belt without a retractor each shoulder restraint and lap strap shall be capable of movement relative to each other during the procedure prescribed in paragraph **7.2.1.4.**

In these cases the belt assembly of the child restraint ~~system~~ may be designed with two or more connecting parts. For "Special Needs Restraints" it is recognized that the additional restraining devices will restrict the speed by which a child can be installed and removed. However, the additional devices shall be designed to release quickly so far as possible.

6.2.1.3. If it is possible to change the inclination of the child restraint system, this change in inclination shall not require manual readjustment of the ~~strap~~child restraint. A deliberate hand-action is required in order to change the inclination of the child restraint system.

6.2.1.4. the groups 0, 0+ and I restraint systems shall keep the child so positioned as to give the required protection even when the child is asleep

6.2.1.5. To prevent submarining, either by impact or through restlessness, a crotch strap shall be required on all forward-facing group I restraints incorporating an integral harness belt system. With the crotch strap attached and in its longest position if adjustable, it shall not be possible to adjust the lap strap to lie above the pelvis in either the 9 kg or the 15 kg dummy.

~~6.2.2. For groups I, II and III, all restraint devices utilizing a "lap strap" must positively guide the "lap strap" to ensure that the loads transmitted by the "lap strap" are transmitted through the pelvis.~~

~~6.2.3. All straps of the restraint shall be so placed that they cannot cause discomfort to the wearer in normal use or assume a dangerous configuration. The distance between the shoulder straps in the vicinity of the neck should be at least the width of the neck of the appropriate manikin.~~

~~6.2.4. The assembly shall not subject weak parts of the child's body (abdomen, crotch, etc.) to excessive stresses. The design shall be such that compression loads shall not be imposed on the crown of the child's head in the event of a collision.~~

~~6.2.4.1. Y-shaped belts may only be used in rearward-facing and lateral-facing child restraint systems (carrycots).~~

~~6.2.5.6.2.2.~~ The child restraint system shall be so designed and installed as:

~~6.2.5.1. to minimize the danger of injury to the child or to other occupants of the vehicle through sharp edges or protrusions (as defined in Regulation No. 21, for example);~~

~~6.2.5.2.6.2.2.1.~~ _____ not to exhibit sharp edges or protrusions liable to cause damage to vehicle-seat covers or to occupant's clothing;

~~6.2.5.3. not to subject weak parts of the child's body (abdomen, crotch, etc.) to supplementary inertial forces it sets up;~~

~~6.2.5.4.6.2.2.2.~~ _____ to ensure that its rigid parts do not, at points where they are in contact with straps, exhibit sharp edges capable of abrading the straps.

6.2.3. Any ~~part made separable to enable~~ components ~~to be fixed and detached~~ shall be so designed as to avoid any risk of incorrect assembly and use ~~so far as possible~~. Any separable part shall need special tools to be detached or fixed.

"Special Needs Restraints" may have additional restraining devices; these shall be designed to avoid any risk of incorrect assembly and that their means of release and mode of operation is immediately obvious to a rescuer in an emergency.

~~6.2.6. Where the child restraint intended for group I, group II and groups I and II combined includes a chair back, the internal height of the latter, determined in accordance with the diagram in Annex 12, shall be not less than 500 mm.~~

~~6.2.8.6.2.4.~~ Only automatically-locking retractors or emergency-locking retractors may be used.

~~6.2.9.6.2.5.~~ For devices intended for use in Group I it must not be possible for the child to easily slacken that part of the system that restrains the pelvis after the child has been installed; for this purpose the requirements of paragraph 7.2.5. (lock-off devices) shall be fulfilled; any device that is designed to obtain this must be permanently attached to the child restraint system.

6.2.6. A child restraint system may be designed for use in range of size specified by the manufacturer more than one mass group and/or by more than one child, provided that it is able to satisfy the requirements laid down for each of the groups concerned in this regulation. ~~A child restraint in the "universal" category must meet the requirements of that category for all mass groups for which it has been approved.~~

~~6.2.8.~~

~~6.2.11.6.2.7.~~ Child restraints with retractor

In the case of a child restraint incorporating a retractor, the retractor shall have met the requirements of paragraph 7.2.3.

~~6.2.11. In case of booster cushions, the ease with which the straps and tongue of an adult belt pass through the fixture points must be examined. This goes particularly for booster cushions which are designed for the front seats of cars, which may have long semi-rigid stalks. The fixed buckle~~

~~should not be allowed to pass through the fixture points of booster seats, or to permit a lie of belt completely different from that of the test trolley.~~

~~6.2.12. If the child restraint is designed for more than one child, each restraint system shall be fully independent with regard to load transfer and adjustments.~~

~~6.2.13. The child restraints incorporating inflatable elements shall be so designed that the conditions of use (pressure, temperature, humidity) have no influence on their ability to comply with the requirements of this Regulation.~~

6.3. ISOFIX restraint specifications

6.3.1. General characteristics

6.3.1.1. Dimensions

The maximum lateral, downward, and rearward dimensions for the ISOFIX child restraint system and the locations of the ISOFIX anchorages system with which its attachments must engage are defined for the ISOFIX child restraint system manufacturer by the Vehicle Seat Fixture (VSF) defined by paragraph 2.31. of this Regulation.

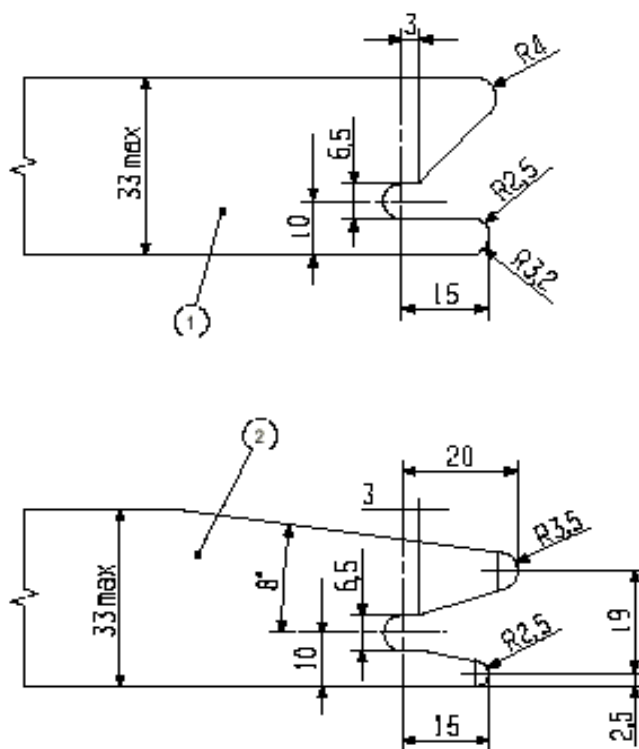
6.3.1.2. Mass

~~The mass of an ISOFIX child restraint system of universal and semi-universal categories and associated of the mass of the biggest child intended to use the child restraint system mass group 0, 0+, 1 shall not exceed [4532] kg.~~

6.3.2. ISOFIX Attachments

6.3.2.1. Type

ISOFIX Attachments may be according to examples shown in Figure 0 (a), or other appropriate designs that are part of a rigid mechanism having provision for adjustment, the nature of which is determined by the ISOFIX child restraint system manufacturer.



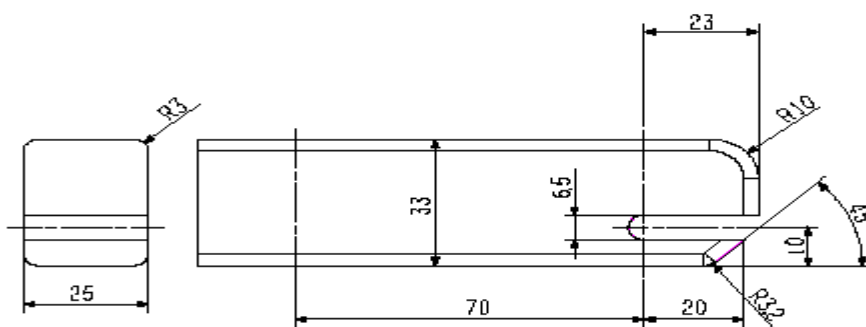
Dimensions in mm
Figure 0 (a)

Key

- 1 ISOFIX child restraint system attachment - example 1
- 2 ISOFIX child restraint system attachment - example 2

6.3.2.2. Dimensions

Dimensions for the portion of the ISOFIX child restraint system attachment that engages the ISOFIX anchorage system must not exceed the maximum dimensions given by the envelope in figure 0 (b)



Dime

Figure 0 (b)

6.3.2.3. Partial latching indication

The ISOFIX child restraint system shall incorporate means by which there is a clear indication that both of the ISOFIX attachments are completely latched with the corresponding ISOFIX lower anchorages. The indication means may be audible, tactile or visual or a combination of two or more. In case of visual indication it must be detectable under all normal lighting conditions.

6.3.3. ISOFIX child restraint top tether strap specifications

6.3.3.1. Top tether connector

The top tether connector should be ISOFIX top tether hook as shown in figure 0 (c), or similar devices that fit within the envelope given by figure 0 (c).

6.3.3.2. ISOFIX Top tether strap features

The ISOFIX top tether strap shall be supported by webbing (or its equivalent), having a provision for adjustment and release of tension.

6.3.3.2.1. ISOFIX Top tether strap length

ISOFIX Child restraint top tether strap length shall be at least 2,000 mm.

6.3.3.2.2. No-slack indicator

The ISOFIX top tether strap or the ISOFIX child seat shall be equipped with a device that will indicate that all slack has been removed from the strap. The device may be part of adjustment and tension relieving device.

6.3.3.2.3. Dimensions

Engagement dimensions for ISOFIX top tether hooks are shown in figure 0 (c).

Dimensions in millimetres

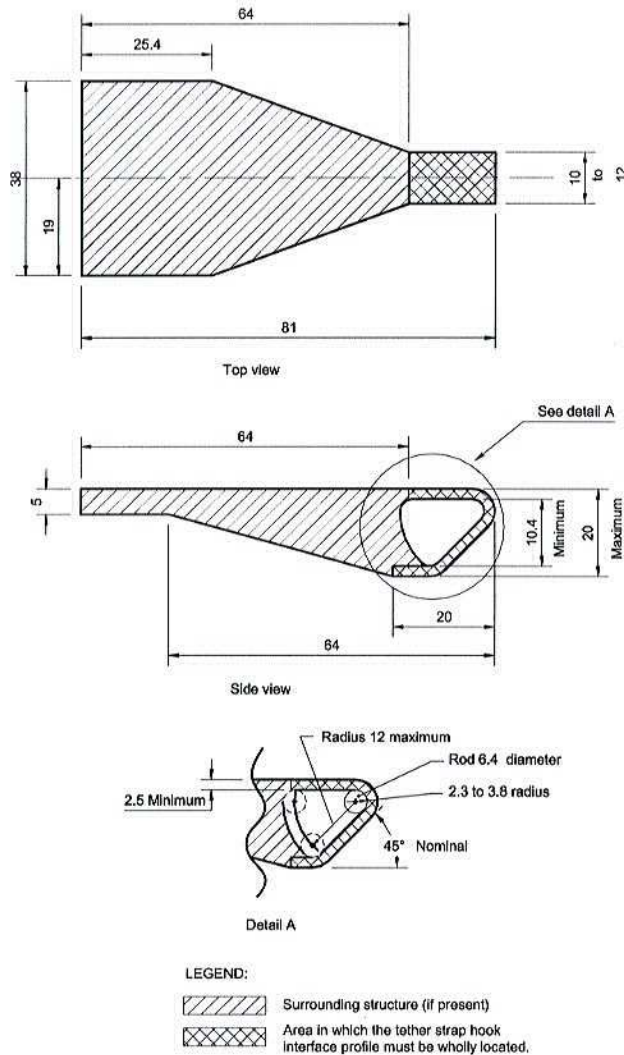


Figure 0 (c): ISOFIX Top tether connector (hook type) dimensions

6.3.4. ISOFIX child restraint support leg specifications

[See ISO definition and recommendations](#)

6.3.4.6.3.5. Adjustment provisions

The ISOFIX attachments, or the ISOFIX child restraint system itself, shall be adjustable to accommodate the range of ISOFIX anchorage locations **and/or vehicle floor** described in Regulation No. 14 **(following ISO recommendations)**.

6.4. Control of Markings

6.4.1. The Technical Service conducting the approval tests shall verify that the markings conform to the requirements of [paragraph 4](#).

6.5. Control of Instructions on Installation and the Instructions for Use

6.5.1. The Technical Service conducting the approval tests shall verify that the instructions on installation and the instructions for use conform to [paragraph 15](#).

6.6. Provisions applicable to the assembled **child restraint system**

6.6.1. Resistance to corrosion

6.6.1.1. A complete child restraint **system**, or the parts thereof that are liable to corrosion, shall be subject to the corrosion test specified in [paragraph 87.1.1](#). below.

6.6.1.2. After the corrosion test as prescribed in [paragraphs 87.1.1.1](#). and [87.1.1.2.](#), no signs of deterioration likely to impair the proper functioning of the child restraint **system**, and no significant corrosion, shall be visible to the unaided eye of a qualified observer.

6.6.2. Energy absorption

6.6.2.1. For all devices with backrests there shall be internal surfaces, defined in [Annex 18](#) to this Regulation, comprising material with a peak acceleration of less than 60 g when measured in accordance with [Annex 17](#) to this Regulation. This requirement applies also to areas of impact shields which are in the head strike area.

6.6.2.2. In the case of child restraint systems with permanent mechanically attached adjustable head support devices, in which the height of either the adult safety-belt or of the child harness is directly controlled by the adjustable head support, it is not necessary to demand energy absorbing material in areas as defined in [Annex 18](#), which are not contactable by the manikin's head, i.e. behind the head support.

6.6.3. Overturning

6.6.3.1. The child restraint shall be tested as prescribed in [paragraph 87.1.2.](#); the manikin shall not fall out of the device and, when the test seat is in the upside down position the **manikin's head shall not move more than 300 mm from its original position in a vertical direction relative to the test seat.**

6.6.4. Dynamic test

6.6.4.1. General. The child restraint shall be subjected to a dynamic test in conformity with [paragraph 8.1.3](#). below.

6.6.4.1.1. Child restraints ~~of the "universal", "restricted" and "semi-universal" categories~~ shall be tested on the test trolley by means of the test seat prescribed in [paragraph 67.](#), and in conformity with [paragraph 8.1.3.1](#).

- 6.6.4.1.2. Child restraints of the "specific vehicle" category shall be tested with each vehicle model for which the child restraint is intended. The Technical Service responsible for conducting the test may reduce the number of vehicle models tested if they do not differ greatly in the aspects listed **in paragraph 7.1.4.1.2.3.** The child restraint may be tested in one of the following ways:
- 6.6.4.1.2.1. On a complete vehicle, as prescribed in paragraph 8.1.3.3.;
- 6.6.4.1.2.2. In a vehicle body shell on the test trolley, as prescribed in paragraph 8.1.3.2.; or,
- 6.6.4.1.2.3. In sufficient parts of the vehicle bodyshell to be representative of the vehicle structure and impact surfaces. If the child restraint is intended for use in the rear seat, these shall include the back of the front seat, the rear seat, the floor pan, the B and C pillars and the roof. If the child restraint is intended for use in the front seat, the parts shall include the dashboard, the A pillars, the windscreen, any levers or knobs installed in the floor or on a console, the front seat, the floor pan and the roof. ~~Furthermore, if the child restraint is intended for use in combination with the adult safety belt, the parts shall include the appropriate adult belt(s).~~ The Technical Service responsible for conducting the test may permit items to be excluded if they are found to be superfluous. Testing shall be as prescribed in **paragraph 8.1.3.2.**
- 6.6.4.1.3. The dynamic test shall be performed on child restraint ~~systems~~ which have not previously been under load.
- 6.6.4.1.4. During the dynamic tests, **no part of the child restraint actually helping to keep the child in position shall break, and** no buckles or locking system or displacement system shall release.
- ~~6.6.4.1.5. In the case of "non-integral type" the seat belt used shall be the standard belt and its anchorage brackets prescribed in Annex 13 to this Regulation. This does not apply to "specific vehicle" approvals where the actual belt of the vehicle shall be used.~~
- 6.6.4.1.5. If a "specific vehicle" child restraint system is installed in the area behind the rearmost forward facing adult seat positions (for example, the luggage area), one test with the largest dummy/dummies on a complete vehicle as prescribed in paragraph 8.1.3.3.3. shall be performed. The other tests, including the conformity of production, may be done as prescribed in paragraph 8.1.3.2., if the manufacturer so wishes.
- 6.6.4.1.6. In the case of a "Special Needs Restraint" every dynamic test specified by this Regulation **[for each mass group See ECE.R22 for drafting]** shall be performed twice: first, using the primary means of restraint and second, with all restraining devices in use. In these tests, special attention shall be given to the requirements in paragraphs 6.2.3. and 6.2.4.
- ~~6.6.4.1.8. During the dynamic tests, the standard safety belt used to install the child restraint shall not become disengaged from any guide or locking device utilised for the test conducted.~~
- 6.6.4.1.7. A child restraint with a support leg shall be tested as follows:
- a) ~~In the case of semi-universal category,~~ **The tests for frontal impact shall be conducted with the support leg adjusted to both its maximum and minimum adjustment compatible with the positioning of the trolley floor pan. The tests for rearward impact shall be conducted with the worst case position selected by the Technical Service. During the tests the support leg shall be supported by the trolley floor pan as described**

in Annex 6, Appendix 3, Figure 2. If there is clearance between the shortest leg length and the highest floor pan level, the leg is adjusted to the floor pan level of 140 mm below Cr. If the maximum leg length is more than the lowest floor pan level would allow to be used, the leg is adjusted to that lowest floor pan level of 280 mm below Cr. In the case of support leg with adjustable steps, the support leg length shall be adjusted to the next adjustment position, in order to ensure the support leg is in contact with the floor.

b) In the case of support legs out of the plane of symmetry, the worst case shall be selected by the Technical Service for the test.

c) In the case of specific vehicle category, the support leg shall be adjusted as specified by the child restraint manufacturer.

~~6.6.4.1.10. In the case of a child restraint making use of an ISOFIX anchorage system and anti-rotation device, if any, the dynamic test shall be carried out:~~

~~6.6.4.1.10.1. For ISOFIX CRS of size classes A and B:~~

~~6.6.4.1.10.1.1. with the anti-rotation device in use, and~~

~~6.6.4.1.10.1.2. without the anti-rotation device in use. This requirement does not apply when a permanent and non-adjustable support leg is used as an anti-rotation device.~~

~~6.6.4.1.10.2. For ISOFIX child restraint system of other size classes with the anti-rotation device in use.~~

~~6.6.4.2. Chest acceleration^{2/}~~

~~6.6.4.2.1. The resultant chest acceleration shall not exceed 55 g except during periods whose sum does not exceed 3 ms.~~

~~6.6.4.2.2. The vertical component of the acceleration from the abdomen towards the head shall not exceed 30 g except during periods whose sum does not exceed 3 ms.~~

~~6.6.4.3. Abdominal penetration^{3/}~~

~~6.6.4.3.1. During the verification described in Annex 8 – Appendix 1, paragraph 5.3., there shall be no visible signs of penetration of the modelling clay of the abdomen caused by any part of the restraining device.~~

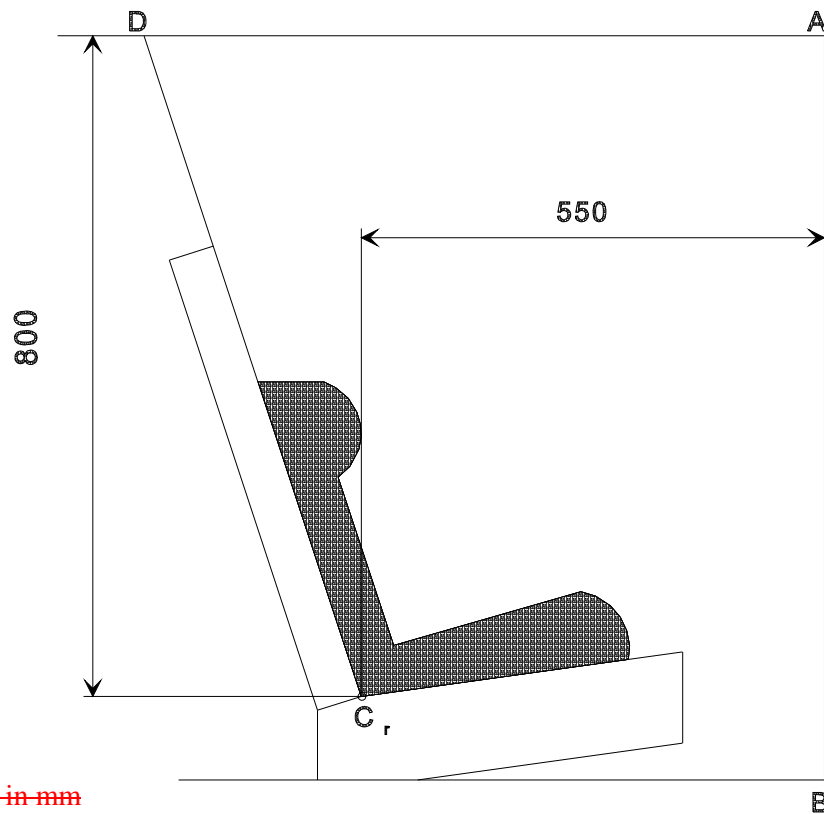
~~6.6.4.4. Manikin displacement~~

~~6.6.4.4.1. Child restraints of the "universal", "restricted" and "semi-universal" categories:~~

^{2/} Chest acceleration limits do not apply when using the "new born" manikin as it is not instrumented.

^{3/} The new-born manikin is not fitted with any abdominal insert. Therefore only a subjective analysis can be used as a guide to abdominal penetration.

6.6.4.4.1.1. — Forward facing child restraints: the head of the manikin shall not pass beyond the planes BA and DA as defined in Figure 1 below. This shall be judged up to 300 ms or the moment that the manikin has come to a definitive standstill whatever occurs first.



Dimensions in mm

Figure 1

Arrangement for testing a forward facing device

~~6.6.4.4.1.2. Rear facing child restraints:~~

~~6.6.4.4.1.2.1. Child restraints supported by dashboard: the head of the manikin shall not pass beyond the planes AB, AD and DCr, as defined in Figure 2 below. This shall be judged up to 300 ms or the moment that the manikin has come to a definitive standstill whatever occurs first.~~

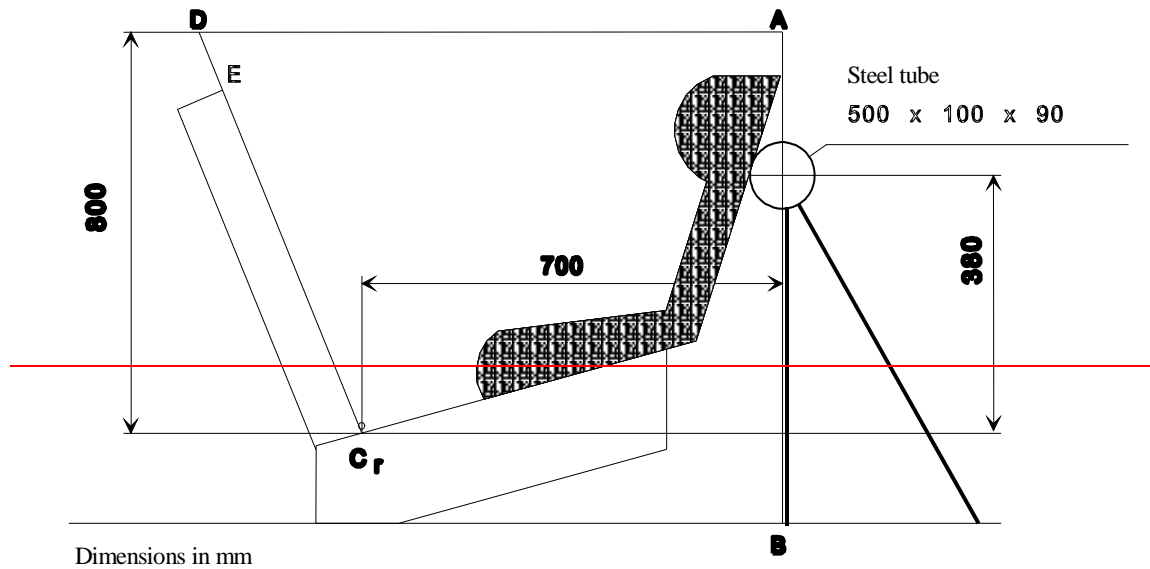
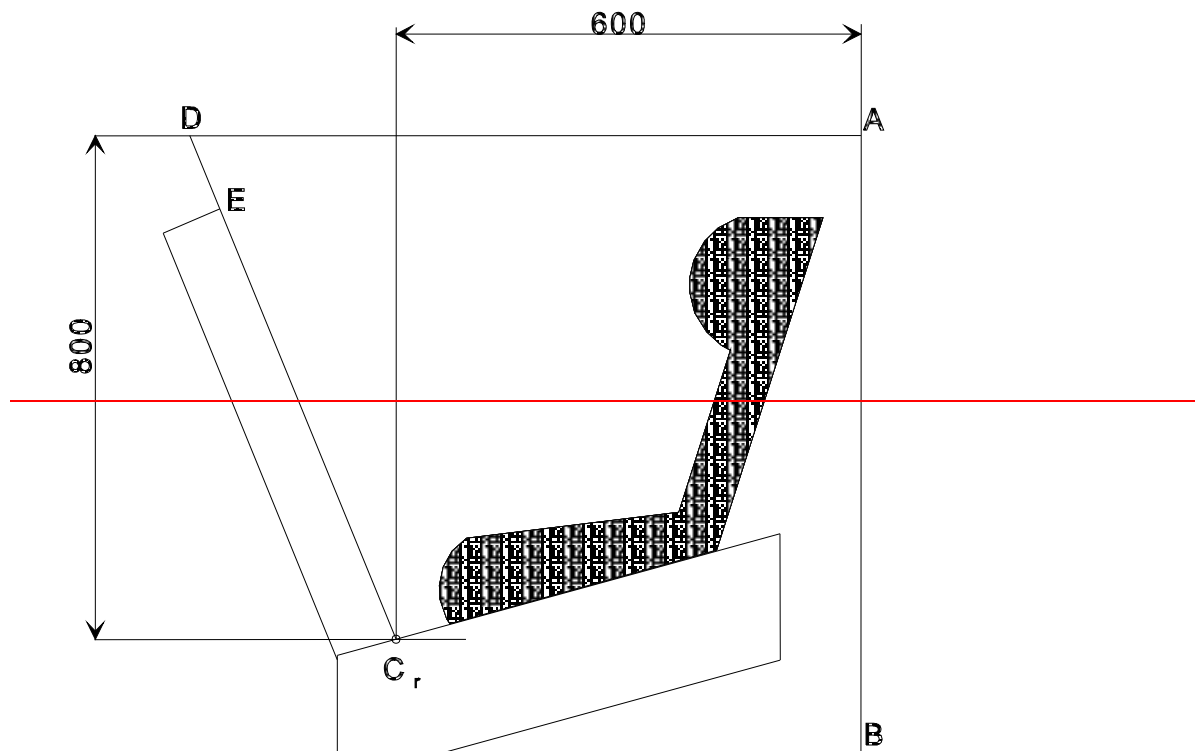


Figure 2:
Arrangement for testing
a rearward-facing device

~~6.6.4.4.1.2.2. Child restraints in group 0 not supported by the dashboard, and carrycots: the head of the manikin shall not pass the planes AB, AD and DE as shown in Figure 3 below. This shall be judged up to 300 ms or the moment that the manikin has come to a definitive standstill whatever occurs first.~~



Dimensions in mm

Figure 3

~~Arrangement for testing child restraint devices group 0, not supported by the dashboard~~

~~6.6.4.4.1.2.3. Child restraints other than group 0 not supported by the dashboard:~~

~~The head of the manikin shall not pass the planes FD, FG and DE, as shown in Figure 4 below. This shall be judged up to 300 ms or the moment that the manikin has come to a definitive standstill whatever occurs first.~~

~~In the case there is a contact of such a child restraint with the 100 mm diameter bar and all performance criteria are met, there shall be one further dynamic test (front impact) with the heaviest dummy intended for such child restraint and without the 100 mm diameter bar; the requirements for this test are that all criteria other than forward displacement shall be met.~~

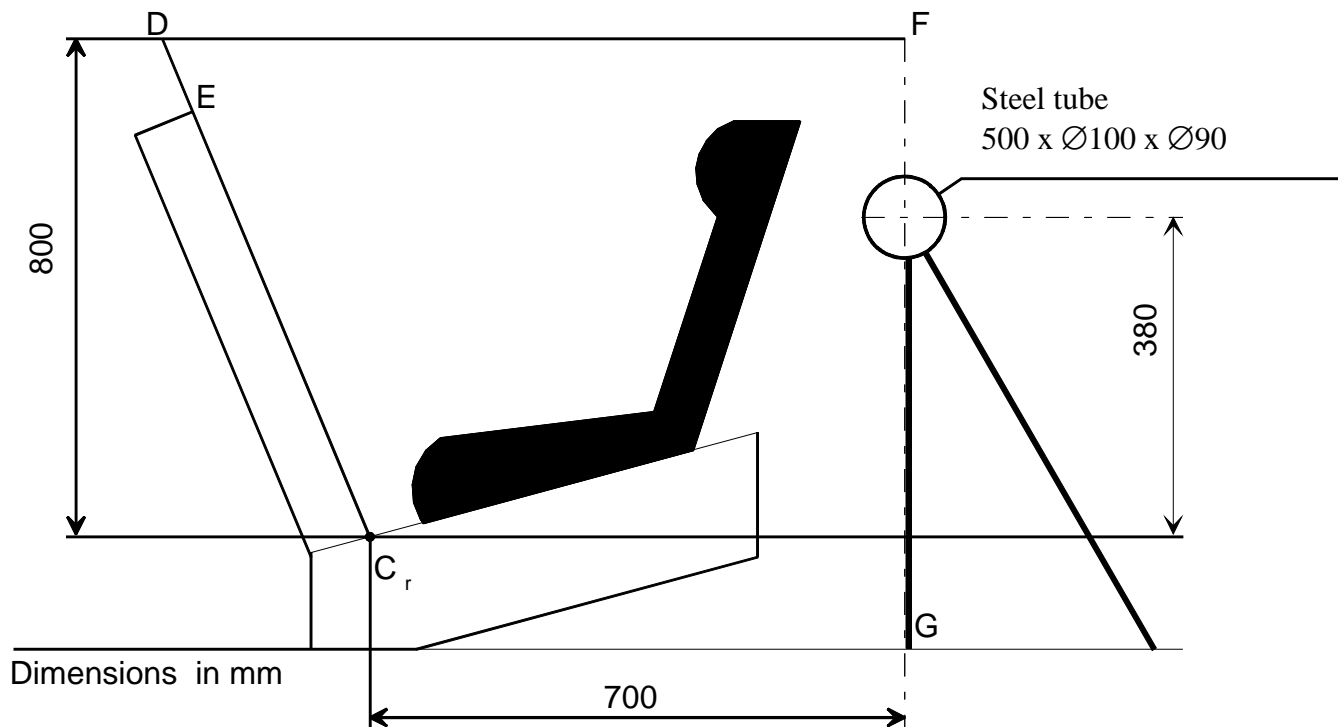


Figure 4:

Arrangement for testing rearward-facing devices, except group 0,
not supported by the dashboard

~~6.6.4.4.2.6.6.4.1.8. Child restraints of the "specific vehicle" category: when tested in a complete vehicle or a vehicle body shell, the head shall not come into contact with any part of the vehicle. However, if there is contact, the speed of impact of the head shall be less than 24 km/h and the part contacted shall meet the requirements of the energy absorption test laid down in Regulation No. 21, Annex 4. In tests with complete vehicles it shall be possible to remove the manikins from the child restraint without the use of tools after the test.~~

6.6.5. Resistance to temperature

6.6.5.1. Buckle assemblies, retractors, adjusters and lock-off devices that are liable to be affected by temperature, shall be subject to the temperature test specified in paragraph 8.2.8. below.

6.6.5.2. After the temperature test as prescribed in paragraph 8.2.8.1., no signs of deterioration likely to impair the proper functioning of the child restraint, shall be visible to the unaided eye of a qualified observer.

6.7. Provisions applicable to individual components of the restraint

6.7.1. Buckle

- 6.7.1.1. The buckle shall be so designed as to preclude any possibility of incorrect manipulation. This means, inter/alia, that it must not be possible for the buckle to be left in a partially closed position; it must not be possible to exchange the buckle parts inadvertently when the buckle is being locked; the buckle must only lock when all parts are engaged. Wherever the buckle is in contact with the child, it shall not be narrower than the minimum width of strap as specified in paragraph 7.2.4.1.1 below. This paragraph is not applicable to belt assemblies already approved according to ECE Regulation No. 16 or any equivalent standard in force. In the case of a "Special Needs Restraint" only the buckle on the primary means of restraint need comply with the requirements of paragraphs 7.2.1.1. to 7.2.1.9. inclusive.
- 6.7.1.2. The buckle, even when not under tension, shall remain closed whatever its position. It shall be easy to operate and to grasp. It shall be possible to open it by pressure on a button or on a similar device. The surface to which this pressure must be applied must have in the position of actual unlocking and when projected into a plane perpendicular to the button's initial direction of motion: for enclosed devices, an area of not less than 4.5 cm² with a width of not less than 15 mm; for non-enclosed devices, an area of 2.5 cm² and a width of not less than 10 mm. The width shall be the smaller of the two dimensions forming the prescribed area and shall be measured rectangular to the direction of movement of the release button.
- 6.7.1.3. The buckle release area shall be coloured red. No other part of the buckle shall be of this colour.
- 6.7.1.4. It shall be possible to release the child from the restraint by a single operation on a single buckle. For groups 0 and 0+ it is allowed to remove the child together with devices such as infant carrier/carry-cot/carry-cot restraints if the child restraint system can be released by operation of a maximum of two buckles.
- 6.7.1.4.1. A clip connection between the shoulder straps of a harness belt is deemed not to comply with the single operation requirement given in paragraph 7.2.1.4. above.
- 6.7.1.5. For groups II and III the buckle shall be so placed that the child occupant can reach it. In addition it shall for all groups be so placed that its purpose and mode of operation are immediately obvious to a rescuer in an emergency.
- 6.7.1.6. Opening of the buckle shall enable the child to be removed independently of the "chair", "chair support" or "impact shield", if fitted, and if the device includes a crotch strap the crotch strap shall be released by operation of the same buckle.
- 6.7.1.7. The buckle shall be capable of withstanding the temperature test operation requirements given in paragraph 8.2.8.1. and repeated operation, and shall, before the dynamic test prescribed in paragraph 8.1.3. undergo a test comprising 5,000 ± 5 opening and closing cycles under normal conditions for use.
- 6.7.1.8. The buckle shall be subjected to the following tests of opening:
- 6.7.1.8.1. Test under load

- 6.7.1.8.1.1. A child restraint having already undergone the dynamic test prescribed in paragraph 8.1.3. below shall be used for this test.
- 6.7.1.8.1.2. The force required to open the buckle in the test prescribed in paragraph 8.2.1.1. below shall not exceed 80 N.
- 6.7.1.8.2. No-load test
 - 6.7.1.8.2.1. A buckle which has not previously been subjected to a load shall be used for this test. The force needed to open the buckle when it is not under load shall be in the range of 40-80 N in the tests prescribed in paragraph 8.2.1.2.
- 6.7.1.9. Strength.
 - 6.7.1.9.1. During the test in accordance with paragraph 8.2.1.3.2. no part of the buckle or the adjacent straps or adjusters shall break or be detached.
 - 6.7.1.9.2. A harness buckle of mass groups 0 and 0+ shall withstand 4,000 N.
 - 6.7.1.9.3. A harness buckle of mass group I and higher shall withstand 10,000 N.
 - 6.7.1.9.4. The competent authority may dispense with the buckle strength test if information already available renders the test superfluous.
- 6.7.2. Adjusting device
 - 6.7.2.1. The range of adjustment shall be sufficient to permit correct adjustment of the child restraint with all manikins of the weight group for which the device is intended and to permit satisfactory installation in all specified vehicle models.
 - 6.7.2.2. All adjusting devices shall be of the "quick adjuster" type, except that adjusting devices used only for the initial installation of the restraint in the vehicle may be of other than the "quick adjuster" type.
 - 6.7.2.3. Devices of the "quick adjuster" type shall be easy to reach when the child restraint is correctly installed and the child or manikin is in position.
 - 6.7.2.4. A device of the "quick adjuster" type shall be easily adjustable to the child's physique. In particular, in a test performed in accordance with paragraph 8.2.2.1., the force required to operate a manual adjusting device shall not exceed 50 N.
 - 6.7.2.5. Two samples of the child-restraint adjusting devices shall be tested as prescribed by the temperature test operation requirements given in paragraph 8.2.8.1. and in paragraph 8.2.3.
 - 6.7.2.5.1. The amount of strap slip shall not exceed 25 mm for one adjusting device or 40 mm for all adjusting devices.
 - 6.7.2.6. The device must not break or become detached when tested as prescribed in paragraph 8.2.2.1.

6.7.2.7. An adjuster mounted directly on the child restraint shall be capable of withstanding repeated operation and shall, before the dynamic test prescribed in paragraph 8.1.3. undergo a test comprising $5,000 \pm 5$ cycles as specified in paragraph 8.2.7.

6.7.3. Retractors

6.7.3.1. Automatically-locking retractors

6.7.3.1.1. The strap of a safety-belt equipped with an automatically-locking retractor shall not unwind by more than 30 mm between locking positions of the retractor. After a rearward movement of the wearer the belt must either remain in its initial position or return to that position automatically on subsequent forward movement of the wearer.

6.7.3.1.2. If the retractor is part of a lap belt, the retracting force of the strap shall be not less than 7 N as measured in the free length between the manikin and the retractor as prescribed in paragraph 8.2.4.1. below. If the retractor is part of a chest restraint, the retracting force of the strap shall be not less than 2 N or more than 7 N as similarly measured. If the strap passes through a guide or pulley, the retracting force shall be measured in the free length between the manikin and the guide or pulley. If the assembly incorporates a device, manually or automatically operated, that prevents the strap from being completely retracted, that device shall not be in operation when these measurements are effected.

6.7.3.1.3. The strap shall be repeatedly withdrawn from the retractor and allowed to retract, in the conditions prescribed in paragraph 8.2.4.2. below, until 5,000 cycles have been completed. The retractor shall then be subjected to the temperature test operation requirements given in paragraph 8.2.8.1. and corrosion test described in paragraph 8.1.1 and the dust-resistance test described in paragraph 8.2.4.5. It shall then satisfactorily complete a further 5,000 cycles of withdrawal and retraction. After the above tests the retractor shall continue to operate correctly and to meet the requirements of paragraphs 7.2.3.1.1. and 7.2.3.1.2. above.

6.7.3.2. Emergency-locking retractors

6.7.3.2.1. An emergency-locking retractor shall when tested as prescribed in paragraph 8.2.4.3. satisfy the conditions below:

6.7.3.2.1.1. It shall be locked when the deceleration of the vehicle reaches 0.45 g.

6.7.3.2.1.2. It shall not lock for strap accelerations of less than 0.8 g as measured in the axis of strap extraction.

6.7.3.2.1.3. It shall not lock when its sensing device is tilted by not more than 12° in any direction from the installation position specified by its manufacturer.

6.7.3.2.1.4. It shall lock when its sensing device is tilted by more than 27° in any direction from the installation position specified by its manufacturer.

- 6.7.3.2.2. Where the operation of a retractor depends on an external signal or power source, the design shall ensure that the retractor locks automatically upon failure or interruption of that signal or power source.
- 6.7.3.2.3. A multiple-sensitivity emergency-locking retractor shall meet the requirements set out above. In addition, if one of the sensitivity factors relates to strap extraction, locking must have occurred at a strap acceleration of 1.5 g as measured in the axis of strap extraction.
- 6.7.3.2.4. In the tests referred to in paragraphs 7.2.3.2.1.1. and 7.2.3.2.3. above, the amount of strap extraction occurring before the retractor locks shall not exceed 50 mm, starting at the length of unwinding specified in paragraph 8.2.4.3.1. In the test referred to in paragraph 7.2.3.2.1.2. above, locking shall not occur during the 50 mm of strap extraction starting at the length of unwinding specified in paragraph 8.2.4.3.1. below.
- 6.7.3.2.5. If the retractor is part of a lap belt, the retracting force of the strap shall be not less than 7 N as measured in the free length between the manikin and the retractor as prescribed in paragraph 8.2.4.1. If the retractor is part of a chest restraint, the retracting force of the strap shall be not less than 2 N or more than 7 N as similarly measured. If the strap passes through a guide or pulley, the retracting force shall be measured in the free length between the manikin and the guide or pulley. If the assembly incorporates a device, manually or automatically operated, that prevents the strap from being completely retracted, that device shall not be in operation when these measurements are effected.
- 6.7.3.2.6. The strap shall be repeatedly withdrawn from the retractor and allowed to retract, in the conditions prescribed in paragraph 8.2.4.2., until 40,000 cycles have been completed. The retractor shall then be subjected to the temperature test operation requirements given in paragraph 8.2.8.1. and corrosion test described in paragraph 8.1.1 and to the dust-resistance test described in paragraph 8.2.4.5. It shall then satisfactorily complete a further 5,000 cycles of withdrawal and retraction (making 45,000 in all). After the above tests the retractor shall continue to operate correctly and to meet the requirements of paragraphs 7.2.3.2.1. to 7.2.3.2.5. above.
- 6.7.4. Straps
- 6.7.4.1. Width
- 6.7.4.1.1. The minimum width at the child-restraint straps which contact the dummy shall be 25 mm for groups 0, 0+ and I, and 38 mm for groups II and III. These dimensions shall be measured during the strap strength test prescribed in paragraph 8.2.5.1., without stopping the machine and under a load equal to 75 percent of the breaking load of the strap.
- 6.7.4.2. Strength after room conditioning
- 6.7.4.2.1. On two sample straps conditioned as prescribed in paragraph 8.2.5.2.1., the breaking load of the strap shall be determined as prescribed in paragraph 8.2.5.1.2. below.
- 6.7.4.2.2. The difference between the breaking loads of the two samples shall not exceed 10 percent of the greater of the two breaking loads measured.

6.7.4.3. Strength after special conditioning

6.7.4.3.1. On two straps conditioned as prescribed in one of the provisions of paragraph 8.2.5.2. (except paragraph 8.2.5.2.1.), the breaking load of the strap shall be not less than 75 percent of the average of the loads determined in the test referred to in paragraph 8.2.5.1. below.

6.7.4.3.2. In addition, the breaking load shall be not less than 3.6 kN for the restraints of the groups 0, 0+ and I, 5 kN for those of group II, and 7.2 kN for those of group III.

6.7.4.3.3. The competent authority may dispense with one or more of these tests if the composition of the material used, or information already available, renders the test or tests superfluous.

6.7.4.3.4. The abrasion conditioning procedure of type 1 defined in paragraph 8.2.5.2.6. shall only be performed when the microslip test defined in paragraph 8.2.3. below gives a result above 50 percent of the limit prescribed in paragraph 7.2.2.5.1. above.

6.7.4.4. It shall not be possible to pull the complete strap through any adjusters, buckles or anchoring points.

6.7.5. Lock-off device

6.7.5.1. The lock-off device must be permanently attached to the child restraint.

6.7.5.2. The lock-off device must not impair the durability of the adult belt and undergo temperature test operation requirements given in paragraph 8.2.8.1.

6.7.5.3. The lock-off device must not prevent the rapid release of the child.

6.7.5.4. Class A devices.

The amount of slip of the webbing shall not exceed 25 mm after the test prescribed in paragraph 8.2.6.1.

6.7.5.5. Class B devices.

The amount of slip of the webbing shall not exceed 25 mm after the test prescribed in paragraph 8.2.6.2.

6.7.6. ISOFIX attachment specifications

"ISOFIX attachments" and latching indicators shall be capable of withstanding repeated operations and shall, before the dynamic test prescribed in paragraph 8.1.3., undergo a test comprising 2000 ± 5 opening and closing cycles under normal conditions of use.

6.8. Hans Classification

6.8.1. Child restraint systems may cover more than one size provided that the requirements of each size are fulfilled. Moreover each size ~~seperately~~separately has to be indicated on the child restraint and at least the shoulder heights belonging to these sizes are to be visible for the user.

- 6.8.2. Forward-facing is not permitted for size 50-74 and size 50-80.
- 6.8.3. There are no restrictions with regard to forward-facing for sizes above size 50-80, however for size 74-98 the orientation rearward-facing is strongly recommended.
- 6.8.4. The class integral is required for size 50-74, size 50-80 and size 74-98.
- 6.8.5. The class integral for an ISOFIX child restraint is restricted to size 50-74, size 50-80 and size 74-98.
- 6.8.6. ISOFIX child restraints of sizes above size 74-98 shall be of the class non-integral.
- 6.8.7. The mass of an ISOFIX child restraint shall not exceed 15 kg.

The previous is written with the understanding that both the proposed third anchorage point and the testing with better dummies could make that ISOFIX (as fixation system) with the indication Rxxx-UNIVERSAL can be used in more orientations and spread over more sizes

7. TESTS

- 7.1. Tests of the assembled child restraint system
- 7.1.1. Corrosion
- 7.1.1.1. The metal items of the child restraint shall be positioned in a test chamber as prescribed in [Annex 4](#). In the case of a child restraint incorporating a retractor, the strap shall be unwound to full length less 100 ± 3 mm. Except for short interruptions that may be necessary, for example, to check and replenish the salt solution, the exposure test shall proceed continuously for a period of 50 ± 0.5 hours.
- 7.1.1.2. On completion of the exposure test the metal items of the child restraint shall be gently washed, or dipped, in clean running water with a temperature not higher than 38°C to remove any salt deposit that may have formed and then allowed to dry at room temperature of 18 to 25 °C for 24 ± 1 hours before inspection in accordance with paragraph 7.1.1.2. above.
- 7.1.2. Overturning
- 7.1.2.1. The manikin shall be placed in the restraints installed in accordance with this Regulation and taking into account the manufacturer's instructions and with the standard slack as specified in paragraph 7.1.3.6. below.
- 7.1.2.2. The restraint shall be fastened to the test seat or vehicle seat. The whole seat shall be rotated around a horizontal axis contained in the median longitudinal plane of the seat through an angle of 360° at a speed of 2-5 degrees/second. For the purposes of this test, devices intended for use in specific cars may be attached to the test seat described in [Annex 6](#).
- 7.1.2.3. This test shall be carried out again rotating in the reverse direction after having replaced, if necessary, the manikin in its initial position. With the rotational axis in the horizontal plane

and at 90° to that of the two earlier tests, the procedure shall be repeated in the two directions of rotation.

- 7.1.2.4. These tests shall be carried out using both the smallest and the largest appropriate manikin of the group or groups for which the restraining device is intended.

8. TEST REPORTS

9. PRODUCTION QUALIFICATION

10.CONFORMITY OF PRODUCTION AND ROUTINE TESTS

11.MODIFICATION AND EXTENSION OF APPROVAL OF A CHILD RESTRAINT SYSTEM

12.PENALTIES FOR NON-CONFORMITY OF PRODUCTION

13.PRODUCTION DEFINITELY DISCONTINUED

14.INFORMATION FOR USERS

15.TRANSITIONAL PROVISIONS

16.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 withdrawal of approval, or production definitely discontinued, issued in other countries, are to be sent.

Annex 1 A

Annex 1 B

Annex 2 A

Annex 2 B

Annex 4

CORROSION TEST

1. Test apparatus
 - 1.1. The apparatus shall consist of a mist chamber, a salt solution reservoir, a supply of suitably conditioned compressed air, one or more atomizing nozzles, sample supports, provision for heating the chamber, and necessary means of control. The size and detailed construction of the apparatus shall be optional, provided that the test conditions are met.
 - 1.2. It is important to ensure that drops of solution accumulated on the ceiling or cover of the chamber do not fall on test samples.
 - 1.3. Drops of solution which fall from test samples shall not be returned to the reservoir for respraying.
 - 1.4. The apparatus shall not be constructed of materials that will affect the corrosiveness of the mist.
2. Location of test samples in the mist cabinet
 - 2.1. Samples, except retractors, shall be supported or suspended between 15° and 30° from the vertical and preferably parallel to the principal direction of horizontal flow of mist through the chamber, based upon the dominant surface being tested.
 - 2.2. Retractors shall be supported or suspended so that the axes of the reel for storing the strap shall be perpendicular to the principal direction of horizontal flow of mist through the chamber. The strap opening in the retractor shall also be facing in this principal direction.
 - 2.3. Each sample shall be so placed as to permit free settling of mist on all samples.
 - 2.4. Each sample shall be so placed as to prevent salt solution from one sample dripping on to any other sample.
3. Salt solution
 - 3.1. The salt solution shall be prepared by dissolving 5 ± 1 parts by mass of sodium chloride in 95 parts of distilled water. The salt shall be sodium chloride substantially free of nickel and copper and containing not more than 0.1 percent of sodium iodide and not more than 0.3 percent of total impurities in the dry state.

3.2. The solution shall be such that, when atomized at 35°C, the collected solution is in the pH range of 6.5 to 7.2.

4. Compressed air

4.1. The compressed air supply to the nozzle or nozzles for atomizing the salt solution shall be free of oil and dirt, and maintained at a pressure between 70 kN/m² and 170 kN/m².

5. Conditions in the mist chamber

5.1. The exposure zone of the mist chamber shall be maintained at 35 ± 5°C. At least two clean mist collectors shall be placed within the exposure zone, so that no drops of solution from the test samples or any other sources are collected. The collectors shall be placed near the test samples, one as near as possible to any nozzle and one as far as possible from all nozzles. The mist shall be such that, for each 80 cm² of horizontal collecting area, from 1.0 to 2.0 ml of solution per hour, when measured over an average of at least 16 hours, is collected in each collector.

5.2. The nozzle or nozzles shall be directed or baffled, so that the spray does not impinge directly on the test samples.

Annex 5

Annex 6 (to be revised)

DESCRIPTION OF TROLLEY

1. Trolley
 - 1.1. For tests on child restraints, the trolley, carrying the seat only, shall have a mass greater than 380 kg. For tests on child restraint systems in the vehicle specific category, the trolley with the attached vehicle structure shall have a mass greater than 800 kg.
2. Calibration screen
 - 2.1. A calibration screen shall be attached firmly to the trolley with a movement limit line plainly marked on it to enable compliance with forward movement criteria to be determined from photographic records.
3. Seat
 - 3.1. The seat shall be constructed as follows:
 - 3.1.1. A rigid back, fixed, dimensions of which are given in Appendix 1 to this annex. The lower part and the upper part is made of a 20 mm diameter tube;
 - 3.1.2. Rigid seating, dimensions of which are given in Appendix 1 to this annex. The rear part of the seating is made from a rigid sheet metal, the upper edge of which is a 20 mm diameter tube. The front part of the seating is also made of a 20 mm diameter tube;
 - 3.1.3. For access to the anchor brackets, openings shall be made at the rear of the cushion of the seat, as prescribed in Appendix 1 to this annex;
 - 3.1.4. The width of the seat shall be 800 mm;
 - 3.1.5. The back and the seating shall be covered with polyurethane foam, the characteristics of which are given in Table 1. The dimensions of the cushion are given in Appendix 1 to this annex;

Table 1:

Density according to ISO 485 (kg/m ³)	43
Bearing strength according to ISO 2439B (N)	
p - 25 percent	125
p - 40 percent	155
Bearing strength factor according to ISO 3386 (kPa)	4
Elongation at rupture according to ISO 1798 (percent)	180
Breaking strength according to ISO 1798 (kPa)	100
Compression set according to ISO 1856 (percent)	3

- 3.1.6. The polyurethane foam shall be covered with a sun shade cloth, made of polyacrylate fibre, the characteristics of which are given in Table 2.

Table 2:

Specific mass (g/m ²)	290
Breaking strength according to DIN 53587 on test specimen 50 mm wide:	
lengthwise (kg):	120
breadthwise (kg):	80

- 3.1.7. Covering the seat and the seat back^{4/}
- 3.1.7.1. The seat foam cushion is produced out of a square foam block (800 x 575 x 135 mm) in such a way (see Figure 1 of Appendix 1 to this annex) that its shape resembles the shape of the aluminium bottom-plate specified in Figure 2 of Appendix 1 to this annex.
- 3.1.7.2. Six holes are drilled in the bottom-plate in order to fasten it to the trolley with bolts. The holes are drilled alongside the longest side of the plate, three on each side, their position being dependent on the construction of the trolley. Six bolts are put through the holes. It is recommended to glue the bolts on the plate with an appropriate adhesive. Afterwards, the bolts are fastened with nuts.
- 3.1.7.3. The cover material (1250 x 1200 mm, see Figure 3 of Appendix 1 to this annex) is cut across the width in such a way that it is not possible for the material to overlap after covering. There should be a gap of about 100 mm between the edges of the cover material. Therefore the material has to be cut at about 1200 mm.

^{4/} Details of materials used in this process can be obtained from TNO (Research Institute for Road Vehicles), Schoemakerstraat 97, 2628 VK Delft, The Netherlands.

- 3.1.7.4. The cover material is marked with two lines which run across the width. They are drawn 375 mm from the centreline of the cover material. (See Figure 3 of Appendix 1 to this annex)
- 3.1.7.5. The seat foam cushion is placed upside down on the cover material with the aluminium bottom-plate on top.
- 3.1.7.6. On both sides the cover material is stretched until the lines drawn on it match the edges of the aluminium bottom-plate. At each bolt position, small incisions are made and the cover material is pulled over the bolts.
- 3.1.7.7. At the position of the grooves in the bottom-plate and in the foam, the cover material should be incised.
- 3.1.7.8. The cover is glued to the aluminium plate with a flexible glue. The nuts have to be removed before gluing.
- 3.1.7.9. The flaps on the side are folded onto the plate and are glued as well.
- 3.1.7.10. The flaps in the grooves are folded inside and taped with a strong tape.
- 3.1.7.11. The flexible glue has to dry for at least 12 hours.
- 3.1.7.12. The seat back cushion is covered in exactly the same way as the seat, only the lines on the cover material (1250 x 850 mm) are drawn 320 mm apart from the centreline of the material.
- 3.1.8. Line Cr is coincident with the intersection line between the top plane of the seat and the front lane of the seat back.
- 3.2. Test of rearward-facing devices
- 3.2.1. A special frame shall be fitted on the trolley in order to support the child restraint as shown in Figure 1.
- 3.2.2. A steel tube shall be attached firmly to the trolley in such a way that a load of $5,000 \pm 50$ N applied horizontally to the centre of the tube does not cause a movement greater than 2 mm.
- 3.2.3. The dimensions of the tube shall be: 500 x 100 x 90 mm.

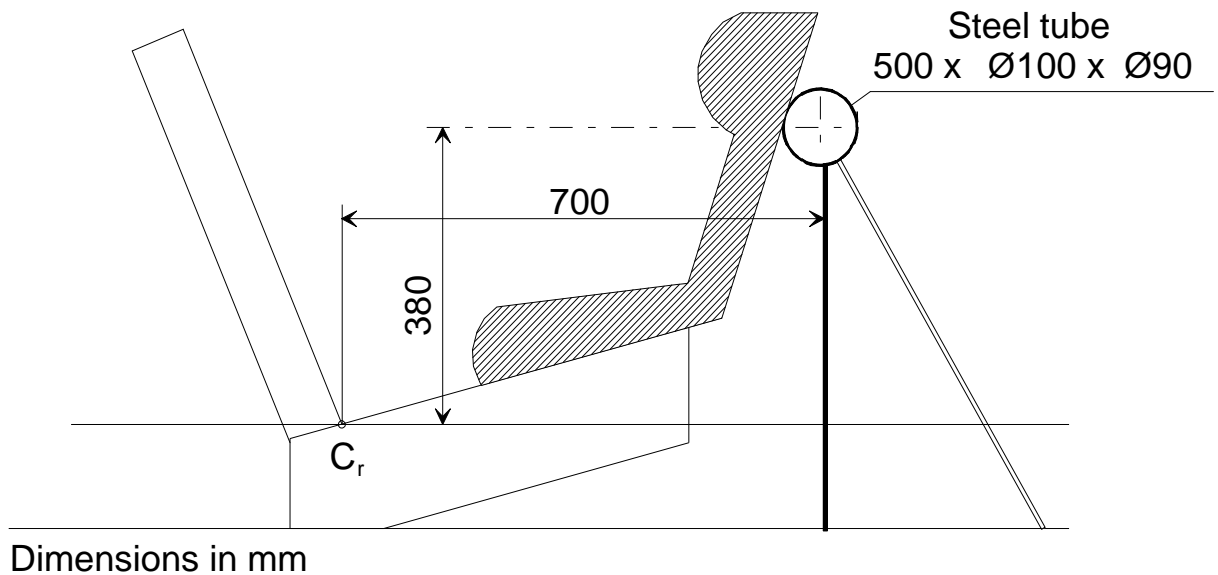


Figure 1

Arrangement for testing a rearward-facing device

- 3.3. Trolley floor pan
- 3.3.1. The floor pan of the trolley shall be constructed of a flat sheet of metal of uniform thickness and material, see Figure 2 of Appendix 3 to this annex.
- 3.3.1.1. The floor pan shall be rigidly mounted on the trolley. The height of the floor pan relative to the Cr axis projection point, dimension X^{5/} in Figure 2, shall be adjusted to meet the requirements of paragraph 7.1.4.1.9.
- 3.3.1.2. The floor pan shall be designed so that the surface hardness should not be below 120 HB, according to EN ISO 6506-1:1999.
- 3.3.1.3. The floor pan shall withstand an applied vertical concentrated load of 5 kN without causing a vertical movement greater than 2 mm referring to Cr axis and without any permanent deformation occurring.
- 3.3.1.4. The floor pan shall have a surface roughness not exceeding Ra 6,3 according to ISO 4287:1997.

^{5/} The dimension X shall be of 210 mm with an adjustment range of ± 70 mm.

- 3.3.1.5. The floor pan shall be designed so that no permanent deformation is occurring after a dynamic test of a child restraint system, according to this Regulation.
4. Stopping device
- 4.1. The device consists of two identical absorbers mounted in parallel.
- 4.2. If necessary, an additional absorber shall be used for each 200 kg increase in nominal mass. Each absorber shall comprise:
- 4.2.1. an outer casing formed from a steel tube;
- 4.2.2. a polyurethane energy-absorber tube;
- 4.2.3. a polished-steel olive-shaped knob penetrating into the absorber; and
- 4.2.4. a shaft and an impact plate.
- 4.3. The dimensions of the various parts of this absorber are shown in the diagram reproduced in Appendix 2 to this annex.
- 4.4. The characteristics of the absorbing material are given in table 3 and table 4 of this annex.
- 4.5. The stopping device assembly shall be maintained for at least 12 hours at a temperature between 15 ° and 25 °C before being used for the calibration tests described in Annex 7 to this Regulation. The stopping device shall, for each type of test, meet the performance requirements laid down in Annex 7, Appendices 1 and 2. For dynamic tests of a child restraint, the stopping device assembly shall be maintained for at least 12 hours at the same temperature, to within ± 2 °C, as that of the calibration test. Any other device giving equivalent results can be accepted.

Table 3

CHARACTERISTICS OF THE ABSORBING MATERIAL "A" ^{6/}

(ASTM Method D 735 unless otherwise stated)

<u>Shore hardness A:</u>	<u>95 ± 2 at 20 ± 5 °C temperature</u>
Breaking strength:	$R_o \geq 350 \text{ kg/cm}^2$
Minimum elongation:	$A_o \geq 400 \text{ percent}$
Module at 100 percent elongation:	$\geq 110 \text{ kg/cm}^2$
at 300 percent elongation:	$\geq 240 \text{ kg/cm}^2$
Low temperature brittleness (ASTM Method D 736): 5 hours at - 55 °C	
Compression set (Method B): 22 hours at 70 °C ≤ 45 percent	
Density at 25 °C:	1.05 to 1.10
Ageing in air (ASTM Method D 573):	
70 hours at 100 °C:	Shore hardness: max. variation ± 3 breaking strength: decrease < 10 percent of R_o elongation: decrease < 10 percent of A_o weight: decrease < 1 percent
Immersion in oil (ASTM Method No. 1 Oil):	
70 hours at 100 °C:	Shore hardness: max. variation ± 4 breaking strength: decrease < 15 percent of R_o elongation: decrease < 10 percent of A_o volume: swelling < 5 percent
Immersion in oil (ASTM Method No. 3 Oil):	
70 hours at 100 °C:	breaking strength: decrease < 15 percent of R_o elongation: decrease < 15 percent of A_o volume: swelling < 20 percent
Immersion in distilled water:	
1 week at 70 °C:	breaking strength: decrease < 35 percent of R_o elongation: increase < 20 percent of A_o

^{6/} The address to obtain the relevant ASTM standards is: ASTM, 1916 Race Street, Philadelphia, USA PA 19 103.

Table 4

CHARACTERISTICS OF THE ABSORBING MATERIAL "B"

(ASTM Method 2000 (1980) unless otherwise stated)

Shore hardness A:	88 ± 2 at 20 ± 5 °C temperature
Breaking strength:	$R_o \geq 300$ kg/cm ²
Minimum elongation:	$A_o \geq 400$ percent
Module at 100 percent elongation:	≥ 70 kg/cm ²
at 300 percent elongation:	≥ 130 kg/cm ²

Low temperature brittleness (ASTM Method D 736): 5 hours at - 55 °C

Compression set (Method B): 22 hours at 70 °C ≤ 45 percent

Density at 25 °C: 1.08 to 1.12

Ageing in air (ASTM Method D 573 (1981)):

70 hours at 100 °C:	Shore hardness: max. variation ± 3 breaking strength: decrease < 10 percent of R_o elongation: decrease < 10 percent of A_o weight: decrease < 1 percent
---------------------	---

Immersion in oil (ASTM Method D 471 (1979) Oil No. 1):

70 hours at 100 °C:	Shore hardness: max. variation ± 4 breaking strength: decrease < 15 percent of R_o elongation: decrease < 10 percent of A_o volume: swelling < 5 percent
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Immersion in oil (ASTM Method D 471 (1979) Oil No. 3):

70 hours at 100 °C:	breaking strength: decrease < 15 percent of R_o elongation: decrease < 15 percent of A_o volume: swelling < 20 percent
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Immersion in distilled water:

1 week at 70°C:

breaking strength: decrease < 35 percent of R_o

elongation: increase < 20 percent of A_o

Annex 6 - Appendix 1

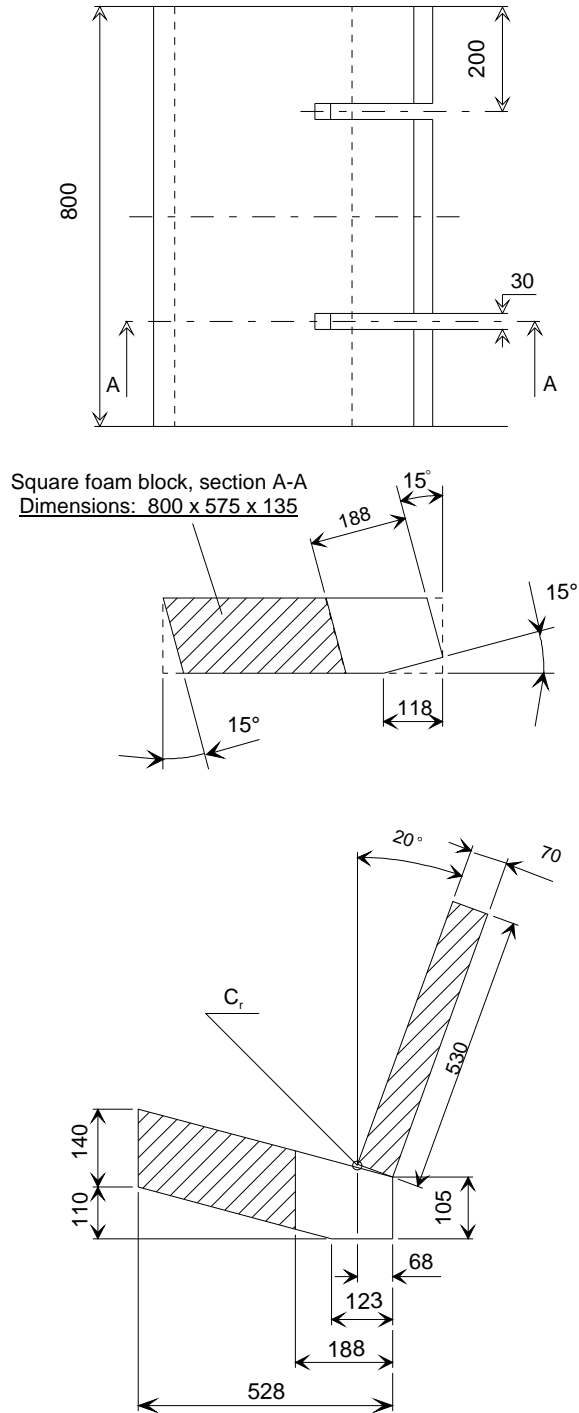


Figure 1

Dimensions of the seat and the seat cushions

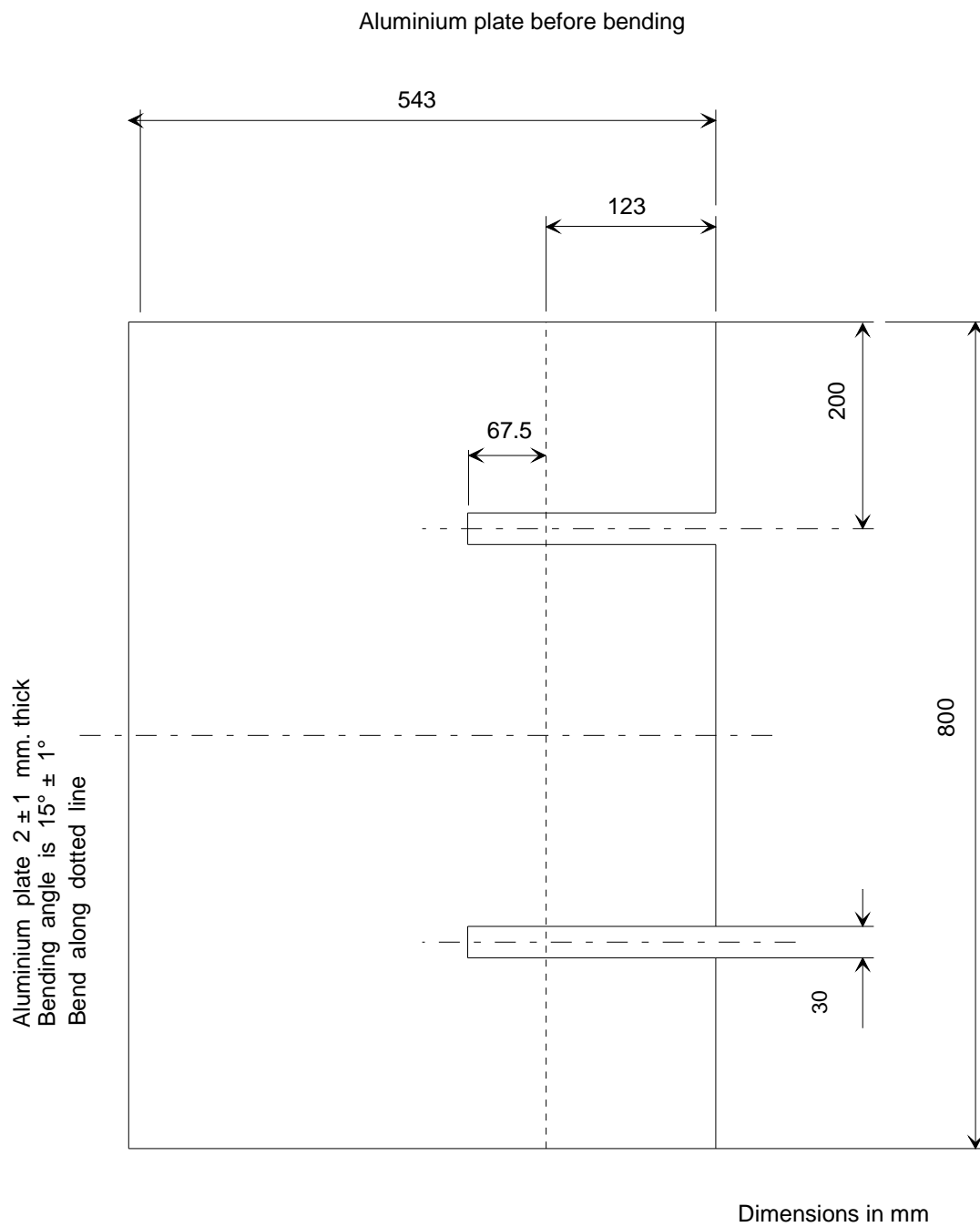


Figure 2: Dimensions of the aluminium bottom-plate

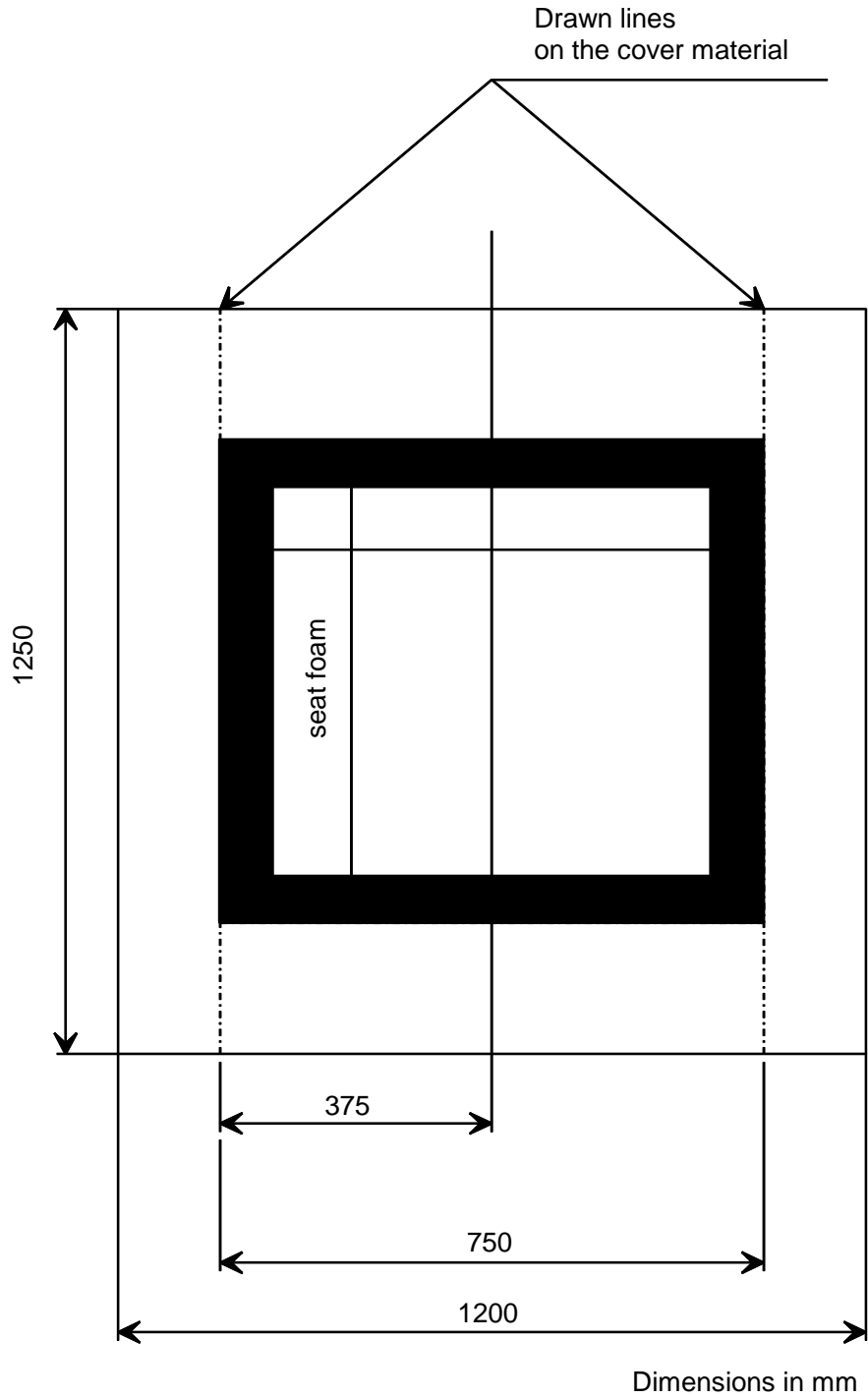


Figure 3: Dimensions of the cover material

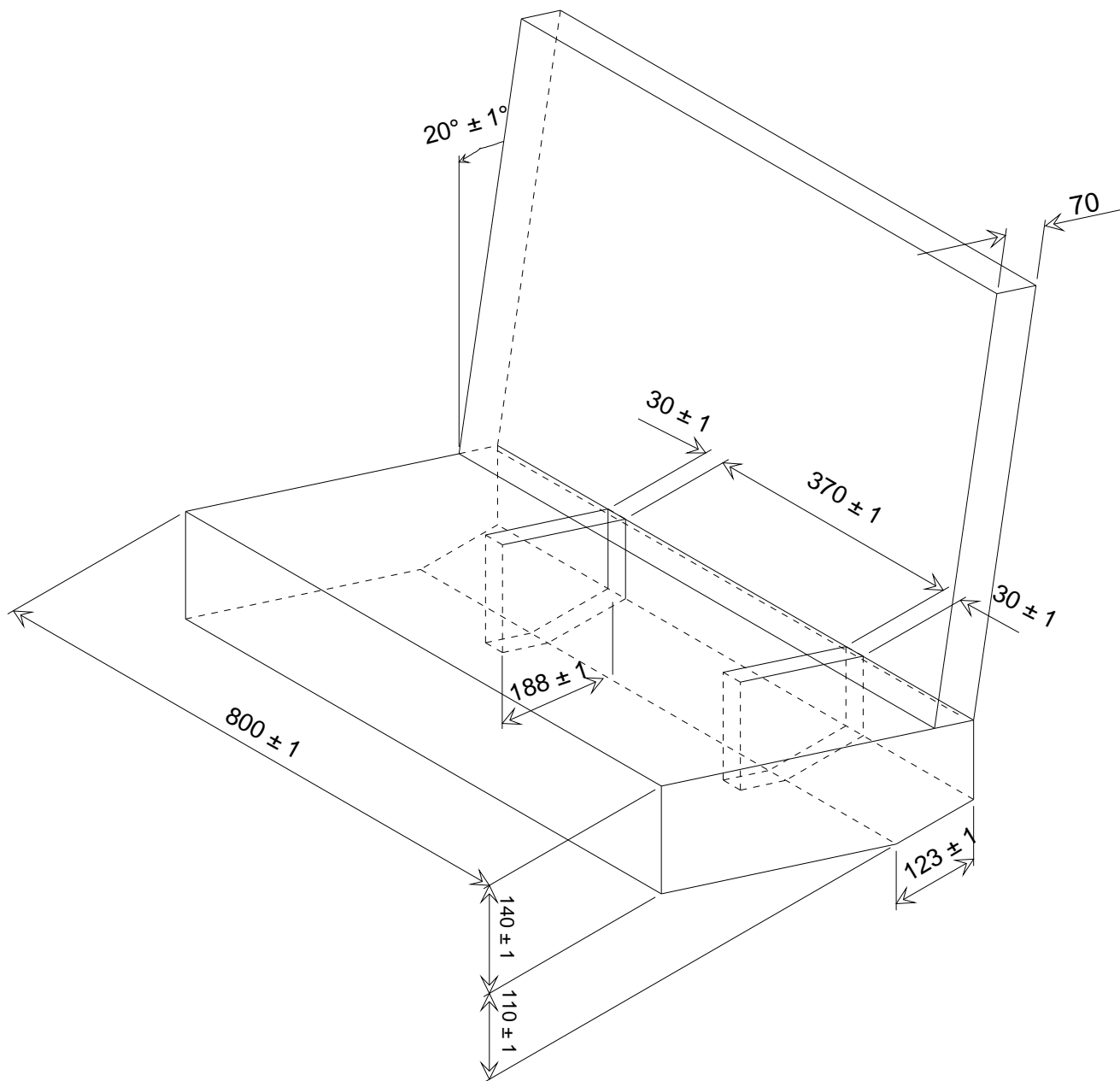
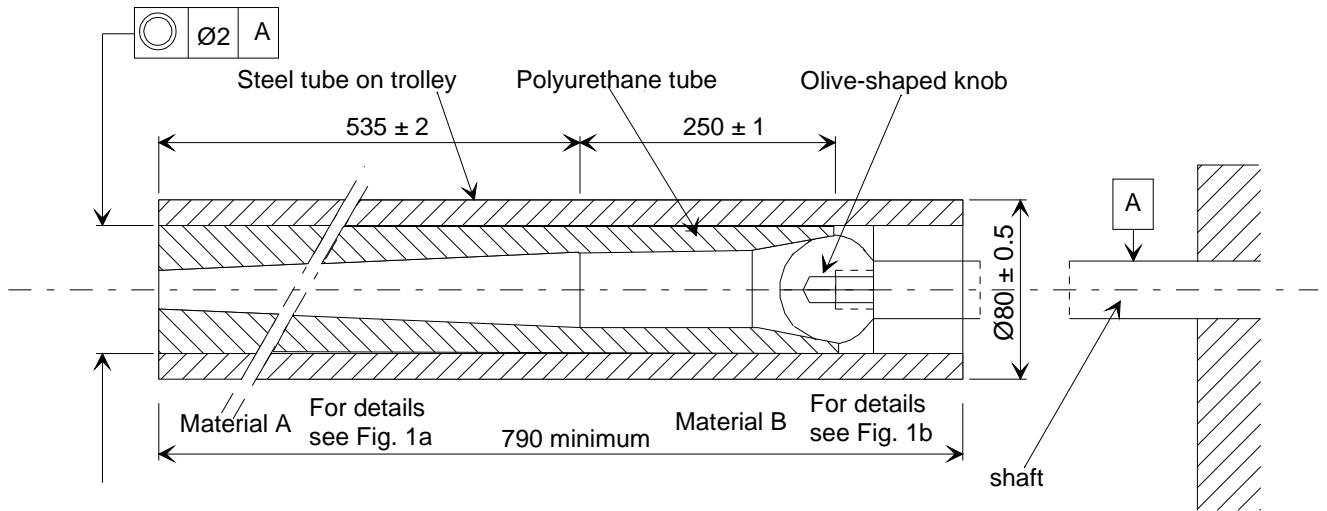


Figure 4:
3- Dimensional view of seat

Annex 6 - Appendix 2
 Stopping device
 Frontal Impact dimensions (in mm)



Play defined according to external diameter of polyurethane tube (light push fit)

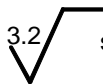
3.2  surface finish

Figure 1

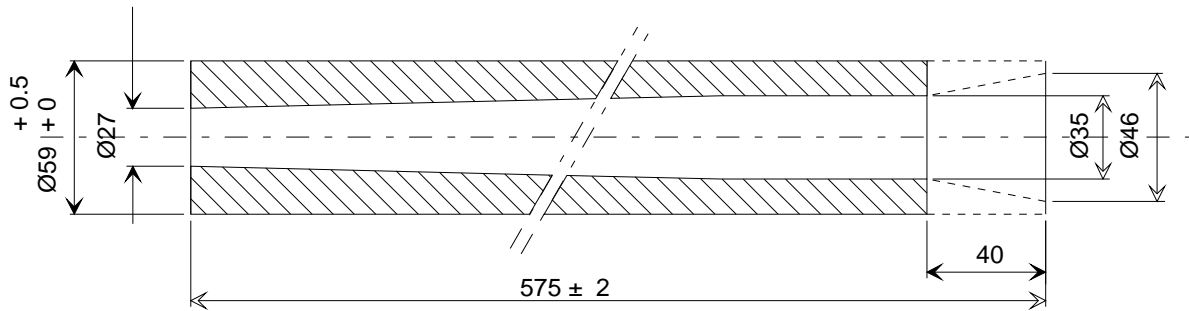


Figure 1a: Material A

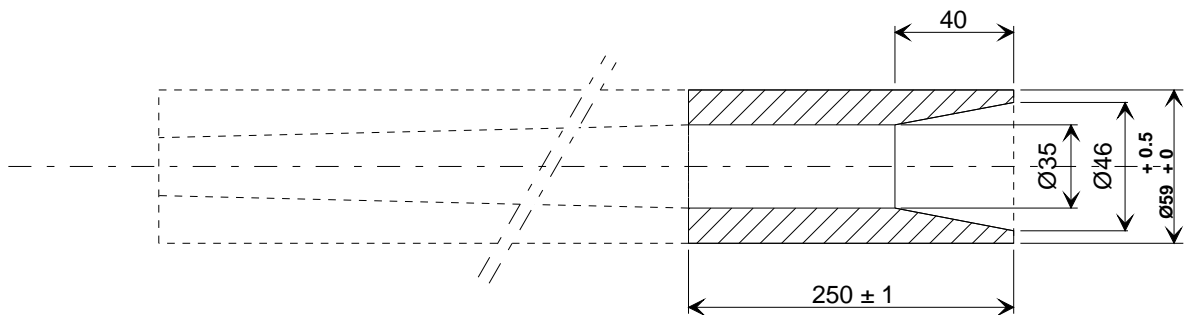
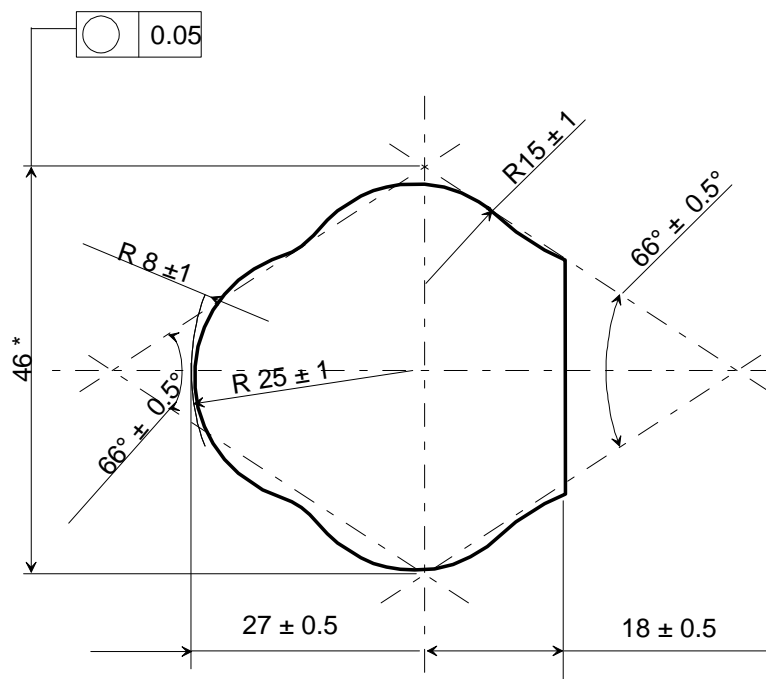


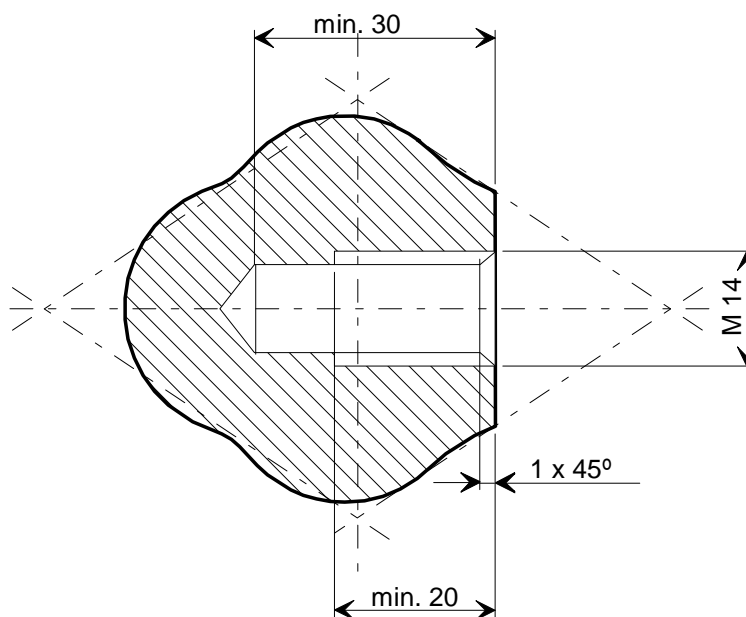
Figure 1b: Material B



* This dimension can vary between 43 and 49 mm

Dimensions in mm

Figure 2:
 Stopping device olive-shaped knob



Dimensions in mm

Figure 3:
 Stopping device olive-shaped knob

Stopping device
 (assembled)
 Rear impact
 dimensions in mm

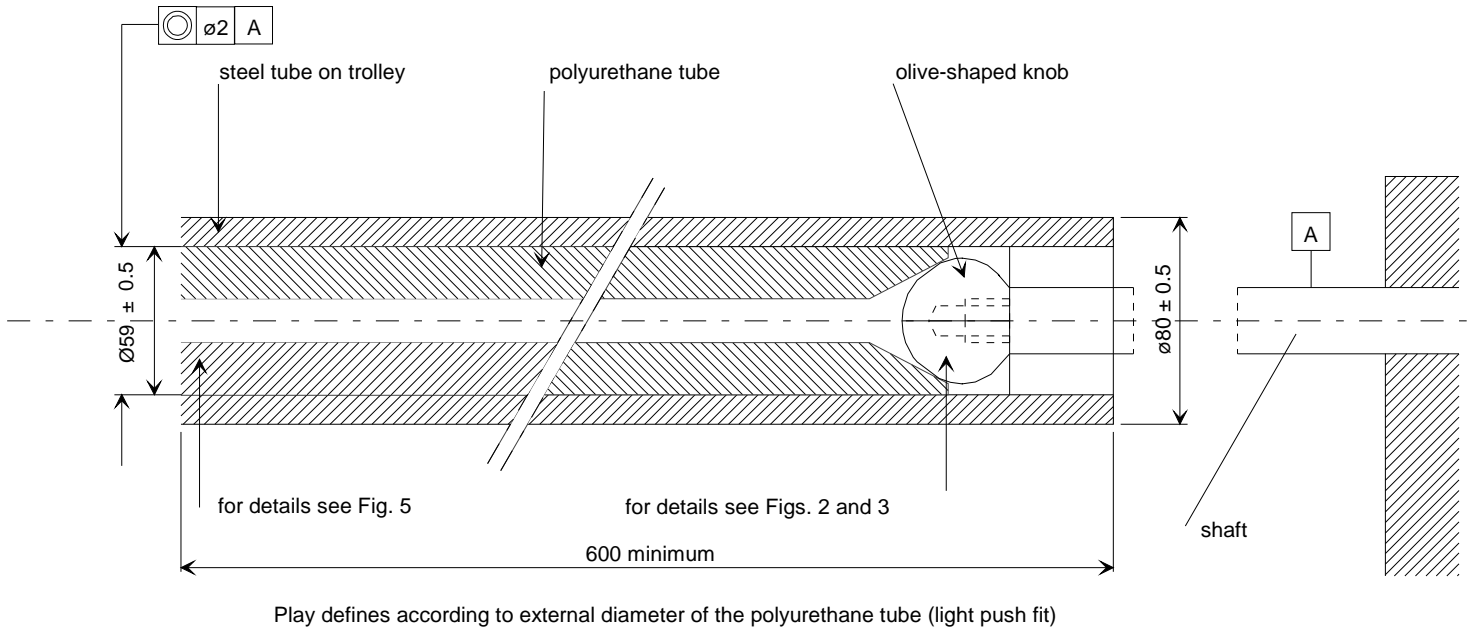


Figure 4

Stopping device
polyurethane tube
Rear impact
dimensions in mm

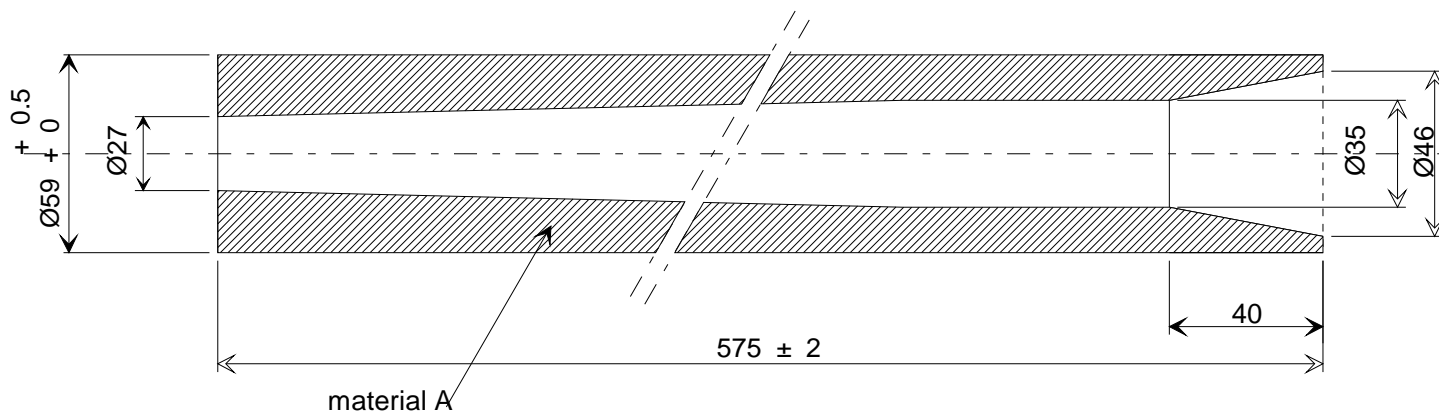


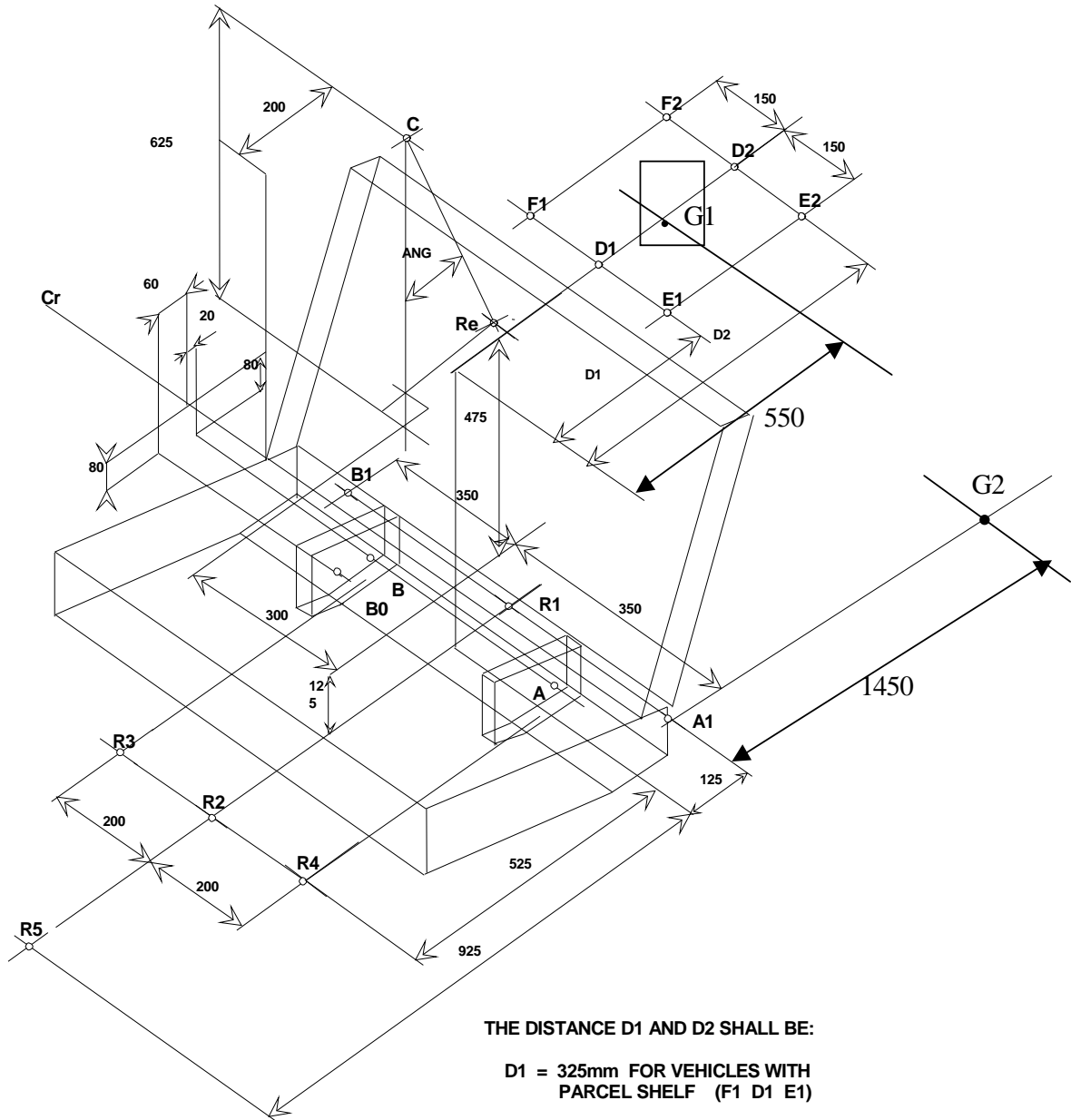
Figure 5

Annex 6 - Appendix 3

ARRANGEMENT AND USE OF ANCHORAGES ON THE TEST TROLLEY

1. The anchorages shall be positioned as shown in the figure below.
When attaching the standard anchorage plate to the anchorage points A and B or B0 the plates shall be mounted with the bolt in the transverse horizontal direction with the angled surface facing inboard and shall be free to rotate about the axis
2. Child restraints in the "universal" and "restricted" categories shall use the following anchorage points:
 - 2.1. For child restraint using lap belts, points A and B;
 - 2.2. For child restraint using lap and diagonal belts, points A, B0 and C.
 - 2.3. For child restraints using ISOFIX attachment, rearmost point H1 and H2.
3. Anchorages A, B and/or (rearmost) H₁ H₂ and D shall be used for child restraints in the "semi-universal" category having only one additional upper anchorage.
4. Anchorages A, B and/or (rearmost) H₁ H₂, E and F shall be used for child restraints in the "semi-universal" category having only one additional upper anchorages.
5. Anchorage points R₁, R₂, R₃, R₄ and R₅ are the additional anchorage points for rearward-facing child restraint systems in the "semi-universal" category having one or more additional anchorages (see paragraph 8.1.3.5.3.).
6. Except in the case of point C, (which represents the pillar loop position) the points, which correspond to the arrangement of the anchorages show where the ends of the belt are to be connected to the trolley or to the load transducer, as the case may be. The structure carrying the anchorages shall be rigid. The upper anchorages must not be displaced by more than 0.2 mm in the longitudinal direction when a load of 980 N is applied to them in that direction. The trolley shall be so constructed that no permanent deformation shall occur in the parts bearing the anchorages during the test.

7. For carry-cots in group 0, the points A_1 and/or B_1 can be used alternatively, as specified by the manufacturer of the restraint systems. A_1 and B_1 are located on a transverse line through R_1 at a distance of 350 mm from R_1 .
8. For testing of child restraints in the "universal" and "restricted" categories, a standard retractor belt, as specified in Annex 13, shall be fitted to the test seat. The webbing used between the retractor and the anchorage plate A_1 of the standard safety belt shall be renewed for each dynamic test.
9. For testing of child restraints with top tether, the anchorage G_1 or G_2 shall be used.
10. In the case of child restraints utilising a support leg, the Technical Service shall select the anchorages to be used according to paragraphs 2., 3., 4. or 5. above and with the support leg adjusted as specified in paragraph 7.1.4.1.9.



THE DISTANCE D1 AND D2 SHALL BE:

D1 = 325mm FOR VEHICLES WITH
 PARCEL SHELF (F1 D1 E1)

D1 = 1025mm FOR VEHICLES WITH
 FOLDING BACK REAR SEATS
 (ESTATE TYPE) (F2 D2 E2)

DIMENSIONS REFERRING TO Cr
 ARE TOLERANCED WITH: ± 2 mm
 EXCEPT FOR DISTANCE FLOOR TO Cr ± 10 mm

DISTANCE C - R_e = 530 mm

Re is located on the centerline of the retractor spool
 ANGLE "ANG" = 30° MAXIMUM

Figure 1

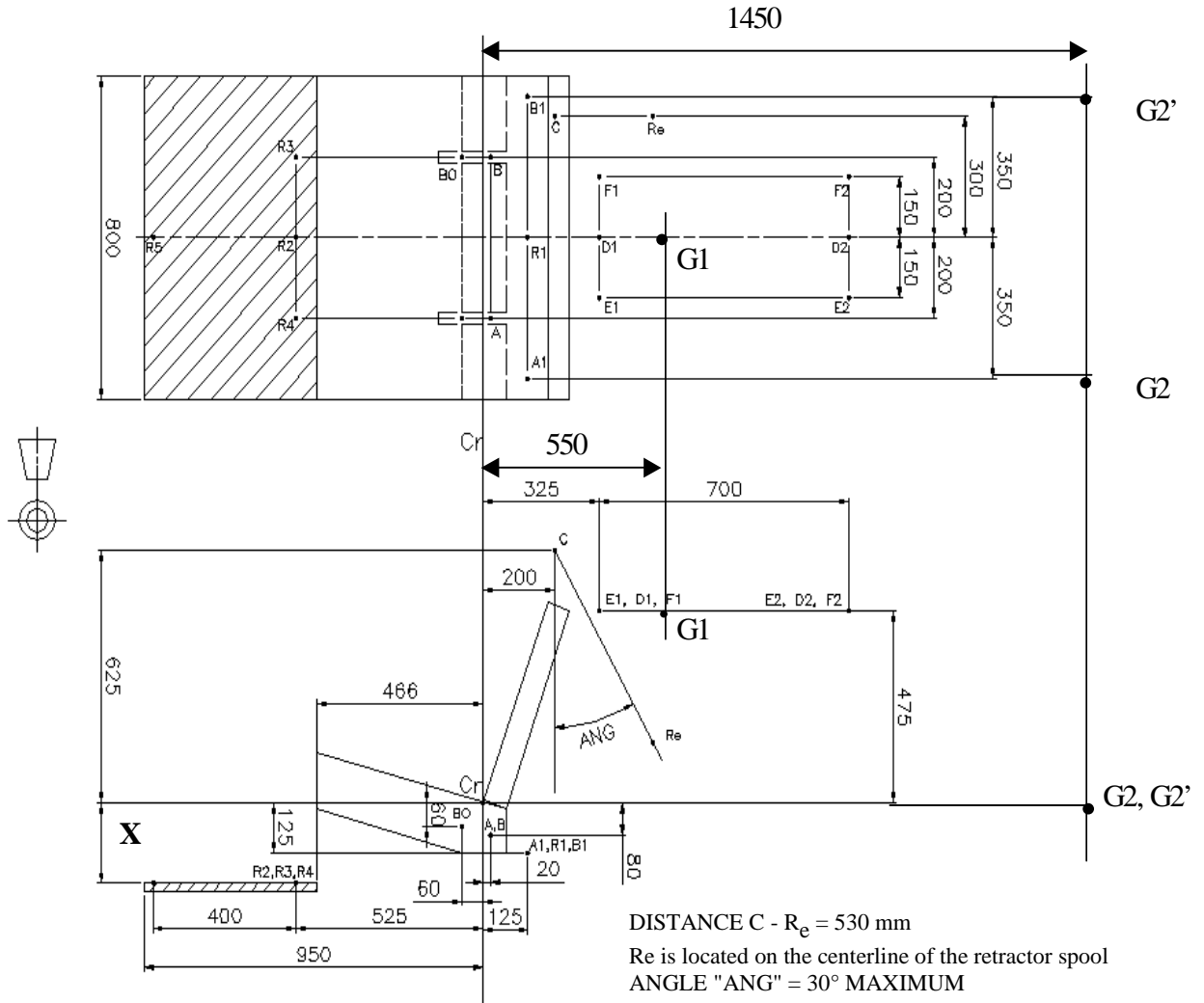
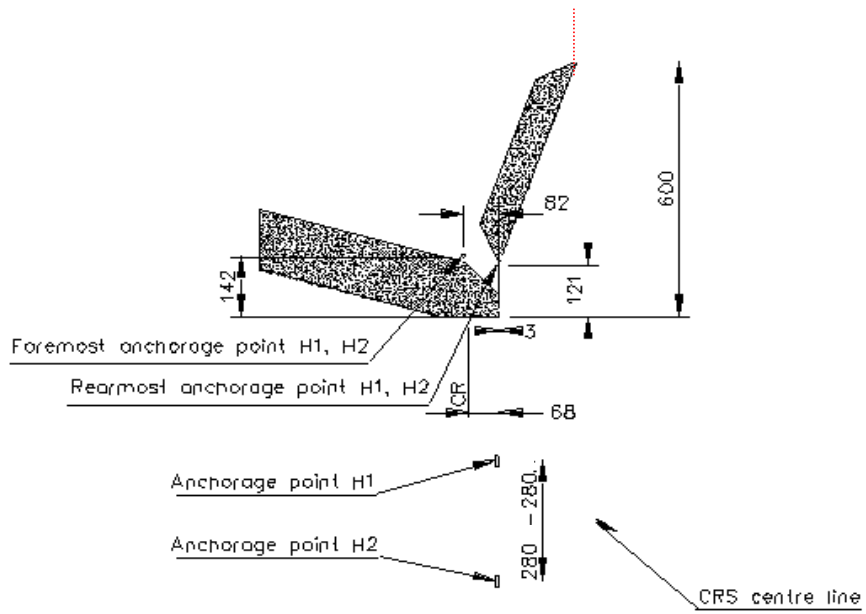


Figure 2

FLOOR AREA IS HATCHED



Anchorage points H1 & H2 – 6 mm ± 0.1 mm

Figure 3

Annex 7

Annex 8

Annex 9

Annex 10

Annex 11

Annex 12

Annex 13

Annex 14

Annex 15

Annex 16

Annex 17

TEST OF ENERGY ABSORBING MATERIAL

1. Headform

1.1. The headform shall consist of a solid wooden hemisphere with an added smaller spherical segment as shown in Figure A below. It shall be constructed so that it can be dropped freely along the axis marked and it shall have provision for mounting an accelerometer in order to measure the acceleration along the direction of fall.

1.2. The headform shall have a total mass, including the accelerometer of 2.75 ± 0.05 kg.

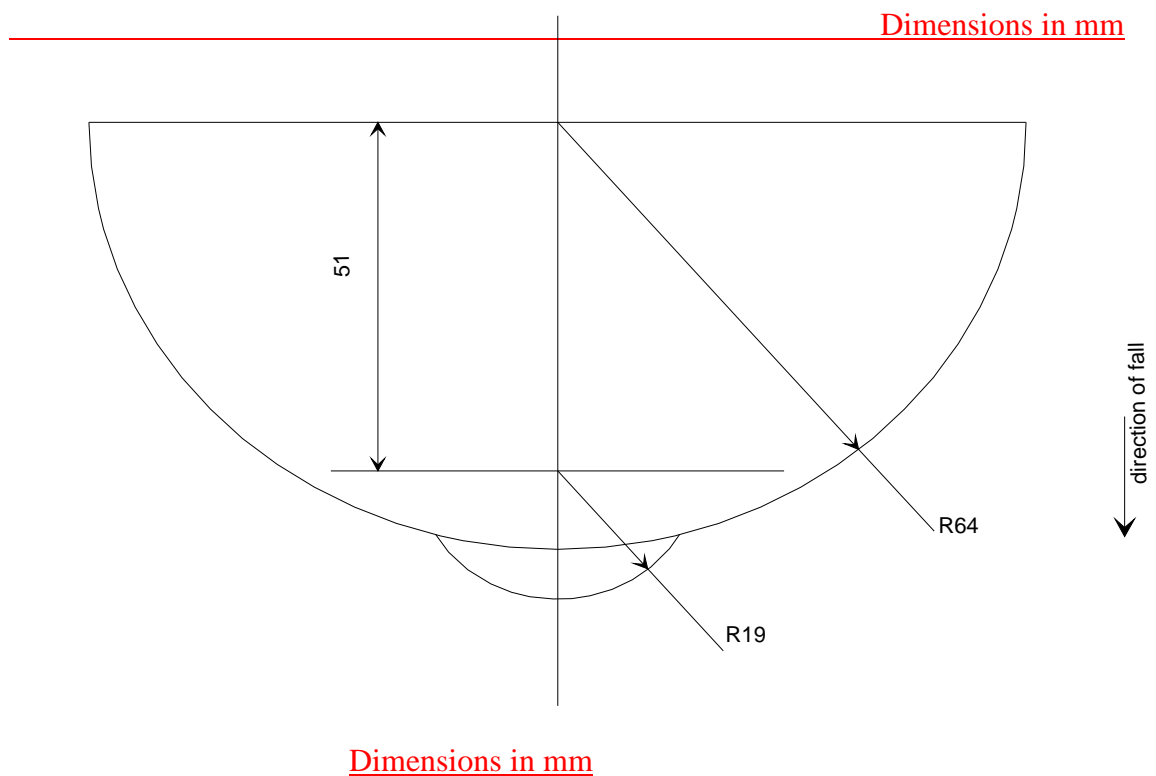


Figure A: Headform

2. Instrumentation

The acceleration shall be recorded during the test, using equipment in accordance with channel frequency class 1000 as specified in the latest version of ISO 6487.

3. Procedure

3.1. The test shall be conducted on a completely assembled child restraint with a minimum of modification only where necessary to ensure access for the support (directly beneath the point of impact) and for the impactor device and such that there is minimal effect on the performance by the modification.

3.2. The assembled child restraint shall be fully supported on its outer surface in the region of impact and be supported directly beneath the point of impact on a smooth rigid base, for example a solid concrete plinth.

3.3. Raise the headform to a height of 100 $-0/+5$ mm from the respective upper surfaces of the assembled child restraint to the lowest point on the headform, and allow it to fall. Record the acceleration experienced by the headform during impact.

Annex 18

METHOD OF DEFINING HEAD IMPACT AREA OF DEVICES WITH BACKRESTS AND FOR REARWARD-FACING DEVICES DEFINING THE MINIMUM SIZE OF SIDE WINGS

1. Place the device on the test seat described in Annex 6. Reclinable devices shall be set in the most upright position. Place the smallest manikin in the device in accordance with the manufacturer's instructions. Mark a point "A" on the backrest on the same horizontal level as the shoulder of the smallest manikin at a point 2 cm inside the outer edge of the arm. All internal surfaces above the horizontal plane passing through point A shall comprise special energy-absorbing material tested in accordance with Annex 17. This material shall cover the internal surfaces of the backrest and side wings, including the inner edges (zone of radius) of the side wings. The energy absorbing material may be an integral part of the child seat. In the case of carry cot devices where a symmetrical installation of the dummy is not possible according to the device and manufacturer instructions, the lower limit of area at which material complying with Annex 17 shall be used, shall be all areas beyond dummy's shoulder in the head direction, when measured with this dummy in the carry cot in its worst position consistent with the manufactures instructions and the carry cot positioned on the test bench.

If a symmetrical installation of the dummy in the carry-cot may be possible, the whole inner surfaces shall be covered with material complying with Annex 17; this material has to fulfill its purpose together with the inner side structure; the Technical Service may assess this aspect with further tests.

2. For rearward-facing devices there shall be side wings with a depth of minimum 90 mm measured from the median of the surface of the backrest. These side wings shall start at the horizontal plane passing through point "A" and continue to the top of the seat back. Starting from a point 90 mm below the top of the seat back, the depth of the side wing may be gradually reduced.

3. The requirement in paragraph 2. above for a minimum size of side wings does not apply to child restraints of mass groups II and III in the specific vehicle category to be used in the luggage area according to paragraph 6.1.2. of this Regulation.