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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

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UNIFORM PROVISIONS CONCERNING THE APPROVAL OF VEHICLES WITH REGARD TO SAFETY-BELT ANCHORAGES

UNITED NATIONS

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1. SCOPE

This Regulation applies to anchorages for safety-belts for adult occupants of forward-facing seats in vehicles of categories M and N.[1]

2. DEFINITIONS

For the purposes of this Regulation,

2.1. "approval of a vehicle" means the approval of a vehicle type equipped with anchorages for given types of safety-belts;

2.2. "vehicle type" means a category of power-driven vehicles which do not differ in such essential respects as the dimensions, lines and materials of components of the vehicle structure or seat structure to which the anchorages are attached;

2.3. "belt anchorages" means the parts of the vehicle structure or the seat structure or any other part of the vehicle to which the safety-belt assemblies are to be secured;

2.4. "effective belt anchorage" means the point used to determine conventionally, as specified in paragraph 5.4., the angle of each part of the safety-belt in relation to the wearer, that is, the point to which a strap would need to be attached to provide the same lie as the intended lie of the belt when worn, and which may or may not be the actual belt anchorage depending on the configuration of the safety-belt hardware at its attachment to the belt anchorage.

2.4.1. For example, in the case

2.4.1.1. where a safety-belt incorporates a rigid part which is attached to a lower belt anchorage and which is either fixed or free to swivel, the effective belt anchorage for all positions of seat adjustment is the point where the strap is attached to that rigid part;

2.4.1.2. where a strap guide is used on the vehicle structure or on the seat structure, the middle point of the guide at the place where the strap leaves the guide on the belt wearer's side, shall be considered as the effective belt anchorage; and,

2.4.1.3. where the belt runs directly from the wearer to a retractor attached to the vehicle structure or the seat structure without an intervening strap guide, the effective belt anchorage shall be considered as being the intersection of the axis of the reel for storing the strap with the plane passing through the centre line of the strap on the reel;

2.5. "floor" means the lower part of the vehicle body-work connecting the vehicle side walls. In this context it includes ribs, swages and possibly other reinforcements, even if they are below the floor, such as longitudinal and transverse members;

2.6. "seat" means a structure which may or may not be integral with the vehicle structure complete with trim, intended to seat one adult person. The term covers both an individual seat or part of a bench seat intended to seat one person;

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[1] As defined in the Consolidated Resolution (R.E.3, annex 7), document: TRANS/SC1/WP29/78/Amend.3.

2.6.1. "front passenger seat" means any seat where the "foremost H-point" of the seat in question is in or in front of the vertical transverse plane through the driver's R-point;

2.7. "group of seats" means either a bench-type seat, or seats which are separate but side by side (i.e. with the foremost anchorages of one seat in line with or forward of the rearmost anchorages and in line with or behind the foremost anchorages of another seat) and accommodate one or more seated adult person;

2.8. "bench seat" means a structure complete with trim, intended to seat more than one adult person;

2.9. "folding seat" means an auxiliary seat intended for occasional use which is normally folded;

2.10. "seat type" means a category of seats which do not differ in such essential respects as:

2.10.1. the shape, dimensions and materials of the seat structure,

2.10.2. the types and dimensions of the adjustment systems and all locking systems,

2.10.3. the type and dimensions of the belt anchorages on the seat, of the seat anchorage and of the affected parts of the vehicle structure;

2.11. "seat anchorage" means the system by which the seat assembly is secured to the vehicle structure, including the affected parts of the vehicle structure;

2.12. "adjustment system" means the device by which the seat or its parts can be adjusted to a position suited to the morphology of the seated occupant; this device may, in particular, permit of:

2.12.1. longitudinal displacement;

2.12.2. vertical displacement;

2.12.3. angular displacement;

2.13. "displacement system" means a device enabling the seat or one of its parts to be displaced or rotated without a fixed intermediate position, to permit easy access to the space behind the seat concerned;

2.14. "locking system" means any device ensuring that the seat and its parts are maintained in any position of use and includes devices to lock both the seat back relative to the seat and the seat relative to the vehicle.

3. APPLICATION FOR APPROVAL

3.1. The application for approval of a vehicle type with regard to the belt anchorages shall be submitted by the vehicle manufacturer or by his duly accredited representative.

3.2. It shall be accompanied by the undermentioned documents in triplicate and by the following particulars:

3.2.1. drawings of the general vehicle structure on an appropriate scale, showing the positions of the belt anchorages, the effective belt anchorages (where appropriate), and detailed drawings of the belt anchorages and of the points to which they are attached;

3.2.2. a specification of the materials used which may affect the strength of the belt anchorages;

3.2.3. a technical description of the belt anchorages;

3.2.4. in the case of belt anchorages affixed to the seat structure:

3.2.4.1. detailed description of the vehicle type with regard to the design of the seats, of the seat anchorages and of their adjustment and locking systems;

3.2.4.2. drawings, on an appropriate scale and in sufficient detail, of the seats, of their anchorage to the vehicle, and of their adjustment and locking systems.

3.3. At the option of the manufacturer, a vehicle representative of the vehicle type to be approved or the parts of the vehicle considered essential for the belt anchorage tests by the technical service conducting approval tests shall be submitted to the service.

4. APPROVAL

4.1. If the vehicle submitted for approval pursuant to this Regulation meets the requirements of paragraphs 5. and 6. of this Regulation, approval of that vehicle type shall be granted.

4.2. An approval number shall be assigned to each type approved. Its first two digits (at present 03) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another vehicle type as defined in paragraph 2.2. above.

4.3. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation by means of a form conforming to the model in annex 1 to the Regulation.

4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation an international approval mark consisting of:

4.4.1. a circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;[2]

4.4.2. the number of this Regulation, to the right of the circle prescribed in paragraph 4.4.1.

4.5. If the vehicle conforms to a vehicle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.4.1. need not be repeated; in such a case the additional numbers and symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.4.1.

4.6. The approval mark shall be clearly legible and be indelible.

4.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.

4.8. Annex 2 to this Regulation gives examples of arrangements of the approval mark.

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[2] 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech and Slovak Federal Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (Vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal and 22 for the Russian Federation; subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

5. SPECIFICATIONS

5.1. Definitions (see annex 3)

5.1.1. The H point is a reference point as defined in paragraph 2.3. of annex 4 of this Regulation, which must be determined in accordance with the procedure set out in that annex.

5.1.1.1. Point H' is a reference point corresponding to H as defined in paragraph 5.1.1. which shall be determined for every normal position in which the seat is used.

5.1.1.2. The R point is the seating reference point defined in paragraph 2.4. of annex 4 of this Regulation.

5.1.2. The three-dimensional reference system is defined in appendix 2 of annex 4 of this Regulation.

5.1.3. Points L_1 and L_2 are the lower effective belt anchorages.

5.1.4. Point C is a point situated 450 mm vertically above the R point. However, if the distance S as defined in paragraph 5.1.6. is not less than 280 mm and if the alternative formula BR = 260 mm + 0.8S specified in paragraph 5.4.3.3. is chosen by the manufacturer, the vertical distance between C and R shall be 500 mm.

5.1.5. The angles α_1 and α_2 are respectively the angles between a horizontal plane and planes perpendicular to the median longitudinal plane of the vehicle and passing through the point H_1 and the points L_1 and L_2.

5.1.6. S is the distance in millimetres of the effective upper belt anchorages from a reference plane P parallel to the longitudinal median plane of the vehicle defined as follows:

5.1.6.1. If the seating position is well-defined by the shape of the seat, the plane P shall be the median plane of this seat.

5.1.6.2. In the absence of a well-defined position:

5.1.6.2.1. The plane P for the driver's seat is a vertical plane parallel to the median longitudinal plane of the vehicle which passes through the centre of the steering-wheel in the plane of the steering-wheel rim when the steering-wheel, if adjustable, is in its central position.

5.1.6.2.2. The plane P for the front outboard passenger shall be symmetrical with that of the driver.

5.1.6.2.3. The plane P for the rear outboard seating position shall be that specified by the manufacturer on condition the following limits for distance A between the longitudinal median plane of the vehicle and plane P are respected:

A is equal or more than 200 mm if the bench seat has been designed to accommodate two passengers only,

A is equal or more than 300 mm if the bench seat has been designed to accommodate more than two passengers.

5.2. General specifications

5.2.1. Anchorages for safety-belts shall be so designed, made and situated as to:

5.2.1.1. enable the installation of a suitable safety-belt. The belt anchorages of the front outboard positions shall be suitable for safety-belts incorporating a retractor and pulley, taking into consideration in particular the strength characteristics of the belt anchorages, unless the manufacturer supplies the vehicle equipped with other types of safety-belts which incorporate retractors. If the anchorages are

suitable only for particular types of safety-belts, these types shall be stated on the form mentioned in paragraph 4.3. above;

5.2.1.2. reduce to a minimum the risk of the belt's slipping when worn correctly;

5.2.1.3. reduce to a minimum the risk of strap damage due to contact with sharp rigid parts of the vehicle or seat structures;

5.2.1.4. enable the vehicle, in normal use, to comply with the provisions of this Regulation;

5.2.1.5. for anchorages which take up different positions to allow persons to enter the vehicle and to restrain the occupants, the specifications of this Regulation shall apply to the anchorages in the effective restraint position.

5.3. Minimum number of belt anchorages to be provided

5.3.1. Any vehicle in categories M and N (except those vehicles which include places specially designed for standing passengers in categories M_2 over 3.5 t and M_3) must be equipped with safety-belt anchorages which satisfy the requirements of this Regulation.

5.3.2. The minimum number of safety-belt anchorages for each forward directed seating position shall be those specified in annex 6.

5.3.3. However, for outboard seating positions, other than front, of vehicles of category M_1, shown in annex 6 and marked with the symbol ϕ, two lower anchorages are allowed, where there exists a passage between a seat and the nearest side-wall of the vehicle intended to permit access of passengers to other parts of the vehicle.

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

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

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

5.3.5. For all seating positions shown in annex 6 and marked with the symbol #, each exposed seating position as defined in paragraph 5.3.6. must be equipped with two lower anchorages.

5.3.6. An "exposed seating position" is one where there is no "protective screen" in front of the seat within the following defined space:

between two horizontal planes, one through the H-point and the other 400 mm above it;

between two vertical longitudinal planes which are symmetrical in relation to the H-point and are 400 mm apart;

behind a transverse vertical plane 1.30 m from the H-point.

For the purpose of this requirement "protective screen" means a surface of suitable strength and showing no discontinuity such that, if a sphere of 165 mm diameter is geometrically projected in a

longitudinal horizontal direction through any point of the space defined above and through the centre of the sphere, nowhere in the protective screen is there any aperture through which the geometric projection of the sphere can be passed.

A seat is considered to be an "exposed seating position" if the protective screens within the space defined above have a combined surface area of less than 800 cm^2.

5.3.7. For all folding seats, as well as all the seats of any vehicle which are not covered by paragraphs 5.3.1. to 5.3.5., no belt anchorages are required. However, if the vehicle is fitted with anchorages for such seats, these anchorages must comply with the provisions of this Regulation. In this case, two lower anchorages shall be sufficient.

5.4. Location of belt anchorages (see annex 3, fig.1.)

5.4.1. General

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

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

5.4.2. Location of the effective lower belt anchorage

5.4.2.1. Front seats, vehicle category M_1

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

5.4.2.2. Rear seats, vehicle category M_1

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

5.4.2.3. Front seats, vehicle categories other than M_1

In motor vehicles of categories other than M_1 the angles α_1 and α_2 must be between 30 and 80 degrees for all normal travelling positions of the front seats. Where in the case of front seats of vehicles having a maximum vehicle mass not exceeding 3.5 tonnes at least one of the angles α_1 and α_2 is constant in all normal positions of use, its value shall be 60 ± 10° (e.g. anchorage fixed at the seat).

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

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

bench seats,

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

other rear seats

angles α_1 and α_2 may be between 20° and 80° in any normal position of use. Where in the case of front seats of vehicles having a maximum vehicle mass not exceeding 3.5 tonnes at least one of the angles α_1 and α_2 is constant in all normal positions of use, its value shall be 60 ± 10° (e.g. anchorage fixed at the seat).

5.4.2.5. The distance between the two vertical planes parallel to the median longitudinal plane of the vehicle and each passing through a different one of the two effective lower belt anchorages L_1 and L_2 of the same seat-belt shall not be less than 350 mm. The median longitudinal plane of the seat shall pass between points L_1 and L_2 and shall be at least 120 mm from these points.

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

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

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

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

XJ_1: a segment perpendicular to the plane defined by segments RZ and ZX, measured in a forward direction from point X and 60 mm long.

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

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

5.4.3.2. The effective upper anchorage shall lie below the plane FN, which runs perpendicular to the longitudinal median plane of the seat and makes an angle of 65° with the torso line. The angle may be reduced to 60° in the case of rear seats. The plane FN shall be so placed as to intersect the torso line at a point D such that DR = 315 mm + 1.8 S. However, when S ≤ 200 mm, then DR = 675 mm.

5.4.3.3. The effective upper belt anchorage shall lie behind a plane FK running perpendicular to the longitudinal median plane of the seat and intersecting the torso line at an angle of 120° at a point B such that BR = 260 mm + S. Where S ≥ 280 mm, the manufacturer may use BR = 260 mm + 0.8S at his discretion.

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

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

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

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

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

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

5.4.3.7.3. The anchorage(s) is/are intended for a harness belt, complies/comply with the requirements laid down in paragraph 5.4.3.6. if it lie(s) behind the transverse plane passing through the reference line and is/are located:

5.4.3.7.3.1. In the case of a single anchorage, within the area common to two dihedrals defined by the verticals passing through points J_1 and J_2 as defined in paragraph 5.4.3.1. and whose horizontal sections are shown in figure 2 of annex 3 of this Regulation;

5.4.3.7.3.2. In the case of two anchorages, within whichever of the above defined dihedrals is suitable, provided that each anchorage is not more than 50 mm distant from the symmetrically-located, mirror-image position of the other anchorage about plane P, as defined in paragraph 5.1.6. of the seat in question.

5.5. Strength of anchorages

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

5.5.2. In vehicles where these anchorages are used, the displacement and release systems which enable all the occupants to leave the vehicle shall be capable of being actuated manually after the tractive force has ceased.

5.6. Dimensions of threaded anchorage holes

5.6.1. An anchorage shall have a threaded hole of 7/16 inch (20 UNF 2B).

5.6.2. If the vehicle is fitted by the manufacturer with safety-belts which are attached to all anchorages prescribed for the seat in question, these anchorages need not meet the requirement set out in paragraph 5.6.1., provided that they comply with the other provisions of this Regulation. In addition, the requirement set out in paragraph 5.6.1. shall not apply to additional anchorages which meet the requirement set out in paragraph 5.4.3.7.3.

5.6.3. It shall be possible to remove the safety-belt without damaging the anchorage.

6. TESTS

6.1. General

6.1.1. Subject to application of the provisions of paragraph 6.2., and at the request of the manufacturer;

6.1.1.1. the tests may be carried out either on a vehicle structure or on a completely finished vehicle;

6.1.1.2. windows and doors may be fitted or not and closed or not;

6.1.1.3. any fitting normally provided and likely to contribute to the rigidity of the vehicle structure may be fitted.

6.1.2. The seats shall be fitted and placed in the position for driving or use chosen by the technical service responsible for conducting approval tests to give the most adverse conditions with respect to the strength of the system. The position of the seats shall be stated in the report. The seat-back shall, if its inclination is adjustable, be locked as specified by the manufacturer or, in the absence of any such

specification, in a position corresponding to an effective seat-back angle as close as possible to 25° for vehicles of categories M_1 and N_1 and to 15° for vehicles of all other categories.

6.2. Securing of the vehicle

6.2.1. The method used to secure the vehicle during the test shall not be such as to strengthen the anchorages or the anchorage areas or to lessen the normal deformation of the structure.

6.2.2. A securing device shall be regarded as satisfactory if it produces no effect on an area extending over the whole width of the structure and if the vehicle or the structure is blocked or fixed in front at a distance of not less than 500 mm from the anchorage to be tested and is held or fixed at the rear not less than 300 mm from that anchorage.

6.2.3. It is recommended that the structure should rest on supports arranged approximately in line with the axes of the wheels or, if that is not possible, in line with the points of attachment of the suspension.

6.2.4. If a securing method other than that prescribed in paragraphs 6.2.1. - 6.2.3. of this Regulation is used, evidence must be furnished that it is equivalent.

6.3. General test requirements

6.3.1. All the belt anchorages of the same group of seats shall be tested simultaneously.

6.3.2. The tractive force shall be applied in a forward direction at an angle of 10° ± 5° above the horizontal in a plane parallel to the median longitudinal plane of the vehicle.

6.3.3. Full application of the load shall be achieved as rapidly as possible. The belt anchorages must withstand the specified load for not less than 0.2 second.

6.3.4. Traction devices to be used in the tests described in paragraph 6.4. below are shown in annex 5.

6.3.5. The belt anchorages for seats for which upper belt anchorages are provided shall be tested under the following conditions:

6.3.5.1. Front Outboard Seats:

The belt anchorages shall be submitted to the test prescribed in paragraph 6.4.1. in which the loads are transmitted to them by means of a device reproducing the geometry of a three-point belt equipped with a retractor having a pulley or strap guide at the upper belt anchorage. In addition, if the number of anchorages is more than that prescribed in paragraph 5.3. these anchorages shall be subjected to the test specified in paragraph 6.4.5., in which the loads shall be transmitted to the anchorages by means of a device reproducing the geometry of the type of safety-belt intended to be attached to them.

6.3.5.1.1. In the case where the retractor is not attached to the required outboard lower belt anchorage or in the case where the retractor is attached to the upper belt anchorage, the lower belt anchorages shall also be submitted to the test prescribed in paragraph 6.4.3.

6.3.5.1.2. In the above case the tests prescribed in paragraphs 6.4.1. and 6.4.3. can be performed on two different structures if the manufacturer so requests.

6.3.5.2. Rear outboard seats and all centre seats:

The belt anchorages shall be subjected to the test prescribed in paragraph 6.4.2. in which the loads are transmitted to them by means of a device reproducing the geometry of a three-point safety-belt without a retractor, and to the test prescribed in paragraph 6.4.3. in which the loads are transmitted to the two lower belt anchorages by means of a device reproducing the geometry of a lap belt. The two tests can be performed on two different structures if the manufacturer so requests.

6.3.5.3. When a manufacturer supplies his vehicle with safety-belts, the corresponding belt anchorages may, at the request of the manufacturer, be submitted only to a test in which the loads are transmitted to them by means of a device reproducing the geometry of the type of belts to be attached to these anchorages.

6.3.6. If no upper belt anchorages are provided for the outboard seats and the centre seats, the lower belt anchorages shall be submitted to the test prescribed in paragraph 6.4.3. in which the loads are transmitted to these anchorages by means of a device reproducing the geometry of a lap belt.

6.3.7. If the vehicle is designed to accept other devices which do not enable the straps to be directly attached to belt anchorages without intervening sheaves, etc. or which require belt anchorages supplementary to those mentioned in paragraph 5.3., the safety-belt or an arrangement of wires, sheaves, etc. representing the equipment of the safety-belt, shall be attached by such a device to the belt anchorages in the vehicle and the belt anchorages shall be subjected to the tests prescribed in paragraph 6.4. as appropriate.

6.3.8. A test method other than those prescribed in paragraph 6.3. may be used, but evidence must be furnished that it is equivalent.

6.4. Particular test requirements

6.4.1. Test in configuration of a three point belt incorporating a retractor having a pulley or strap guide at the upper belt anchorage

6.4.1.1. A special pulley or guide for the wire or strap appropriate to transmit the load from the traction device, or the pulley or strap guide supplied by the manufacturer shall be fitted to the upper belt anchorage.

6.4.1.2. A test load of 1350 daN ± 20 daN shall be applied to a traction device (see annex 5, figure 2) attached to the belt anchorages of the same belt, by means of a device reproducing the geometry of the upper torso strap of such a safety-belt. In the case of vehicles of categories other than M_1 and N_1, the test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.

6.4.1.3. At the same time a tractive force of 1350 daN ± 20 daN shall be applied to a traction device (see annex 5, figure 1) attached to the two lower belt anchorages. In the case of vehicles of categories other than M_1 and N_1, the test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.

6.4.2. Test in configuration of a three-point belt without retractor or with a retractor at the upper belt anchorage

6.4.2.1. A test load of 1350 daN ± 20 daN shall be applied to a traction device (see annex 5, figure 2) attached to the upper belt anchorage and to the opposite lower belt anchorage of the same belt, using, if supplied by the manufacturer, a retractor fixed at the upper belt anchorage. In the case of vehicles of categories other than M_1 and N_1, the test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.

6.4.2.2. At the same time a tractive force of 1350 daN ± 20 daN shall be applied to a traction device (see annex 5, figure 1) attached to the lower belt anchorages. In the case of vehicles of categories other than M_1 and N_1, the test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.

6.4.3. Test in configuration of a lap belt

A test load of 2225 daN ± 20 daN shall be applied to a traction device (see annex 5, figure 1) attached to the two lower belt anchorages. In the case of vehicles of categories other than M_1 and N_1, the test load shall be 1110 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 740 ± 20 daN.

6.4.4. Test for belt anchorages located wholly within the seat structure or dispersed between the vehicle structure and the seat structure

6.4.4.1. The test specified in paragraphs 6.4.1., 6.4.2. and 6.4.3. above shall be performed, as appropriate, at the same time superimposing for each seat and for each group of seats a force as stated below.

6.4.4.2. The loads indicated in paragraphs 6.4.1., 6.4.2. and 6.4.3. above shall be supplemented by a force equal to 20 times the mass of the complete seat applied horizontally and longitudinally through the centre of gravity of the seat.

In the case of vehicles in categories M_2 and N_2, this force must be equal to 10 times the mass of the complete seat; for categories M_3 and N_3 it must be equal to 6.6 times the mass of the complete seat.

6.4.5. Test in configuration of a special-type belt

6.4.5.1. A test load of 1350 ± 20 daN shall be applied to a traction device (see annex 5, figure 2) attached to the belt anchorages of such a safety-belt by means of a device reproducing the geometry of the upper torso strap or straps.

6.4.5.2. At the same time, a tractive force of 1350 ± 20 daN shall be applied to a traction device (see annex 5, figure 3) attached to the two lower belt anchorages.

6.4.5.3. In the case of vehicles of categories other than M_1 and N_1, this test load shall be 675 ± 20 daN, except that for M_3 and N_3 vehicles the test load shall be 450 ± 20 daN.

7. INSPECTION AFTER TESTING

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

8. MODIFICATIONS AND EXTENSION OF APPROVAL OF THE VEHICLE TYPE

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

8.1.1. consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the vehicle still complies with the requirements; or

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

8.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 4.3. above to the Parties to the Agreement which apply this Regulation.

8.3. The competent authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation.

9. CONFORMITY OF PRODUCTION

9.1. Every vehicle bearing an approval mark as prescribed under this Regulation shall conform to the vehicle type approved with regard to details affecting the characteristics of the anchorages.

9.2. In order to verify conformity as prescribed in paragraph 9.1. above, a sufficient number of serially-produced vehicles bearing the approval mark required by this Regulation shall be subjected to random checks.

9.3. As a general rule the checks as aforesaid shall be confined to the taking of measurements. However, if necessary, the vehicles shall be subjected to some of the tests described in paragraph 6. above, selected by the technical service conducting approval tests.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

10.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 9.1. above is not complied with or if its anchorages fail to pass the checks prescribed in paragraph 9. above.

10.2. If a Contracting Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in annex 1 to this Regulation.

11. OPERATING INSTRUCTIONS

The national authorities may require the manufacturers of vehicles registered by them to state clearly in the instructions for operating the vehicle

11.1. where the anchorages are; and

11.2. for what types of belts the anchorages are intended (see annex 1, item 5).

12. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of safety-belt anchorages approved in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication that authority shall inform thereof the other Parties to the 1958 Agreement which apply this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation.

13. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

The Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension, or refusal or extension or withdrawal of approval, issued in other countries, are to be sent.

14. TRANSITIONAL PROVISIONS

14.1. As from the date of entry into force of this Regulation, as amended by the 03 series of amendments, no Contracting Party shall refuse to grant approvals under this Regulation as amended by the 03 series of amendments.

14.2. As from 1 July 1992, Contracting Parties applying this Regulation shall grant approvals only if the vehicle type approved meets the requirements of this Regulation as amended by the 03 series of amendments.

14.3. As from 1 July 1997, Contracting Parties applying this Regulation may refuse to recognize approvals which were not granted in accordance with the 03 series of amendments to this Regulation.

Annex 1

COMMUNICATION

(maximum format: A4 (210 x 297 mm)

E 1/

Issued by: Name of administration
.....
.....
.....

concerning: 2/ APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

of a vehicle type with regard to safety-belt anchorages pursuant to Regulation No. 14

Approval No: ..... Extension No: .....

1. Trade name or mark of the power-driven vehicle .....

2. Type of vehicle .....

3. Manufacturer's name and address .....

4. If applicable, name and address of manufacturer's representative .....

.....

5. Designation of the type of belts and retractors authorized for fitting to the anchorages with which the vehicle is equipped:

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

*/ Insert in the actual position the following letter(s):
"A" for a three-point belt,
"B" for lap belts,
"S" for special-type belts; in this case the type shall be stated under "Remarks",
"Ar", "Br" or "Sr" for belts with retractors,
"Ae", "Be" or "Se" for belts with an energy absorption device,
"Are", "Bre" or "Sre" for belts with retractors and energy-absorption devices on at least one anchorage.

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

2/ Strike out what does not apply.

Remarks: .....

.....

6. 3/ Description of seats .....

7. 3/ Description of the adjustment, displacement and locking systems either of the seat or of its parts

.....

.....

8. 3/ Description of seat anchorage .....

9. Description of particular type of safety-belt required in the case of an anchorage located in the seat structure or incorporating an energy-dissipating device .....

.....

10. Vehicle submitted for approval on .....

11. Techchnical service responsible for conducting approval tests .....

12. Date of report issued by that service .....

13. Number of report issued by that service .....

14. Approval granted/extended/refused/withdrawn 2/.....

15. Position of approval mark on vehicle .....

16. Place .....

17. Date .....

18. Signature .....

19. The following documents, filed with the administration service which has granted approval and available on request are annexed to this communication:

.... drawings, diagrams and plans of the belt anchorages and of the vehicle structure;

.... photographs of the belt anchorages and of the vehicle structure;

.... drawings, diagrams and plans of the seats, of their anchorage on the vehicle, of the adjustment and displacement systems of the seats and of their parts and of their locking devices; 3/

.... photographs of the seats, of their anchorage, of the adjustment and displacement systems of the seats and of their parts, and of their locking devices. 3/

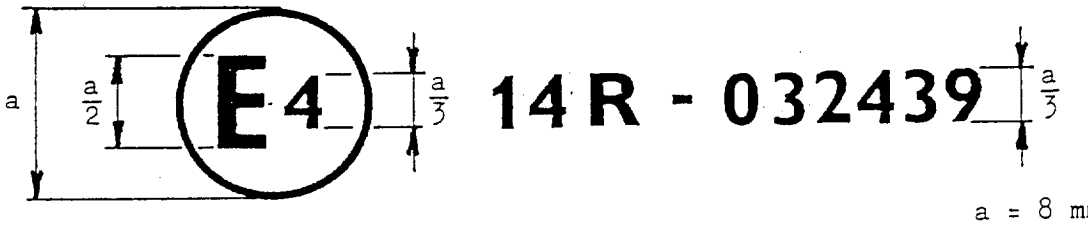
2/ Strike out what does not apply.

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

Annex 2

ARRANGEMENTS OF THE APPROVAL MARK

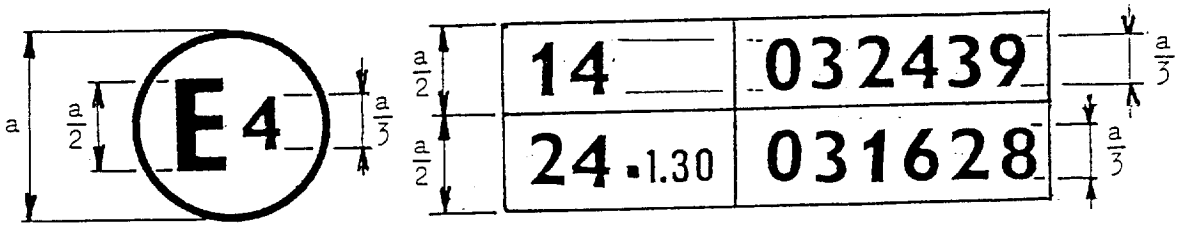
Model A
(see paragraph 4.4. of this Regulation)



a = 8 mm min

The above approval mark affixed to a vehicle shows that the vehicle type concerned has, with regard to safety-belt anchorages, been approved in the Netherlands (E 4), pursuant to Regulation No. 14, under the number 032439. The first two digits of the approval number indicate that Regulation No. 14 already included the 03 series of amendments when the approval was given.

Model B
(see paragraph 4.5. of this Regulation)



a = 8 mm min

The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos. 14 and 24. */ (In the case of the latter Regulation the corrected absorption co-efficient is 1.30 m^{-1}). The approval numbers indicate that on the dates on which these approvals were granted Regulations Nos. 14 and 24 included the 03 series of amendments.

*/ The second number is given merely as an example.

Annex 3

LOCATION OF EFFECTIVE BELT ANCHORAGES

Figure 1 : AREAS OF LOCATION OF EFFECTIVE BELT ANCHORAGES

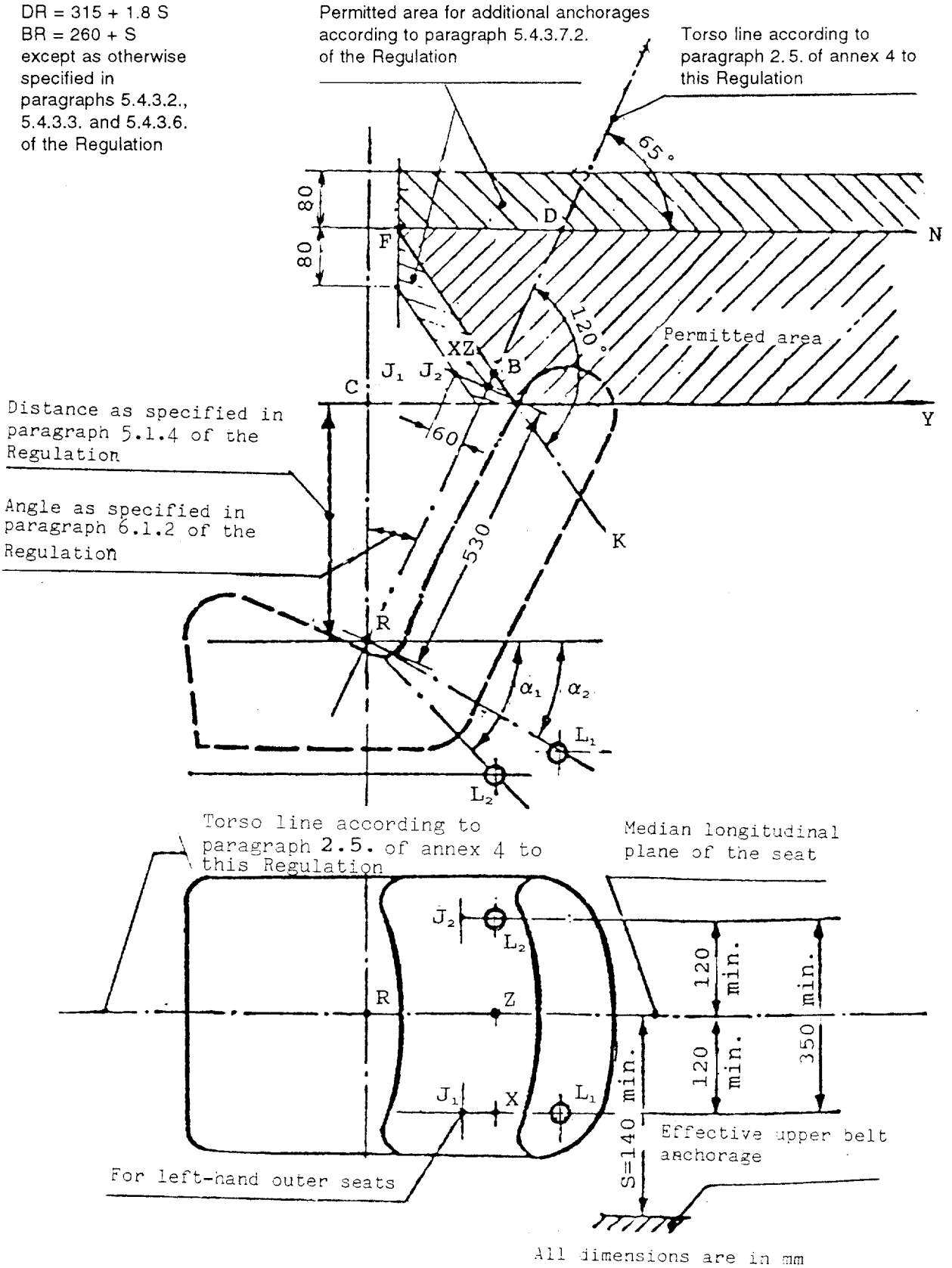
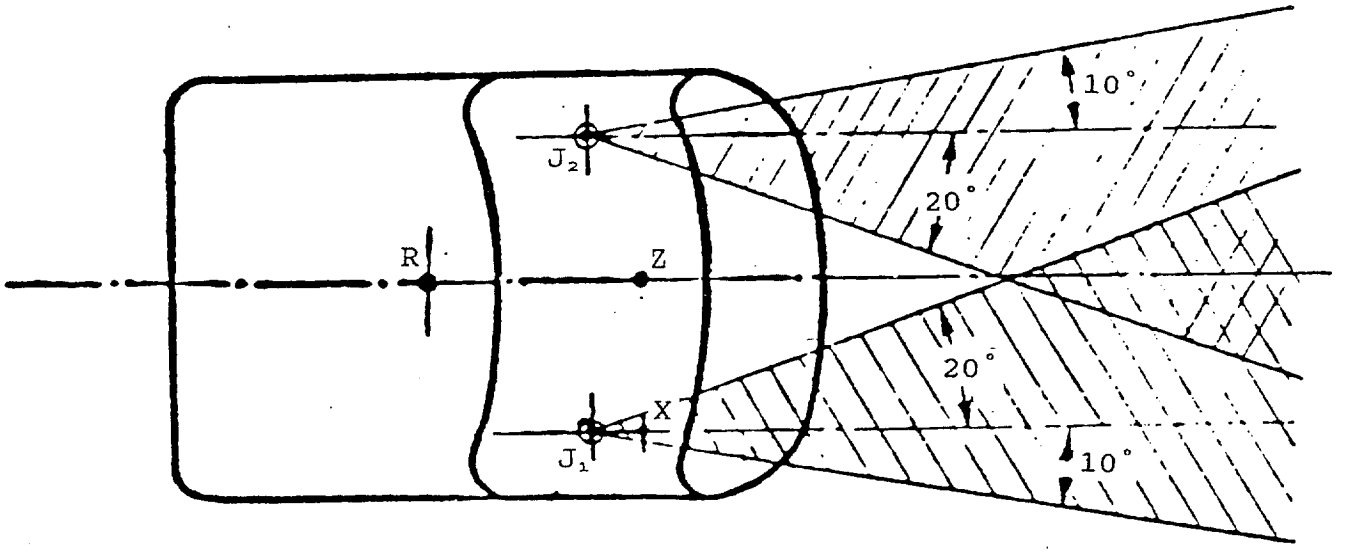


Figure 2 : EFFECTIVE UPPER ANCHORAGES
conforming to paragraph 5.4.3.7.3. of the Regulation



Annex 4

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

1. PURPOSE

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

2. DEFINITIONS

For the purposes of this annex:

2.1. "Reference data" means one or several of the following characteristics of a seating position:

2.1.1. the "H" point and the "R" point and their relationship,

2.1.2. the actual torso angle and the design torso angle and their relationship.

2.2. "Three-dimensional 'H' point machine" (3-D H machine) means the device used for the determination of "H" points and actual torso angles. This device is described in appendix 1 to this annex;

2.3. "'H' point" means the pivot centre of the torso and the thigh of the 3-D H machine installed in the vehicle seat in accordance with paragraph 4 below. The "H" point is located in the centre of the centreline of the device which is between the "H" point sight buttons on either side of the 3-D H machine. The "H" point corresponds theoretically to the "R" point (for tolerances see paragraph 3.2.2. below). Once determined in accordance with the procedure described in paragraph 4, the "H" point is considered fixed in relation to the seat-cushion structure and to move with it when the seat is adjusted;

2.4. "'R' point" or "seating reference point" means a design point defined by the vehicle manufacturer for each seating position and established with respect to the three-dimensional reference system;

2.5. "Torso-line" means the centreline of the probe of the 3-D H machine with the probe in the fully rearward position;

2.6. "Actual torso angle" means the angle measured between a vertical line through the "H" point and the torso line using the back angle quadrant on the 3-D H machine. The actual torso angle corresponds theoretically to the design torso angle (for tolerances see paragraph 3.2.2. below):

2.7. "Design torso angle" means the angle measures between a vertical line through the "R" point and the torso line in a position which corresponds to the design position of the seat-back established by the vehicle manufacturer;

2.8. "Centreplane of occupant" (C/LO) means the median plane of the 3-D H machine positioned in each designated seating position; it is represented by the co-ordinate of the "H" point on the "Y" axis. For individual seats, the centreplane of the seat coincides with the centreplane of the occupant. For other seats, the centreplane of the occupant is specified by the manufacturer;

2.9. "Three-dimensional reference system" means a system as described in appendix 2 to this annex;

2.10. "Fiducial marks" are physical points (holes, surfaces, marks or indentations) on the vehicle body as defined by the manufacturer;

2.11. "Vehicle measuring attitude" means the position of the vehicle as defined by the co-ordinates of fiducial marks in the three-dimensional reference system.

---

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

3. REQUIREMENTS

3.1. Data presentation

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

3.1.1. the co-ordinates of the "R" point relative to the three-dimensional reference system;

3.1.2. the design torso angle;

3.1.3. all indications necessary to adjust the seat (if it is adjustable) to the measuring position set out in paragraph 4.3. below.

3.2. Relationship between measured data and design specifications

3.2.1. The co-ordinates of the "H" point and the value of the actual torso angle obtained by the procedure set out in paragraph 4. below shall be compared, respectively, with the co-ordinates of the "R" point and the value of the design torso angle indicated by the vehicle manufacturer.

3.2.2. The relative positions of the "R" point and the "H" point and the relationship between the design torso angle and the actual torso angle shall be considered satisfactory for the seating position in question if the "H" point, as defined by its co-ordinates, lies within a square of 50 mm side length with horizontal and vertical sides whose diagonals intersect at the "R" point, and if the actual torso angle is within 5° of the design torso angle.

3.2.3. If these conditions are met, the "R" point and the design torso angle, shall be used to demonstrate compliance with the provisions of this Regulation.

3.2.4. If the "H" point or the actual torso angle does not satisfy the requirements of paragraph 3.2.2. above, the "H" point and the actual torso angle shall be determined twice more (three times in all). If the results of two of these three operations satisfy the requirements, the conditions of paragraph 3.2.3. above shall apply.

3.2.5. If the results of at least two of the three operations described in paragraph 3.2.4. above do not satisfy the requirements of paragraph 3.2.2. above, or if the verification cannot take place because the vehicle manufacturer has failed to supply information regarding the position of the "R" point or regarding the design torso angle, the centroid of the three measured points or the average of the three measured angles shall be used and be regarded as applicable in all cases where the "R" point or the design torso angle is referred to in this Regulation.

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

4.1. The vehicle shall be preconditioned at the manufacturer's discretion, at a temperature of 20 ± 10°C to ensure that the seat material reached room temperature. If the seat to be checked has never been sat upon, a 70 to 80 kg person or device shall sit on the seat twice for one minute to flex the cushion and back. At the manufacturer's request, all seat assemblies shall remain unloaded for a minimum period of 30 min prior to installation of the 3-D H machine.

4.2. The vehicle shall be at the measuring attitude defined in paragraph 2.11. above.

4.3. The seat, if it is adjustable, shall be adjusted first to the rearmost normal driving or riding position, as indicated by the vehicle manufacturer, taking into consideration only the longitudinal adjustment of the seat, excluding seat travel used for purposes other than normal driving or riding positions. Where other modes of seat adjustment exist (vertical, angular, seat-back, etc.) these will then be adjusted to the position specified by the vehicle manufacturer. For suspension seats, the vertical position shall be rigidly fixed corresponding to a normal driving position as specified by the manufacturer.

4.4. The area of the seating position contacted by the 3-D H machine shall be covered by a muslin cotton, of sufficient size and appropriate texture, described as a plain cotton fabric having 18.9 threads per cm^2 and weighing 0.228 kg/m^2 or knitted or non-woven fabric having equivalent characteristics. If test

is run on a seat outside the vehicle, the floor on which the seat is placed shall have the same essential characteristics [2] as the floor of the vehicle in which the seat is intended to be used.

4.5. Place the seat and back assembly of the 3-D H machine so that the centreplane of the occupant (C/LO) coincides with the centreplane of the 3-D H machine. At the manufacturer's request, the 3-D H machine may be moved inboard with respect to the C/LO if the 3-D H machine is located so far outboard that the seat edge will not permit levelling of the 3-D H machine.

4.6. Attach the foot and lower leg assemblies to the seat pan assembly, either individually or by using the T-bar and lower leg assembly. A line through the "H" point sight buttons shall be parallel to the ground and perpendicular to the longitudinal centreplane of the seat.

4.7. Adjust the feet and leg positions of the 3-D H machine as follows:

4.7.1. Designated seating position: driver and outside front passenger

4.7.1.1. Both feet and leg assemblies shall be moved forward in such a way that the feet take up natural positions on the floor, between the operating pedals if necessary. Where possible the left foot shall be located approximately the same distance to the left of the centreplane of the 3-D H machine as the right foot is to the right. The spirit level verifying the transverse orientation of the 3-D H machine is brought to the horizontal by readjustment of the seat pan if necessary, or by adjusting the leg and foot assemblies towards the rear. The line passing through the "H" point sight buttons shall be maintained perpendicular to the longitudinal centreplane of the seat.

4.7.1.2. If the left leg cannot be kept parallel to the right leg and the left foot cannot be supported by the structure, move the left foot until it is supported. The alignment of the sight buttons shall be maintained.

4.7.2. Designated seating position: outboard rear

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

4.7.3. Other designated seating positions:

The general procedure indicated in paragraph 4.7.1. above shall be followed except that the feet shall be placed as specified by the vehicle manufacturer.

4.8. Apply lower leg and thigh weights and level the 3-D H machine.

4.9. Tilt the back pan forward against the forward stop and draw the 3-D H machine away from the seat-back using the T-bar. Reposition the 3-D H machine on the seat by one of the following methods:

4.9.1. If the 3-D H machine tends to slide rearward, use the following procedure. Allow the 3-D H machine to slide rearward until a forward horizontal restraining load on the T-bar is no longer required i.e. until the seat pan contacts the seat-back. If necessary, reposition the lower leg.

4.9.2. If the 3-D H machine does not tend to slide rearward, use the following procedure. Slide the 3-D H machine rearwards by applying a horizontal rearward load to the T-bar until the seat pan contacts the seat-back (see figure 2 of appendix 1 to this annex).

4.10. Apply a 100 ± 10 N load to the back and pan assembly of the 3-D H machine at the intersection of the hip angle quadrant and the T-bar housing. The direction of load application shall be maintained along a line passing by the above intersection to a point just above the thigh bar housing (see figure 2 of appendix 1 to this annex). Then carefully return the back pan to the seat-back. Care must be exercised throughout the remainder of the procedure to prevent the 3-D H machine from sliding forward.

---

[2] Tilt angle, height difference with a seat mounting, surface texture, etc.

4.11. Install the right and left buttock weights and then, alternately, the eight torso weights. Maintain the 3-D H machine level.

4.12. Tilt the back pan forward to release the tension on the seat-back. Rock the 3-D H machine from side to side through 10° arc (5° to each side of the vertical centreplane) for three complete cycles to release any accumulated friction between the 3-D H machine and the seat.

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

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

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

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

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

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

(a) return the back pan to the seat-back;

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

4.14. Take all measurements:

4.14.1. The co-ordinates of the "H" point are measured with respect to the three-dimensional reference system.

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

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

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

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

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

Annex 4 - Appendix 1

DESCRIPTION OF THE THREE DIMENSIONAL "H" POINT MACHINE */

(3-D H machine)

1. Back and seat pans

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

2. Body and leg elements

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

---

*/ For details of the construction of the 3-D H machine refer to Society of Automobile Engineers (SAE), 400 Commonwealth Drive, Warrendale, Pennsylvania 15096, United States of America.

The machine corresponds to that described in ISO Standard 6549-1980.

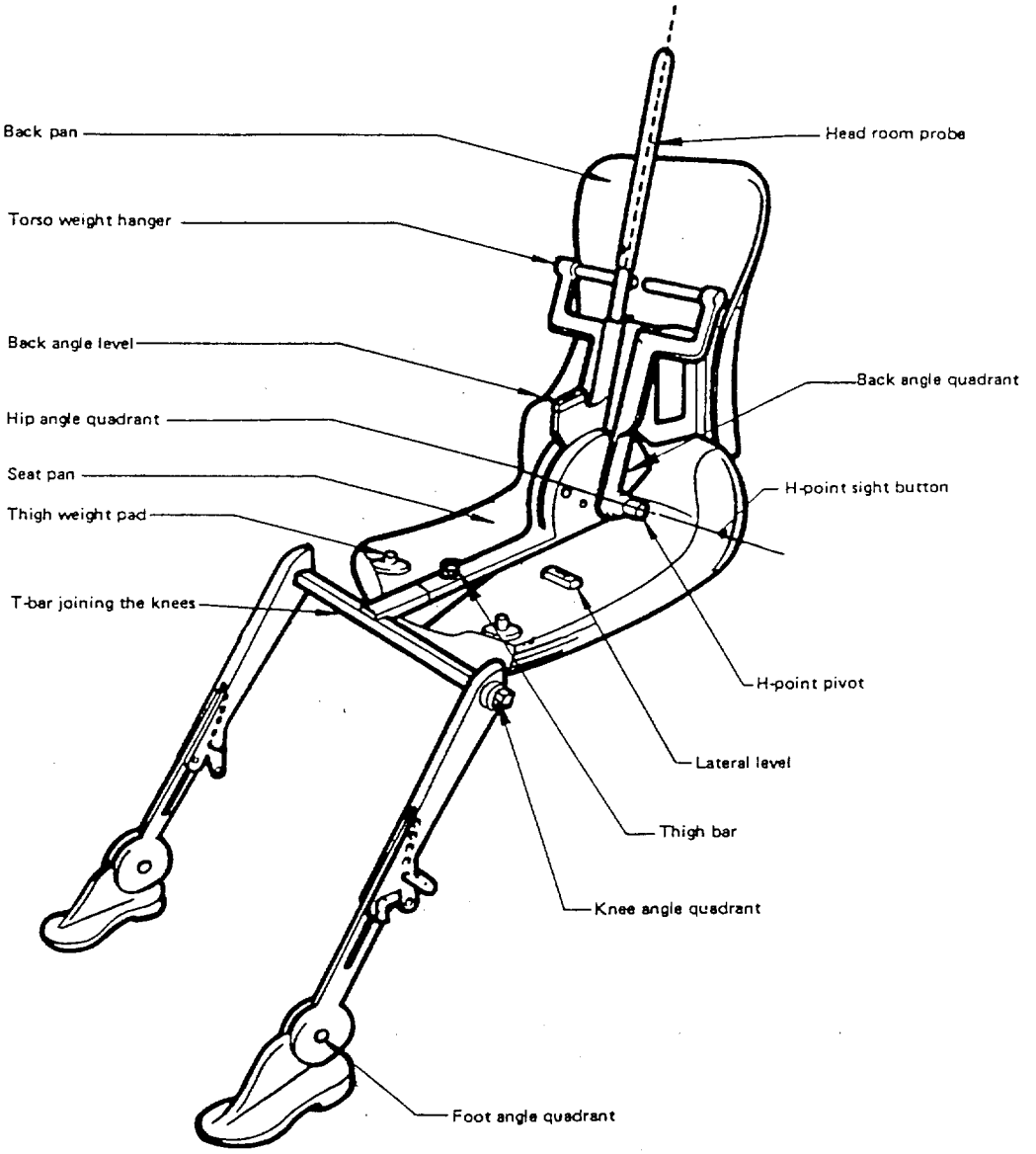


Figure 1 - 3-D H machine elements designation

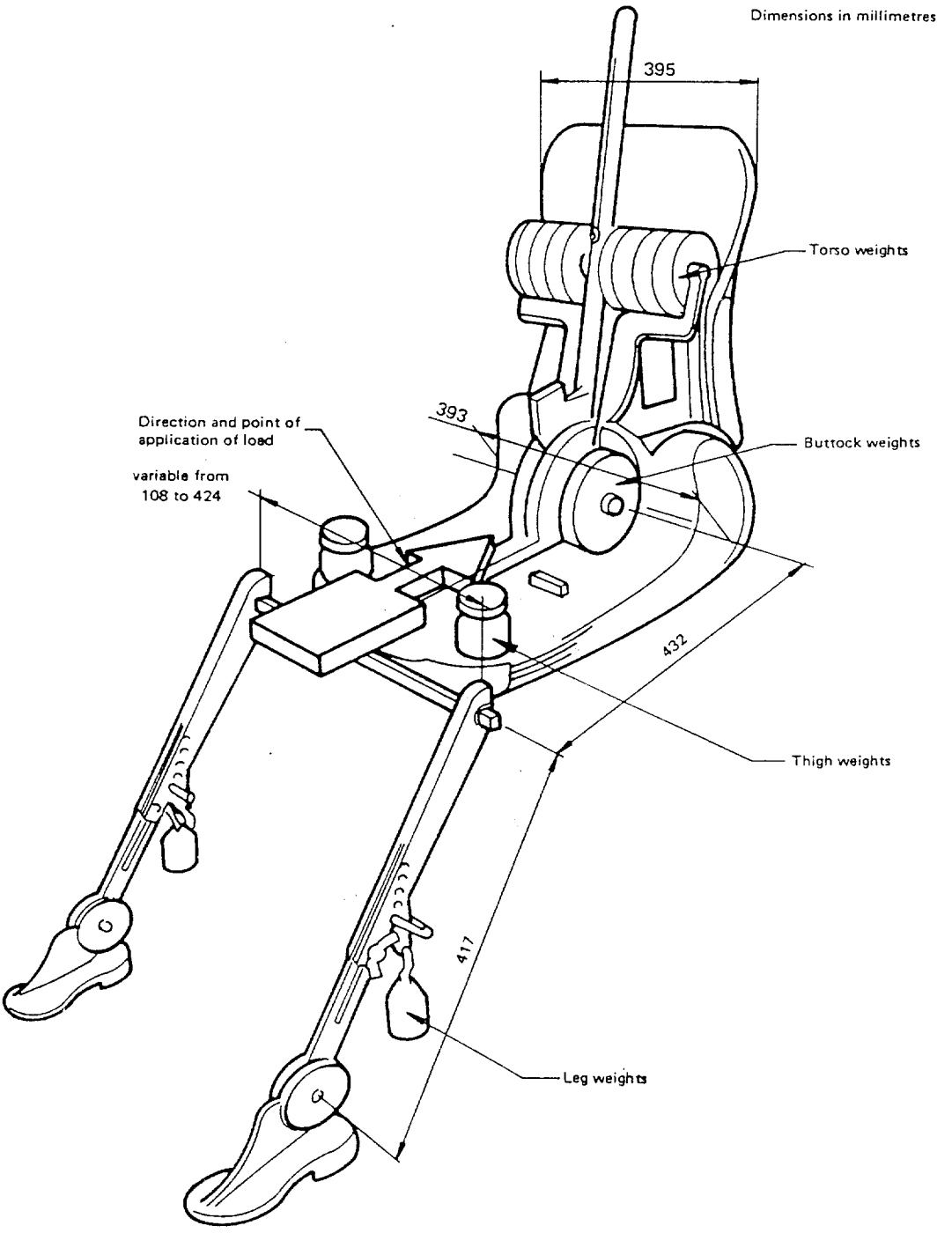


Figure 2 - Dimensions of the 3-D H machine elements and load distribution

Annex 4 - Appendix 2

THREE-DIMENSIONAL REFERENCE SYSTEM

1. The three-dimensional reference system is defined by three orthogonal planes established by the vehicle manufacturer (see figure). */

2. The vehicle measuring attitude is established by positioning the vehicle on the supporting surface such that the co-ordinates of the fiducial marks correspond to the values indicated by the manufacturer.

3. The co-ordinates of the "R" point and the "H" point are established in relation to the fiducial marks defined by the vehicle manufacturer.

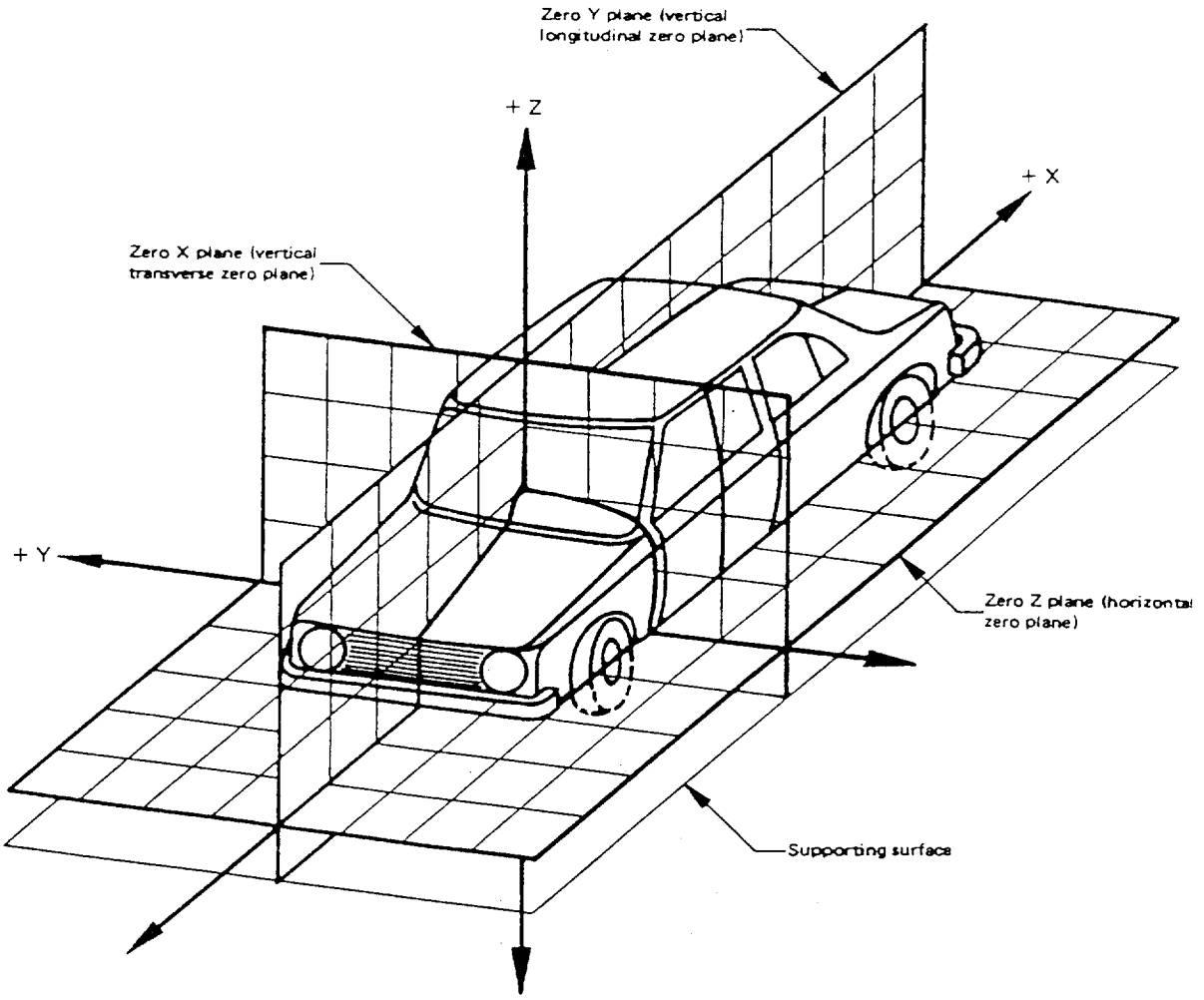


Figure - Three-dimensional reference system

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*/ The reference system corresponds to ISO standard 4130, 1978.

Annex 4 - Appendix 3

REFERENCE DATA CONCERNING SEATING POSITIONS

1. Coding of reference data

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

L = left
C = centre
R = right

2. Description of vehicle measuring attitude

2.1. Co-ordinates of fiducial marks

X .....
Y .....
Z .....

3. List of reference data

3.1. Seating position: .....

3.1.1. Co-ordinates of "R" point

X .....
Y .....
Z .....

3.1.2. Design torso angle: .....

3.1.3. Specifications for seat adjustment */

horizontal : .....
vertical : .....
angular : .....
torso angle: .....

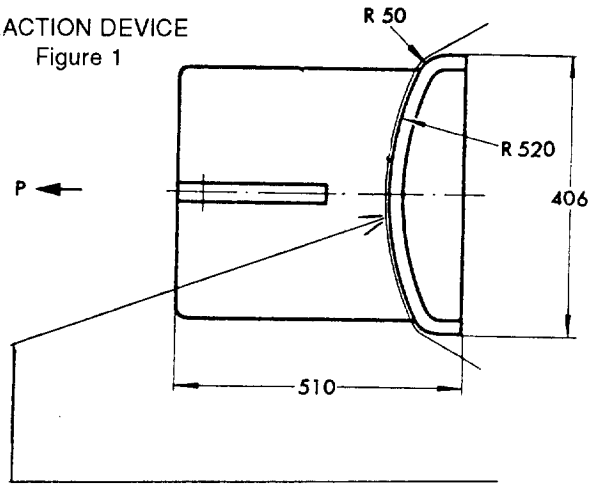
Note: List reference data for further seating positions under 3.2., 3.3., etc.

---

*/ Strike out what does not apply.

Annex 5

TRACTION DEVICE
Figure 1



Cloth-covered foam, thickness 25

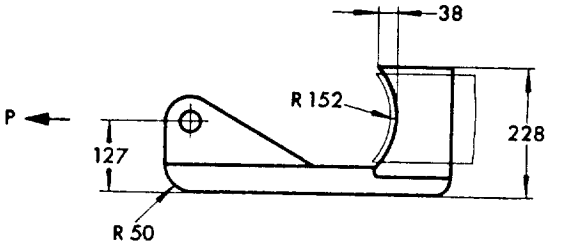
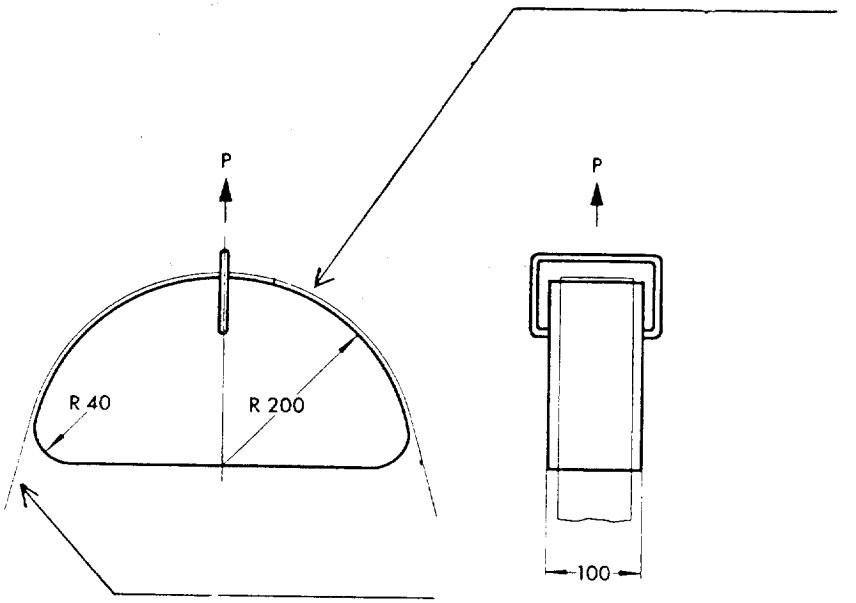


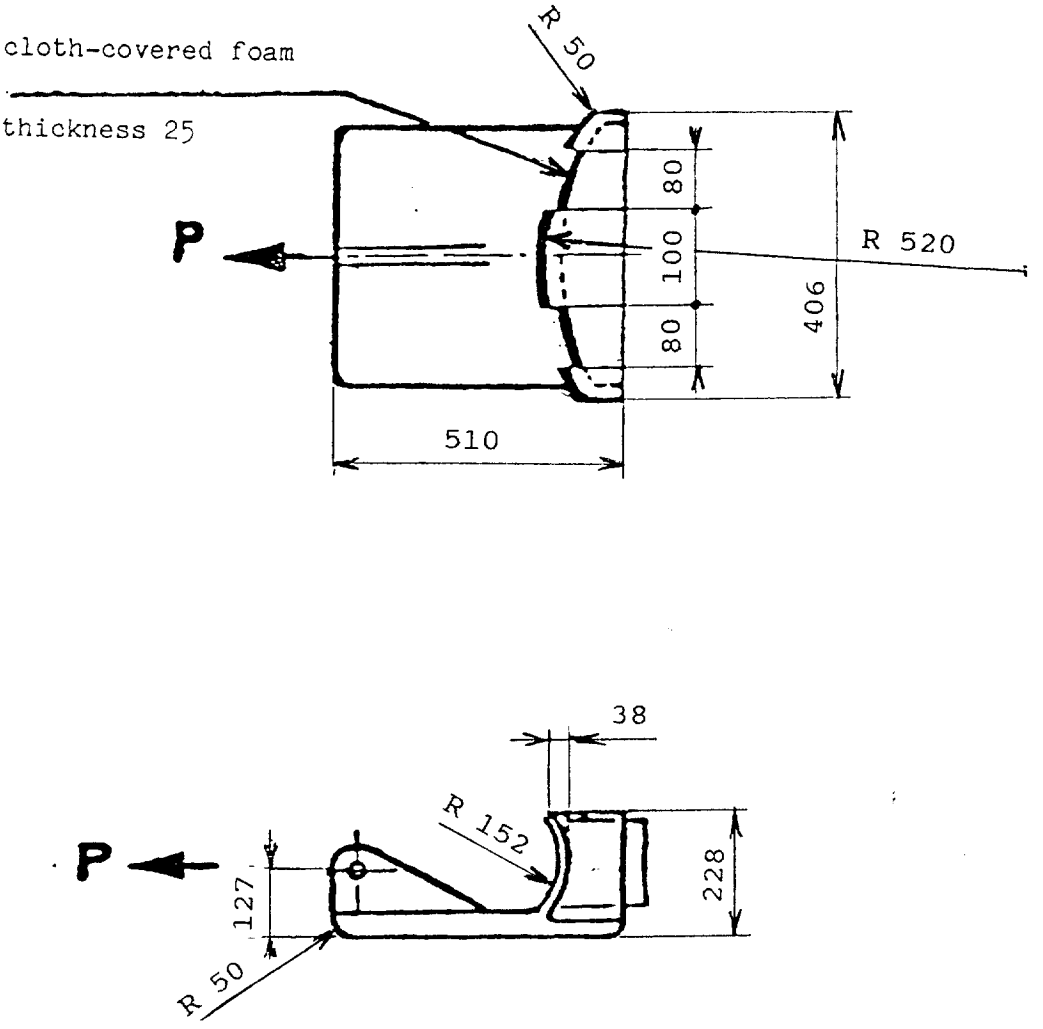
Figure 2

Cloth-covered foam, thickness 25



Strap connecting block to anchorage points
(dimensions in mm)

Figure 3



All dimensions are in mm

Annex 6

MINIMUM NUMBER OF ANCHORAGE POINTS AND LOCATION OF LOWER ANCHORAGES						
VEHICLE CATEGORIES	OUTBOARD SEATING POSITIONS			CENTER SEATING POSITIONS		NOTE
	FRONT		OTHER THAN FRONT	FRONT	OTHER THAN FRONT	
	DRIVER	PASSENGER				
M_1	3	3	ϕ 3	*	2	
$M_2 \leq 3.5$ t	3	3	#	*	#	
$M_2 > 3.5$ t	3	3	#	2	#	
M_3	3	3	#	2	#	
N_1	3	3	#	*	#	
N_2	3	3	#	*	#	
N_3	3	3	#	*	#	

Note: 2 = two lower anchorages which allow the installation of a safety-belt type B
* = refer to paragraph 5.3.4.
\# = refer to paragraphs 5.3.5. and 5.3.6.
3 = two lower anchorages and one upper anchorage which allow the installation of a safety-belt type A
ϕ = refers to paragraph 5.3.3.

Annex 6 - Appendix 1

Location of lower anchorages, angle requirements only : α(°)

	Old requirements		New requirements	
	M_1	other than M_1	M_1	other than M_1
FRONT				
buckle side	30 - 80	30 - 80	45 - 80	30 - 80
other than buckle side	30 - 80	30 - 80	30 - 80	30 - 80
angle constant	50 - 70	30 - 80	50 - 70	50 - 70
bench buckle side other than buckle side	30 - 80	20 - 80	 45 - 80 30 - 80	 20 - 80 20 - 80
adjustable seat with seat back angle < 20°	20 - 80	20 - 80	20 - 80 45 - 80*/	20 - 80
REAR	20- 80	20 - 80	30 - 80	20 - 80
FRONT CENTRE	see FRONT			
REAR CENTRE	see REAR			
FOLDING SEAT	No belt anchorages required. If anchorages are fitted: see angle requirements FRONT and REAR			

*/ "other than buckle side" (α1): 20 - 80°
"buckle side" (α2): 45 - 80°
(both: if angle is not constant, see item 5.4.2.1.).