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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 REAR-VIEW MIRRORS AND OF MOTOR VEHICLES WITH REGARD TO THE INSTALLATION OF REAR-VIEW MIRRORS



UNITED NATIONS

Regulation No. 46

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REAR-VIEW MIRRORS, AND OF
MOTOR VEHICLES WITH REGARD TO THE INSTALLATION OF REAR-VIEW MIRRORS

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Regulation No. 46

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REAR-VIEW MIRRORS,
AND OF MOTOR VEHICLES WITH REGARD TO THE INSTALLATION OF
REAR-VIEW MIRRORS

1. SCOPE

This Regulation applies,

- 1.1. to rear-view mirrors intended to be installed on motor vehicles of categories M and N and to all other motor vehicles having less than four wheels fitted with bodywork which partly or wholly encloses the driver and,
- 1.2. */ to the installation of rear-view mirrors on:
 - 1.2.1. motor vehicles of categories M and N;
 - 1.2.2. all other motor vehicles having less than four wheels when fitted with bodywork which partly or wholly encloses the driver.

I. REAR-VIEW MIRRORS

2. DEFINITIONS

For the purpose of this Regulation,

- 2.1. "Rear-view mirror" means any device intended to give, within the fields of vision defined in paragraph/16.5., a clear view to the rear and side of the vehicle, excluding complex optical systems such as periscopes;
- 2.2. "Interior rear-view mirror" means a device as defined in paragraph 2.1. which can be fitted in the passenger compartment of a vehicle;
- 2.3. "Exterior rear-view mirror" means a device as defined in paragraph 2.1. which can be mounted on the external surface of a vehicle;
- 2.4. "Surveillance rear-view mirror" means a rear-view mirror other than that defined in paragraph 2.1. which can be fitted to the inside or outside of the vehicle in order to provide fields of vision other than those specified in paragraph 16.5.

*/ For motor vehicles not included in categories M and N and all other motor vehicles not fitted with bodywork which partly or wholly encloses the driver the requirements set out in a Regulation which is being prepared and the number of which will be defined later, shall apply.

- 2.5. "Rear-view mirror type" means devices which do not differ in respect of the following main characteristics:
- 2.5.1. the dimensions and radius of curvature of the rear-view mirror reflecting surface,
- 2.5.2. the design, shape or materials of the rear-view mirrors, including the connection with the bodywork;
- 2.6. "Class of rear-view mirrors" means all devices having one or more common characteristics or functions.
- They are classified as follows:
- Class I Interior rear-view mirrors, giving the field of vision defined in paragraph 16.5.2.;
- Classes II "Main" exterior rear-view mirrors, giving the fields and III of vision defined in paragraph 16.5.3.;
- Class IV "Wide-angle" exterior rear-view mirrors, giving the field of vision defined in paragraph 16.5.4.;
- Class V "Close-proximity" exterior rear-view mirrors, giving the field of vision defined in paragraph 16.5.5.;
- 2.7. "r" means the average of the radii of curvature measured over the reflecting surface, in accordance with the method described in annex/7, paragraph/2 to this Regulation;
- 2.8. "Principal radii of curvature at one point obtained on the reflecting surface (ri)" means the values obtained using the apparatus defined in annex 7, measures on the arc of the reflecting surface passing through the centre of the mirror parallel to the segment/b, as defined in paragraph 7.1.2.1., and on the arc perpendicular to this segment;
- 2.9. "Radius of curvature at one point on the reflecting surface (rp)" means the arithmetic average of the principal radii of curvature r_i and r'_i , i.e.:
- $$r_p = \frac{r_i + r'_i}{2}$$
- 2.10. "Centre of the mirror" means the centroid of the visible area of the reflecting surface;
- 2.11. "Radius of curvature of the constituent parts of the rear-view mirror" means the radius "c" of the arc of the circle which most closely approximates to the curved form of the part in question;

2.12. "Vehicle categories M and N" means those defined in paragraphs 5.2.2. and 5.2.3. of Regulation No. 13.

3. APPLICATION FOR APPROVAL

3.1 The application for approval of a type of rear-view mirror shall be submitted by the holder of the trade name or mark or by his duly accredited representative.

3.2. For each class of rear-view mirror the application shall be accompanied by the undermentioned documents in triplicate and by the following particulars:

3.2.1. a technical description, including mounting instructions and specifying the type(s) of vehicles for which the rear-view mirror is intended;

3.2.2. drawings sufficiently detailed to enable:

3.2.2.1. the class to be identified,

3.2.2.2. compliance with the general specifications prescribed in paragraph 6 to be verified,

3.2.2.3. compliance with the dimensions prescribed in paragraph 7.1. to be verified,

3.2.2.4. compliance with the positioning of the spaces provided for the approval mark and prescribed by paragraph 4.2. below to be checked.

3.3. In addition, the application for approval shall be accompanied by four samples of the type of rear-view mirror. At the request of the laboratory, supplementary samples may be required.

3.4. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type-approval is granted.

4. MARKINGS

4.1. The samples of rear-view mirrors submitted for approval shall bear the trade name or mark of the manufacturer; this marking shall be clearly legible and be indelible.

4.2. Every rear-view mirror shall possess on its protective housing a space large enough to accommodate the approval mark, which must be legible when the rear-view mirror has been mounted on the vehicle; this space shall be shown on the drawings referred to in paragraph 3.2.2. above.

5. APPROVAL

- 5.1. If the samples submitted for approval meet the requirements of paragraphs 6 to 8 of this Regulation, approval of the pertinent type of rear-view mirror shall be granted.
- 5.2. An approval number shall be assigned to each type approved. Its first two digits (at present 01, corresponding to the 01 series of amendments which entered into force on 5 October 1987) 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 shall not assign the same number to another type of rear-view mirror.
- 5.3. Notice of approval or of refusal or of extension or withdrawal of approval or of production definitely discontinued of a type of rear-view mirror pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in annex/1 to this Regulation.
- 5.4. There shall be affixed, conspicuously and in the space referred to in paragraph 4.2. above, to every rear-view mirror conforming to a type approved under this Regulation, in addition to the mark prescribed in paragraph 4.1., an international approval mark consisting of:
- 5.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;
1/
- 5.4.2. An approval number;
- 5.4.3. An additional symbol in the form of a figure in Roman numerals.
- 5.5. The approval mark and the additional symbol shall be clearly legible and be indelible.

1/ 1 for the Federal Republic of Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for Czechoslovakia, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 for the German Democratic Republic, 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal and 22 for the Union of Soviet Socialist Republics. 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.

- 5.6. Annex 3 to this Regulation gives an example of the arrangement of the aforesaid approval mark and additional symbol.
6. GENERAL REQUIREMENTS
- 6.1. All rear-view mirrors shall be adjustable.
- 6.2. The edge of the reflecting surface shall be enclosed in a protective housing (holder, etc.) which, on its perimeter, shall have a value of "c" \geq 2.5 mm at all points and in all directions. If the reflecting surface projects beyond the protective housing, the radius of curvature "c" of the edge of the projecting part shall be not less than 2.5 mm and shall return into the protective housing under a force of 50 N applied to the point of greatest projection relative to the protective housing in a horizontal direction approximately parallel to the longitudinal median plane of the vehicle.
- 6.3. When the rear-view mirror is mounted on a plane surface, all its parts, irrespective of the adjustment position of the device, including those parts remaining attached to the protective housing after the test set out in paragraph 8.2., which are in potential static contact with a sphere, either 165 mm in diameter, in the case of interior rear-view mirrors, or 100 mm in diameter, in the case of exterior rear-view mirrors, shall have a radius of curvature "c" of not less than 2.5 mm.
- 6.3.1. Edges of fixing holes or recesses, which are less than 12 mm in width are exempt from the radius requirements of paragraph 6.3. provided they are blunted.
- 6.4. The attachment device on the vehicle shall be so designed that a cylinder with a 50 mm radius, having at its axis the axis, or one of the axes, of pivot or rotation which ensure deflection of the rear-view mirror in the direction of impact concerned, passes through at least part of the surface to which the device is attached.
- 6.5. In the case of exterior rear-view mirrors, the parts referred to in paragraphs 6.2. and 6.3., made of a material with a Shore A hardness not greater than 60, are exempt from the corresponding provisions.
- 6.6. In the case of interior rear-view mirrors, when the parts referred to in paragraphs 6.2. and 6.3. are made of soft material of a hardness less than 50 Shore A, mounted on a rigid support, the prescriptions of paragraphs 6.2. and 6.3. apply only to the support.

7. SPECIAL SPECIFICATIONS

7.1. Dimensions

7.1.1. Interior rear-view mirrors (Class I)

The dimensions of the reflecting surface shall be such that it is possible to inscribe thereon a rectangle having one side of length 4 cm and the other of length "a":

$$a = 15\text{cm} \times \frac{1}{1 + \frac{1\ 000}{r}}$$

7.1.2. Exterior rear-view mirrors (Classes II and III)

7.1.2.1. The dimensions of the reflecting surface shall be such that it is possible to inscribe thereon:

7.1.2.1.1. a rectangle of a height of 4 cm and of base length, in centimetres, "a", and

7.1.2.1.2. a segment parallel to the height of the rectangle and of length, in centimetres, "b".

7.1.2.2. The minimum values of "a" and "b" are given in the table below:

Class of rear-view mirrors	Categories of vehicles for which the rear-view mirrors are designed	a	b
II	M ₂ , M ₃ , N ₂ and N ₃	$\frac{17}{1 + \frac{1\ 000}{r}}$	20
III	M ₁ and N ₁) N ₃ (when the provisions) of paragraph 16.2.1.3.) are applicable)	$\frac{13}{1 + \frac{1\ 000}{r}}$	7

7.1.3. "Wide-angle" exterior rear-view mirrors (Class IV):

The contours of the reflecting surface shall be of simple form and its dimensions such that it provides the field of vision specified in paragraph 16.5.4.

- 7.1.4. "Close-proximity" exterior rear-view mirrors (Class V):
- The contours of the reflecting surface shall be of simple form and its dimensions such that it provides the field of vision specified in paragraph 16.5.5.
- 7.2. Reflecting surface and coefficient of reflection
- 7.2.1. The reflecting surface of a rear-view mirror shall be either flat or spherically convex.
- 7.2.2. Differences between the radii of curvature
- 7.2.2.1. The difference between r_i or r_i' and r_p at each reference point shall not exceed $0.15 r$.
- 7.2.2.2. The difference between any of the radii of curvature (r_{p1} , r_{p2} and r_{p3}) and r shall not exceed $0.15 r$.
- 7.2.2.3. When " r " is not less than 3,00 mm, the value of $0.15 r$ quoted in paragraphs 7.2.2.1. and 7.2.2.2. is replaced by $0.25 r$.
- 7.2.3. The value of " r " shall not be less than:
- 7.2.3.1. 1,200 mm for interior rear-view mirrors (Class I) and "main" exterior rear-view mirrors of Class III.
- 7.2.3.2. 1,800 mm for "main" exterior rear-view mirrors of Class II.
- 7.2.3.3. 400 mm for "wide-angle" exterior rear-view mirrors (Class IV) and "close-proximity" exterior rear-view mirrors (Class V).
- 7.2.4. The value of the normal coefficient of reflection, determined according to the method described in annex 5 to this Regulation, shall not be less than 40%. If the mirror has two positions ("day" and "night"), the "day" position shall allow the colours of the signals used for road traffic to be recognized. The value of the normal coefficient of reflection in the "night" position shall not be less than 4%.
- 7.2.5. The reflecting surface shall retain the characteristics specified in paragraph 7.2.4., in spite of prolonged exposure to adverse weather conditions, in normal conditions of use.
8. TESTS
- 8.1. Rear-view mirrors, other than "close-proximity" exterior rear-view mirrors (Class V), shall be subjected to the tests described in paragraphs 8.2. and 8.3. below.

- 8.1.1.1. The test prescribed in paragraph 8.2. shall not be required for any exterior rear-view mirrors of which no part is less than 2/m from the ground, whatever the adjustment position may be, when the vehicle is under the load corresponding to its maximum technically permissible weight.

This derogation shall also apply where the attachments of rear-view mirrors (attachment plates, arms, swivel joints, etc.) which are situated less than 2 m from the ground do not project beyond the overall width of the vehicle, measured in the transverse vertical plane passing through the lowest rear-view mirror attachment, or any point forward of this plane if the latter configuration gives a greater overall width.

In such cases a description specifying that the rear-view mirror must be mounted so as to conform with the above-mentioned conditions for the positioning of its attachments on the vehicle shall be provided.

Where advantage is taken of this derogation, the arm shall be indelibly marked with the symbol Δ . In addition, the type approval certificate shall be endorsed to this effect.

8.2. Impact test

8.2.1. Description of the test device.

- 8.2.1.1.1. The test device shall consist of a pendulum capable of swinging about two horizontal axes at right angles to each other, one of which is perpendicular to the front plane containing the "release" trajectory of the pendulum. The end of the pendulum shall comprise a hammer formed by a rigid sphere with a diameter of 165 ± 1 mm and having a 5 mm-thick rubber covering of Shore A 50 hardness. A device shall be provided which permits determination of the maximum angle assumed by the arm in the plane of release. There shall be a support firmly fixed to the structure supporting the pendulum which serves to hold the specimens in compliance with the impact requirements stipulated in paragraph 8.2.2.6. below. Figure 1 below gives the dimensions of the test facility and the special design specifications.

- 8.2.1.1.2. The centre of percussion of the pendulum shall coincide with the centre of the sphere which forms the hammer. It is at a distance "1" from the axis of oscillation in the release plane which is equal to $1 \text{ m} \pm 5 \text{ mm}$. The reduced mass of the pendulum to its centre of percussion is $m_0 = 6.8 \pm 0.05$ kg (the relationship between the centre of gravity of the pendulum and its axis of rotation is expressed in the equation:

$$m_0 = m \frac{d}{1}$$

dimensions in mm

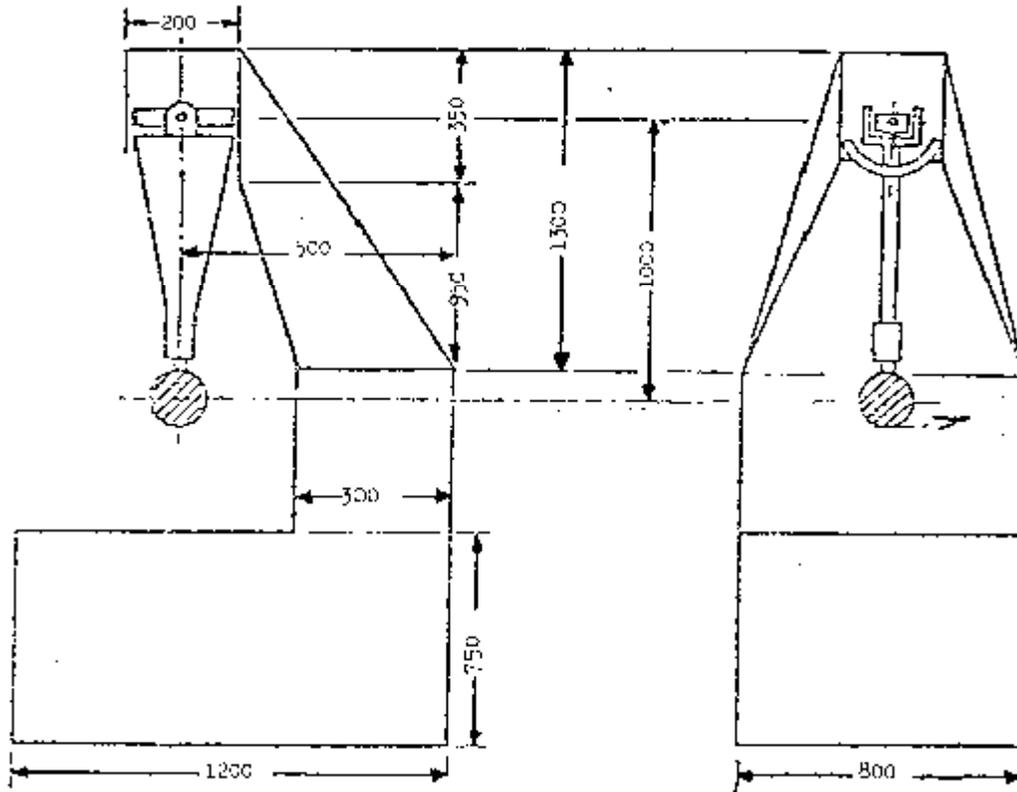


Figure 1

8.2.2. Description of the test.

8.2.2.1. The procedure used to clamp the rear-view mirror to the support shall be that recommended by the manufacturer of the device, or, where appropriate, by the vehicle manufacturer.

8.2.2.2. Positioning the rear-view mirror for the test.

8.2.2.2.1. Rear-view mirrors shall be positioned on the pendulum impact rig such that the axes which are horizontal and vertical when installed on a vehicle in accordance with the vehicle or rear-view mirror manufacturers' mounting instructions, are in a similar position.

8.2.2.2.2. When a rear-view mirror is adjustable in relation to the base, the test position shall be the least favourable for any pivoting device to operate within the limits provided by the mirror or vehicle manufacturer.

8.2.2.2.3. When the rear-view mirror has a device for adjusting its distance from the base, the device shall be set in the position where the distance between the protective housing and the base is shortest.

8.2.2.2.4. When the reflecting surface is mobile in the protective housing, it shall be adjusted so that the upper corner which is furthest from the vehicle, is in the position of greatest projection relative to the protective housing.

8.2.2.3. Except for test 2 for interior rear-view mirrors (paragraph 8.2.2.6.1.) when the pendulum is in a vertical position, the horizontal and longitudinal vertical planes passing through the centre of the hammer, shall pass through the centre of the mirror as defined in paragraph 2.10. The longitudinal direction of oscillation of the pendulum shall be parallel to the longitudinal plane of the vehicle.

8.2.2.4. When, under the conditions governing adjustment prescribed in paragraphs 8.2.2.2.1. and 8.2.2.2.2., parts of the rear-view mirror limit the return of the hammer, the point of impact shall be shifted in a direction perpendicular to the axis of rotation or pivot in question. This displacement shall be that which is strictly necessary for the implementation of the test. It shall be limited in such a way that:

8.2.2.4.1. either the sphere delimiting the hammer intersects the cylinder defined in paragraph 6.4. or remains at least tangential to it;

8.2.2.4.2. or the point of contact of the hammer is located at least 10 mm from the periphery of the reflecting surface.

- 8.2.2.5. The test consists in allowing the hammer to fall from a height corresponding to a pendulum angle of 60° from the vertical so that the hammer strikes the rear-view mirror at the moment when the pendulum reaches the vertical position.
- 8.2.2.6. The rear-view mirrors are subjected to impact in the following different conditions:
- 8.2.2.6.1. Interior rear-view mirrors:
- 8.2.2.6.1.1. Test 1 - The point of impact shall be as defined in paragraph 8.2.2.3. The impact shall be such that the hammer strikes the rear-view mirror on the reflecting surface side.
- 8.2.2.6.1.2. Test 2 - On the edge of the protective housing in such a way that the impact produced makes an angle of 45° with the plane of the mirror and is situated in the horizontal plane passing through the centre of the mirror. The impact is directed in the reflecting surface side.
- 8.2.2.6.2. Exterior rear-view mirrors:
- 8.2.2.6.2.1. Test 1 - The point of impact shall be as defined in paragraphs 8.2.2.3. or 8.2.2.4. The impact shall be such that the hammer strikes the rear-view mirror on the reflecting surface side.
- 8.2.2.6.2.2. Test 2 - The point of impact shall be as defined in paragraphs 8.2.2.3. or 8.2.2.4. The impact shall be such that the hammer strikes the rear-view mirror on the opposite side to the reflecting surface.
- 8.2.2.6.2.3. Where a Class II or III rear-view mirror is attached to the same mounting as a Class IV rear-view mirror, the above-mentioned tests shall be carried out on the lower rear-view mirror.
- Nevertheless, the technical service responsible for testing may, if it deems necessary, repeat one or both of these tests on the upper rear-view mirror if the latter is less than 2/m from the ground.
- 8.3. Bending test on the protective housing fixed to the stem
- 8.3.1. Description of the test.
- 8.3.1.1. The protective housing shall be placed horizontally in a device in such a way that the adjustment parts of the mounting can be clamped securely. In the direction of the greatest dimension of the protective housing, the end nearest the point of fixing on the adjustment part shall be immobilized by means of a fixed stop 15/mm wide, covering the entire width of the protective housing.

- 8.3.1.2. At the other end, a stop identical to the one described above shall be placed on the protective housing so that the specified test load can be applied to it (Figure 2).
- 8.3.1.3. The end of the protective housing opposite that at which the force is applied may be clamped instead of kept in position as shown in Figure 2.
- 8.3.2. The test load shall be 25 kg applied for one minute.

Example of bending test apparatus for rear view mirror protective housings

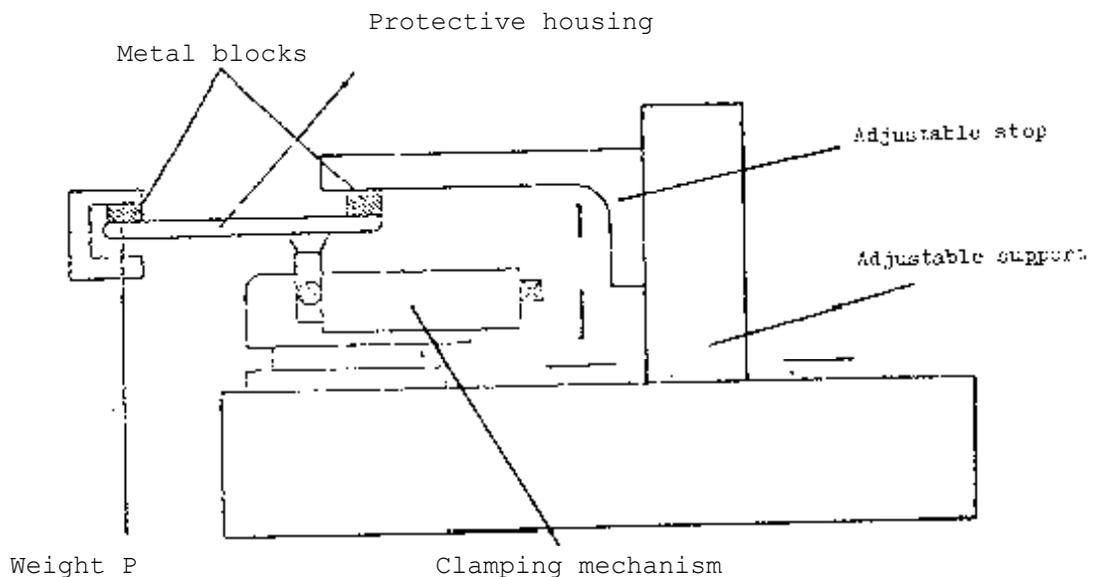


Figure 2

- 8.4. Results of the tests
- 8.4.1. In the tests described in paragraph 8.2., the pendulum shall return in such a way that the projection on the release plane of the position taken by the arm makes an angle of at least 20° with the vertical.
- 8.4.1.1. The accuracy of the angle measurement shall be +1°.

- 8.4.1.2. This requirement is not applicable to rear-view mirrors stuck to the windscreen, in respect of which the requirement stipulated in paragraph 8.4.2. shall be applied after the test.
- 8.4.1.3. The required pendulum angle of return to the vertical is reduced from 20° to 10° for all Class II rear-view mirrors and for Class III rear-view mirrors which are attached to the same mounting as Class IV rear-view mirrors.
- 8.4.2. Should there be a breakage of the mounting of the rear-view mirror during the tests described in paragraph 8.2. for rear-view mirrors stuck to the windscreen, the part remaining shall not project from the base by more than 1 cm and the configuration remaining after the test shall comply with the conditions prescribed in paragraph 6.3.
- 8.4.3. The mirror shall not break during the tests described in paragraphs 8.2. and 8.3. However, breakage of the mirror shall be allowed if one of the following conditions is fulfilled:
- 8.4.3.1. The fragments of glass still adhere to the back of the protective housing or to a surface firmly attached to the protective housing, except that partial separation of the glass from its backing is permitted, provided this does not exceed 2.5/mm either side of the crack. It is permissible for small splinters to become detached from the surface of the glass at the point of impact.
- 8.4.3.2. The mirror is made of safety glass.
9. MODIFICATION OF THE TYPE OF REAR-VIEW MIRROR AND EXTENSION OF APPROVAL
- 9.1. Every type-modification of the rear-view mirror shall be notified to the administrative department which approved the type of rear-view mirror. The department may then either:
- 9.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect, and that in any case the rear-view mirror still complies with the requirements; or
- 9.1.2. Require a further test report from the technical service responsible for conducting the tests.
- 9.2. Confirmation or refusal of approval, specifying the alterations shall be communicated by the procedure specified in paragraph 5.3. above to the Parties to the Agreement which apply this Regulation.
- 9.3. The extension of approval shall be notified to all Parties to the 1958 Agreement applying this Regulation by the procedure set out in paragraph 5.3. above.

9.4. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension.

10. CONFORMITY OF PRODUCTION

10.1. Every rear-view mirror approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set out in paragraphs 6. to 8. above.

10.2. In order to verify that the requirements of paragraph 10.1. are met, suitable checks of the production shall be carried out.

10.3. The holder of the approval shall, in particular:

10.3.1. Ensure existence of procedures for effective quality control of the rear-view mirrors;

10.3.2. Have access to the testing equipment necessary for checking conformity to each approved type;

10.3.3. Ensure that test result data are recorded and that the annexed documents remain available for a period to be determined in agreement with the administrative service;

10.3.4. Analyse the results of each type of test, in order to verify and ensure the consistency of the rear-view mirror characteristics, making allowance for permissible variations in industrial production;

10.3.5. Ensure that for each type of rear-view mirror at least the tests prescribed in annex 9 to this Regulation are carried out;

10.3.6. Ensure that any set of samples or test pieces giving evidence of non-conformity in the type of test in question shall give rise to a further sampling and test. All necessary steps shall be taken to restore conformity of the corresponding production.

10.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applied in each production unit.

10.4.1. At every inspection, the test records and production records shall be presented to the visiting inspector.

10.4.2. The inspector may take samples at random to be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own checks.

- 10.4.3. Where the quality level appears unsatisfactory or it seems necessary to verify the validity of the tests carried out in application of paragraph 10.4.2., the inspector shall select samples to be sent to the technical service which conducted the type-approval tests.
- 10.4.4. The competent authority may carry out any test prescribed in this Regulation.
- 10.4.5. The normal frequency of inspections authorized by the competent authority shall be one per year. In cases where unsatisfactory results are found during one of these inspections, the competent authority shall ensure that all necessary steps are taken to restore conformity of production as rapidly as possible.

11. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 11.1. The approval granted in respect of a type of rear-view mirror pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 10.1. above is not complied with or if the type of rear-view mirror did not satisfy the requirements prescribed in paragraph 10.2. above.
- 11.2. If a 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 copy of the approval form bearing at the end, in large letters, the signed and dated annotation "APPROVAL WITHDRAWN".

12. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of rear-view mirror 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 Agreement applying this Regulation by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation "PRODUCTION DISCONTINUED".

II. INSTALLATION OF REAR-VIEW MIRRORS

13. DEFINITIONS

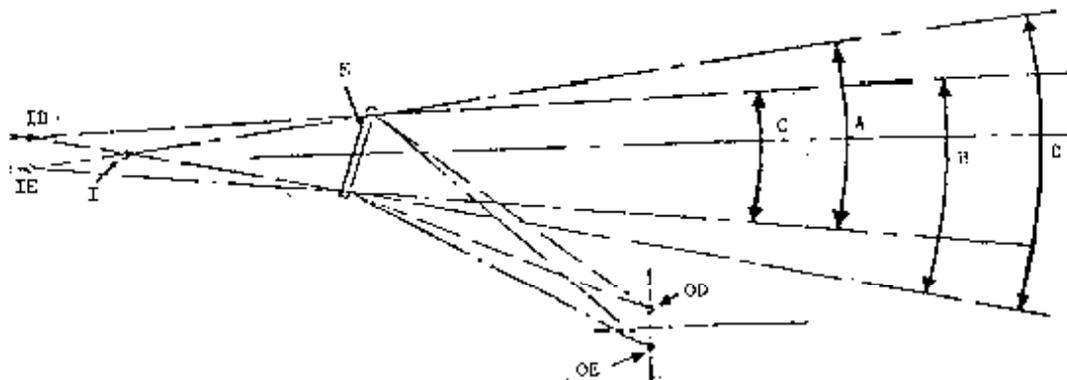
For the purpose of this Regulation,

- 13.1. "Type of vehicle as regards rear-view mirrors" means motor vehicles which are identical in respect of the following basic features:

- 13.1.1. the bodywork features which reduce the field of vision,
- 13.1.2. the co-ordinates of point "R" of the driver's seat,
- 13.1.3. the positioning and types of mandatory and optional rear-view mirrors (where fitted);
- 13.2. "Driver's ocular points" means two points 65 mm apart and 635 mm vertically above point "R" of the driver's seat as defined in annex 8. The straight line joining these points runs perpendicular to the vertical longitudinal median plane of the vehicle. The centre of the segment joining the two ocular points is in the longitudinal vertical plane which shall pass by the centre of the seating position of the driver designated by the vehicle manufacturer;
- 13.3. "Ambinocular vision" means the total field of vision obtained by the superimposition of the monocular fields of view of the right eye and the left eye (see figure 3).

Figure 3

AMBINOCULAR VISION



Interior rear view mirror

- OD)
 OE) - driver's eyes
- 1D)
 1E) - virtual monocular images
- 1 - virtual ambinocular image
 A - angle of visibility of the left eye
 B - angle of visibility of the right eye
 C - binocular angle of visibility
 D - ambinocular angle of visibility.

14. APPLICATION FOR APPROVAL
- 14.1. The application for approval of a vehicle type with regard to the installation of rear-view mirrors shall be submitted by the vehicle manufacturer or by his duly accredited representative.
- 14.2. It shall be accompanied by the undermentioned documents in triplicate and by the following particulars:
- 14.2.1. a description of the vehicle type with respect to the items mentioned in paragraph 13.1. above,
- 14.2.2. a list of the components necessary to identify rear-view mirrors which can be installed on the vehicle,
- 14.2.3. drawings showing the position of the rear-view mirror and its adapting components on the vehicle, and
- 14.2.4. indications by the manufacturer stating:
- 14.2.4.1. data relating to point "R" of the driver's seating position,
- 14.2.4.2. the maximum width of the body when the vehicle is supplied complete with body,
- 14.2.4.3. the maximum and minimum body widths for which the rear-view mirror is approved (in the case of chassis-cab mentioned in paragraph 16.3.3.).
- 14.3. A vehicle representative of the vehicle type to be approved shall be submitted to the technical service responsible for conducting the approval tests.
- 14.4. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective checks on conformity of production before type-approval is granted.
15. APPROVAL
- 15.1. If the vehicle type submitted for approval in accordance with paragraph 14. above meets the requirements of paragraph 16. of this Regulation, approval shall be granted.

- 15.2. An approval number shall be assigned to each type approved. Its first two digits (at present 01, corresponding to the 01 series of amendments which entered into force on 5 October 1987) 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 shall not assign the same number to another vehicle type.
- 15.3. Notice of approval or of refusal or of extension or withdrawal of approval of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in annex 2 to this Regulation.
- 15.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a type approved under this Regulation an international approval mark consisting of:
- 15.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval; */
- 15.4.2. The number of this Regulation, followed by the letter R, a dash and the approval number to the right of the circle prescribed in paragraph 15.4.1.
- 15.5. 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 15.4.1. need not be repeated; in such a case, the Regulation and approval numbers and the additional 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 15.4.1.

*/ See paragraph 5.4.1., footnote 1/.

- 15.6. The approval mark shall be clearly legible and be indelible.
- 15.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 15.8. Annex 4 to this Regulation gives examples of arrangements of the approval mark.
16. REQUIREMENTS
- 16.1. The vehicle shall meet the following requirements:
- 16.1.1. The rear-view mirrors installed on the vehicle shall be of a type approved under this Regulation.
- 16.1.2. Rear-view mirrors shall be fixed in such a way that the mirror does not move so as to significantly change the field of vision as measured, or vibrate to an extent which would cause the driver to misinterpret the nature of the image received.
- 16.1.2.1. The conditions prescribed in paragraph 16.1.2. shall be maintained when the vehicle is moving at speeds of up to 80% of its maximum design speed, but not exceeding 150 km/h.
- 16.2. Number
- 16.2.1. Minimum number of mandatory rear-view mirrors.
- 16.2.1.1. For vehicles of categories M and N the fields of vision specified in paragraph/16.5. shall be provided by the minimum number of mandatory rear-view mirrors shown in the following table:

Vehicle category	Interior rear-view mirrors Class I	Exterior rear-view mirrors			
		Main-rear-view mirrors		Wide-angle rear-view mirrors Class IV	Close-proximity rear-view mirrors Class V
		Class II	Class III		
M1	1 (but see 16.2.1.2.)	- (but see 16.2.1.3.)	1 on the off-side of the vehicle (but see 16.2.2.1.)	-	-
M2	-	2 (1 on the left and 1 on the right)	-	-	- (but see 16.2.2.2. and 16.3.7)
M3	-	2 (1 on the left and 1 on the right)	-	-	- (but see 16.2.2.2. and 16.3.7)
N1	1 (but see 16.2.1.2.)	- (but see 16.2.1.3.)	1 on the off-side of the vehicle (but see 16.2.2.1)	-	-
N2	- (but see 16.2.2.3.)	2 (1 on the left and 1 on the right)	- (but see 16.2.1.3.)	- (but see 16.2.2.4.)	- (but see 16.2.2.2. and 16.3.7)
Rigid lorries with or without trailer N3	- (but see 16.2.2.3.)	2 (1 on the left and 1 on the right)	- (but see 16.2.1.3.)	- (but see 16.2.2.4.)	- (but see 16.3.7)
Articulated tractors	- (but see 16.2.2.3.)	2 (1 on the left and 1 on the right)	- (but see 16.2.1.3.)	1	- (but see 16.3.7)

- 16.2.1.2. Nevertheless, in the case of vehicles of categories M_1 and N_1 :
- 16.2.1.2.1. If the interior rear-view mirror does not meet the requirements prescribed in paragraph 16.5.2., an additional exterior rear-view mirror shall be fitted to the vehicle. It shall be fitted to the right side of the vehicle in countries with right-hand rule of the road, and to the left side of the vehicle in countries with left-hand rule of the road.
- 16.2.1.2.2. If the interior rear-view mirror does not provide any rearward vision, its presence shall not be required.
- 16.2.1.2.3. Class II exterior rear-view mirrors shall be permitted.
- 16.2.1.3. Nevertheless, if the design of category N_2 or N_3 vehicles makes it technically impossible to obtain the fields of vision specified in paragraph 16.5.3.2.2. and 16.5.4. when a Class IV rear-view mirror is fitted to the same mounting as a Class II rear-view mirror, the latter may be replaced by a Class III rear-view mirror.
- 16.2.1.4. Motor vehicles having less than four wheels fitted with bodywork which partly or wholly encloses the driver shall be equipped:
- Either with an interior rear-view mirror of Class I and an exterior rear-view mirror of Class II or Class III, which shall be fitted to the right side of the vehicle in countries with right-hand rule of the road and to the left side of the vehicle in countries with left-hand rule of the road,
- or with two exterior rear-view mirrors of Class II or Class III, one at each side of the vehicle.
- The provisions of paragraph 6.5. below are not applicable to the above-mentioned vehicles. 1/
- 16.2.2. Maximum number of optional rear-view mirrors.
- 16.2.2.1. In the case of vehicles of category M_1 and N_1 , an exterior rear-view mirror may be fitted on the side of the vehicle opposite to that on which the mandatory exterior rear-view mirror referred to in paragraph 16.2.1.1. is fitted;
- 16.2.2.2. A Class V exterior rear-view mirror may be fitted to vehicles of categories M_2 , M_3 and N_2 ;

1/ Fields of vision to be prescribed for such vehicles are under study.

- 16.2.2.3. An interior rear-view mirror may be fitted to vehicles of categories N₂ and N₃;
- 16.2.2.4. A Class IV exterior rear-view mirror may also be fitted to:
- Category N₂ vehicles,
- Category N₃ vehicles - rigid lorries with or without trailer;
- 16.2.2.5. The rear-view mirrors referred to in paragraphs 16.2.2.1. to 16.2.2.4. must satisfy the requirements of this Regulation. Nevertheless, the provisions of paragraph 16.5. shall not apply to the rear-view mirrors referred to in paragraph 16.2.2.3;
- 16.2.2.6. The provisions of this Regulation do not apply to the surveillance rear-view mirrors defined in paragraph 2.4. Nevertheless, such exterior rear-view mirrors shall be mounted so as to be at least 2 m above the ground when the vehicle is under a load corresponding to its maximum permissible mass.
- 16.3. Position
- 16.3.1. Rear-view mirrors shall be so placed that the driver, when sitting in the driving seat in a normal driving position, has a clear view of the road to the rear and side(s) of the vehicle.
- 16.3.2. Exterior rear-view mirrors shall be visible through the side windows or through the portion of the windscreen that is swept by the windscreen wiper. However, for design reasons, this provision shall not apply to exterior rear-view mirrors fitted on the right side of vehicles of categories M₂ and M₃ in countries with right-hand rule of the road and on the left side of vehicles of the same categories in countries with left-hand rule of the road.
- 16.3.3. In the case of any vehicle which is tested in chassis-cab form when the field of vision is measured, the minimum and maximum body widths shall be stated by the manufacturer, and if necessary, simulated by dummy head boards. All vehicle and rear-view mirror configurations taken into consideration during the tests shall be shown on the type-approval certificate (see annex 2).
- 16.3.4. The prescribed exterior rear-view mirror on the driver side of the vehicle shall be located so as to form an angle of not more than 55° between the vertical longitudinal median plane of the vehicle and the vertical plane which passes through the centre of the rear-view mirror and through the centre of the straight 65 mm line which joins the driver's two ocular points.

- 16.3.5. The rear-view mirror(s) shall not protrude beyond the external bodywork of the vehicle substantially more than is necessary to comply with the requirements concerning fields of vision laid down in paragraph 16.5.
- 16.3.6. Where the bottom edge of an exterior rear-view mirror is less than 2 m above the ground when the vehicle is laden, this rear-view mirror shall not project more than 0.20 m beyond the overall width of the vehicle when not fitted with the rear-view mirror.
- 16.3.7. Class V rear-view mirrors shall be mounted on vehicles in such a way that, regardless of their position after adjustment, no part of these rear-view mirrors or their protective housings is less than 2 m above the ground when the vehicle is under a load corresponding to its maximum permissible mass.
- Class V rear-view mirrors shall be prohibited on any vehicle where the height of the cab is such that this requirement cannot be met.
- 16.3.8. Subject to the requirements of paragraphs 16.3.5. and 16.3.6., rear-view mirrors may project beyond the permissible maximum widths of vehicles.
- 16.4. Adjustment
- 16.4.1. The interior rear-view mirror shall be such that the driver can adjust it when in his driving position.
- 16.4.2. The exterior rear-view mirror on the driver's side shall be capable of adjustment from inside the vehicle, the door being closed, although the window may be open. However, it may be locked in position from the outside.
- 16.4.3. The requirements of paragraph 16.4.2. shall not apply to exterior rear-view mirrors which, after being pushed into the retracted position can be restored to the extended position without adjustment.
- 16.5. Field of vision
- 16.5.1. The fields of vision defined below shall be established using ambinocular vision, the eyes being at the "driver's ocular points" as defined in paragraph 13.2. The fields of vision shall be determined when the vehicle is in running order as defined in document TRANS/SC1/WP29/78, annex 3, paragraph 6.1.1., second paragraph, plus one front seat passenger, the mass of the passenger being 75 kg +1%. They shall be established through windows which have a total light transmission factor of at least 70% measured normal to the surface.

16.5.2. Interior rear-view mirrors (Class I).

16.5.2.1. The field of vision shall be such that the driver can see at least a 20 m-wide flat horizontal portion of the road centred on the vertical longitudinal median plane of the vehicle, from 60 m behind the driver's ocular points (annex 6, figure 1) to the horizon.

16.5.2.2. The field of vision may be reduced by the presence of a head-rest and devices such as, in particular, sun visors, rear windscreen wipers and heating elements, provided that all these devices together do not obscure more than 15% of the prescribed field of vision when projected onto a vertical plane perpendicular to the longitudinal median plane of the vehicle. The degree of obstruction shall be measured with the headrests adjusted to their lowest possible position and with the sun visors folded back.

16.5.3. Main exterior rear-view mirrors (Classes II and III).

16.5.3.1. Left-hand exterior rear-view mirrors for vehicles driven on the right-hand side of the road, and right-hand exterior rear-view mirrors for vehicles driven on the left-hand side of the road.

The field of vision shall be such that the driver can see at least a 2.50/m-wide flat, horizontal portion of the road, which is bounded on the right (for vehicles driven on the right) or the left (for vehicles driven on the left) by the plane which is parallel to the median longitudinal vertical plane passing through the outermost point of the vehicle on the left (for vehicles driven on the right) or the right (for vehicles driven on the left) and extend from 10 m behind the driver's ocular points to the horizon (annex 6, figure 2).

16.5.3.2. Right-hand exterior rear-view mirrors for vehicles driven on the right, and left-hand exterior rear-view mirrors for vehicles driven on the left.

16.5.3.2.1. In the case of category M₁ vehicles and category N₁ vehicles having a maximum weight not exceeding 2 tonnes, the field of vision shall be such that the driver can see at least a 4 m-wide, flat, horizontal portion of the road bounded on the left (in the case of vehicles driven on the right), or on the right (in the case of vehicles driven on the left) by a plane parallel to the median longitudinal vertical plane passing through the outermost point of the vehicle on the right (in the case of vehicles driven on the right) or on the left (in the case of vehicles driven on the left) which extends from 20 m behind the driver's ocular points to the horizon (see annex 6, figure 2).

16.5.3.2.2. In the case of vehicles other than those referred to in paragraph 16.5.3.2.1. above, the field of vision shall be such that the driver can see at least a 3.50 m-wide, flat, horizontal portion of the road, bounded on the left (in the case of vehicles driven on the right), or on the right (in the case of vehicles driven on the left) by a plane parallel to the median longitudinal vertical plane of the vehicle and passing through the outermost point of the vehicle on the right (in the case of vehicles driven on the right) or on the left (in the case of vehicles driven on the left) which extends from 30 m behind the driver's ocular points to the horizon.

In addition, the road must be visible to the driver over a width of 0.75 m from a point 4 m behind the vertical plane passing through the drivers ocular points (see annex 6, figure 3).

16.5.4. Wide-angle exterior rear-view mirrors (Class IV).

The field of vision shall be such that the driver can see at least a 12.50 m-wide, flat, horizontal portion of the road, bounded on the left (in the case of vehicles driven on the right), or on the right (in the case of vehicles driven on the left) by a plane parallel to the median longitudinal vertical plane of the vehicle and passing through the outermost point of the vehicle on the right (in the case of vehicles driven on the right) or on the left (in the case of vehicles driven on the left) which extends from at least 15 m to 25 m behind the driver's ocular points.

In addition, the road must be visible to the driver over a width of 2.5 m from a point 3 m behind the vertical plane passing through the driver's ocular points (see annex 6, figure 4).

16.5.5. Close-proximity exterior rear-view mirrors (Class V).

The field of vision shall be such that the driver can see a flat horizontal portion of the road along the side of the vehicle, bounded by the following vertical planes (see annex 6, figures 5 (a) and 5 (b)):

16.5.5.1. the plane parallel to the median longitudinal vertical plane of the vehicle which passes through a point 0.2 m beyond the outermost point of the vehicle cab on the right (in the case of vehicles driven on the right) or on the left (in the case of vehicles driven on the left), the overall width of the vehicle's cab being measured in the transverse vertical plane passing through the driver's ocular points;

16.5.5.2. in the transverse direction, the parallel plane passing at a distance of 1 m in front of the plane referred to in paragraph 16.5.5.1;

- 16.5.5.3. to the rear, the plane parallel to the vertical plane passing through the driver's ocular points and situated at a distance of 1.25/m behind that plane;
- 16.5.5.4. to the front, the plane parallel to the vertical plane passing through the driver's ocular points and situated at a distance of 1 m in front of that plane. If the vertical transverse plane passing through the leading edge of the vehicle bumper is less than 1 m in front of the vertical plane passing through the driver's ocular points, the field of vision shall be limited to that plane (see annex 6, figure 5 (b)).
- 16.5.6. In the case of rear-view mirrors consisting of several reflecting surfaces which are either of different curvature or make an angle with each other, at least one of the reflecting surfaces shall provide the field of vision and have the dimensions (see paragraph 7.1.2.) specified for the class to which they belong.
- 16.5.7. Obstructions
- In the fields of vision specified above, obstructions due to the bodywork and any of its components, such as door handles, outline marker lamps, direction indicators, extremities of rear bumpers, and reflective-surface cleaning components shall not be taken into account if they are responsible for a total obstruction of less than 10% of the prescribed field of vision.
- 16.5.7.1. The obstructions shall be measured with headrest arranged in the lowest possible position allowed by their adjustment system and sun/visors folded back.
- 16.5.8. Test procedure
- The field of vision shall be determined by placing powerful light sources at the ocular points and examining the light reflected on a monitoring screen. Other equivalent methods may be used.
17. MODIFICATIONS OF THE VEHICLE TYPE AND EXTENSION OF APPROVAL
- 17.1. Every modification of the vehicle type shall be notified to the administrative department which approved the vehicle type. The department may then either:
- 17.1.1. 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
- 17.1.2. Require a further test report from the technical service responsible for conducting the tests.

- 17.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 15.3. above to the Parties to the Agreement which apply this Regulation.
- 17.3. Extension of approval shall be communicated to the Parties to the 1958 Agreement applying this Regulation by the procedure set out in paragraph 5.3. above.
- 17.4. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension.
18. CONFORMITY OF PRODUCTION
- 18.1. Every vehicle approved pursuant to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set out in paragraph 16 above.
- 18.2. In order to verify that the requirements of paragraph 18.1. above are met, appropriate checks on production shall be carried out.
- 18.3. The holder of the approval shall in particular:
- 18.3.1. Ensure existence of procedures for effective quality control of the vehicles as regards all aspects relevant to compliance with the requirements set out in paragraph 16 above;
- 18.3.2. Ensure that for every type of vehicle sufficient checks are carried out regarding the number and type of rear-view mirrors and the dimensions specified for their correct installation, so as to ensure that all vehicles in production comply with the specifications given for the vehicle submitted for type approval;
- 18.3.3. Ensure that, if the checks carried out pursuant to paragraph 18.3.2. above give evidence of non-conformity of one or more vehicles with the requirements set out in paragraph 16 above, all necessary steps are taken to restore conformity of the corresponding production.
- 18.4. The competent authority which granted type approval may at any time verify the conformity control methods applied for each production unit. The authority may also carry out any random checks on serially-manufactured vehicles in respect to the requirements set out in paragraph 16 above.
- 18.5. Where unsatisfactory results are found during verifications and checks pursuant to paragraph 18.4. above, the competent authority shall ensure that all necessary steps are taken to restore conformity of production as rapidly as possible.

19. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

19.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 18.1. above is not complied with or if the vehicle fails to pass the checks prescribed in paragraph 18.2. above.

19.2. If a 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 copy of the approval form bearing at the end, in large letters, the signed and dated annotation "APPROVAL WITHDRAWN".

20. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of vehicle 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 Agreement applying this Regulation by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation "PRODUCTION DISCONTINUED".

21. TRANSITIONAL PROVISIONS

21.1. As from the official date of entry into force of the 01 series of amendments to this Regulation, no Contracting Party applying this Regulation shall refuse an application for approval under this Regulation as amended by the 01 series of amendments.

21.2. As from 1 October 1973, Contracting Parties applying this Regulation shall grant approvals to a type of vehicle with regard to the installation of rear-view mirrors only if the type of vehicle meets the requirements of this Regulation as amended by the 01 series of amendments.

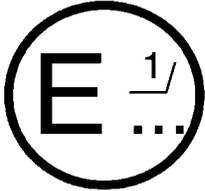
21.3. As from 1 October 1988, Contracting Parties applying this Regulation may prohibit the entry into service of a type of vehicle if the mounting of rear-view mirrors does not meet the requirements of this Regulation as amended by the 01 series of amendments.

21.4. As from 1 October 1992, no new type approvals shall be granted pursuant to paragraph 16.2.1.3. and Contracting Parties applying this Regulation may prohibit the entry into service of vehicles referred to in paragraph 16.2.1.3. above which have been granted type-approval pursuant to that paragraph.

- 21.5. Approvals which were granted to rear-view mirrors of Classes I, II or III pursuant to this Regulation in its original form (00/series) before the date of entry into force of this series of amendments shall remain valid.
- 21.6. The provisions of this Regulation shall not prohibit the approval of a type of vehicle with regard to the mounting of rear-view mirrors pursuant to this Regulation as modified by the 01 series of amendments, if all or part of the rear-view mirrors of Classes I, II or III, with which it is fitted, bear the approval mark prescribed by the original version (00 series) of this Regulation.
22. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS
- The Parties to the 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 refusal or extension or withdrawal of approval, issued in other countries, are to be sent.
-

Annex 1

(Maximum format: A 4 (210 x 297 mm))



-----1/

Communication concerning: approval
refusal of approval
extension of approval
withdrawal of approval
production definitely
discontinued 2/

of a type of rear-view mirror, pursuant to Regulation/No. 46

Approval No. Extension No.
.....

1. Rear-view mirror of Class I, II, III, IV, V 2/
2. Brief description including in particular the following information:
 - 2.1. Type of control)
 - 2.2. Principal dimensions) of the reflecting surface
 - 2.3. Nominal radius of curvature)
3. Trade name or mark
4. Manufacturer's name and address
5. If applicable, name and address of manufacturer's representative
6. Symbol _{2 m} as defined in paragraph 8.1.1. of this Regulation: yes/no 2/
7. Submitted for approval on
8. Technical service responsible for conducting approval tests
9. Date of report issued by that service

1/ Name of administration.
2/ Strike out what does not apply.

10. Number of report issued by that service
11. Approval granted/refused/extended/withdrawn 2/
12. Reason(s) for extension of approval (if applicable)
13. Place
14. Date
15. Signature
16. A list of the documents contained in the approval file transmitted to the administrative service which has granted approval is annexed to this communication.

Annex 2

(Maximum format: A 4 (210 x 297 mm))

-----1/



Communication concerning: approval
refusal of approval
extension of approval
withdrawal of approval
production definitely
discontinued 2/

of a type of vehicle with regard to the mounting of
rear-view mirrors, pursuant to Regulation No. 46

Approval No. Extension No.
.....

1. Trade name or mark of the vehicle
2. Vehicle type
3. Vehicle category (M1, M2, M3, N1 < 2 tons. N1, N2, N3) 2/
- 3.1. If the vehicle category is N3: rigid lorry/tractor
vehicle/semi-trailer 2/
4. Manufacturer's name and address
5. If applicable, name and address of manufacturer's representative
6. Trade name or mark of rear-view mirrors and type-approval number
7. Class(es) of rear-view mirror(s) (I, II, III, IV, V) 2/
8. The derogation (applicable until 1 October 1992) concerning a rear-view
mirror of Class II fitted to the same mounting as a rear-view mirror of
Class IV, in a vehicle of category N3 (in the case described in
paragraph/16.2.1.3. of this Regulation) is granted/refused 2/

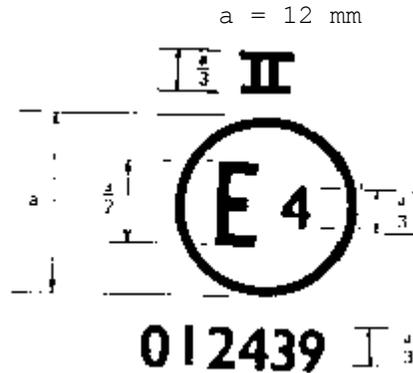
1/ Name of administration.
2/ Strike out what does not apply.

9. Extension of type-approval of the vehicle to cover the following rear-view mirror type(s)
10. Identification data on the "R" point of the driver's seating position ..
11. Maximum and minimum body width for which the rear-view mirror is approved (in the case of a vehicle in chassis-cab form as referred to in paragraph 16.3.3. of this Regulation)
12. Vehicle submitted for approval on
13. Technical service responsible for conducting approval tests
14. Date of report issued by that service
15. Number of report issued by that service
16. Approval granted/refused/extended/withdrawn 2/
17. Reason(s) for extension of approval (if applicable)
18. Place
19. Date
20. Signature
21. A list of the documents contained in the approval file transmitted to the administrative service which has granted approval is annexed to this communication

2/ Strike out what does not apply.

Annex 3

ARRANGEMENT OF THE REAR-VIEW-MIRROR APPROVAL MARK
(See paragraph 5.4. of the Regulation)



The above approval mark affixed to a rear-view mirror indicates that the mirror is a rear-view mirror, of Class II, which has been approved in the Netherlands (E 4) pursuant to Regulation No. 46 and under approval number 012439. The first two digits of the approval number indicate that Regulation No. 46 already included the 01 series of amendments when the approval was granted.

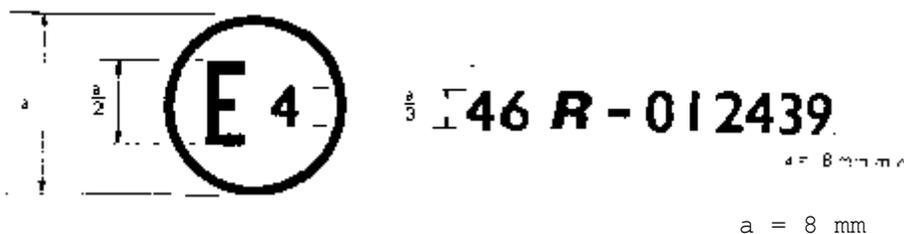
Note: The approval number and the additional symbol must be placed close to the circle and either above or below the "E" or to the left or right of that letter. The digits of the approval number must be on the same side of the "E" and point in the same direction. The additional symbol must be directly opposite the approval number. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

Annex 4

ARRANGEMENTS OF THE VEHICLE APPROVAL MARK CONCERNING
 THE INSTALLATION OF REAR-VIEW MIRRORS

Model A

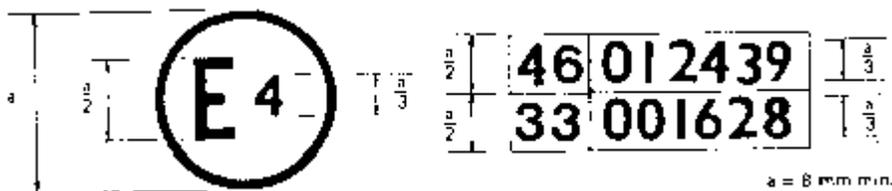
(See paragraph 15.4. of the Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulation No. 46 under the approval number 012439. The first two digits of the approval number indicate that Regulation No. 46 already included the 01 series of amendments when the approval was granted.

Model B

(See paragraph 15.5. of the Regulation)



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.46 and 33. 1/ The approval numbers indicate that, at the date when the respective approvals were granted, Regulation No. 46 included the 01 series of amendments but Regulation No. 33 was still in its original form.

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

Annex 5

TEST METHOD FOR DETERMINING REFLECTIVITY

1. DEFINITIONS

1.1. CIE standard illuminant A: 1/

λ	\bar{x}	(λ)
600	1.062	2
620	0.854	4
650	0.283	5

1.2. CIE standard source A: 1/ Gas-filled tungsten filament lamp operating at a correlated colour temperature of $T_{68} = 2,855.6$ K.

1.3. CIE 1931 standard colorimetric observer: 1/ Receptor of radiation whose colorimetric characteristics correspond to the spectral tristimulus values $x(\lambda)$, $y(\lambda)$, $z(\lambda)$ (see table).

1.4. CIE spectral tristimulus values: 1/ Tristimulus values of the spectral components of an equi-energy spectrum in the CIE (XYZ) system.

1.5. Photopic vision: 1/ Vision by the normal eye when it is adapted to levels of luminance of at least several candelas per square metre.

2. APPARATUS

2.1. General

2.1.1. The apparatus shall consist of a light source, a holder for the test sample, a receiver unit with a photodetector and an indicating meter (see figure 1), and a means of eliminating the effects of extraneous light.

2.1.2. The receiver may incorporate a light-integrating sphere to facilitate measuring the reflectance of non-flat (convex) mirrors (see figure 2).

2.2. Spectral characteristics of light source and receiver.

2.2.1. The light source shall consist of a CIE standard source A and associated optics to provide a near-collimated light beam. A voltage stabilizer is recommended to maintain a fixed lamp voltage during instrument operation.

1/ Definitions taken from CIE Publication 50 (45), International Electrotechnical Vocabulary, Group 45: lighting.

2.2.2. The receiver shall have a photodetector with a spectral response proportional to the photopic luminosity function of the CIE (1931) standard colorimetric observer (see table). Any other combination of illuminant-filter-receptor giving the overall equivalent of CIE standard illuminant A and photopic vision may be used. When an integrating sphere is used in the receiver, the interior surface of the sphere shall be coated with a matt (diffusive) spectrally non-selective white coating.

2.3. Geometric conditions

2.3.1. The angle of the incident beam (θ) should preferably be 0.44 ± 0.09 rad ($25 \pm 5^\circ$) from the perpendicular to the test surface and shall not exceed the upper limit of the tolerance (i.e. 0.53 rad or 30°). The axis of the receptor shall make an angle (θ) with this perpendicular equal to that of the incident beam (see figure 1). The incident beam upon arrival at the test surface shall have a diameter of not less than 19mm. The reflected beam shall not be wider than the sensitive area of the photodetector, shall not cover less than 50% of such area, and as nearly as possible shall cover the same area segment as used during instrument calibration.

2.3.2. When an integrating sphere is used in the receiver section, the sphere shall have a minimum diameter of 127 mm. The sample and incident beam apertures in the sphere wall shall be of such a size as to admit the entire incident and reflected light beams. The photodetector shall be located so as not to receive direct light from either the incident or the reflected beams.

2.4. Electrical characteristics of the photodetector-indicator unit

The photodetector output as read on the indicating meter shall be a linear function of the light intensity on the photosensitive area. Means (electrical and/or optical) shall be provided to facilitate zeroing and calibration adjustments. Such means shall not affect the linearity or the spectral characteristics of the instrument. The accuracy of the receptor-indicator unit shall be with $\pm 2\%$ of full scale, or $\pm 10\%$ of the magnitude of the reading, whichever is the smaller.

2.5. Sample holder

The mechanism shall be capable of locating the test sample so that the axes of the source arm and receptor are intersect at the reflecting surface. The reflecting surface may lie within or at either face of the mirror sample, depending on whether it is a first-surface, second-surface, or prismatic "flip" type mirror.

3. PROCEDURE

3.1. Direct calibration method

3.1.1. In the direct calibration method, air is used as the reference standard. This method is applicable for those instruments which are so constructed as to permit calibration at the 100% point by swinging the receiver to a position directly on the axis of the light source (see figure 1).

3.1.2. It may be desired in some cases (such as when measuring low-reflectivity surfaces) to use an intermediate calibration point (between 0 and 100% on the scale) with this method. In these cases a neutral density filter of known transmittance shall be inserted in the optical path, and the calibration control shall then be adjusted until the meter reads the percentage transmission of the neutral density filter. This filter shall be removed before making reflectivity measurements.

3.2. Indirect calibration method

The indirect calibration method is applicable for those instruments with fixed source and receiver geometry. A properly calibrated and maintained reflectance standard is required. This reference standard should preferably be a flat mirror with a reflectance value as near as possible to that of the test samples.

3.3. Flat mirror measurement

The reflectance of flat mirror samples can be measured on instruments employing either the direct or indirect calibration method. The reflectance value is read directly from the indicating meter.

3.4. Non-flat (convex) mirror measurement

The measurement of the reflectance of non-flat (convex) mirrors requires the use of instruments which incorporate an integrating sphere in the receiver unit (see figure 2). If the instrument indicating meter indicates n_e divisions with a reference standard mirror of E per cent reflectance, then, with a mirror of unknown reflectance, n_x divisions will correspond to a reflectance of X per cent, given by the formula:

$$X = E \frac{n_x}{n_e}$$

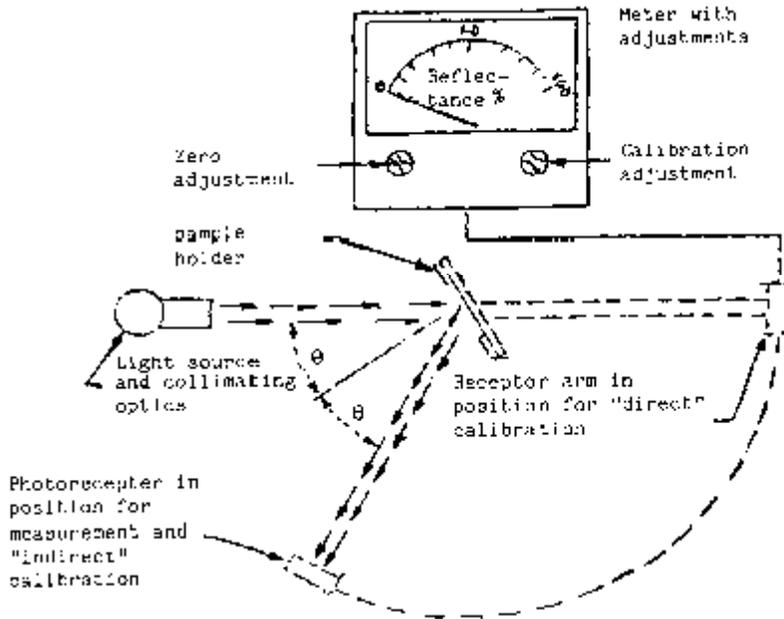


Figure 1 - Generalized reflectometer showing geometries for the two calibration methods

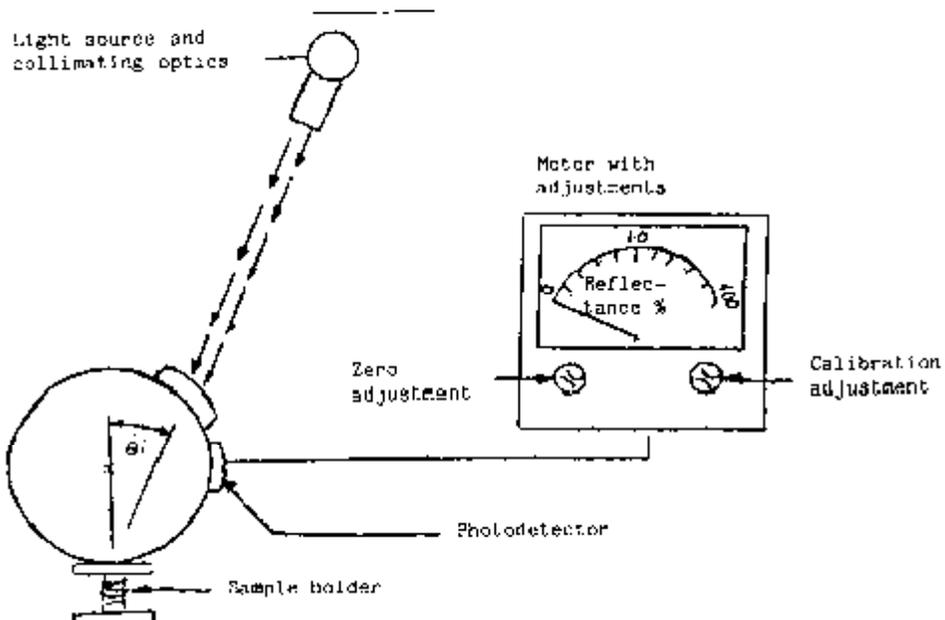


Figure 2 - Generalized reflectometer, incorporating an integrating sphere in the receiver

PECTRAL TRISTIMULUS VALUES FOR THE CIE 1931 STANDARD COLORIMETRIC OBSERVER 1/

(This table is taken from CIE Publication/50645 (1970))

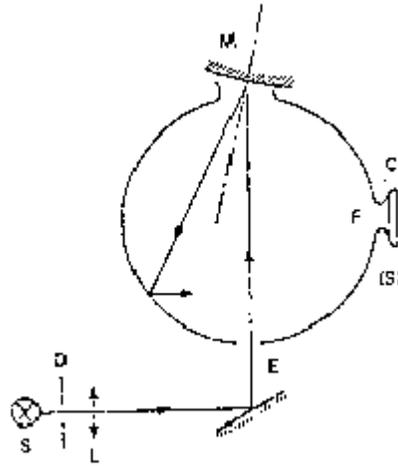
λ	x(2)	y(2)	Z(2)
380	0.001 4	0.000 0	0.006 5
390	0.004 2	0.000 1	0.020 1
400	0.014 3	0.000 4	0.067 9
410	0.043 5	0.001 2	0.207 4
420	0.134 4	0.004 0	0.645 6
430	0.283 9	0.011 6	1.385 6
440	0.348 3	0.023 0	1.747 1
450	0.336 2	0.038 0	1.772 1
460	0.290 8	0.060 0	1.669 2
470	0.195 4	0.091 0	1.287 6
480	0.095 6	0.139 0	0.813 0
490	0.032 0	0.208 0	0.465 2
500	0.004 9	0.323 0	0.272 0
510	0.009 3	0.503 0	0.158 2
520	0.063 3	0.710 0	0.078 2
530	0.165 5	0.862 0	0.042 2
540	0.290 4	0.954 0	0.020 3
550	0.433 4	0.995 0	0.008 7
560	0.594 5	0.995 0	0.003 9
570	0.762 1	0.952 0	0.002 1
580	0.916 3	0.870 0	0.001 7
590	1.026 3	0.757 0	0.001 1
600	1.062 2	0.631 0	0.000 8
610	1.002 6	0.503 0	0.000 3
620	0.854 4	0.381 0	0.000 2
630	0.642 4	0.265 0	0.000 0
640	0.447 9	0.175 0	0.000 0
650	0.283 5	0.107 0	0.000 0
660	0.164 9	0.061 0	0.000 0
670	0.087 4	0.032 0	0.000 0
680	0.046 8	0.017 0	0.000 0
690	0.022 7	0.008 2	0.000 0
700	0.011 4	0.004 1	0.000 0
710	0.005 8	0.002 1	0.000 0
720	0.002 9	0.001 0	0.000 0
730	0.001 4	0.000 5	0.000 0
740	0.000 7	0.000 2 <u>2/</u>	0.000 0
750	0.000 3	0.000 1	0.000 0
760	0.000 2	0.000 1	0.000 0
770	0.000 1	0.000 0	0.000 0
780	0.000 0	0.000 0	0.000 0

1/ Abridged table. The values of $y(2) = V(2)$ are rounded off to four/decimal places.

2/ Changed in 1966 (from 3 to 2).

EXPLANATORY FIGURE

Example of device for measuring the reflection factor of spherical mirrors



C = Receiver

D = Diaphragm

E = Window of entry

F = Window of measurement

L = Lens

M = Object window

S = Light source

(S) = Integrating sphere

Annex 6

REAR-VIEW MIRROR FIELDS OF VISION AT GROUND LEVEL

I. INTERIOR REAR-VIEW MIRROR (Class I) (see paragraph 16.5.2 of this Regulation)

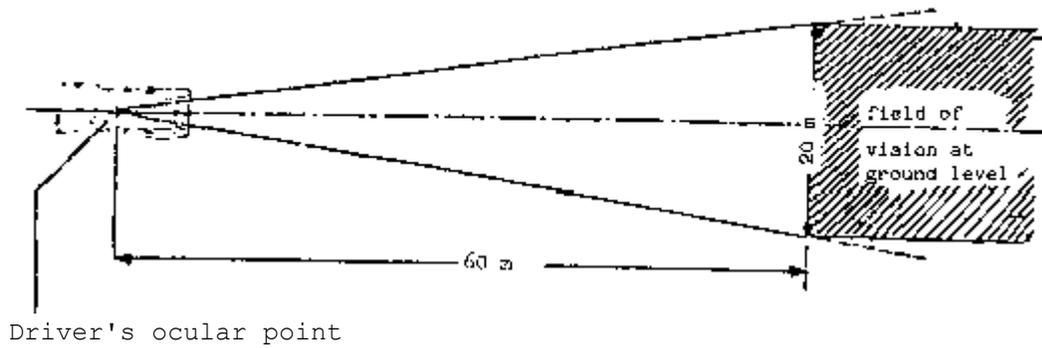
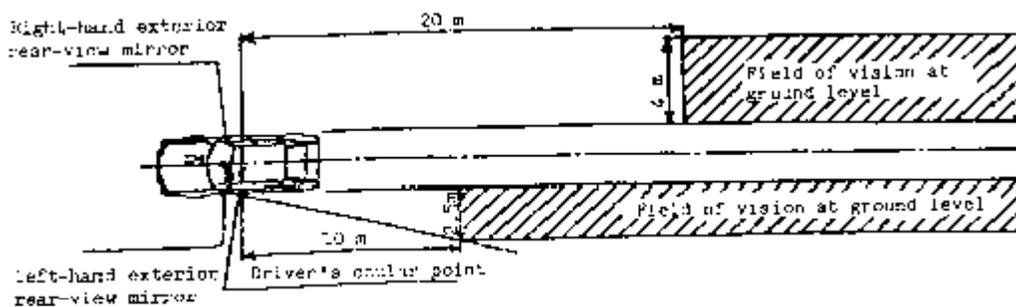


Figure 1

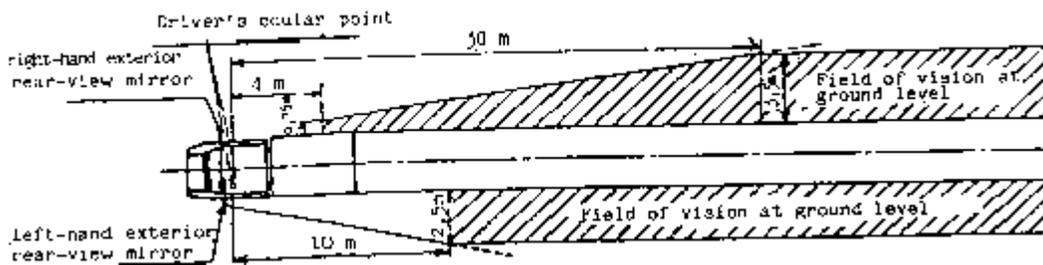
II. EXTERIOR REAR-VIEW MIRRORS
 (EXAMPLES OF VEHICLES DRIVEN ON THE RIGHT)

1. "Main" exterior rear-view mirrors (Classes II and III) (see paragraph 16.5.3)



Category M1 and category N1 vehicles up to 2 tonnes

Figure 2



Vehicle other than that shown in Figure 4

Figure 3

2. "Wide-angle" exterior rear-view mirrors (Class IV) (see paragraph 16.5.5)

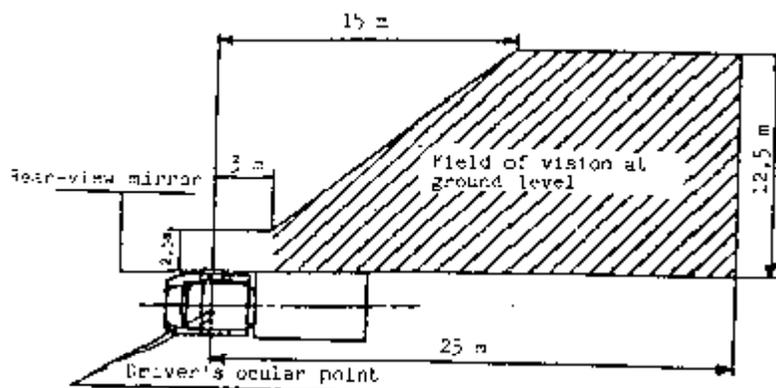


Figure 4

3. "Close-proximity" exterior rear-view mirror (Class V) (see paragraph 16.5.5)

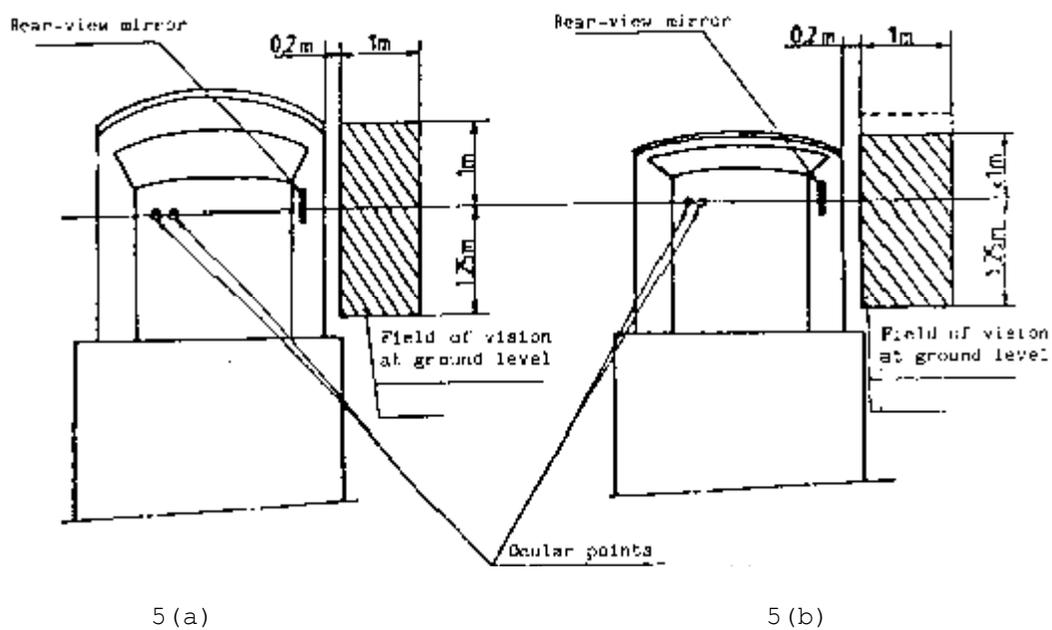


Figure 5

Annex 7

PROCEDURE FOR DETERMINING THE RADIUS OF CURVATURE "r" OF
 A MIRROR'S REFLECTING SURFACE

1. Measurements

1.1. Equipment

The "spherometer" described in figure/1 is used.

1.2. Measuring points

1.2.1. The principal radii of curvature shall be measured at three points situated as close as possible to positions at

$\frac{1}{3}$ $\frac{1}{3}$ $\frac{2}{3}$

, and of the distance along the arc of the reflecting

$\frac{1}{3}$ $\frac{2}{3}$ $\frac{1}{3}$

surface passing through the centre of the mirror and parallel to segment/b, or of the arc passing through the curve of the mirror which is perpendicular to it if this arc is the longest.

1.2.2. Where, because of mirror size, it is impossible to obtain measurement in the directions defined in item 1.2.1 the technical departments responsible for the tests may take measurements at this point in two perpendicular directions as close as possible to those prescribed above.

2. Calculation of the radius of curvature (r)
 "r" expressed in mm is calculated using the formula:

$$r = \frac{r_{p1} + r_{p2} + r_{p3}}{\frac{1}{p1} + \frac{1}{p2} + \frac{1}{p3}}$$

where r_{p1} is the radius of curvature of the first measuring point, r_{p2} at the second and r_{p3} at the third.

Annex 8

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 DH 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 thigh of the 3 DH 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 DH 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 a vehicle manufacturer for each seating position and established with respect to 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.

- 2.5. "Torso-line" means the centreline of the probe of the 3 DH 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 DH 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 DH 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.

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 degree of the design of the 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 degrees C to ensure tha the seat material reaches the 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 DH 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 be then 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 DH machine shall be covered by a muslin cotton, of sufficient size and appropriate texture, described as a plain cotton fabric having 18.9 threads per/cm² and weighing 0.228 kg/m² or knitted or non-woven fabric having equivalent characteristics.

If test is run on a seat outside the vehicle, the floor on which the seat is placed shall have the same essential characteristics 1/ as the floor of the vehicle in which the seat is intended to be used.

4.5. Place the seat and back assembly of the 3 DH machine so that the centreplane of the occupant (C/LO) coincides with the centreplane of the 3 DH machine. At the manufacturer's request, the 3 DH machine may be moved inboard with respect to the C/LO if the 3 DH machine is located so far outboard that the seat edge will not permit levelling of the 3 DH 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 DH 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 DH machine as the right foot is to the right. The spirit level verifying the transverse orientation of the 3 DH 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.

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

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 DH machine.

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

4.9.1. If the 3 DH machine tends to slide rearward, use the following procedure. Allow the 3 DH 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 DH machine does not tend to slide rearward, use the following procedure. Slide the 3 DH 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 DH 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 DH machine from sliding forward.

- 4.11. Install the right and left buttock weights and then, alternately, the eight torso weights. Maintain the 3 DH machine level.
- 4.12. Tilt the back pan forward to release the tension on the seat-back. Rock the 3DH 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 DH machine and the seat.

During the rocking action, the T-bar of the 3 DH 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 DH machine to ensure that no inadvertent exterior loads are applied in a vertical or fore-and-aft direction.

The feet of the 3DH 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 spirit levels for zero position. If any movement of the feet has occurred during the rocking operation of the 3 DH 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 3DH machine's seat pan on the seat.

- 4.13. Holding the T-bar to prevent the 3 DH 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 3DH machine. If another level adjustment of the 3 DH machine is necessary, rotate the back pan forward, re-level, and repeat the procedure from 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 DH machine with the probe in its fully rearward position.
- 4.15. If a re-run of the installation of the 3 DH machine is desired, the seat assembly should remain unloaded for a minimum period of 30 min prior to the re-run. The 3 DH 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 DH 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 8 - Appendix 1

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

(3 DH 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 DH machine should be checked for free movement without encountering noticeable friction.

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

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

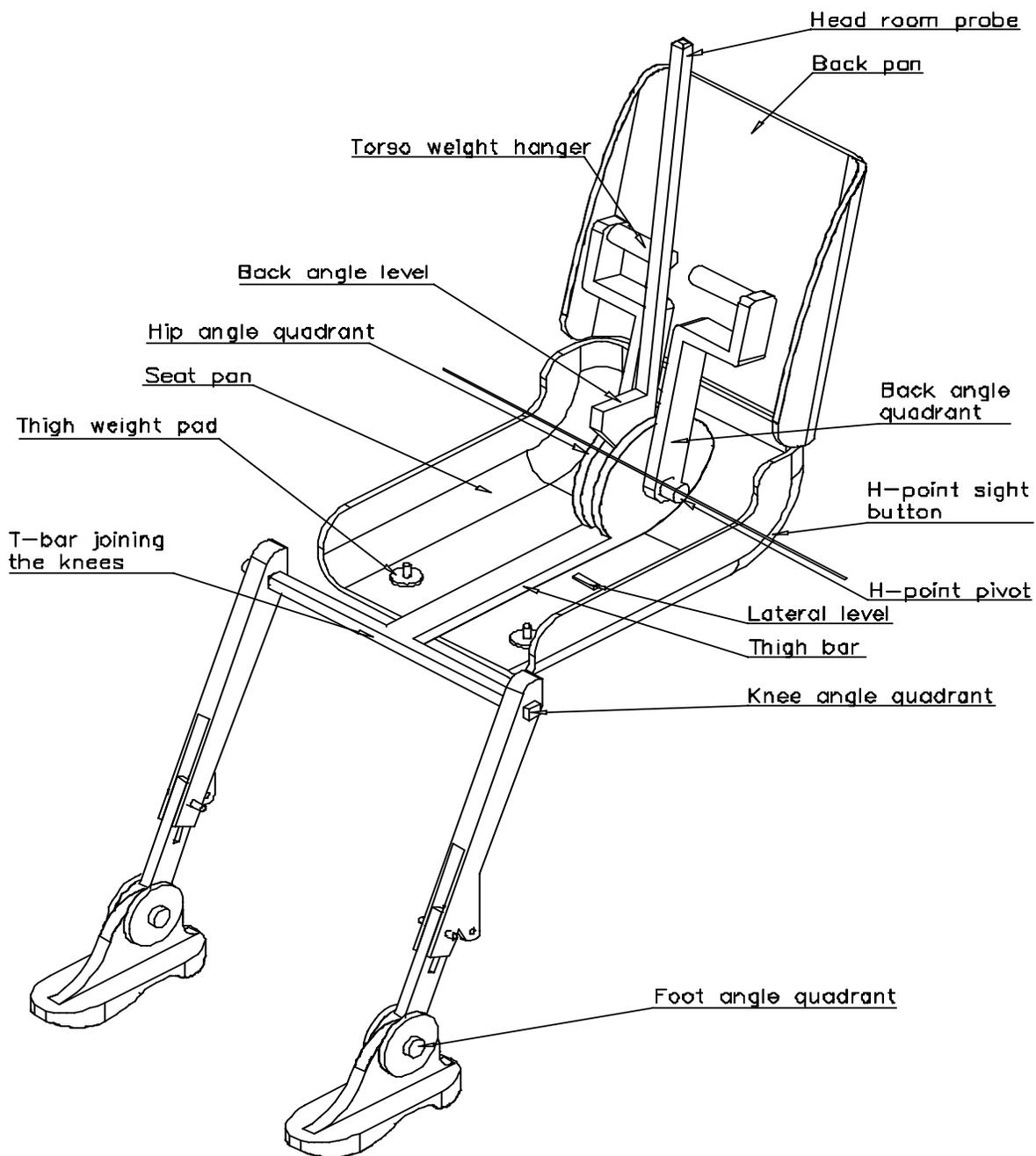


Figure 1 - 3 DH machine elements designation

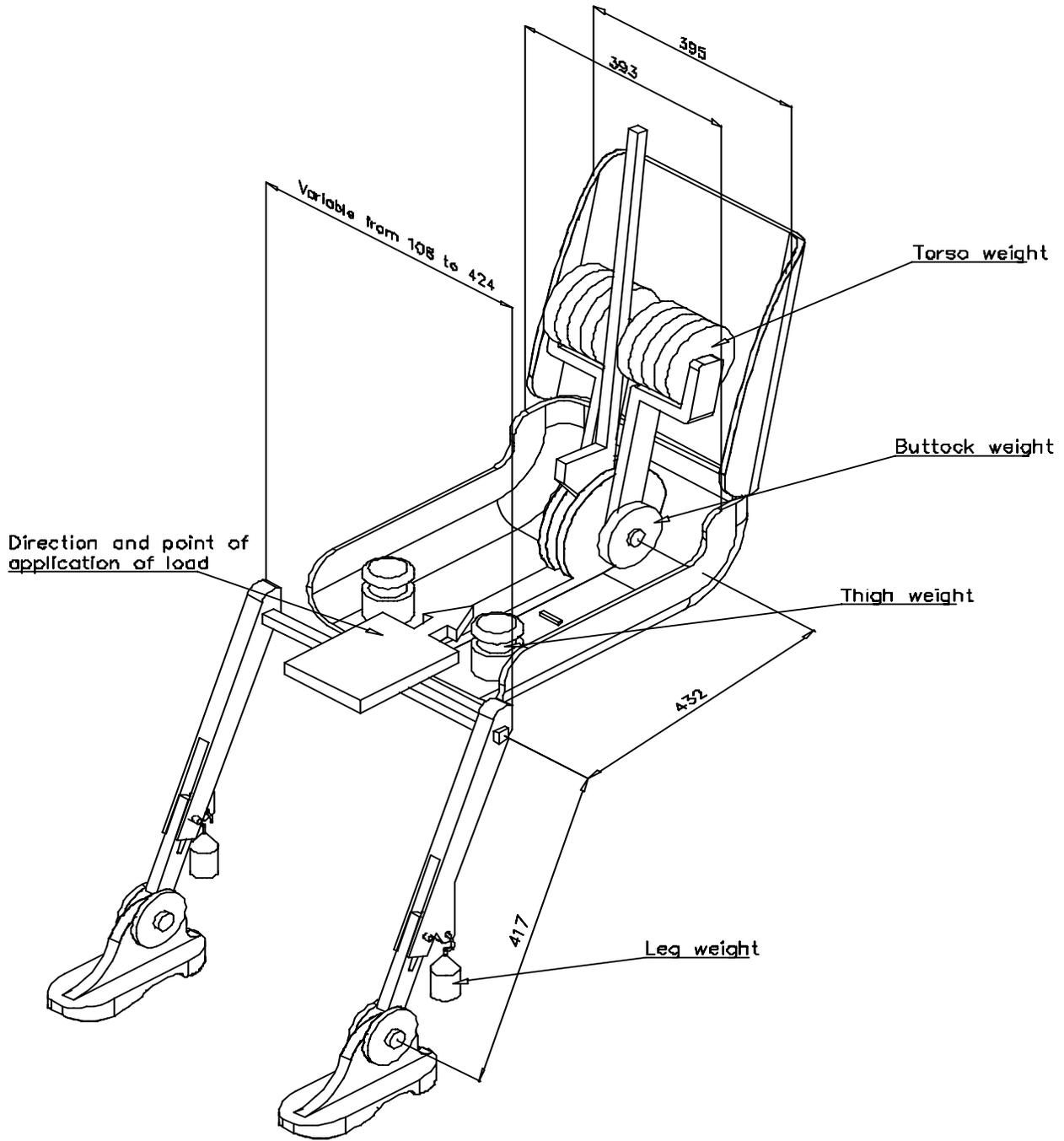


Figure 2 - Dimensions of the 3 DH machine elements and load distribution

Annex 8 - 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.

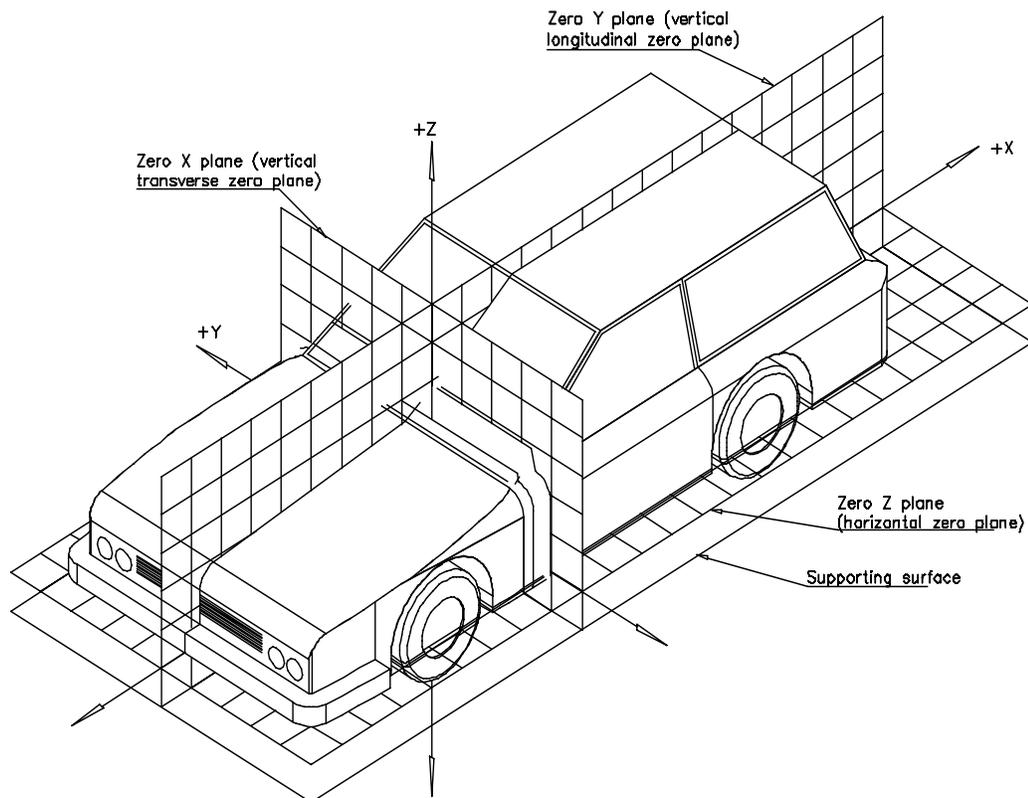


Figure - Three-dimensional reference system

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

Annex 8 - 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 9

CHECKS ON CONFORMITY OF PRODUCTION

1. DEFINITION

For the purpose of this annex,

"Type of deflection system" means a specified combination of axes, pivotal points and other articulation mechanisms ensuring deflection of the rear-view mirror in the direction of impact concerned.

2. TESTS

Rear-view mirrors shall be subjected to the following tests:

2.1. Reflecting surface (all Classes):

2.1.1. Verification of the nominal radius of curvature, in accordance with the requirements of this Regulation, annex 7, paragraph 2;

2.1.2. Measurement of differences between radii of curvature, in accordance with the requirements of this Regulation, paragraph 7.2.2.

2.2. Interior rear-view mirrors (Class I):

Bending test of the protective housing on its support, in accordance with the requirements of paragraph/8.3. of this Regulation.

2.3. Exterior rear-view mirrors (Classes II, III and IV), other than those of which no component part is situated less than 2 m above the ground:

Test of behaviour under impact in accordance with the requirements of paragraph/8.2. of this Regulation.

3. FREQUENCY AND RESULTS OF TESTS

3.1. Verification of the nominal radius of curvature and measurement of differences between radii of curvature:

3.1.1. Frequency

Once every three months for each approval number and each nominal radius of curvature.

3.1.2. Results

All measurements shall be recorded.

The limits of differences specified in paragraph 7.2.2. of this Regulation shall be complied with.

3.2. Bending test of the protective housing on its support:

3.2.1. Frequency

Once per month for each approval number.

3.2.2. Results

All results shall be recorded.

The requirements of paragraph/8.4. of this Regulation shall be complied with.

3.3. Impact test

3.3.1. Frequency

Once every three months for each approval number, each type of deflection system and each mounting configuration.

3.3.2. Results

All results shall be recorded.

The requirements of paragraph 8.4. of this Regulation shall be complied with.

3.4. Sampling

The samples subjected to testing shall be selected in relation to the volume of production of each rear-view mirror type.
