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I Acts whose publication is obligatory

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

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

I

(Acts whose publication is obligatory)

Regulation No 25 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of head restraints (headrests), whether or not incorporated in vehicle seats (*)

1. SCOPE

1.1. This Regulation applies to head-restraint devices conforming to one of the types defined in paragraph 2.2 below ⁽¹⁾.

1.1.1. It does not apply to head-restraint devices which may be fitted to folding seats or seats facing towards the side or towards the rear.

1.1.2. It applies to seat backs themselves, when they are so designed as to serve also as head restraints as defined in paragraph 2.2 below.

2. DEFINITIONS

For the purposes of this Regulation,

2.1. 'Vehicle type' means a category of power-driven vehicles which do not differ in such essential respects as:

2.1.1. the lines and internal dimensions of the bodywork constituting the passenger compartment,

2.1.2. the types and dimensions of the seats,

2.1.3. type and dimensions of head-restraint attachment and of the relevant parts of the vehicle structure in the case of head restraint directly anchored to the vehicle structure;

2.2. 'Head restraint' means a device whose function is to limit the rearward displacement of an adult occupant's head in relation to his torso in order to reduce the danger of injury to the cervical vertebrae of that occupant in the event of an accident;

2.2.1. 'Integrated head restraint' means a head restraint constituted by the upper part of the seat back. Head restraints corresponding to the definitions in paragraphs 2.2.2 and 2.2.3 below, but which cannot be detached from the seat or the vehicle structure except by the use of tools or following the partial or total removal of the seat furnishings, correspond to this definition;

2.2.2. 'Removable head restraint' means a head restraint constituted by a component separable from the seat, designed for insertion and positive retention in the seat back structure;

2.2.3. 'Separate head restraint' means a head restraint constituted by a separate component of the seat, designed for insertion and/or positive retention in the structure of the vehicle;

(*) Incorporating the 03 series of amendments.

⁽¹⁾ The head restraints of category M₁ vehicles which conform to the provisions of Regulation No 17 are not required to conform to the provisions of this Regulation.

- 2.3. 'Type of seat' means a category of seats which do not differ in their dimensions, in their framework or in their padding, although they may differ in finish and colour;
- 2.4. 'Type of head restraint' means a category of head restraints which do not differ in their dimensions, in their framework or in their padding, although they may differ in finish, in colour and in covering;
- 2.5. 'Reference point' of the seat (H point) (see annex 3 to this Regulation) means the trace, in a vertical plane longitudinal in relation to the seat, of the theoretical axis of rotation between the leg and the torso of a human body represented by a manikin;
- 2.6. 'Reference line' means a straight line which, either on a test manikin having the weight and dimensions of a fiftieth percentile adult male or on a test manikin having identical characteristics, passes through the joint of the leg with the pelvis and the joint of the neck with the thorax. On the manikin reproduced in annex 3 to this Regulation, for determining the H point of the seat, the reference line is that shown in fig. 1 in the appendix to that annex;
- 2.7. 'Head line' means a straight line passing through the centre of gravity of the head and through the joint of the neck with the thorax. When the head is at rest the head line is situated in the extension of the reference line;
- 2.8. 'Folding seat' means an auxiliary seat intended for occasional use and normally folded;
- 2.9. 'Adjustment system' means the device by which the seat or its parts can be adjusted to a position suited to the morphology of the seated occupant.

This device may, in particular, permit:

- 2.9.1. longitudinal displacement,
- 2.9.2. vertical displacement,
- 2.9.3. angular displacement;
- 2.10. 'Displacement system' means a device by which the seat or one of its parts can be displaced or rotated, without a fixed intermediate position, to permit easy access to the space behind the seat concerned.

3. APPLICATION FOR APPROVAL

- 3.1. The application for approval shall be submitted by the holder of the trade name or mark of the seat or the head restraint or by his duly accredited representative.
- 3.2. It shall be accompanied by the undermentioned documents in triplicate:
 - 3.2.1. a detailed description of the head restraint, specifying in particular the nature of the padding material or materials and, where applicable, the position and specifications of the braces and anchorage pieces for the type or types of seats for which approval of the head restraint is sought;
 - 3.2.2. In the case of a 'removable' head restraint (see the definition in paragraph 2.2.2):
 - 3.2.2.1. a detailed description of the type or types of seats for which approval of the head restraint is sought,
 - 3.2.2.2. particulars identifying the type or types of vehicle on which the seats referred to in paragraph 3.2.2.1 above are intended to be fitted;

- 3.2.3. In the case of a 'separate' head restraint (see the definition in paragraph 2.2.3):
 - 3.2.3.1. a detailed description of the structural zone to which the head restraint is intended to be fixed,
 - 3.2.3.2. particulars identifying the type of vehicle to which the head restraints are intended to be fitted,
 - 3.2.3.3. dimensional drawings of the characteristic parts of the structure and the head restraint, the drawings must show the position intended for the approval number in relation to the circle of the approval mark;
 - 3.2.4. dimensioned drawings of the characteristic parts of the seat and the head restraint. The drawings must show the position intended for the approval number in relation to the circle of the approval mark.
- 3.3. The following shall be submitted to the technical service responsible for conducting the approval tests:
 - 3.3.1. If the head restraint is of the 'integral' type (see the definition in paragraph 2.2.1), four complete seats.
 - 3.3.2. If the head restraint is of the 'removable' type (see the definition in paragraph 2.2.2):
 - 3.3.2.1. two seats of each of the types to which the head restraint is to be fitted;
 - 3.3.2.2. 4 + 2N head restraints, N being the number of types of seat to which the head restraint is to be fitted.
 - 3.3.3. If the head restraint is of the 'separate' type (see the definition in paragraph 2.2.3), three head restraints and the relevant part of the vehicle structure, or a complete vehicle.
- 3.4. The technical service responsible for conducting the approval tests may request:
 - 3.4.1. the delivery to that service of specific parts, or of specific samples of the materials used, and/or
 - 3.4.2. the production to that service of vehicles of the type or types referred to in paragraph 3.2.2.2 above.
- 4. MARKINGS
 - 4.1. The devices submitted for approval shall:
 - 4.1.1. be clearly and indelibly marked with the trade name or mark of the applicant for approval;
 - 4.1.2. provide, at a site shown in the drawings referred to in paragraphs 3.2.3.3 or 3.2.4 above, adequate space for the approval mark.
 - 4.2. Where the head restraint is of the 'integral' or 'removable' type (see definitions in paragraphs 2.2.1 and 2.2.2), the markings referred to in paragraphs 4.1.1 and 4.1.2 above may be reproduced on labels situated at a site shown in the drawings referred to in paragraph 3.2.4 above.
- 5. APPROVAL
 - 5.1. If the type of head restraint submitted for approval pursuant to this Regulation meets the requirements of paragraphs 6 and 7 below, approval of that type of head restraint shall be granted.
 - 5.2. An approval number shall be assigned to each type approved. Its first two digits (at present 03 corresponding to the 03 series of amendments which entered into force on 20 November 1989) 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 this number to another type of head restraint.

- 5.3. Notice of approval or of extension or of refusal of approval of a type of head restraint pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation, by means of a form conforming to the model in annex 1 to this Regulation.
- 5.4. There shall be affixed to every head restraint defined in paragraphs 2.2.1, 2.2.2 and 2.2.3 approved under this Regulation, whether incorporated in a seat or not, 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. the approval number; and
- 5.4.3. in the case of a head restraint incorporated in the seat back, in front of the approval number, the number of this Regulation, the letter 'R' and a dash.
- 5.5. The approval mark shall be affixed in the space referred to in paragraph 4.1.2 above.
- 5.6. The approval mark shall be clearly legible and be indelible.
- 5.7. Annex 2 to this Regulation gives examples of the arrangement of the approval marks.
6. GENERAL SPECIFICATIONS
- 6.1. The presence of the head restraint shall not be an additional cause of danger to occupants of the vehicle. In particular it shall not in any position of use exhibit any dangerous roughness or sharp edge liable to increase the risk or seriousness of injury to the occupants. Parts of the head restraint which are situated in the impact zone defined below shall be capable of dissipating energy in the manner specified in annex 6 to this Regulation.
- 6.1.1. The impact zone is bounded laterally by two vertical longitudinal planes, one on each side of and each 70 mm distant from the plane of symmetry of the seat considered.
- 6.1.2. The impact zone is limited in height to the part of the head restraint situated above the plane perpendicular to the reference line R and 635 mm distant from the H point.
- 6.1.3. By derogation from the above provisions, the requirements concerning energy absorption shall not apply to the rear faces of head restraints for seats behind which there are no other seats.
- 6.2. Parts of the front and rear faces of the head restraint, excluding parts of the rear faces of head restraints designed to be installed in seats behind which no other seating positions are provided, which are situated outward of the longitudinal vertical planes defined above shall be so padded as to prevent any direct contact of the head with the components of the structure, which shall, in those areas which can be contacted by a sphere of 165 mm diameter, have a radius of curvature of not less than 5 mm.

⁽¹⁾ 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 (vacant), 25 (vacant), 26 for Slovenia and 27 for Slovakia. 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.

Alternatively, these components may be considered satisfactory if they pass the energy-absorption test described in annex 6 to this Regulation. If the above-mentioned parts of the head restraints and their supports are covered with material softer than 50 Shore (A) hardness, the requirements of this paragraph, with the exception of those relating to energy absorption as defined in annex 6 to this Regulation, shall apply only to the rigid parts.

- 6.3. The head restraint shall be anchored to the seat or, where appropriate, to the vehicle structure, in such a way that no rigid and dangerous part projects from the padding of the head restraint, from the anchorage or from the seat back as a result of the pressure exerted by the head during the test.
- 6.4. The height of the head restraint, measured in accordance with the requirements of paragraph 7.2 below, shall conform to the following specifications:
 - 6.4.1. The height of head restraints shall be measured as described in paragraph 7.2 below.
 - 6.4.2. For head restraints not adjustable for height, the height shall be not less than 800 mm in the case of front seats and 750 mm in the case of other seats.
 - 6.4.3. For head restraints adjustable for height:
 - 6.4.3.1. the height shall be not less than 800 mm in the case of front seats and 750 mm in the case of other seats; this value shall be obtained in a position between the highest and lowest positions to which adjustment is possible;
 - 6.4.3.2. there shall be no 'use position' resulting in a height of less than 750 mm;
 - 6.4.3.3. in the case of seats other than the front seats the head restraints may be such that they can be displaced to a position resulting in a height of less than 750 mm, provided that such position is clearly recognizable to the occupant as not being included for the use of the head restraint;
 - 6.4.3.4. in the case of front seats head restraints may be such that they can be automatically displaced when the seat is not occupied, to a position resulting in a height of less than 750 mm, provided that they automatically return to the position of use when the seat is occupied.
 - 6.4.4. The dimensions mentioned in paragraphs 6.4.2 and 6.4.3.1 above may be less than 800 mm in the case of front seats and 750 mm in the case of other seats to leave adequate clearance between the head restraint and the interior surface of the roof, the windows or any part of the vehicle structure; however, the clearance shall not exceed 25 mm. In the case of seats fitted with displacement and/or adjustment systems, this shall apply to all seat positions. Furthermore, by derogation to paragraph 6.4.3.2 above, there shall not be any 'use position' resulting in a height lower than 700 mm.
 - 6.4.5. By derogation to the height requirements mentioned in paragraphs 6.4.2 and 6.4.3.1 above, the height of any head restraint designed to be provided in rear centre seats or seating positions shall be not less than 700 mm.
- 6.5. The height of the device on which the head rests, measured as prescribed in paragraph 7.2, shall in the case of a head restraint adjustable for height be not less than 100 mm.
- 6.6. There shall be no gap of more than 60 mm between the seat back and the head restraint in the case of a device not adjustable for height.
 - 6.6.1. If the head restraint is adjustable for height it shall, in its lowest position, be not more than 25 mm from the top of the seat back.
 - 6.6.2. In the case of a head restraint not adjustable for height, the area to be considered is:
 - 6.6.2.1. above a plane perpendicular to the reference line at 540 mm from the R point and

- 6.6.2.2. between two vertical longitudinal planes passing at 85 mm on either side of the reference line.

In this area, one or more gaps, which regardless of its shape can show a distance 'a' measured as described in paragraph 7.5 of more than 60 mm, are permitted provided that after the additional test under paragraph 7.4.3.4, the requirements of paragraph 7.4.3.6 are still met.

- 6.6.3. In the case of head restraints adjustable for height, one or more gaps, which regardless of its shape can show a distance 'a' measured as described in paragraph 7.5 of more than 60 mm, are permitted on the part of the device serving as the head restraint provided that, after the additional test under paragraph 7.4.3.4, the requirements of paragraph 7.4.3.6 are still met.
- 6.7. The width of the head restraint shall be such as to provide suitable support for the head of a person normally seated. In the plane of measurement of width defined in paragraph 7.3 below, the head restraint shall cover an area extending not less than 85 mm to each side of the plane of symmetry of the seat for which the head restraint is intended, that distance being measured as prescribed in paragraph 7.3.
- 6.8. The head restraint and its anchorage shall be such that the maximum backward displacement of the head permitted by the head restraint and measured in conformity with the static procedure prescribed in paragraph 7.4 below is less than 102 mm.
- 6.9. The head restraint and its anchorage shall be strong enough to bear without failure the load prescribed in paragraph 7.4.3.7 below.
- 6.10. If the head restraint is adjustable, it must not be possible to exceed the maximum prescribed height for use without voluntary action by the user in addition to adjusting operation.

7. TESTS

- 7.1. Determination of the reference point (H point) of the seat in which the head restraint is incorporated

This point shall be determined in conformity with the requirements of annex 3 to this Regulation.

- 7.2. Determination of the height of the head restraint

- 7.2.1. All lines shall be drawn in the plane of symmetry of the seat considered, the intersection of which plane with the seat determines the countour of the head restraint and of the seat back (see annex 4, fig. 1, to this Regulation).

- 7.2.2. The manikin corresponding to a fiftieth percentile adult male or the manikin shown in annex 3 to this Regulation shall be placed in a normal position on the seat. The seat back, if inclinable, shall be locked in a position corresponding to a rearward inclination of the reference line of the manikin's torso of as nearly as possible 25° from the vertical.

- 7.2.3. The projection of the reference line of the manikin shown in annex 3 shall in the case of the seat considered be drawn in the plane specified in paragraph 7.2.1. The tangent S to the top of the head restraint shall be drawn perpendicular to the reference line.

- 7.2.4. The distance h from the H point to the tangent S is the height to be taken into consideration in implementing the requirement of paragraph 6.4.

- 7.3. Determination of the width of the head restraint (see annex 4, fig. 2, to this Regulation).

- 7.3.1. The plane S_1 perpendicular to the reference line and situated 65 mm below the tangent S defined in paragraph 7.2.3 defines a section in the head restraint bounded by the outline C. The direction of the straight lines tangential to C representing the intersection of the vertical planes (P and P'), parallel to the plane of symmetry of the seat considered, with the plane S_1 shall be traced in the plane S_1 .

- 7.3.2. The width of the head restraint to be taken into consideration in implementing the requirement of paragraph 6.7 is the distance L separating the traces of planes P and P' in plane S₁.
- 7.3.3. The width of the head restraint shall if necessary also be determined 635 mm above the reference point of the seat, this distance being measured along the reference line.
- 7.4. Determination of the effectiveness of the device
- 7.4.1. The effectiveness of the head restraint shall be checked by the static test described below.
- 7.4.2. Preparation for the test
- 7.4.2.1. If the head restraint is adjustable it shall be set in the highest position.
- 7.4.2.2. In the case of a bench seat, where part or all of the supporting frame (including that of the head restraints) is common to more than one seating position, the test shall be conducted simultaneously for all those seating positions.
- 7.4.2.3. If the seat or the seat-back is adjustable relative to a head restraint anchored to the vehicle structure, it shall be placed in the most unfavourable position as considered by the technical service.
- 7.4.3. Testing
- 7.4.3.1. All lines shall be drawn in the vertical plane of symmetry of the seat considered (see annex 5 to this Regulation).
- 7.4.3.2. A projection of the reference line R shall be drawn in the plane referred to in paragraph 7.4.3.1.
- 7.4.3.3. The displaced reference line R₁ shall be determined by applying to the part simulating the back in the manikin referred to in annex 3 to this Regulation an initial force producing a rearward moment of 37,3 daNm about the H point.
- 7.4.3.4. By means of a spherical head 165 mm in diameter an initial force producing a moment of 37,3 daNm about the H point shall be applied at right angles to the displaced reference line R₁ at a distance of 65 mm below the top of the head restraint the reference line being retained in its displaced position R₁ as determined in accordance with the requirements of paragraph 7.4.3.3 above.
- 7.4.3.4.1. If the presence of gaps prevents the application of the force prescribed above at 65 mm from the top of the head restraint, the distance may be reduced so that the axis of the force passes through the centre line of the frame element nearest to the gap.
- 7.4.3.4.2. In the case described in paragraphs 6.6.2 and 6.6.3 above, the test shall be repeated by applying to each gap, using a sphere of 165 mm in diameter, a force:
- passing through the centre of gravity of the smallest of the sections of the gap, along transversal planes parallel to the reference line, and reproducing a moment of 37,3 daNm about the 'R' point.
- 7.4.3.5. The tangent Y to the spherical head, parallel to the displaced reference line R₁, shall be determined.
- 7.4.3.6. The distance X between the tangent Y and the displaced reference line R₁ shall be measured. The requirement of paragraph 6.8 shall be considered to be met if the distance X is less than 102 mm.
- 7.4.3.7. In cases where the force prescribed in paragraph 7.4.3.4 is applied at a distance of 65 mm or less below the top of the head restraint, and only in such cases, it shall be increased to 89 daNm unless breakage of the seat or its back occurs earlier.

- 7.5. Determination of distance 'a' of head restraint gaps (see annex 7 to this Regulation)
- 7.5.1. The distance 'a' shall be determined for each gap and in relation to the front face of the head restraint, by means of a sphere having a diameter of 165 mm;
- 7.5.2. The sphere shall be put into contact with the gap in a point of the gap area which allows the maximum sphere intrusion considering no load to be applied;
- 7.5.3. The distance between the two points of contact of the sphere with the gap will constitute the distance 'a' to be considered for the evaluation of the provisions under paragraph 6.6.2 and 6.6.3.
8. CONFORMITY OF PRODUCTION
- 8.1. Every head restraint or seat bearing an approval mark in conformity with annex 2 shall conform to the type of head restraint approved and comply with the conditions prescribed in paragraphs 6 and 7 above.
- 8.2. In order to verify conformity as aforesaid, a sufficient number of random checks shall be performed on serially-produced head restraints.
- 8.3. Head restraints offered or to be offered for sale shall be used for the tests.
- 8.4. Head restraints selected for verification of conformity with an approved type shall undergo the test described in paragraph 7 of this Regulation.
9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 9.1. *Approved head restraints*
- The approval granted in respect of a type of head restraint pursuant to this Regulation may be withdrawn if head restraints bearing the particulars referred to in paragraph 5.4 above fail to pass the random checks or do not conform to the type approved.
- 9.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in annex 1 to this Regulation.
10. MODIFICATION AND EXTENSION OF APPROVAL OF A TYPE OF HEAD RESTRAINT
- 10.1. Every modification of the type of head restraint shall be notified to the administrative department which approved the type of head restraint. The department may then either:
- 10.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the head restraint still complies with the requirements; or
- 10.1.2. Require a further test report from the technical service responsible for conducting the tests.
- 10.2. 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 applying this Regulation.
- 10.3. The competent authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation.

11. INSTRUCTIONS

The manufacturer shall supply, with each model conforming to a type of head restraint approved, particulars of the types and characteristics of the seats for which the head restraint is approved. When the head restraint is adjustable, the adjusting and/or release operations must be clearly stated in this notice.

12. PRODUCTION DEFINITELY DISCONTINUED

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

13. TRANSITIONAL PROVISIONS

13.1. As from the official date of entry into force of the 04 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approvals under this Regulation as amended by the 04 series of amendments.

13.2. As from 24 months after the date of entry into force of the 04 series of amendments, Contracting Parties applying this Regulation shall grant ECE approval only if the vehicle type to be approved complies with the requirements of this Regulation as amended by the 04 series of amendments.

13.3. As from 48 months after the date of entry into force of the 04 series of amendments, existing approvals to this Regulation shall cease to be valid, except in the case of vehicle types which comply with the requirements of this Regulation as amended by the 04 series of amendments.

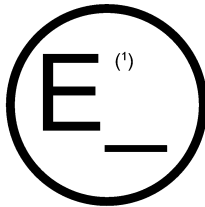
14. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS AND OF ADMINISTRATIVE DEPARTMENTS

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

ANNEX 1

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by:

Name of administration:

.....

.....

.....

Concerning ⁽²⁾:

APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of a type of head restraint, whether or not incorporated in a seat pursuant to Regulation No 25

Approval No:

Extension No:

1. Trade name or mark:
2. Manufacturer's name:
3. If applicable, name of manufacturer's representative:
4. Address:
5. Submitted for approval on:
6. Technical service conducting tests:
7. Brief description of the head restraint ⁽³⁾:
8. Type and characteristics of the seats for which the head restraint is intended or in which it is incorporated:
9. Types of vehicles for which the seats for which the head restraint is designed are intended:
10. Date of report issued by the technical service:
11. Number of report issued by the technical service:
12. Approval granted/refused/extended/withdrawn ⁽²⁾
13. Place:
14. Date:
15. Signature:
16. The list of documents filed with the administration service which has granted approval and available on request is annexed to this communication.

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

⁽²⁾ Strike out what does not apply.

⁽³⁾ In the case of «integrated» or «removable» head restraints (see the definitions in paragraphs 2.2.1 and 2.2.2 of this Regulation), this item need not be completed if all the necessary characteristics and particulars are entered under item 8.

ANNEX 2

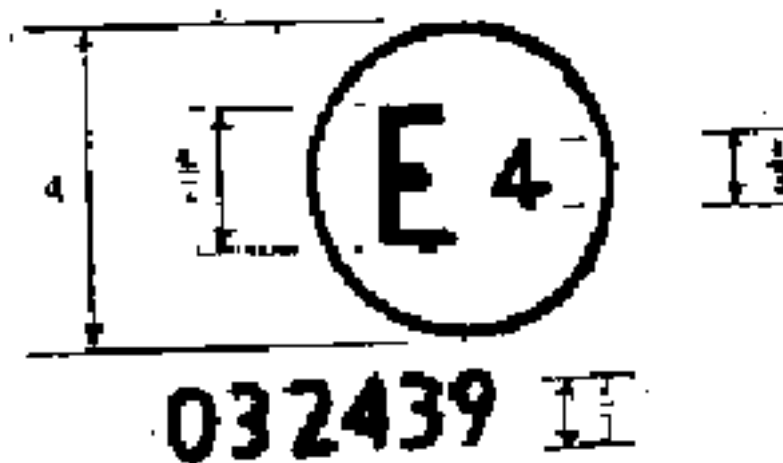
ARRANGEMENTS OF APPROVAL MARKS (*)

Approval mark for an 'integrated' or 'removable' type head restraint (see the definitions in paragraphs 2.2.1 and 2.2.2 of this Regulation).



The above approval mark affixed to one or more 'integrated' or 'removable' type head restraints shows that, pursuant to Regulation No 25, the type of head restraint has been approved in the Netherlands (E4) under approval number 032439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 25 as amended by the 03 series of amendments.

Approval mark for a 'separate' type head restraint (see the definition in paragraph 2.2.3 of this Regulation).



The above approval mark affixed to a head restraint shows that the head restraint in question has been approved and that it is a 'separate' head restraint, approved in the Netherlands (E4), under approval number 032439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 25, as amended by the 03 series of amendments.

(*) The approval number must be placed close to the circle and either above or below the 'E', or to the left or right of that letter.

ANNEX 3

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

1. PURPOSE

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

2. DEFINITIONS

For the purposes of this annex:

- 2.1. 'Reference data' means one or several of the following characteristics of a seating position:
 - 2.1.1. the 'H' point and the 'R' point and their relationship;
 - 2.1.2. the actual torso angle and the design torso angle and their relationship.
- 2.2. 'Three-dimensional "H" point machine' (3-D H machine) means the device used for the determination of 'H' points and actual torso angles. This device is described in appendix 1 to this annex.
- 2.3. "'H" point' means the pivot centre of the torso and thigh of the 3-D H machine installed in the vehicle seat in accordance with paragraph 4 below. The 'H' point is located in the centre of the centreline of the device which is between the 'H' point sight buttons on either side of the 3-D H machine. The 'H' point corresponds theoretically to the 'R' point (for tolerances see paragraph 3.2.2 below). Once determined in accordance with the procedure described in paragraph 4, the 'H' point is considered fixed in relation to the seat-cushion structure and to move with it when the seat is adjusted.
- 2.4. "'R" point' or 'seating reference point' means a design point defined by a vehicle manufacturer for each seating position and established with respect to the three-dimensional reference system.
- 2.5. 'Torso-line' means the centreline of the probe of the 3-D H machine with the probe in the fully rearward position.
- 2.6. 'Actual torso angle' means the angle measured between a vertical line through the 'H' point and the torso line using the back angle quadrant on the 3-D H machine. The actual torso angle corresponds theoretically to the design torso angle (for tolerances see paragraph 3.2.2 below).
- 2.7. 'Design torso angle' means the angle measures between a vertical line through the 'R' point and the torso line in a position which corresponds to the design position of the seat-back established by the vehicle manufacturer.
- 2.8. 'Centreplane of occupant' (C/LO) means the median plane of the 3-D H machine positioned in each designated seating position; it is represented by the co-ordinate of the 'H' point on the 'Y' axis. For individual seats, the centreplane of the seat coincides with the centreplane of the occupant. For other seats, the centreplane of the occupant is specified by the manufacturer;
- 2.9. 'Three-dimensional reference system' means a system as described in appendix 2 to this annex;
- 2.10. 'Fiducial marks' are physical points (holes, surfaces, marks or indentations) on the vehicle body as defined by the manufacturer;

⁽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.

- 2.11. '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 that 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-D H machine.
- 4.2. The vehicle shall be at the measuring attitude defined in paragraph 2.11 above.
- 4.3. The seat, if it is adjustable, shall be adjusted first to the rearmost normal driving or riding position, as indicated by the vehicle manufacturer, taking into consideration only the longitudinal adjustment of the seat, excluding seat travel used for purposes other than normal driving or riding positions. Where other modes of seat adjustment exist (vertical, angular, seat-back. etc.) these will 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-D H machine shall be covered by a muslin cotton, of sufficient size and appropriate texture, described as a plain cotton fabric having 18,9 threads per cm² and weighing 0,228 kg/m² or knitted or non-woven fabric having equivalent characteristics.

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

- 4.5. Place the seat and back assembly of the 3-D H machine so that the centreplane of the occupant (C LO) coincides with the centreplane of the 3-D H machine. At the manufacturer's request, the 3-D H machine may be moved inboard with respect to the C LO if the 3-D H machine is located so far outboard that the seat edge will not permit levelling of the 3-D H machine.
- 4.6. Attach the foot and lower leg assemblies to the seat pan assembly, either individually or by using the T-bar and lower leg assembly. A line through the 'H' point sight buttons shall be parallel to the ground and perpendicular to the longitudinal centreplane of the seat.

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

- 4.7.1. Designated seating position: driver and outside front passenger

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

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

- 4.7.2. Designated seating position: outboard rear

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

- 4.7.3. Other designated seating positions:

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

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

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

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

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

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

- 4.10. Apply a 100 + 10 N load to the back and pan assembly of the 3-D H machine at the intersection of the hip angle quadrant and the T-bar housing. The direction of load application shall be maintained along a line passing by the above intersection to a point just above the thigh bar housing (see figure 2 of appendix 1 to this annex). Then carefully return the back pan to the seat-back. Care must be exercised throughout the remainder of the procedure to prevent the 3-D H machine from sliding forward.
- 4.11. Install the right and left buttock weights and then, alternately, the eight torso weights. Maintain the 3-D H machine level.
- 4.12. Tilt the back pan forward to release the tension on the seatback. Rock the 3-D H machine from side to side through 10° arc (5° to each side of the vertical centreplane) for three complete cycles to release any accumulated friction between the 3-D H machine and the seat.

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

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

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

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

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

- 4.13. Holding the T-bar to prevent the 3-D H machine from sliding forward on the seat cushion, proceed as follows:
 - (a) return the back pan to the seat back;
 - (b) alternately apply and release a horizontal rearward load, not to exceed 25 N, to the back angle bar at a height approximately at the centre of the torso weights until the hip angle quadrant indicates that a stable position has been reached after load release. Care shall be exercised to ensure that no exterior downward or lateral loads are applied to the 3-D H machine. If another level adjustment of the 3-D H machine is necessary, rotate the back pan forward, re-level, and repeat the procedure from 4.12.
- 4.14. Take all measurements:
 - 4.14.1. The co-ordinates of the 'H' point are measured with respect to the three-dimensional reference system;
 - 4.14.2. The actual torso angle is read at the back angle quadrant of the 3-D H machine with the probe in its fully rearward position.
- 4.15. If a re-run of the installation of the 3-D H machine is desired, the seat assembly should remain unloaded for a minimum period of 30 min prior to the re-run. The 3-D H machine should not be left loaded on the seat assembly longer than the time required to perform the test.
- 4.16. If the seats in the same row can be regarded as similar (bench seat, identical seats, etc.) only one 'H' point and one 'actual torso angle' shall be determined for each row of seats, the 3-D H machine described in appendix 1 to this annex being seated in a place regarded as representative for the row. This place shall be:
 - 4.16.1. in the case of the front row, the driver's seat;
 - 4.16.2. in the case of the rear row or rows, an outer seat.

*Appendix 1***DESCRIPTION OF THE THREE DIMENSIONAL 'H' POINT MACHINE (*)**

(3-D H machine)

1. BACK AND SEAT PANS

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

2. BODY AND LEG ELEMENTS

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

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

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

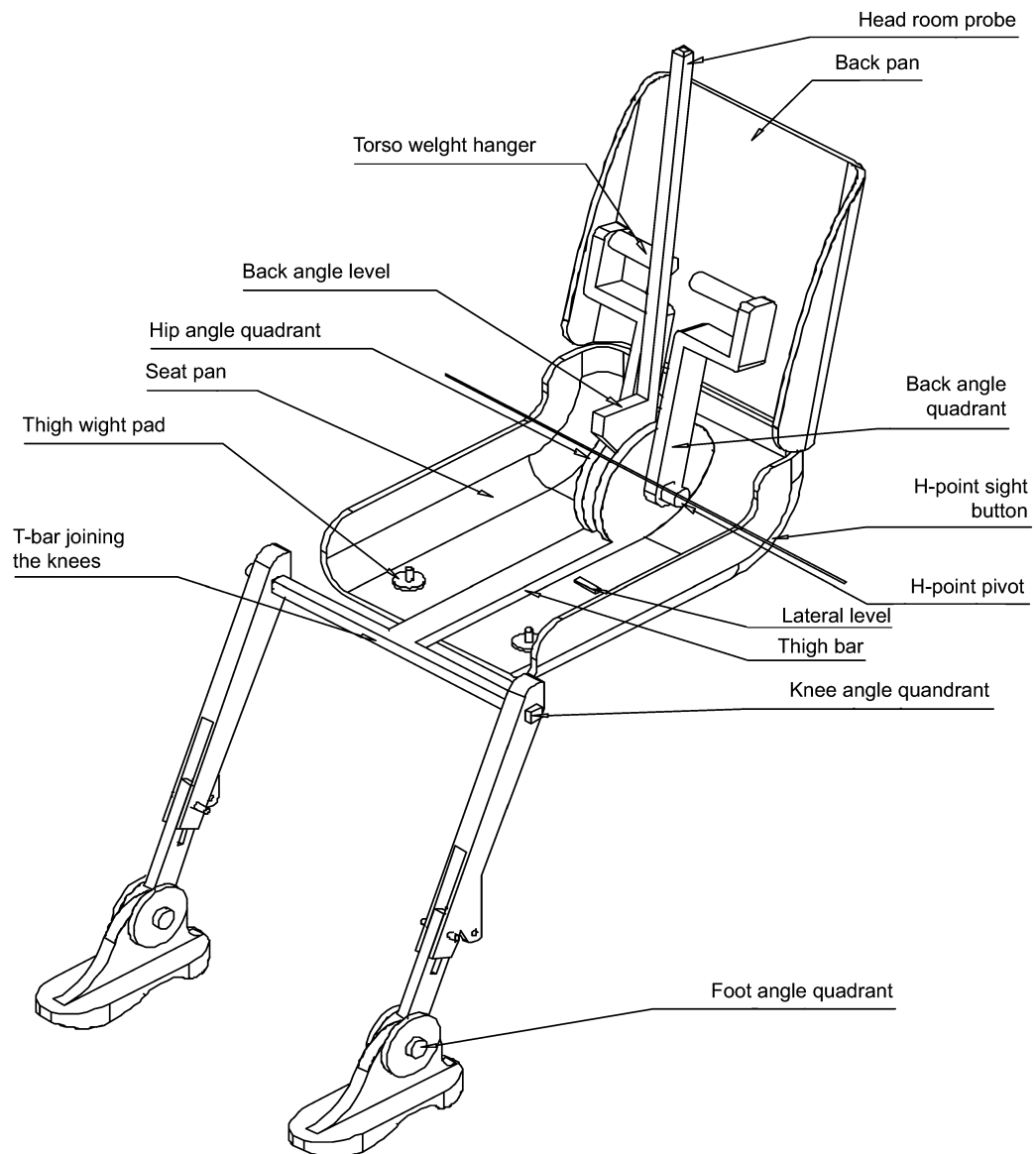


Figure 1: 3-D H machine elements designation

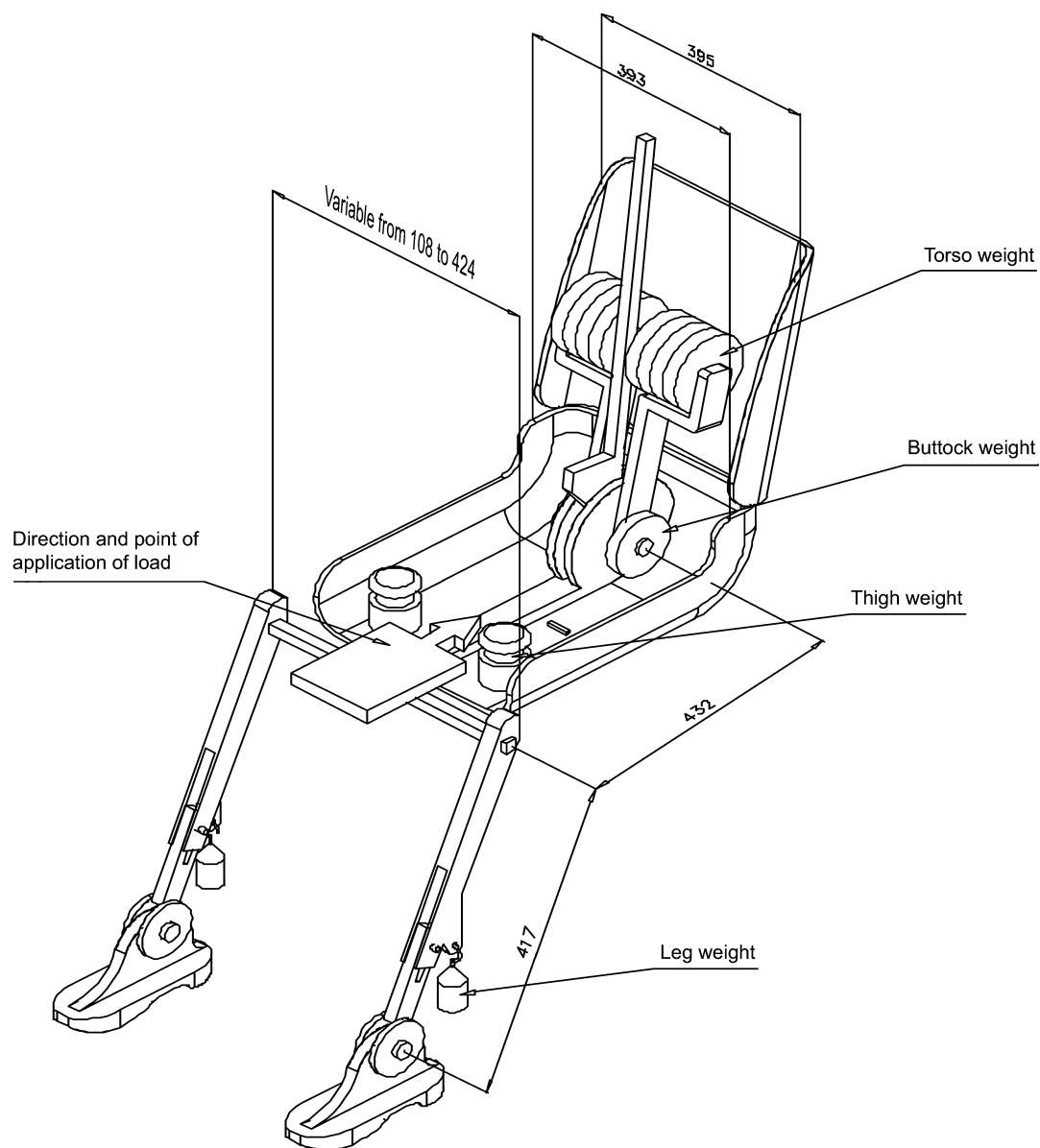


Figure 2: Dimensions of the 3-D H machine elements and load distribution

Appendix 2

THREE-DIMENSIONAL REFERENCE SYSTEM

1. The three-dimensional reference system is defined by three orthogonal planes established by the vehicle manufacturer (see figure) (*).
2. The vehicle measuring attitude is established by positioning the vehicle on the supporting surface such that the 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.

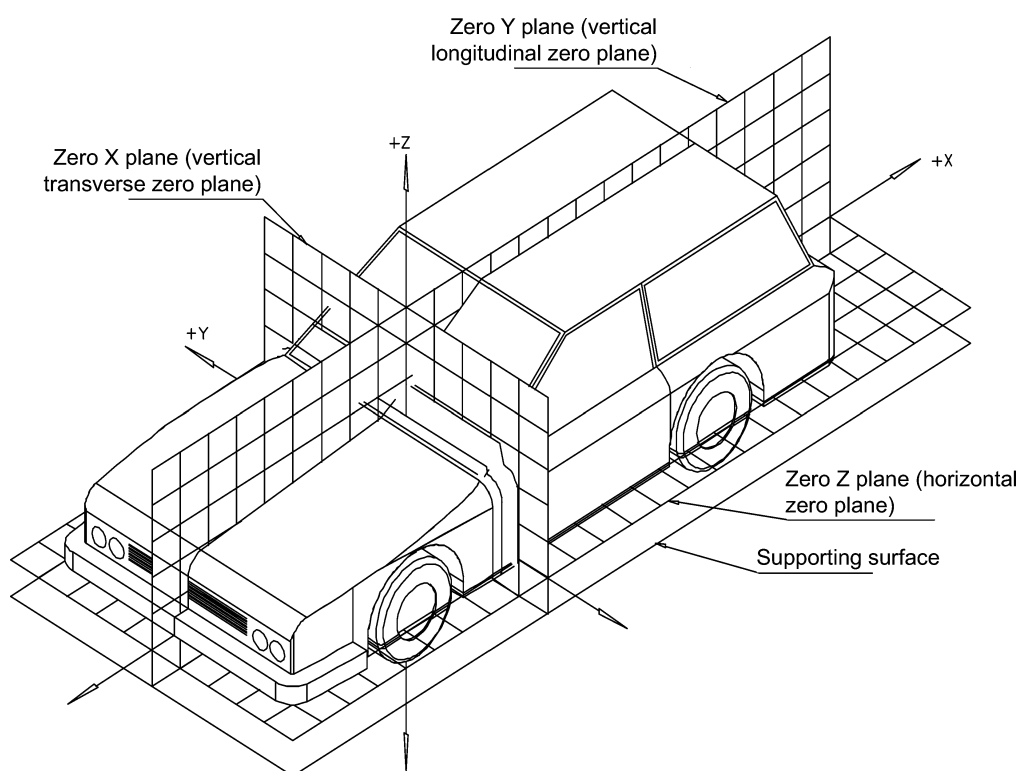


Figure: Three-dimensional reference system

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

*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 4

DETERMINATION OF HEIGHT AND WIDTH OF HEAD RESTRAINT

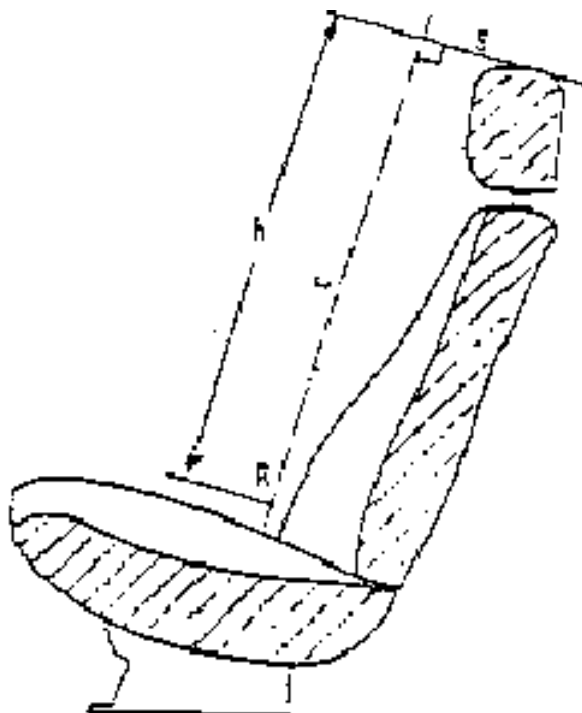


Figure 1: Height

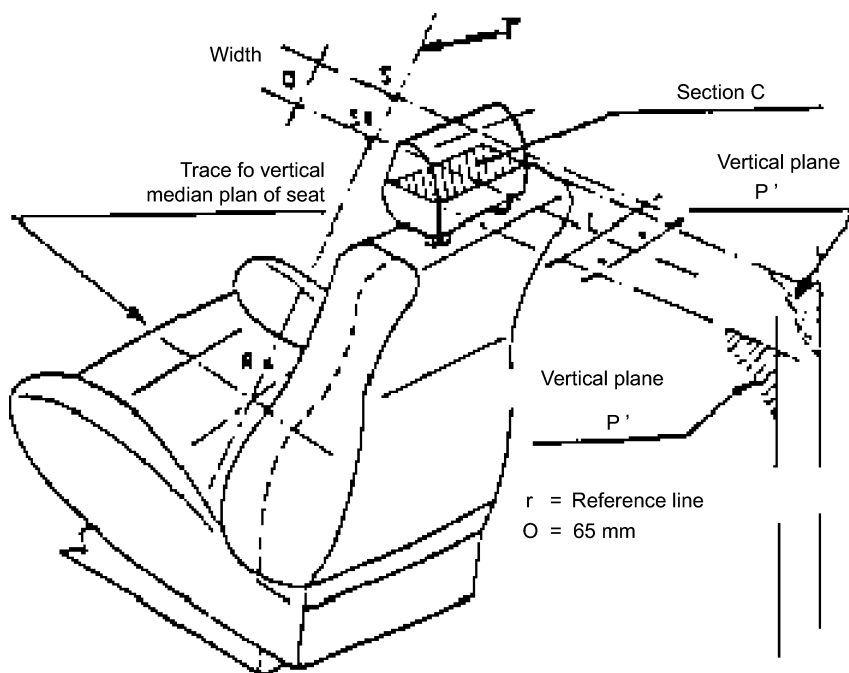
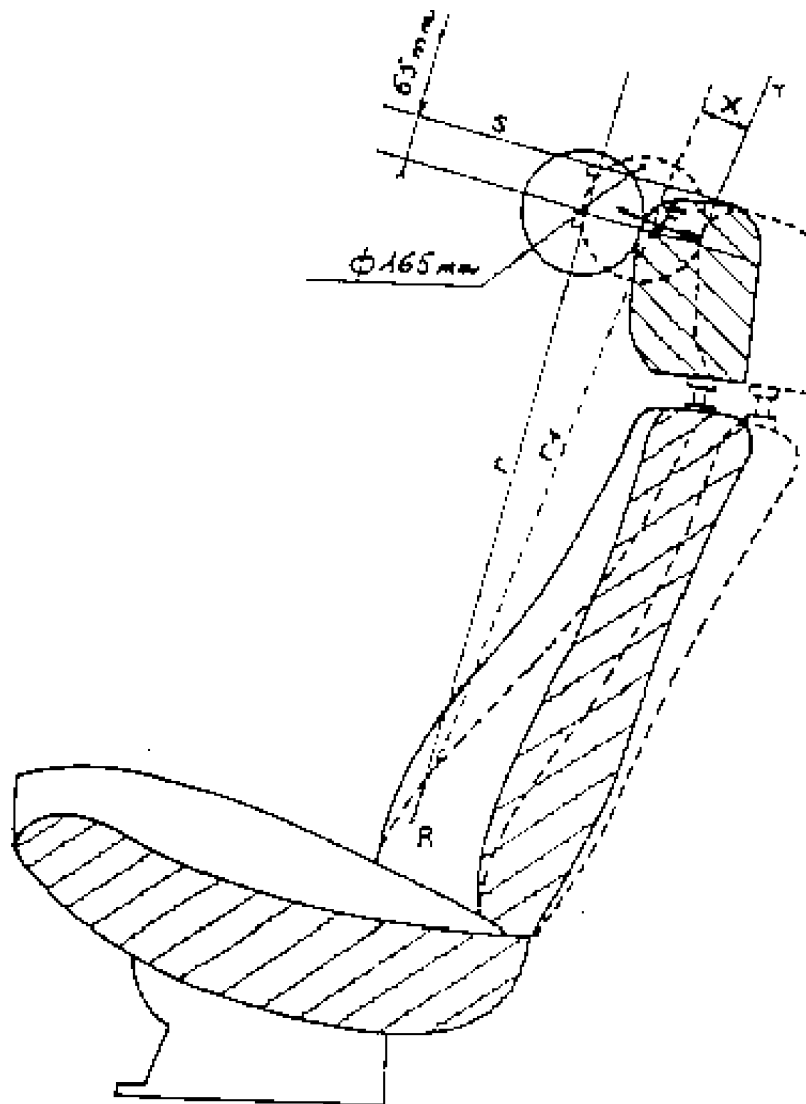


Figure 2

ANNEX 5

DETAILS OF LINES DRAWN AND MEASUREMENTS TAKEN DURING TESTS



_____ Outline of Initial position
 - - - - - Outline of Position under load
 r: reference line
 r1: displaced reference line

Moment of F in relation to r: 37,3 daNm

ANNEX 6

TEST PROCEDURE FOR CHECKING ENERGY DISSIPATION**1. INSTALLATION, TEST APPARATUS, RECORDING INSTRUMENTS AND PROCEDURE****1.1. Installation**

The head restraint covered with an energy dissipating material shall be fitted and tested on the seat or the structural part of the vehicle in which it is installed. The structural component shall be firmly secured to the test bench so as to remain stationary when the impact is applied, and the base on which it rests shall, in the absence of a particular specification for which reasons are given, be approximately horizontal. The seat back, if it can be adjusted, shall be bolted into the position described in paragraph 7.2.2 of this Regulation.

The head restraint shall be mounted on the seat back, as it is presented in the vehicle. In the case of a separate head restraint, it shall be secured to the part of the vehicle structure to which it is normally secured.

If the head restraint is adjustable it shall be placed in the most unfavourable position the adjustment device permits.

1.2. Test apparatus

1.2.1. This apparatus consists of a pendulum whose pivot is supported by ball-bearings and whose reduced mass (*) at its centre of percussion is 6,8 kg. The lower extremity of the pendulum consists of a rigid headform 165 mm in diameter whose centre is identical with the centre of percussion of the pendulum.

1.2.2. The headform shall be fitted with two accelerometers and a speed-measuring device, all capable of measuring values in the direction of impact.

1.3. Recording instruments

The recording instruments used shall be such that measurements can be made with the following degrees of accuracy:

1.3.1. Acceleration:

accuracy = ± 5 % of the actual value

frequency class of the measurement chain: CFC 600 corresponding to the characteristics of ISO standard 6487 (1987)

Transverse sensitivity ≤ 5 % of the lowest point on the scale.

1.3.2. Speed:

accuracy = $\pm 2,5$ % of the real value;

sensitivity = 0,5 km/h

1.3.3. Time recording

the instrumentation shall enable the action to be recorded throughout its duration and readings to be made within one one-thousandth of a second:

the beginning of the impact at the moment of first contact between the headform and the item being tested shall be detected on the recordings used for analysing the test.

(*) The relationship of the reduced mass 'm_r' of the pendulum to the total mass 'm' of the pendulum at a distance 'a' between the centre of percussion and the axis of rotation and at a distance 'l' between the centre of gravity and the axis of rotation is given by the formula:
 $m_r = m (l/a)$.

1.4. *Test procedure*

1.4.1. With the head restraint installed and adjusted as indicated in paragraph 1.1 of this annex, the impact shall take place at points selected by the laboratory in the impact zone defined in paragraph 6.1 of this Regulation and possibly outside the impact zone defined in paragraph 6.2 of this Regulation on surfaces with a radius of curvature of less than 5 mm.

1.4.1.1. On the rear surface, the direction of impact from the rear towards the front in a longitudinal plane shall be at an angle of 45° to the vertical.

1.4.1.2. On the front surface, the direction of impact from the front towards the rear, in a longitudinal plane, shall be horizontal.

1.4.1.3. The front and rear zones are bounded by the horizontal plane tangential to the top of the head restraint as determined in paragraph 7.2 of this Regulation.

1.4.2. The headform shall strike the test item at a speed of 24,1 km/h; this speed shall be achieved either by the mere energy of propulsion or by using an additional impelling device.

2. RESULTS

In tests carried out by the above procedure the deceleration of the headform shall not exceed 80 g continuously for more than 3 milliseconds. The deceleration rate shall be taken as the average of the readings on the two decelerometers.

3. EQUIVALENT PROCEDURES

3.1. Equivalent test procedures shall be permitted on condition that the results required in paragraph 2 above can be obtained, in particular, items of test apparatus may be oriented differently so long as the relative angles between the head restraint and the direction of impact are respected.

3.2. Responsibility for demonstrating the equivalence of a method other than that described in paragraph 1 shall rest with the person using that other method.

ANNEX 7

DETERMINATION OF DIMENSION 'A' OF HEAD RESTRAINT GAPS

(see paragraphs 6.6.2 and 6.6.3 of this Regulation)

Section A — A

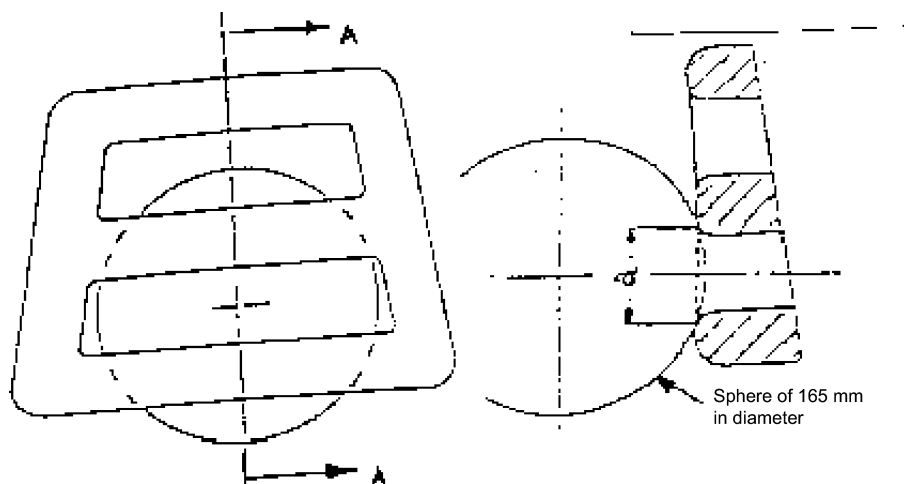


Figure 1: Example of horizontal gaps

Note: Section A — A is to be made in a point of the gap area which allows the maximum sphere intrusion, without exerting any load.

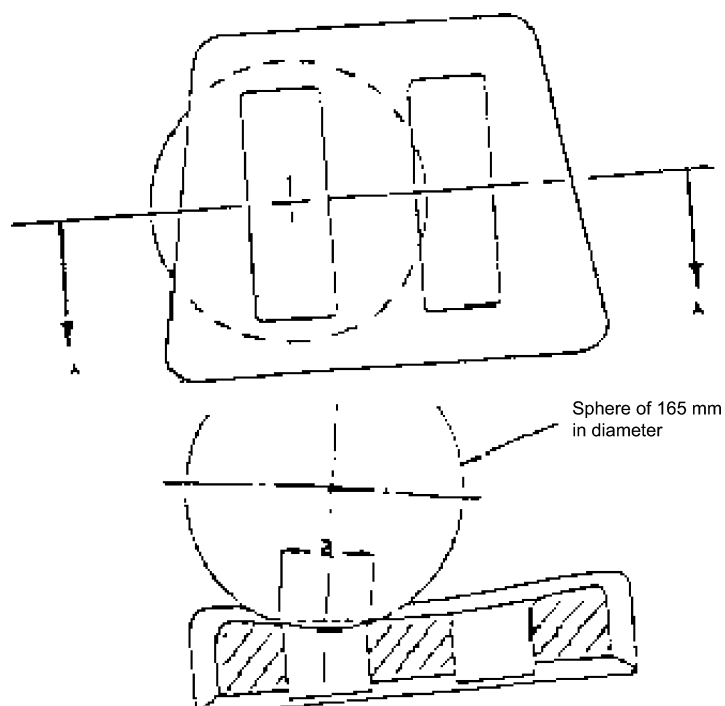


Figure 2: Example of vertical gaps

Note: Section A — A is to be made in a point of the gap area which allows the maximum sphere intrusion, without exerting any load.

Regulation No 26 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of vehicles with regard to their external projections

1. SCOPE AND PURPOSE

- 1.1. This Regulation applies to external projections of category M1 vehicles ⁽¹⁾. It does not apply to exterior rear-view mirrors or to the ball of towing devices.
- 1.2. The purpose of this Regulation is to reduce the risk or seriousness of bodily injury to a person hit by the bodywork or brushing against it in the event of a collision. This is valid both when the vehicle is stationary and in motion.

2. DEFINITIONS

For the purposes of this Regulation:

- 2.1. 'Approval of a vehicle' means the approval of a vehicle type with regard to its external projections.
- 2.2. 'Vehicle type' means a category of motor vehicles which do not differ in such essential respects as, shape or materials of the external surface.
- 2.3. 'External surface' means the outside of the vehicle including the bonnet, the lid of the luggage compartment, the doors, the wings, the roof, the lighting and light-signalling devices and the visible strengthening components.
- 2.4. 'Floor line' means the line determined as follows:
- Successively position round a laden vehicle a cone with a vertical axis the height of which is not defined, and with a half angle of 30° in such a way that it contacts, constantly and as low as possible, the external surface of the vehicle. The floor line is the geometric trace of these points of contact. In determining the floor line, the jacking points, exhaust pipes or wheels shall not be taken into consideration. The gaps of the wheel arches are assumed to be filled in by an imaginary surface forming a smooth continuation of the surrounding external surface. At both ends of the vehicle the bumper shall be taken into consideration when establishing the floor line. Dependent upon the particular vehicle the floor line trace may occur at the bumper section extremity or at the body panel below the bumper. Where two or more points of contact occur simultaneously, the lower point of contact shall be used to determine the floor line.
- 2.5. 'Radius of curvature' means the radius of the arc of a circle which comes closest to the rounded form of the component under consideration.
- 2.6. 'Laden vehicle' means the vehicle laden to the maximum permitted technical mass. Vehicles equipped with hydropneumatic, hydraulic or pneumatic suspension or a device for automatic levelling according to load shall be tested with the vehicle in the most adverse normal running condition specified by the manufacturer.
- 2.7. 'Extreme outer edge' of the vehicle means, in relation to the sides of the vehicle, the plane parallel to the median longitudinal plane of the vehicle coinciding with its outer lateral edge, and, in relation to the front and rear ends, the perpendicular transverse plane of the vehicle coinciding with its outer front and rear edges, account not being taken of the projection:
- 2.7.1. of tyres near their point of contact with the ground, and connections for tyre pressure gauges;

⁽¹⁾ As defined in Annex 7 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) (document TRANS/SC1/WP29/78/Amend.3).

- 2.7.2. of any anti-skid devices which may be mounted on the wheels;
- 2.7.3. of rear-view mirrors;
- 2.7.4. of side direction indicator lamps, end outline marker lamps, front and rear position (side) lamps and parking lamps;
- 2.7.5. in relation to the front and rear ends, of parts mounted on the bumpers, of towing devices and of exhaust pipes.
- 2.8. 'The dimension of the projection' of a component mounted on a panel means the dimension determined by the method described in paragraph 2 of Annex 3 to this Regulation.
- 2.9. 'The nominal line of a panel' means the line passing through the two points represented by the position of the centre of a sphere when its surface makes its first and last contact with a component during the measuring procedure described in paragraph 2.2 of Annex 3 to this Regulation.

3. APPLICATION FOR APPROVAL

- 3.1 Application for approval of a vehicle type with regard to its external projections.
 - 3.1.1. The application for approval of a vehicle type with regard to its external projections shall be submitted by the vehicle manufacturer or by his duly accredited representative.
 - 3.1.2. It shall be accompanied by the following documents in triplicate:
 - 3.1.2.1. photographs of the front, rear, and side parts of the vehicle taken at an angle of 30° to 45° to the vertical longitudinal median plane of the vehicle;
 - 3.1.2.2. drawings with dimensions of the bumpers and, where appropriate;
 - 3.1.2.3. drawings of certain external projections and if applicable drawings of certain sections of the external surface referred to in 6.9.1.
 - 3.1.3. A vehicle representative of the type of vehicle to be approved shall be submitted to the technical service responsible for conducting the approval tests. At the request of the aforesaid technical service, certain components and certain samples of the material used shall likewise be submitted.
- 3.2. Application for type approval with regard to luggage racks, ski racks or radio receiving or transmitting aerials considered to be separate technical units.
 - 3.2.1. Application for type approval with regard to luggage racks, ski racks or radio receiving or transmitting aerials considered to be separate technical units shall be submitted by the vehicle manufacturer or the manufacturer of the aforementioned separate technical units, or by their duly accredited representative.
 - 3.2.2. For every type of any one of the devices referred to in paragraph 3.2.1 above, the application shall be accompanied by the following:
 - 3.2.2.1. triplicate copies of documents specifying the technical characteristics of the separate technical unit and the assembly instructions to be supplied with every separate technical unit sold;
 - 3.2.2.2. a specimen of the type of separate technical unit. Should the responsible authority consider it necessary, it may request a further specimen.

4. APPROVAL
- 4.1. Approval of a vehicle type with regard to its external projections.
 - 4.1.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraphs 5 and 6 below, approval of that vehicle type shall be granted.
 - 4.1.2. An approval number shall be assigned to each vehicle type approved. Its first two digits (at present 02 corresponding to the 02 series of amendments which entered into force on 13 December 1996) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another vehicle type.
 - 4.1.3. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.
 - 4.1.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation an international approval mark consisting of:
 - 4.1.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval;
 - 4.1.4.2. 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 4.1.4.1.
 - 4.1.5. If the vehicle conforms to a vehicle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation the symbol prescribed in paragraph 4.1.4.1 need not be repeated; in such a case the additional numbers and symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.1.4.1.
 - 4.1.6. The approval mark shall be clearly legible and be indelible.
 - 4.1.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
 - 4.1.8. Annex 2 to this Regulation gives examples of arrangements of approval marks.
 - 4.1.9. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.
- 4.2. Approval with regard to luggage racks, ski racks or radio receiving or transmitting aerials considered to be separate technical units.
 - 4.2.1. If the type of separate technical unit submitted for approval pursuant to this Regulation meets the requirements of paragraphs 6.16, 6.17 and 6.18 below, approval of that type of separate technical unit shall be granted.
 - 4.2.2. An approval number shall be assigned to each type of separate technical unit approved. Its first two digits (at present 02 corresponding to the 02 series of amendments which entered into force on 13 December 1996) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of separate technical unit.

- 4.2.3. Notice of approval, or of extension or refusal or withdrawal of approval or production definitely discontinued, of a type of separate technical unit pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 4 to this Regulation.
- 4.2.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every separate technical unit conforming to a type approved under this Regulation, an international approval mark consisting of:
- 4.2.4.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽¹⁾;
- 4.2.4.2. 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 4.2.4.1.
- 4.2.5. The approval mark shall be clearly legible and be indelible.
- 4.2.6. The approval mark shall be placed close to or on the separate technical unit data plate affixed by the manufacturer.
- 4.2.7. Annex 2 to this Regulation gives examples of arrangements of approval marks.
- 4.2.8. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of conformity of production before type approval is granted.
5. GENERAL SPECIFICATIONS
- 5.1. The provisions of this Regulation shall not apply to those parts of the external surface which, with the vehicle in the laden condition, with all doors, windows and access lids etc., in the closed position, are either:
- 5.1.1. at a height of more than 2 metres, or
- 5.1.2. below the floor line, or
- 5.1.3. so located that, in their static condition as well as when in operation, they cannot be contacted by a sphere 100 mm in diameter.
- 5.2. The external surface of vehicles shall not exhibit, directed outwards, any pointed or sharp parts or any projections of such shape, dimensions, direction or hardness as to be likely to increase the risk or seriousness of bodily injury to a person hit by the external surface or brushing against it in the event of a collision.
- 5.3. The external surface of vehicles shall not exhibit, directed outwards, any part likely to catch on pedestrians, cyclists or motor cyclists.

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

- 5.4. No protruding part of the external surface shall have a radius of curvature less than 2,5 mm. This requirement shall not apply to parts of the external surface which protrude less than 5 mm, but the outward facing angles of such parts shall be blunted, save where such parts protrude less than 1,5 mm.

- 5.5. Protruding parts of the external surface, made of a material of hardness not exceeding 60 shore A, may have a radius of curvature less than 2,5 mm.

The hardness measurement shall be taken with the component as installed on the vehicle. Where it is impossible to carry out a hardness measurement by the Shore A procedure, comparable measurements shall be used for evaluation.

- 5.6. The provisions of the above paragraphs 5.1 to 5.5 shall apply in addition to the particular specifications of the following paragraph 6, except where these particular specifications expressly provide otherwise.

6. PARTICULAR SPECIFICATIONS

6.1. *Ornaments*

- 6.1.1. Added ornaments which project more than 10 mm from their support shall retract, become detached or bend over under a force of 10 daN exerted at their most salient point in any direction in a plane approximately parallel to the surface on which they are mounted. These provisions shall not apply to ornaments on radiator grilles, to which only the general requirements of paragraph 5 shall apply. To apply the 10 daN force a flat-ended ram of not more than 50 mm diameter shall be used. Where this is not possible, an equivalent method shall be used. After the ornaments are retracted, detached or bent over, the remaining projections shall not project more than 10 mm. These projections shall in any case satisfy the provisions of paragraph 5.2. If the ornament is mounted on a base, this base is regarded as belonging to the ornament and not to the supporting surface.

- 6.1.2. Protective strips or shielding on the external surface shall not be subject to the requirements of paragraph 6.1.1 above; however, they shall be firmly secured to the vehicle.

6.2. *Headlights*

- 6.2.1. Projecting visors and rims shall be permitted on headlights, provided that their projection, as measured in relation to the external transparent surface of the headlight does not exceed 30 mm and their radius of curvature is at least 2,5 mm throughout. In the case of a headlamp mounted behind an additional transparent surface, the projection shall be measured from the outermost transparent surface. The projections shall be determined according to the method described in paragraph 3 of Annex 3 to this Regulation.

- 6.2.2. Retracting headlights shall meet the provisions of paragraph 6.2.1 above in both the operative and retracted positions.

- 6.2.3. The provisions of paragraph 6.2.1 above do not apply to headlamps which are sunk into the bodywork or which are 'overhung' by the bodywork, if the latter complies with the requirements of paragraph 6.9.1.

6.3. *Grilles and gaps*

- 6.3.1. The requirements of paragraph 5.4 shall not apply to gaps between fixed or movable elements, including those forming part of air intake or outlet grilles and radiator grilles, provided that the distance between consecutive elements does not exceed 40 mm and provided that the grilles and gaps have a functional purpose. For gaps of between 40 mm and 25 mm the radii of curvature shall be 1 mm or more. However, if the distance between two consecutive elements is equal to or less than 25 mm, the radii of curvature of external faces of the elements shall not be less than 0,5 mm. The distance between two consecutive elements of grilles and gaps shall be determined according to the method described in paragraph 4 of Annex 3 to this Regulation.

- 6.3.2. The junction of the front with the side faces of each element forming a grille or gap shall be blunted.
- 6.4. *Windscreen wipers*
- 6.4.1. The windscreen wiper fittings shall be such that the wiper shaft is furnished with a protective casing which has a radius of curvature meeting the requirements of paragraph 5.4 above and an end surface area of not less than 150 mm². In the case of rounded covers, these shall have a minimum projected area of 150 mm² when measured not more than 6,5 mm from the point projecting furthest. These requirements shall also be met by rear window wipers and headlamp wipers.
- 6.4.2. Paragraph 5.4 shall not apply to the wiper blades or to any supporting members. However, these units shall be so made as to have no sharp angles or pointed or cutting parts.
- 6.5. *Bumpers*
- 6.5.1. The ends of the bumpers shall be turned in towards the external surface in order to minimise the risk of fouling. This requirement is considered to be satisfied if either the bumper is recessed or integrated within the bodywork or the end of the bumper is turned in so that it is not contactable by a 100 mm sphere and the gap between the bumper end and the surrounding bodywork does not exceed 20 mm.
- 6.5.2. If the line of the bumper which corresponds to the outline contour of the car vertical projection is on a rigid surface, that surface shall have a minimum radius of curvature of 5 mm at all its points lying from the contour line to 20 mm inward, and a minimum radius of curvature of 2,5 mm in all other cases. This provision applies to that part of the zone lying from the contour line to 20 mm inward which is situated between and in front (or rear in case of the rear bumper) of tangential points with the contour line of two vertical planes each forming with the longitudinal plane of symmetry of the vehicle an angle of 15° (see fig. 1).

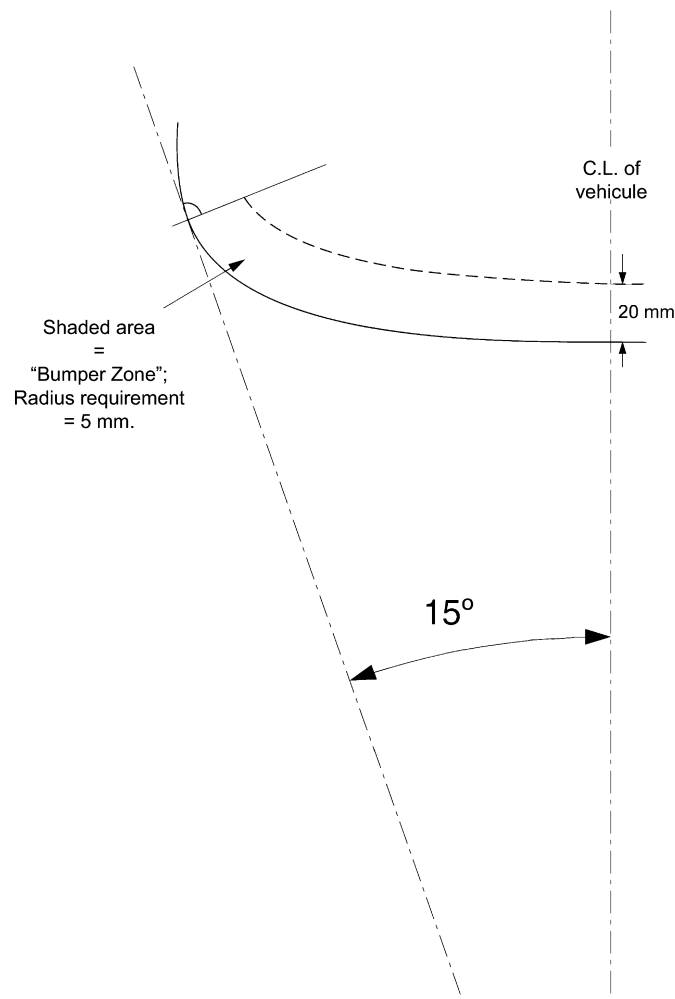


Figure 1

6.5.3. The requirement of paragraph 6.5.2 shall not apply to parts on or of the bumper or to bumper insets which have a projection of less than 5 mm, with special reference to joint covers and jets for head-lamp washers; but the outward facing angles of such parts shall be blunted, save where such parts protrude less than 1,5 mm.

6.6. *Handles, hinges and push-buttons of doors, luggage compartments and bonnets; fuel tank filler caps and covers*

6.6.1. The projection shall not exceed 40 mm in the case of door or luggage compartment handles and 30 mm in all other cases.

6.6.2. If lateral door handles rotate to operate, they shall meet one or other of the following requirements:

6.6.2.1. In the case of handles which rotate parallel to the plane of the door, the open end of handles must be directed towards the rear. The end of such handles shall be turned back towards the plane of the door and fitted into a protective surround or be recessed.

6.6.2.2. Handles which pivot outwards in any direction which is not parallel to the plane of the door shall, when in the closed position, be enclosed in a protective surround or be recessed. The open end shall face either rearwards or downwards.

Nevertheless, handles which do not comply with this last condition may be accepted if:

(a) they have an independent return mechanism,

(b) should the return mechanism fail, they cannot project more than 15 mm,

(c) they comply, in such opened position, with the provisions of paragraph 5.4,

and

(d) their end surface area, when measured not more than 6,5 mm from the point projecting furthest, is not less than 150 mm².

6.7. *Wheels, wheel nuts, hub caps and wheel discs*

6.7.1. The requirements of paragraph 5.4 shall not apply.

6.7.2. The wheels, wheel nuts, hub caps and wheel discs shall not exhibit any pointed or sharp projections that extend beyond the external plane of the wheel rim. Wing nuts shall not be allowed.

6.7.3. When the vehicle is travelling in a straight line, no part of the wheels other than the tyres, situated above the horizontal plane passing through their axis of rotation shall project beyond the vertical projection, in a horizontal plane of the external surface or structure. However, if functional requirements so warrant, wheel discs which cover wheel and hub nuts may project beyond the vertical projection of the external surface or structure on condition that the radius of curvature of the surface of the projecting part is not less than 30 mm and that the projection beyond the vertical projection of the external surface or structure in no case exceeds 30 mm.

6.8. *Sheet-metal edges*

6.8.1. Sheet-metal edges, such as gutter edges and the rails of sliding doors, shall not be permitted unless they are folded back or are fitted with a shield meeting the requirements of this Regulation which are applicable to it. An unprotected edge shall be considered to be folded back either if it is folded back by approximately 180°, or if it is folded towards the bodywork in such a manner that it cannot be contacted by a sphere having a diameter of 100 mm.

6.9. *Body-panels*

- 6.9.1. Folds in body panels may have a radius of curvature of less than 2,5 mm provided that it is not less than one-tenth of the height 'H' of the projection, measured in accordance with the method described in paragraph 1 of Annex 3.

6.10. *Lateral air or rain deflectors*

- 6.10.1. Lateral deflectors shall have a radius of curvature of at least 1 mm on edges capable of being directed outwards.

6.11. *Jacking brackets and exhaust pipes*

- 6.11.1. The jacking brackets and exhaust pipe(s) shall not project more than 10 mm beyond the vertical projection of the floor line lying vertically above them. As an exception to this requirement an exhaust pipe may project more than 10 mm beyond the vertical projection of the floor line, so long as it terminates in rounded edges, the minimum radius of curvature being 2,5 mm.

6.12. *Air intake and outlet flaps*

- 6.12.1. Air intake and outlet flaps shall meet the requirements of paragraphs 5.2, 5.3 and 5.4 in all positions of use.

6.13. *Roof*

- 6.13.1. Opening roofs shall be considered only in the closed position.

- 6.13.2. Convertible vehicles shall be examined with the hood in both the raised and lowered positions.

- 6.13.2.1. With the hood lowered, no examination shall be made of the vehicle inside an imaginary surface formed by the hood when in the raised position.

- 6.13.2.2. Where a cover for the linkage of the hood when folded is provided as standard equipment, the examination shall be made with the cover in position.

6.14. *Windows*

- 6.14.1. Windows which move outwards from the external surface of the vehicle shall comply with the following provisions in all positions of use:

- 6.14.1.1. no exposed edge shall face forwards;

- 6.14.1.2. no part of the window shall project beyond the extreme outer edge of the vehicle.

6.15. *Registration plate brackets*

- 6.15.1. Supporting brackets provided by the vehicle manufacturer for registration plates shall comply with the requirements of paragraph 5.4 of this Regulation if they are contactable by a 100 mm diameter sphere when a registration plate is fitted in accordance with the vehicle manufacturer's recommendation.

6.16. *Luggage racks and ski racks*

- 6.16.1. Luggage racks and ski racks shall be so attached to the vehicle that positive locking exists in at least one direction and that horizontal, longitudinal and transverse forces can be transmitted which are at least equal to the vertical load-bearing capacity of the rack as specified by its manufacturer. For the test of the luggage rack or ski rack fixed to the vehicle according to the manufacturer's instructions, the test loads shall not be applied at one point only.
- 6.16.2. Surfaces which, after installation of the rack, can be contacted by a sphere of 165 mm diameter shall not have parts with a radius of curvature less than 2,5 mm, unless the provisions of paragraph 6.3 can be applied.
- 6.16.3. Fastening elements such as bolts that are tightened or loosened without tools shall not project more than 40 mm beyond the surfaces referred to in 6.16.2, the projection being determined according to the method prescribed in paragraph 2 of Annex 3, but using a sphere of 165 mm diameter in those cases where the method prescribed in paragraph 2.2 of that annex is employed.

6.17. *Radio receiving and transmitting aerials*

- 6.17.1. Radio receiving and transmitting aerials shall be fitted to the vehicle in such a way that if their unattached end is less than 2 m from the road surface in any position of use specified by the manufacturer of the aerial, it shall be inside the zone bounded by the vertical planes which are 10 cm inside the extreme outer edge of the vehicle as defined in paragraph 2.7.
- 6.17.2. Furthermore, aerials shall be so fitted to the vehicle, and if necessary their unattached ends so restricted, that no part of the aerials protrude beyond the extreme outer edge of the vehicle as defined in paragraph 2.7.
- 6.17.3. Shafts of aerials may have radii of curvature of less than 2,5 mm. However, the unattached ends shall be fitted with fixed cappings, the radii of curvature of which are not less than 2,5 mm.
- 6.17.4. The bases of aerials shall not project more than 30 mm when determined according to the procedure of Annex 3, paragraph 2. However, in the case of aerials with amplifiers built into the base, these bases may project up to 40 mm.

6.18. *Assembly instructions*

- 6.18.1. Luggage racks, ski racks and radio receiving or transmitting aerials that have been approved as separate technical units may not be offered for sale, sold or purchased unless accompanied by assembly instructions. The assembly instructions shall contain sufficient information to enable the approved components to be mounted on the vehicle in a manner that complies with the relevant provisions of paragraphs 5 and 6. In particular, the positions of use must be indicated for telescopic aerials.

7. MODIFICATION OF A VEHICLE TYPE AND EXTENSION OF APPROVAL

- 7.1. The administrative department which has granted approval of the vehicle type shall be notified of any modification of the vehicle type. That department may then;
- 7.1.1. either consider that the modifications made are unlikely to have an appreciable adverse effect;
- 7.1.2. or require a further report from the technical service conducting tests.
- 7.2. Confirmation of approval, with a description of the modifications, or refusal of approval shall be communicated, by the procedure laid down in paragraph 4.3 above, to the Parties to the Agreement applying this Regulation.

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

8. CONFORMITY OF PRODUCTION

- 8.1. Vehicle (separate technical unit) approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 5 and 6 above.
- 8.2. In order to verify that the requirements of paragraph 8.1 are met, suitable controls of the production shall be carried out.
- 8.3. The holder of the approval shall in particular:
- 8.3.1. ensure the existence of procedures for the effective control of the quality of products;
 - 8.3.2. have access to the control equipment necessary for checking the conformity to each approved type;
 - 8.3.3. ensure that data of test results are recorded and that related documents shall remain available for a period to be determined in accordance with the administrative service;
 - 8.3.4. analyse the results of each type of test in order to verify and ensure the stability of the product characteristics making allowance for variation of an industrial production;
 - 8.3.5. ensure that for each type of product at least the tests prescribed in Annex 3 to this Regulation are carried out;
 - 8.3.6. ensure that any sampling of samples or test pieces giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.
- 8.4. The competent authority which has granted type approval may at any time verify the conformity control methods applicable to each production unit.
- 8.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
 - 8.4.2. 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 verification.
 - 8.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in the application of paragraph 8.4.2 above, the inspector shall select samples to be sent to the technical service which has conducted the type approval tests.
 - 8.4.4. The competent authority may carry out any test prescribed in this Regulation.
 - 8.4.5. The normal frequency of inspections authorised by the competent authority shall be one per two years. In the case where negative results are recorded during one of these visits, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.

9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 9.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 8.1 above is not complied with.

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

10. PRODUCTION DEFINITELY DISCONTINUED

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

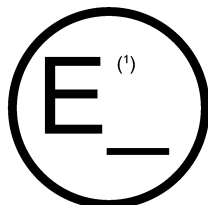
11. NAMES AND ADDRESSES OF TECHNICAL SERVICES CONDUCTING APPROVAL TESTS AND OF ADMINISTRATIVE DEPARTMENTS

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

ANNEX 1

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by:

Name of administration:

.....

.....

.....

concerning ⁽²⁾:

APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of a vehicle type with regard to its external projections, pursuant to Regulation No 26.

Approval No:

Extension No:

1. Trade name or mark of the motor vehicle:
2. Vehicle Type:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Vehicle submitted for approval on:
6. Technical service responsible for conducting approval tests:
7. Date of report issued by that service:
8. Number of report issued by that service:
9. Approval granted/refused/extended/withdrawn ⁽³⁾
10. Reason(s) for the extension of approval (if applicable):
11. Position of approval mark on the vehicle:
12. Place:
13. Date:
14. Signature:
15. The list of documents filed with the administration service which has granted approval and available on request is attached to this communication.

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

⁽²⁾ Strike out what does not apply.

⁽³⁾ Strike out what does not apply.

ANNEX 2

ARRANGEMENTS OF APPROVAL MARKS

Model A

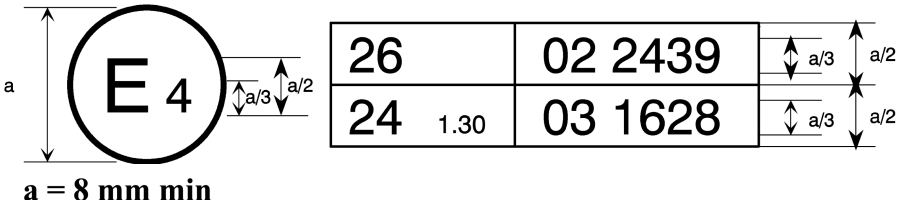
(See paragraphs 4.1.4 and 4.2.4 of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E4) pursuant to Regulation No 26 and under approval number 022439. The first two digits of the approval number indicate that, at the time of approval, Regulation No 26 included the 02 series of amendments.

Model B

(See paragraph 4.1.5 of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E4) pursuant to Regulation No 26 and Regulation No 24 ⁽¹⁾. The first two digits of the approval numbers indicate that, at the dates when the respective approvals were given, Regulation No 26 included the 02 series of amendments, while Regulation No 24 already included the 03 series of amendments.

⁽¹⁾ The second Regulation number is given merely as an example; the corrected absorption coefficient is 1,30 m⁻¹.

ANNEX 3

METHODS OF DETERMINING THE DIMENSIONS OF PROJECTIONS AND GAPS

1. METHOD OF DETERMINING THE HEIGHT OF THE PROJECTION OF FOLDS IN BODY PANELS

- 1.1. The height H of a projection is determined graphically by reference to the circumference of a 165 mm diameter circle, internally tangential to the external outline of the external surface at the section to be checked.
- 1.2. H is the maximum value of the distance, measured along a straight line passing through the centre of the 165 mm diameter circle between the circumference of the aforesaid circle and the external contour of the projection (see Fig. 1).
- 1.3. In cases where it is not possible for a 100 mm diameter circle to contact externally part of the external outline of the external surface at the section under consideration, the surface outline in this area will be assumed to be that formed by the circumference of the 100 mm diameter circle between its tangent points with the external outline (see Fig. 2).
- 1.4. Drawings of the necessary sections through the external surface shall be provided by the manufacturer to allow the height of the projections referred to above to be measured.

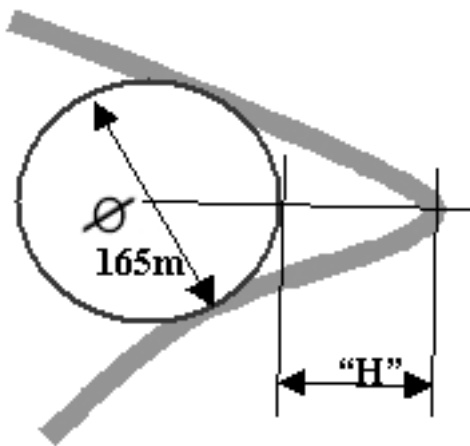


Figure 1

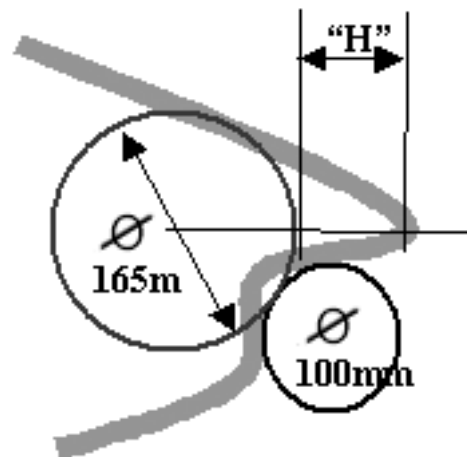


Figure 2

2. METHOD OF DETERMINING THE DIMENSION OF THE PROJECTION OF A COMPONENT MOUNTED ON THE EXTERNAL SURFACE

- 2.1. The dimension of the projection of a component which is mounted on a convex surface may be determined either directly or by reference to a drawing of an appropriate section of this component in its installed condition.
- 2.2. If the dimension of the projection of a component which is mounted on a surface other than convex cannot be determined by simple measurement, it shall be determined by the maximum variation of the distance of the centre of a 100 mm diameter sphere from the nominal line of the panel when the sphere is moved over and is in constant contact with that component. Figure 3 shows an example of the use of this procedure.

3. METHOD OF DETERMINING THE PROJECTION OF HEADLAMP VISORS AND RIMS

- 3.1. The projection from the external surface of the headlamp shall be measured horizontally from the point of contact of a 100 mm diameter sphere as shown in Figure 4.

4. METHOD OF DETERMINING THE DIMENSION OF A GAP OR THE SPACE BETWEEN ELEMENTS OF A GRILLE

- 4.1. The dimension of a gap or space between elements of a grille shall be determined by the distance between two planes passing through the points of contact of the sphere and perpendicular to the line joining those points of contact. Figures 5 and 6 show examples of the use of this procedure.

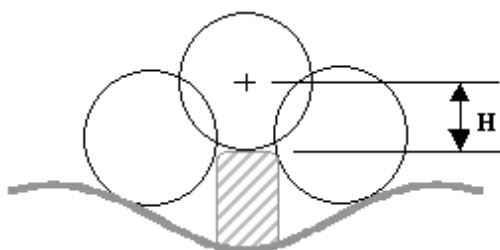


Figure 3

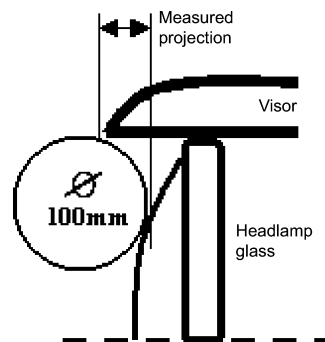


Figure 4

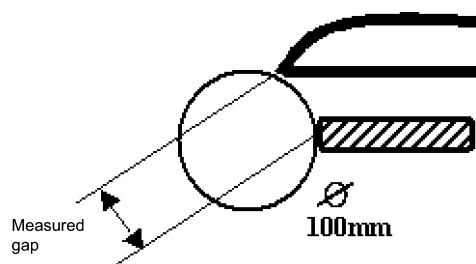


Figure 5

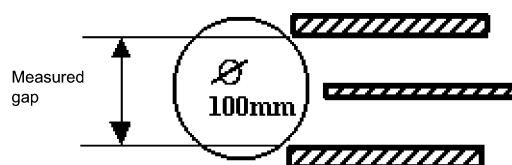
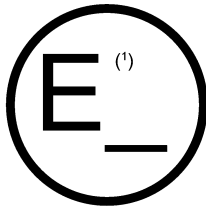


Figure 6

ANNEX 4

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by:

Name of administration:

.....

.....

.....

concerning ⁽²⁾:

APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of a separate technical unit type of luggage rack, ski rack or radio receiving or transmitting aerial ⁽³⁾

Approval No:

Extension No:

1. Trade name or mark:
2. Type:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Characteristics of the separate technical unit:
6. Limitations of use, if any, and assembly instructions:
7. Specimen required for approval of a separate technical unit submitted on:
8. Technical service conducting approval test:
9. Date of report issued by that service:
10. Number of report issued by that service:
11. Approval for separate technical unit has been granted/refused/extended/withdrawn ⁽⁴⁾ in respect of luggage rack(s), ski rack(s), radio receiving or transmitting aerial(s) ⁽⁵⁾
12. Place:
13. Date:
14. Signature:
15. The list of documents filed with the administration service which has granted approval and available on request is attached to this communication.

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

⁽²⁾ Strike out what does not apply.

⁽³⁾ Strike out what does not apply.

⁽⁴⁾ Strike out what does not apply.

⁽⁵⁾ Strike out what does not apply.

Regulation No 28 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of audible warning devices and of motor vehicles with regard to their audible signals

1. SCOPE

This Regulation applies to:

- 1.1. audible warning devices (AWD) ⁽¹⁾, supplied with direct or alternating current or compressed air, which are intended for fitting to motor vehicles of categories L3 to 5, M and N, excluding mopeds (categories L1 and L2) ⁽²⁾;
- 1.2. the audible signals ⁽³⁾ of motor vehicles, with the exception of motor cycles.

I. AUDIBLE WARNING DEVICES

2. DEFINITIONS

For the purposes of this Regulation, audible warning devices (AWD) of different 'types' shall be understood to mean devices essentially different from one another with respect to such matters as:

- 2.1. trade name or mark;
- 2.2. principles of operation;
- 2.3. type of electrical supply (direct or alternating current);
- 2.4. outer shape of case;
- 2.5. shape and dimensions of diaphragm(s);
- 2.6. shape or kind of sound outlet(s);
- 2.7. rated sound frequency or frequencies;
- 2.8. rated supply voltage;
- 2.9. for devices supplied directly from an external compressed air source, rated operating pressure.
- 2.10. The AWD is principally intended for:
 - 2.10.1. motor cycles of a power less than or equal to 7 kW (class I).
 - 2.10.2. vehicles of categories M and N and motor cycles of a power greater than 7 kW (class II).

3. APPLICATION FOR APPROVAL

The application for approval of a type of audible warning device shall be submitted by the holder of the trade name or mark or by his duly accredited representative.

- 3.2. It shall be accompanied by the following documents, in triplicate, giving the following particulars:
 - 3.2.1. a description of the type of audible warning device, paying particular attention to the points mentioned in paragraph 2;

⁽¹⁾ An (AWD) consisting of several sound outlets activated by a single power unit shall be regarded as an AWD.

⁽²⁾ As defined in the Consolidated Resolution (R.E.3).

⁽³⁾ An AWD consisting of several units, each emitting a sound signal and operated simultaneously by the actuation of a single control shall be regarded as an audible warning system.

- 3.2.2. a drawing showing, *inter alia*, the warning device in cross section;
- 3.2.3. a list of the components used in manufacture, duly identified, with an indication of the materials used;
- 3.2.4. detailed drawings of all the components used in manufacture. The drawings shall show the place provided for the approval number in relation to the circle of the approval mark.
- 3.3. In addition, the application for approval shall be accompanied by two samples of the type of warning device.
- 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 the audible warning devices submitted for approval shall bear the manufacturer's trade name or mark; this mark must be clearly legible and indelible.
 - 4.2. Each sample shall have a space of adequate dimensions for the approval mark; this space shall be indicated in the drawing referred to in paragraph 3.2.2.
5. APPROVAL
 - 5.1. If the samples submitted for approval conform to the provisions of paragraphs 6. and 7. below, approval for this type of warning device shall be granted.
 - 5.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00 for the Regulation in its original form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign this number to another type of audible warning device.
 - 5.3. The same approval number may be assigned to types of warning device differing only with respect to rated voltage, rated frequency or frequencies or, for the devices mentioned in paragraph 2.8 above, rated operating pressure.
 - 5.4. Notice of approval or refusal or extension or withdrawal of approval or production definitely discontinued of a type of warning device pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in annex 1 to the Regulation, and of drawings of the audible warning device (supplied by the applicant for approval) with maximum format A4 (210 × 297 mm) or folded to this format and on the scale 1:1.
 - 5.5. On every audible warning device which conforms to a type approved under this Regulation, there shall be affixed conspicuously, in an easily accessible place indicated on the approval form, an international approval mark comprising:
 - 5.5.1. a circle containing the letter 'E' followed by the distinguishing number of the country granting approval ⁽¹⁾;

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

- 5.5.2. an approval number.
- 5.5.3. an additional symbol in the form of a figure in Roman numerals, showing the class to which the AWD belongs.
- 5.6. The approval mark and the additional symbol must be clearly legible and indelible.
- 5.7. Annex 3, Section 1, to this Regulation gives an example of the arrangement of the approval mark.

6. SPECIFICATIONS

6.1. General specifications

- 6.1.1. The audible warning device shall emit a continuous and uniform sound; its acoustic spectrum shall not vary substantially during its operation.

For warning devices supplied with alternating current, this requirement shall apply only at constant generator speed, within the range specified in paragraph 6.2.3.2.

- 6.1.2. The warning device shall have acoustic characteristics (spectral distribution of the acoustic energy, sound pressure level) and mechanical characteristics such that it passes, in the order indicated, the following tests.

6.2. Measurement of the sound characteristics

- 6.2.1. The warning device should, preferably, be tested in an anechoic environment. Alternatively, it may be tested in a semi-anechoic chamber or in an open space ⁽¹⁾. In this case, precautions shall be taken to avoid reflections from the ground within the measuring area (for instance by erecting a set of absorbing screens). Compliance with the spherical divergence to a limit of 1 dB within a hemisphere of not less than 5 m radius, up to the maximum frequency to be measured, especially in the measuring direction and at the height of the apparatus and the microphone, shall be checked.

The ambient noise level shall be at least 10 dB lower than the sound pressure level to be measured.

The device to be tested and the microphone shall be placed at the same height. This height shall be between 1,15 and 1,25 m. The axis of maximum sensitivity of the microphone shall coincide with the direction of the maximum sound level of the device.

The microphone shall be so placed that its diaphragm is at a distance of $2 \pm 0,01$ m from the plane of the sound outlet of the device. In the case of devices with several outlets, the distance shall be determined in relation to the plane of the nearest outlet to the microphone.

- 6.2.2. The measurements of the sound pressure levels shall be made with a class 1 precision sound level metre conforming to the specifications of IEC Publication No. 651, first edition (1979). All measurements shall be made using the time constant 'F'. The measurement of the over-all sound pressure level shall be made using the weighting curve A. The spectrum of the sound emitted shall be measured according to the Fourier transform of the acoustic signal. Alternatively, one-third octave filters conforming to the specifications of IEC Publication No 225, first edition (1966) may be used:

in this case, the sound pressure level in the mid-band frequency 2 500 Hz shall be determined by adding the quadratic means of the sound pressures in the one-third mid-band frequencies 2 000, 2 500 and 3 150 Hz.

⁽¹⁾ The site may take the form, for instance, of an open space of 50 metres radius, the central part of which must be practically horizontal over a radius of at least 20 metres, the surface being of concrete, asphalt or a similar material, which must not be covered with powdery snow, tall weeds, or loose soil or cinders. The measurements shall be made on a clear day. No-one other than the observer reading the instrument shall remain near the audible warning device or the microphone, since the presence of spectators may affect the readings of the instrument to a considerable extent, if they are near the audible warning device or the microphone. Any peak which appears to be unrelated to the general sound level shall be disregarded in the reading.

In every case, only the Fourier transform method shall be regarded as a reference method.

- 6.2.3. The AWD shall be supplied with current, as appropriate, at one of the test voltages:
- 6.2.3.1. in the case of AWDs supplied with direct current, at a voltage measured at the terminal of the electric power source of $13/12$ of the rated voltage.
- 6.2.3.2. in the case of AWDs supplied with alternating current, the current shall be supplied by an electric generator of the type normally used with this type of AWD. The acoustic characteristics of the AWD shall be recorded for electric generator speeds corresponding to 50 %, 75 % and 100 % of the maximum speed indicated by the manufacturer of the generator for continuous operation. During this test, no other electrical load shall be imposed on the electric generator. The endurance test described in paragraph 6.3 shall be carried out at a speed indicated by the manufacturer of the equipment and selected from the above range.
- 6.2.4. If a rectified current source is used for the test of an AWD supplied with direct current, the alternating component of the voltage measured at its terminals, when the warning devices are in operation, shall not be more than 0,1 volt, peak to peak.
- 6.2.5. For AWDs supplied with direct current, the resistance of the connecting leads, expressed in ohms, including terminals and contacts, shall be as close as possible to $(0,10/12) \times$ rated voltage in volts.
- 6.2.6. The warning device shall be mounted rigidly, by means of the equipment indicated by the manufacturer, on a support whose mass is at least ten times that of the warning device under test and not less than 30 kg. In addition, arrangements must be made to ensure that reflexions on the sides of the support and its own vibrations have no appreciable effect on the measuring results.
- 6.2.7. Under the conditions set forth above, the sound-pressure weighted in accordance with curve A shall not exceed the following values:
- (a) 115 dB(A) for AWDs intended principally for motor cycles with a power less than or equal to 7 kW;
- (b) 118 dB(A) for AWDs intended principally for vehicles of categories M and N, and motor cycles with a power greater than 7 kW.
- 6.2.7.1. In addition, the sound-pressure level in the frequency band 1 800 to 3 550 Hz shall be greater than that of any component of a frequency above 3 550 Hz and in any event equal to or greater than:
- (a) 95 dB(A) for AWDs intended principally for motor cycles with a power less than or equal to 7 kW;
- (b) 105 dB(A) for AWDs intended principally for vehicles of categories M and N, and motor cycles with a power greater than 7 kW.
- 6.2.7.2. AWDs meeting the sound characteristics mentioned in (b) may be used on the vehicles mentioned in (a).
- 6.2.8. The specifications indicated above shall also be met by a device subjected to the endurance test referred to in paragraph 6,3 below, with the supply voltage varying between 115 % and 95 % of its rated voltage for AWDs supplied with direct current or, for AWDs supplied with alternating current, between 50 % and 100 % of the maximum speed of the generator indicated by the manufacturer for continuous operations.
- 6.2.9. The time lapse between the moment when the device is actuated and the moment when the sound reaches the minimum value prescribed in paragraph 6.2.7 above shall not exceed 0,2 second measured at an ambient temperature of 20 ± 5 °C. This provision is applicable, *inter alia*, to pneumatic or electro-pneumatic warning devices.

- 6.2.10. Pneumatic or electro-pneumatic warning devices shall, when operating under the power supply conditions established for the devices by the manufacturers, satisfy the same acoustic requirements as are prescribed for electrically operated audible warning devices.

6.3. Endurance test

- 6.3.1. The AWD shall be supplied with current at the rated voltage and with the connecting lead resistances specified in paragraphs 6.2.3 to 6.2.5 above, and operated respectively:

10 000 times for AWDs intended principally for motor cycles with power less than or equal to 7 kW

50 000 times for AWDs intended principally for vehicles of categories M and N and motor cycles with a power greater than 7 kW, each time for one second followed by an interval of four seconds. During the test, the AWD shall be ventilated by an air current having a speed of approximately 10 m/sec.

- 6.3.2. If the test is made in an anechoic chamber, the chamber shall be large enough to ensure normal dispersal of the heat released by the warning device during the test.

- 6.3.3. The ambient temperature in the testing room shall be between + 15 and + 30 °C.

- 6.3.4. If, after the AWD has been operated for half the number of times prescribed, the sound-level characteristics are no longer the same as before the test, the AWD may be adjusted. After being operated the prescribed number times, and after further adjustment if necessary, the AWD must pass the test described in paragraph 6.2 above.

- 6.3.5. For warning devices of the electro-pneumatic type, the device may be lubricated with the oil recommended by the manufacturer after every 10 000 times of operation.

7. MODIFICATION OF THE TYPE OF AUDIBLE WARNING DEVICE AND EXTENSION APPROVAL

- 7.1. Any modification of the type of audible warning device shall be notified to the administrative department which granted approval to the type of audible warning device. This department may then:

7.1.1. either take the view that the modifications made are not likely to have any appreciable adverse effect;

7.1.2. or call for a new report from the technical service responsible for the tests.

- 7.2. Notice of confirmation of the approval, with particulars of the modifications, or of refusal of approval shall be communicated to the Parties to the Agreement applying this Regulation, in accordance with the procedure indicated in paragraph 5.4 above.

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

8. CONFORMITY OF PRODUCTION

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

- 8.1. AWD approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraph 6 above.

- 8.2. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.
- 8.3. The holder of the approval shall in particular:
 - 8.3.1. ensure existence of procedures for the effective control of the quality of products,
 - 8.3.2. have access to the control equipment necessary for checking the conformity to each approved type,
 - 8.3.3. ensure that data of test results are recorded and that annexed documents shall remain available for a period to be determined in accordance with the administrative service,
 - 8.3.4. analyse the results of each type of test, in order to verify and ensure the stability of the product characteristics making allowance for variation of an industrial production,
 - 8.3.5. ensure that for every type of AWD sufficient checks are carried out so as to ensure that all AWDs in production comply with the specifications given for the AWD submitted for the type approval,
 - 8.3.6. ensure that any sampling of samples or test pieces giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.
- 8.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit.
 - 8.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
 - 8.4.2. The inspector may take samples at random which will be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own verification.
 - 8.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in application of paragraph 8.4.2, the inspector shall select samples to be sent to the technical service which has conducted the type approval tests.
 - 8.4.4. The competent authority may carry out any test prescribed in this Regulation.
 - 8.4.5. The normal frequency of inspections authorized by the competent authority shall be one per year. In the case where negative results are recorded during one of these visits, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.
- 9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
 - 9.1. The approval granted to a type of audible warning device pursuant to this Regulation may be withdrawn if the conditions set forth in paragraph 8.1 are not complied with or if the audible warning device fails to pass the checks referred to in paragraph 8.2 above.
 - 9.2. Should a Party to the Agreement applying this Regulation withdraw an approval which it has previously granted, it shall forthwith 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 statement, signed and dated: 'APPROVAL WITHDRAWN'.

10. PRODUCTION DISCONTINUED

If the holder of an approval granted pursuant to this Regulation discontinues the production of the type of audible warning device approved, he shall inform the authority which granted the approval. Upon receipt of the communication, this authority shall inform 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 statement, signed and dated: 'PRODUCTION DISCONTINUED'.

II. AUDIBLE SIGNALS OF MOTOR VEHICLES

11. DEFINITIONS

For the purpose of this Regulation,

- 11.1. 'Approval of the motor vehicle' shall be understood to mean approval of vehicle type with regard to its audible signal;
- 11.2. 'Vehicle type' shall be understood to mean vehicles not essentially different from another with respect to such matters as:
 - 11.2.1. the number and type(s) of warning devices fitted on the vehicle;
 - 11.2.2. the mountings used to fit the warning devices to the vehicle;
 - 11.2.3. the position of the warning devices on the vehicle;
 - 11.2.4. the rigidity of the parts of the structure on which the warning device(s) is (are) mounted;
 - 11.2.5. the shape and materials of the bodywork at the front of the vehicle which might affect the level of the sound emitted by the warning device(s) and have a masking effect.

12. APPLICATION FOR APPROVAL

- 12.1. The application for approval of a vehicle type with regard to its audible signals shall be submitted by the vehicle manufacturer or by his duly accredited representative;
- 12.2. It shall be accompanied by the following documents in triplicate giving the following particulars:
 - 12.2.1. a description of the vehicle type with regard to the items mentioned in paragraph 11.2 above;
 - 12.2.2. a list of the components required to identify the warning device(s) that may be mounted on the vehicle;
 - 12.2.3. Drawings indicating the position on the vehicle of the warning device(s) and of its (their) mountings.
- 12.3. A vehicle representative of the vehicle type to be approved shall be submitted to the technical service responsible for the approval tests.

13. APPROVAL

- 13.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraphs 14 and 15 below, approval for this vehicle type shall be granted.
- 13.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00 for the Regulation in its original form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign this number to another vehicle type.

- 13.3. Notice of approval or of refusal of approval or extension or withdrawal or production definitely discontinued of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in annex 2 to the Regulation, and of drawings (supplied by the applicant for approval) with maximum format A4 (210 × 297 mm), or folded to this format, and on an appropriate scale.
- 13.4. On every vehicle which conforms to a vehicle type approved under this Regulation there shall be affixed conspicuously, in an easily accessible place indicated on the approval form, an international approval mark comprising:
- 13.4.1. a circle containing the letter 'E' followed by the distinguishing number of the country granting approval ⁽¹⁾;
- 13.4.2. the number of this Regulation placed to the right of the circle referred to in paragraph 13.4.1.
- 13.5. If the vehicle conforms to a vehicle type approved, under another (other) Regulation(s) annexed to the Agreement, in the same country as that which has granted the approval under this Regulation, the symbol referred to in paragraph 13.4 need not be repeated; in this case, the additional numbers and symbols of all the Regulations under which approval has been granted in the country which granted the approval under this Regulation shall be set out in vertical columns to the right of the symbol referred to in paragraph 13.4.
- 13.6. The approval mark must be clearly legible and indelible.
- 13.7. The approval mark shall be placed near the plate bearing the characteristics of the vehicle and may also be affixed to this plate.
- 13.8. Annex 3, Section II, to this Regulation gives an example of the arrangement of the approval mark.
- 13.9. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.
14. SPECIFICATIONS
- The vehicle shall comply with the following specifications:
- 14.1. The audible warning device(s) (or system) fitted on the vehicle shall be of a type approved under this Regulation;
- Audible warning devices of Class II approved under this Regulation in its original form, and therefore not bearing the symbol II in their approval mark, may continue to be fitted to vehicle types submitted for approval pursuant to this Regulation.
- 14.2. The test voltage shall be as specified in paragraph 6.2.3 of the Regulation;
- 14.3. The sound pressure measurements shall be made in the conditions specified in paragraph 6.2.2 of this Regulation
- 14.4. The A-weighted sound pressure level emitted by the device fitted on the vehicle shall be measured at a distance of 7 m in front of the vehicle, the latter being placed on an open site ⁽²⁾, on ground as smooth as possible and, in the case of devices supplied with direct current, with its engine stopped.
- 14.5. The microphone of the measuring instrument shall be placed approximately in the mean longitudinal plane of the vehicle;
- 14.6. The sound pressure level of the background noise and wind noise must be at least 10 dB (A) below the sound to be measured;

⁽¹⁾ See paragraph 5.5.1, footnote 1.

⁽²⁾ See paragraph 6.2.1, footnote 2.

- 14.7. The maximum sound-pressure level shall be sought within the range of 0,5 and 1,5 m above the ground;
- 14.8. Measured under the conditions specified in paragraphs 14.2 to 14.7, the maximum sound-pressure level (14.7) of the audible signal tested shall be at least:
- (a) equal to 83 dB(A) and not more than 112 dB(A) for the signals of motor cycles of a power less than or equal to 7 kW;
 - (b) equal to 93 dB(A) and at most 112 dB(A) for the signals of vehicles of categories M and N ⁽¹⁾ and motor cycles of a power greater than 7 kW.

15. MODIFICATIONS OF VEHICLE TYPE AND EXTENSION OF APPROVAL

- 15.1. Any modification of the vehicle type shall be notified to the administrative department which granted approval to the vehicle type. This department may then:
- 15.1.1. either take the view that the modifications made are not likely to have any appreciable adverse effect and that in any case the vehicle still meets the requirements; or
 - 15.1.2. call for a new report from the technical service responsible for the tests.
- 15.2. Notice of confirmation of approval with particulars of the modifications, or of refusal of approval shall be communicated to the Parties to the Agreement applying this Regulation, in accordance with the procedure indicated in paragraph 13.3 above.
- 15.3. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension.

16. CONFORMITY OF PRODUCTION

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

- 16.1. A vehicle approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraph 14. above.
- 16.2. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.
- 16.3. The holder of the approval shall in particular:
- 16.3.1. ensure existence of procedures for effective control of the quality of the vehicles as regards all aspects relevant to compliance with the requirements set out in paragraph 14 above,
 - 16.3.2. ensure that for every type of vehicle sufficient checks are carried out regarding the number and type of AWD, so as to ensure that all vehicles in production comply with the specifications given of vehicle submitted for type approval,
 - 16.3.3. ensure that, if the checks carried out pursuant to paragraph 16.3.2 above give evidence of non-conformity of one or more vehicles with the requirements set out in paragraph 14 above, all necessary steps are taken to restore conformity of the corresponding production.
- 16.4. 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 14 above.

⁽¹⁾ See paragraph 5.5.1, footnote 1.

- 16.5. Where unsatisfactory results are found during verifications and checks pursuant to paragraph 16.4 above, the competent authority shall ensure that all necessary steps are taken to restore conformity of production as rapidly as possible.

17. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 17.1. The approval granted to a vehicle type pursuant to this Regulation may be withdrawn if the conditions set forth in paragraph 16.1 above are not complied with, or if the vehicle fails to pass the checks referred to in paragraph 16.2 above.

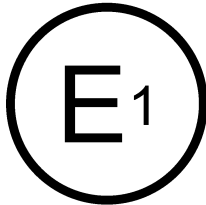
- 17.2. Should a Party to the Agreement applying this Regulation withdraw an approval which it has previously granted, it shall forthwith notify the other Contracting Parties applying this Regulation by means of a copy of the approval form bearing at the end in large letters the statement, signed and dated: 'APPROVAL WITHDRAWN'.

18. NAMES AND ADDRESSES OF THE TECHNICAL SERVICES 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 approval tests and of the administrative departments which grant approval and to which forms certifying approval or refusal or withdrawal of approval, issued in other countries, are to be sent.

ANNEX 1

(Maximum format: A4 (210 × 297 mm))



Name of the Administration

Communication concerning the approval (or refusal or withdrawal of approval or production definitely discontinued or extension of approval) of a type of audible warning device for motor vehicles pursuant to Regulation No 28

Approval No:

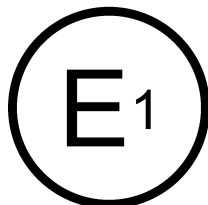
Extension No:

1. Trade name or mark:
2. Type (electro-pneumatic, electro-magnetic with resonator disc, electromagnetic horn, etc ., indicating whether it is a single-tone or multiple-tone warning device.):
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Brief description of warning devices:
6. Supply voltage(s):volts (*)
7. Rated operating pressure(s): kg/cm² (*)
8. Rated frequency (or frequencies):Hz (*)
9. Geometrical characteristics (internal length and diameter) of connecting line between compressor or control and the audible warning device:
10. Submitted for approval on:
11. Technical service responsible for conducting approval tests:
12. Date of report issued by that service:
13. Number of report issued by that service:
14. Approval granted/refused (*)
15. Place:
16. Date:
17. Signature:
18. A list of documents contained in the approval file transmitted to the administrative service which has granted approval is annexed to this communication.

(*) Strike out whatever does not apply.

ANNEX 2

(Maximum format: A4 (210 × 297 mm))



Name of the Administration

Communication concerning the approval (or refusal or withdrawal of approval or production definitely discontinued or extension of approval) of a vehicle type with regard to its audible signals pursuant to Regulation No 28

Approval No:

Extension No:

1. Trade name or mark of the vehicle:
2. Vehicle type:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Type(s) of warning device(s) (*)
6. Sound level values:
7. Submitted for approval on:
8. Technical service responsible for approval tests:
9. Date of report issued by that service:
10. Number of report issued by that service:
11. Approval granted/refused (**)
12. Place:
13. Date:
14. Signature:
15. A list of documents contained in the approval file transmitted to the administrative service which has granted approval is annexed to this communication.

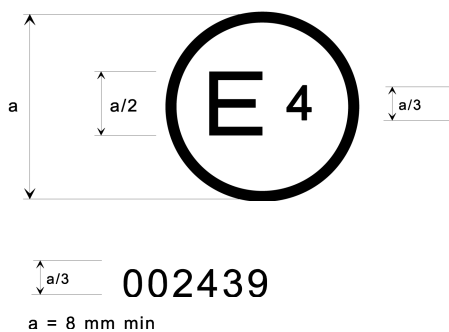
(*) Indicate the approval numbers.

(**) Strike out what does not apply.

ANNEX 3

I. ARRANGEMENT OF THE APPROVAL MARK OF THE AUDIBLE WARNING DEVICE

(see paragraph 5.5 of this Regulation)



The above approval mark affixed to an audible warning device shows that this AWD of Class I has been approved in the Netherlands (E 4) under approval number 002439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 28 in its original form.

Note

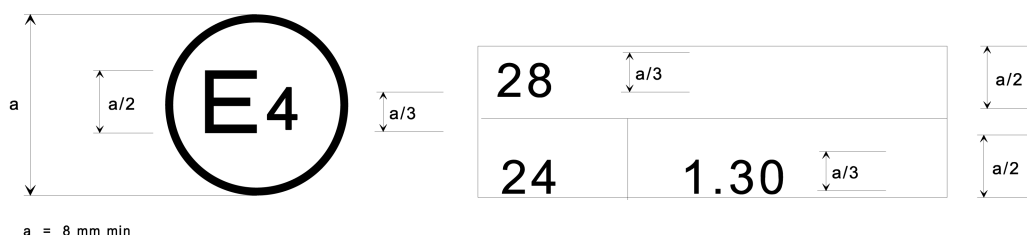
The approval number must be placed close to the circle and must be in a position either above or below the letter 'E' or to left or right of that letter. The digits of the approval number must be on the same side of the letter 'E' and face in the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

II. ARRANGEMENT OF THE APPROVAL MARK OF A VEHICLE WITH REGARD TO ITS AUDIBLE SIGNALS

(see paragraph 13.4 of this Regulation)

Model A

The above approval mark affixed to a vehicle indicates that, pursuant to Regulation No 28, this vehicle type has been approved in the Netherlands (E 4), with regard to its audible signals.

Model B

The above approval mark affixed to a vehicle indicates that, pursuant to Regulations Nos 28 and 24, this vehicle type has been approved in the Netherlands (E 4), with regard to its audible signals and to emissions of pollutants by the Diesel engine. In the case of the latter Regulation, the corrected value of the absorption factor is $1,30 \text{ m}^{-1}$.

Regulation No 44 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of restraining devices for child occupants of power driven vehicles ('child restraint systems')

1. SCOPE

- 1.1. This Regulation applies to child restraint systems which are suitable for installation in power-driven vehicles having three or more wheels, and which are not intended for use with folding (tip-up) or with side-facing seats.

2. DEFINITIONS

For the purpose of this Regulation:

- 2.1. *Child restraint system (restraint)* means an arrangement of components which may comprise the combination of straps or flexible components with a securing buckle, adjusting devices, attachments and in some cases a supplementary device as a carry-cot, infant carrier, a supplementary chair and/or an impact shield, capable of being anchored to a power-driven vehicle. It is so designed as to diminish the risk of injury to the wearer, in the event of a collision or of abrupt deceleration of the vehicle, by limiting the mobility of the wearer's body.

- 2.1.1. Child restraints fall into five 'mass groups':

- 2.1.1.1. group 0 for children of a mass less than 10 kg;
- 2.1.1.2. group 0+ for children of a mass less than 13 kg;
- 2.1.1.3. group I for children of mass from 9 kg to 18 kg;
- 2.1.1.4. group II for children of mass from 15 kg to 25 kg;
- 2.1.1.5. group III for children of mass from 22 kg to 36 kg.

- 2.1.2. Child restraints fall into four 'categories':

- 2.1.2.1. a 'universal' category for use as specified in paragraphs 6.1.1 and 6.1.3.1 on most vehicle seat positions, and in particular those which have been assessed according to Annex 13 — Appendix 2 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) as being compatible with such a category of child restraint;
- 2.1.2.2. a 'restricted' category for use as specified in paragraphs 6.1.1 and 6.1.3.1 in designated seat positions for particular vehicle types as indicated by either the child restraint manufacturer or the vehicle manufacturer;
- 2.1.2.3. a 'semi-universal' category for use as specified in paragraphs 6.1.1 and 6.1.3.2;
- 2.1.2.4. a 'specific vehicle' category for use either;
- 2.1.2.4.1. on specific vehicle types, in accordance with paragraphs 6.1.2 and 6.1.3.3; or
- 2.1.2.4.2. as a 'built in' child restraint.

- 2.1.3. Child restraint systems may be of two classes:

an *integral class* comprising a combination of straps or flexible components with a securing buckle, adjusting device, attachments, and in some cases a supplementary chair and/or impact shield, capable of being anchored by means of its own integral strap or straps;

a *non-integral class* that may comprise a partial restraint, which, when used in conjunction with an adult belt, which passes around the body of the child or restrains the device in which the child is placed, forms a complete child restraint system;

- 2.1.3.1. '*partial restraint*' means a device, such as a booster cushion, which, when used in conjunction with an adult seat belt, which passes around the body of the child or restrains the device in which the child is placed, forms a complete child restraint system;
- 2.1.3.2. '*booster cushion*' means a firm cushion, which can be used with an adult seat belt;
- 2.1.3.3. '*guide strap*' means a strap which constrains the shoulder strap of the adult seat belt in a position to suit the child and where the effective position at which the shoulder strap changes direction can be adjusted by means of a device which can be moved up and down the strap to locate the wearer's shoulder, and then locked into that position. This guide strap is not meant to carry a significant part of the dynamic load.
- 2.2. '*Child-safety chair*' means a child restraint incorporating a chair in which the child is held.
- 2.3. '*Belt*' means a child restraint comprising a combination of straps with a securing buckle, adjusting devices and attachments;
- 2.4. '*Chair*' means a structure which is a constituent part of the child restraint and is intended to accommodate a child in a seated position;
- 2.4.1. '*carry cot*' means a restraint system intended to accommodate and restrain the child in a supine or prone position with the child's spine perpendicular to the median longitudinal plane of the vehicle. It is so designed as to distribute the restraining forces over the child's head and body excluding its limbs in the event of a collision;
- 2.4.2. '*carry cot restraint*' means a device used to restrain a carrycot to the structure of the vehicle;
- 2.4.3. '*infant carrier*' means a restraint system intended to accommodate the child in a rearward-facing semi-recumbent position. It is so designed as to distribute the restraining forces over the child's head and body excluding its limbs in the event of the frontal collision.
- 2.5. '*Chair support*' means that part of a child restraint by which the chair can be raised.
- 2.6. '*Child support*' means that part of a child restraint by which the child can be raised within the child restraint.
- 2.7. '*Impact shield*' means a device secured in front of the child and designed to distribute the restraining forces over the greater part of the height of the child's body in the event of a frontal impact.
- 2.8. '*Strap*' means a flexible component designed to transmit forces;
- 2.8.1. '*lap strap*' means a strap which, either in the form of a complete belt or in the form of a component of such a belt, passes across the front of, and restrains, the child's pelvic region;
- 2.8.2. '*shoulder restraint*' means that part of a belt which restrains the child's upper torso;
- 2.8.3. '*crotch strap*' means a strap (or divided straps, where two or more pieces of webbing make it) attached to the child restraint and the lap strap and is so positioned as to pass between the child's thighs; it is designed to prevent the child sliding under the lap belt in normal use and prevent the lap belt moving up off the pelvis in an impact.
- 2.8.4. '*child-restraining strap*' means a strap which is a constituent part of the belt and restrains only the body of the child;

- 2.8.5. 'child-restraint attachment strap' means a strap which attaches the child restraint to the structure of the vehicle and may be a part of the vehicle-seat retaining device;
- 2.8.6. 'harness belt' means a belt assembly comprising a lap belt, shoulder restraints and, where fitted, a crotch strap;
- 2.8.7. 'Y-shaped belt' means a belt where the combination of straps is formed by a strap to be guided between the child's legs and a strap for each shoulder.
- 2.9. 'Buckle' means a quick release device which enables the child to be held by the restraint or the restraint by the structure of the car and can be quickly opened. The buckle may incorporate the adjusting device;
- 2.9.1. 'enclosed buckle release button', a buckle release button such that it must not be possible to release the buckle using a sphere having a diameter of 40 mm;
- 2.9.2. 'non-enclosed buckle release button', a buckle release button such that it must be possible to release the buckle using a sphere having a diameter of 40 mm.
- 2.10. 'Adjusting device' means a device enabling the restraint or its attachments to be adjusted to the physique of the wearer, the configuration of the vehicle, or both. The adjusting device may either be part of the buckle or be a retractor or any other part of the safety belt;
- 2.10.1. 'quick adjuster' means an adjusting device which can be operated by one hand in one smooth movement.
- 2.10.2. 'adjuster mounted directly on child restraint' means an adjuster for the integral harness which is directly mounted on the child restraint, as opposed to being directly supported by the webbing that it is designed to adjust.
- 2.11. 'Attachments' means parts of the child restraint, including securing components, which enable the child restraint to be firmly secured to the vehicle structure either directly or through the vehicle seat.
- 2.12. 'Energy absorber' means a device which is designed to dissipate energy independently of or jointly with the strap and forms part of a child restraint.
- 2.13. 'Retractor' means a device designed to accommodate a part or the whole of the strap of a child restraint. The term covers the following devices:
- 2.13.1. 'an automatically-locking retractor', a retractor which allows extraction of the desired length of a strap and, when the buckle is fastened, automatically adjusts the strap to the wearer's physique, further extraction of the strap without voluntary intervention by the wearer being prevented;
- 2.13.2. 'an emergency-locking retractor', a retractor which does not restrict the belt wearer's freedom of movement in normal driving conditions. Such a device has length-adjusting devices which automatically adjust the strap to the wearer's physique, and a locking mechanism actuated in an emergency by:
- 2.13.2.1. deceleration of the vehicle, extraction of the strap from the retractor, or any other automatic means (single sensitivity); or
- 2.13.2.2. a combination of any of these means (multiple sensitivity).
- 2.14. 'Restraint anchorages' means these parts of the vehicle structure or seat structure to which the child-restraint attachments are secured;

- 2.14.1. 'additional anchorage' means a part of the vehicle structure or of the vehicle seat structure, or any other part of the vehicle, to which a child restraint is intended to be secured and which is additional to the anchorages approved under Regulation No 14.
- 2.15. 'Forward-facing' means facing in the normal direction of travel of the vehicle.
- 2.16. 'Rearward-facing' means facing in the direction opposite to the normal direction of travel of the vehicle.
- 2.17. 'Inclined position' means a special position of the chair which allows the child to recline.
- 2.18. 'Lying down/supine/prone position' means a position where at least the child's head and body excluding its limbs are on a horizontal surface when at rest in the restraint.
- 2.19. 'Child-restraint type' means child restraints which do not differ in such essential respects as:
- 2.19.1. the category, and the mass group(s) for which and the position and orientation (as defined in paragraphs 2.15 and 2.16) in which the restraint is intended to be used;
- 2.19.2. the geometry of the child restraint;
- 2.19.3. the dimensions, mass, material and colour of:
- the seat;
- the padding;
- and
- the impact shield;
- 2.19.4. the material, weave, dimensions and colour of the straps;
- 2.19.5. the rigid components (buckle, attachments, etc.).
- 2.20. 'Vehicle seat' means a structure, which may or may not be integral with the vehicle structure, complete with trim and intended to seat one adult person. In this respect:
- 2.20.1. 'group of vehicle seats' means either a bench seat or a plurality of seats which are separate but side by side (i.e. so fixed that the front anchorages of one seat are in line with the front or rear anchorages of another seat or on a line passing between those anchorages), each seat accommodating one or more seated adult persons;
- 2.20.2. 'vehicle bench seat' means a structure complete with trim and intended to seat more than one adult person;
- 2.20.3. 'vehicle front seats' means the group of seats situated foremost in the passenger compartment, i.e. having no other seat directly in front of them;
- 2.20.4. 'vehicle rear seats' are fixed, forward-facing seats situated behind another group of vehicle seats.
- 2.21. 'Adjustment system' means the complete device by which the vehicle seat or its parts can be adjusted to suit the physique of the seat's adult occupant; this device may, in particular, permit:
- 2.21.1. longitudinal displacement, and/or

- 2.21.2. vertical displacement, and/or
- 2.21.3. angular displacement.
- 2.22. '*Vehicle seat anchorage*' means the system, including the affected parts of the vehicle structure, by which the adult seat as a whole is secured to the vehicle structure.
- 2.23. '*Seat type*' means a category of adult seats which do not differ in such essential respects as:
 - 2.23.1. the shape, dimensions and materials of the seat structure,
 - 2.23.2. the types and dimensions of the seat-back adjustment and locking systems, and
 - 2.23.3. the type and dimensions of the adult safety-belt anchorage on the seat, of the seat anchorage, and of the affected parts of the vehicle structure.
- 2.24. '*Displacement system*' means a device enabling the adult seat or one of its parts to be displaced angularly or longitudinally, without a fixed intermediate position, to facilitate the entry and exit of passengers and the loading and unloading of objects.
- 2.25. '*Locking system*' means a device ensuring that the adult seat and its parts are maintained in the position of use.
- 2.26. '*Lock-off device*' is a device which locks and prevents movement of one section of the webbing of an adult safety-belt relative to another section of the webbing of the same belt. The term covers the following classes:
 - 2.26.1. '*Class A device*', a device that prevents the child pulling webbing from the retractor through to the lap part of the belt, when the adult belt is used to restrain the child directly. When supplied with group I restraints, the device allows compliance with paragraph 6.2.9.
 - 2.26.2. '*Class B device*', a device that allows the retention of an applied tension in the lap part of an adult safety-belt, when the adult belt is used to restrain the child restraint. The device is intended to prevent webbing slipping from the retractor through the device, which would release the tension and place the restraint in a non-optimal position.
- 2.27. '*Special Needs Restraint*' is a child restraint system designed for children who have special needs as a result of either a physical or mental handicap; this device may in particular permit additional restraining devices for any part of the child, but it must contain as a minimum a primary means of restraint which complies with the requirements of this Regulation.
- 3. APPLICATION FOR APPROVAL
 - 3.1. The application for approval of a type of child restraint shall be submitted by the holder of the trade mark or by his duly accredited representative.
 - 3.2. The application for approval, relating to each type of child restraint, shall be accompanied by:
 - 3.2.1. a technical description of the child restraint, specifying the straps and other materials used, and accompanied by drawings of the parts making up the child restraint and in the case of retractors, installation instructions for these retractors and their sensing devices, declaration on toxicity (paragraph 6.1.5) and flammability (paragraph 6.1.6), the drawings must show the position intended for the approval number and additional symbol(s) in relation to the circle of the approval mark. The description shall mention the colour of the model submitted for approval;

- 3.2.2. four samples of the child restraint;
- 3.2.3. a 10-metre length of each category of strap used in the child restraint; and
- 3.2.4. additional samples shall be supplied at the request of the technical service responsible for conducting the test;
- 3.2.5. instructions and details of packaging in accordance with paragraph 14 below;
- 3.2.6. in case of carry-cots, if the carry-cot restraint may be used in combination with a number of types of carry-cots, the restraint manufacturer shall supply a list of the latter.
- 3.3. Where an approved adult safety belt is used to secure the child restraint, the application must stipulate the category of adult safety belt to be used, e.g. static lap belts.
- 3.4. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of conformity of production before type-approval is granted.

4. MARKINGS

- 4.1. The samples of child restraint submitted for approval in conformity with the provisions of paragraphs 3.2.2 and 3.2.3 above shall be clearly and indelibly marked with the manufacturer's name, initials or trade mark.
- 4.2. One of the parts made of plastics of the child restraint device (such as shell, impact shield, booster cushion, etc.), except the belt(s) or harness, shall be marked clearly (and indelibly) with the year of production.
- 4.3. If the restraint is to be used in combination with an adult safety belt the correct routing of the webbing shall be clearly indicated by means of a drawing permanently attached to the restraint. If the restraint is held in place by the adult safety-belt, the routes of the webbing shall be clearly marked on the product by colour coding. The colours for the safetybelt route to be used when the device is installed forward facing shall be red and when installed rear-facing shall be blue. The same colours shall also be used on the labels on the device that illustrate the methods of use.

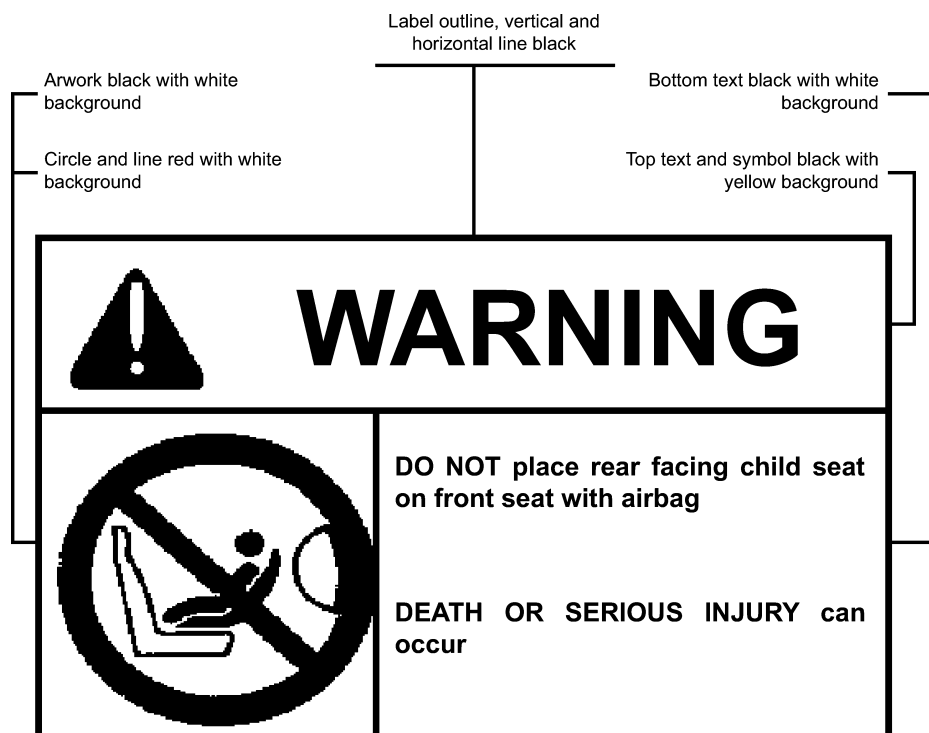
The separate routes of the lap and shoulder sections of the safety-belt shall each be distinguished on the product by colour coding and/or words.

The marking defined in this paragraph shall be visible with the restraint in the vehicle. For group 0 restraints, this marking shall also be visible with the child in the restraint.

- 4.4. Rearward facing child restraints shall have a permanently attached label, visible in the installed position, with the warning: 'EXTREME HAZARD — Do not use in passenger seats equipped with airbags'; this label shall be provided in the language of the country where the device is sold.
- 4.5. In addition, in the immediate area where the child's head rests within the child restraint and on the visible surface of the child restraint system, rearward-facing restraints shall have the following label permanently attached (the text information shown is a minimum).

This label shall be provided in the language(s) of the country where the device is sold.

Label minimum size: 60 × 120 mm



- 4.6. In the case of child restraints that can be used forward and rear-facing, include the words:

'Important — do not use forward facing before the child's weight exceeds (Refer to instructions)'

- 4.7. In the case of child restraints with alternative belt routes, the alternative load bearing contact points between the child restraint and the adult safety-belt must be permanently marked. This marking shall indicate that it is the alternative belt route, and shall conform with the above coding requirements for forward and rearward facing seats.
- 4.8. If the child restraint offers alternative load bearing contact points, the marking required in paragraph 4.3 shall include an indication that the alternative belt route is described in the instructions.

5. APPROVAL

- 5.1. Each sample submitted in conformity with paragraphs 3.2.2 and 3.2.3 above shall meet the specifications set forth in paragraphs 6 to 8 of this Regulation in every respect before approval can be granted.
- 5.2. An approval number shall be assigned to each type approved. Its first two digits (at present 03 corresponding to the 03 series of amendments which entered into force on 12 September 1995) 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 child restraint covered by this Regulation.
- 5.3. Notice of approval or of extension or refusal of approval of a child restraint 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. In addition to the marks prescribed in paragraph 4 above, the following particulars shall be affixed in a suitable space to every child restraint conforming to a type approved under this Regulation:
- 5.4.1. an international approval mark consisting of:
- 5.4.1.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽¹⁾;
- 5.4.1.2. an approval number;
- 5.4.2. the following additional symbols:
- 5.4.2.1. the word(s) 'universal', 'restricted', 'semi-universal' or 'vehicle specific' depending on the category of restraint.
- 5.4.2.2. the mass range for which the child restraint has been designed, namely, 0-10 kg; 0-13 kg; 9-18 kg; 15-25 kg; 22-36 kg; 0-18 kg; 9-25 kg; 15-36 kg; 0-25 kg; 9-36 kg; 0-36 kg.
- 5.4.2.3. the symbol 'Y', in the case of a device containing a crotch strap, in conformity with the requirements of supplement 3 to the 02 series of amendments to the Regulation;
- 5.4.2.4. the symbol 'S' in the case of a 'Special Needs Restraint'.
- 5.5. Annex 2 to this Regulation gives an example of the arrangement of the approval mark.
- 5.6. The particulars referred to in paragraph 5.4 above shall be clearly legible and be indelible, and may be affixed either by means of a label or by direct marking. The label or marking shall be resistant to wear.
- 5.7. The labels referred to in paragraph 5.6 above may be issued either by the authority which has granted the approval or, subject to that authority's authorization, by the manufacturer.
6. GENERAL SPECIFICATIONS
- 6.1. *Positioning and securing on the vehicle*
- 6.1.1. The use of child restraints in the 'universal', 'semi-universal' and 'restricted' categories is permitted in the front and rear seat positions if the restraints are fitted in conformity with the manufacturer's instructions.

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

- 6.1.2. The use of child restraints in the 'specific vehicle' category is permitted in all seat positions and also in the luggage area if the restraints are fitted in conformity with the manufacturer's instructions. In the case of a rear-facing restraint, the design must ensure that support for the child's head is provided whenever the restraint is ready to use. This is to be determined as a line perpendicular to the seat back through the eye line, the point of intersection shall be at least 40 mm below the start of radius of such a head support.
- 6.1.3. According to the category which it belongs to, the child restraint shall be secured to the vehicle structure or to the seat structure;
- 6.1.3.1. for the '*universal*' and '*restricted*' categories, only by means of an adult safety-belt (with or without a retractor) meeting the requirements of Regulation No 16 (or equivalent) fitted to anchorages meeting the requirements of Regulation No 14 (or equivalent).
- 6.1.3.2. for the '*semi-universal*' category: by means of the lower anchorages prescribed in Regulation No 14 and additional anchorages meeting the recommendation of Annex 11 to this Regulation;
- 6.1.3.3. for the '*specific vehicle*' category: by means of the anchorages designed by the manufacturer of the vehicle or the manufacturer of the child restraint;
- 6.1.3.4. In the case of child restraining straps or child restraint attachment strap utilizing belt anchorages to which are already fitted an adult belt or belts, the technical service shall check that:

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

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

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

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

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

The technical service shall apply the requirements of Annex 11 to this Regulation to the bar and the fastenings;

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

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

- 6.1.4. A booster cushion must be restrained by either an adult belt, using the test as specified in paragraph 8.1.4, or by separate means.
- 6.1.5. The child restraint manufacturer has to declare in written form that the toxicity of materials used in the manufacture of restraint systems and accessible to the restrained child is in conformity with the relevant parts of CEN Safety of Toys, part 3 (June 1982). Tests confirming the validity of the declaration may be carried out at the discretion of the test authority. This paragraph does not apply to restraint devices of groups II and III.

- 6.1.6. The child restraint manufacturer has to declare in written form that the flammability of materials used to manufacture the restraint system is in conformity with the relevant paragraphs of the ECE Consolidated Resolution on the Construction of Vehicles (R.E.3) (document TRANS/WP.29/78/Rev.1, paragraph 1.42). Tests confirming the validity of the declaration may be carried out at the discretion of the test authority.
- 6.1.7. In the case of rearward-facing child restraints supported by the vehicle dashboard, for the purpose of approval to this Regulation the dashboard is assumed to be sufficiently rigid.
- 6.1.8. In the case of child restraints of the 'universal' category, the main load-bearing contact point between the child restraint and the adult safety-belt shall not be less than 150 mm from the Cr axis when measured with the child restraint on the dynamic test bench. This shall apply to all adjustment configurations. Additional alternative belt routes are allowed. Where an alternative belt route exists, the manufacturer must make specific reference to the alternative route in the user instructions, as required in paragraph 14. When tested, using such alternative belt route(s), the restraint shall comply with all the requirements of the Regulation with the exception of this paragraph.
- 6.1.9. The maximum length of adult belt which may be used to secure a 'universal' category child restraint on the dynamic test bench is defined in Annex 13 to this Regulation.
- To check compliance with this requirement, the child restraint shall be secured onto the test bench using the appropriate standard seat belt described in Annex 13. The dummy shall not be installed unless the design of the restraint is such that the installation of a dummy would increase the amount of belt used. With the child restraint in the installed position there shall be no tension in the belt apart from that exerted by the standard retractor, where fitted. Where the retractor belt is used, this condition shall be met with at least 150 mm of belt remaining on the spool.
- 6.1.10. Child restraints of groups 0 and 0+ shall not be used forward facing.
- 6.2. *Configuration*
- 6.2.1. The configuration of the restraint shall be such that
- 6.2.1.1. the restraint gives the required protection in any intended position of the restraint system; for 'Special Needs Restraints' the primary means of restraint shall give the required protection in any intended position of the restraint system without the use of the additional restraining devices which may be present.
- 6.2.1.2. the child is easily and quickly installed and removed; in the case of a child restraint system in which the child is restrained by means of a harness belt or a Y-shaped belt without a retractor each shoulder restraint and lap strap shall be capable of movement relative to each other during the procedure prescribed in paragraph 7.2.1.4.
- In these cases the belt assembly of the child restraint system may be designed with two or more connecting parts. For 'Special Needs Restraints' it is recognized that the additional restraining devices will restrict the speed by which a child can be installed and removed. However, the additional devices shall be designed to release quickly so far as possible.
- 6.2.1.3. If it is possible to change the inclination of the restraint, this change in inclination shall not require manual readjustment of the straps. A deliberate hand-action is required in order to change the inclination of the restraint.
- 6.2.1.4. the groups 0, 0+ and I restraint systems shall keep the child so positioned as to give the required protection even when the child is asleep;

- 6.2.1.5. to prevent submarining, either by impact or through restlessness, a crotch strap shall be required on all forwardfacing group I restraints incorporating an integral harness belt system. With the crotch strap attached, and in its longest position if adjustable, it shall not be possible to adjust the lap strap to lie above the pelvis in either the 9 kg or the 15 kg dummy.
- 6.2.2. For groups I, II and III, all restraint devices utilizing a 'lap strap' must positively guide the 'lap strap' to ensure that the loads transmitted by the 'lap strap' are transmitted through the pelvis.
- 6.2.3. All straps of the restraint shall be so placed that they cannot cause discomfort to the wearer in normal use or assume a dangerous configuration. The distance between the shoulder-straps in the vicinity of the neck should be at least the width of the neck of the appropriate manikin.
- 6.2.4. The assembly shall not subject weak parts of the child's body (abdomen, crotch, etc.) to excessive stresses. The design shall be such that compression loads shall not be imposed on the crown of the child's head in the event of a collision.
- 6.2.4.1. Y-shaped belts may only be used in rearward facing child restraint systems.
- 6.2.5. The child restraint shall be so designed and installed as:
 - 6.2.5.1. to minimise the danger of injury to the child or to other occupants of the vehicle through sharp edges or protrusions (as defined in Regulation No 21, for example);
 - 6.2.5.2. not to exhibit sharp edges or protrusions liable to cause damage to vehicle-seat covers or to occupant's clothing;
 - 6.2.5.3. not to subject weak parts of the child's body (abdomen, crotch, etc.) to supplementary inertial forces it sets up;
 - 6.2.5.4. to ensure that its rigid parts do not, at points where they are in contact with straps, exhibit sharp edges capable of abrading the straps.
- 6.2.6. Any part made separable to enable components to be fixed and detached shall be so designed as to avoid any risk of incorrect assembly and use so far as possible. 'Special Needs Restraints' may have additional restraining devices; these shall be designed to avoid any risk of incorrect assembly and that their means of release and mode of operation is immediately obvious to a rescuer in an emergency.
- 6.2.7. Where the child restraint intended for group I, group II and groups I and II combined includes a chair back, the internal height of the latter, determined in accordance with the diagram in Annex 12, shall be not less than 500 mm.
- 6.2.8. Only automatically-locking retractors or emergency-locking retractors may be used.
- 6.2.9. For devices intended for use in Group I it must not be possible for the child to easily slacken that part of the system that restrains the pelvis after the child has been installed; any device that is designed to obtain this must be permanently attached to the child restraint system.
- 6.2.10. A child restraint may be designed for use in more than one mass group and/or by more than one child, provided that it is able to satisfy the requirements laid down for each of the groups concerned. A child restraint in the 'universal' category must meet the requirements of that category for all mass groups for which it has been approved.
- 6.2.11. Child restraints with retractor

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

- 6.2.12. In case of booster cushions, the ease with which the straps and tongue of an adult belt pass through the fixture points must be examined. This goes particularly for booster cushions which are designed for the front seats of cars, which may have long semi-rigid stalks. The fixed buckle should not be allowed to pass through the fixture points of booster seats, or to permit a lie of belt completely different from that of the test-trolley.
- 6.2.13. If the child restraint is designed for more than one child, each restraint system shall be fully independent with regard to load transfer and adjustments.
- 6.2.14. The child restraints incorporating inflatable elements shall be so designed that the conditions of use (pressure, temperature, humidity) have no influence on their ability to comply with the requirements of this Regulation.
7. PARTICULAR SPECIFICATIONS
- 7.1. *Provisions applicable to the assembled restraint*
- 7.1.1. Resistance to corrosion
- 7.1.1.1. A complete child restraint, or the parts thereof that are liable to corrosion, shall be subject to the corrosion test specified in paragraph 8.1.1 below.
- 7.1.1.2. After the corrosion test as prescribed in paragraphs 8.1.1.1 and 8.1.1.2, no signs of deterioration likely to impair the proper functioning of the child restraint, and no significant corrosion, shall be visible to the unaided eye of a qualified observer.
- 7.1.2. Energy absorption
- 7.1.2.1. For all devices with backrests there shall be internal surfaces, defined in Annex 18 to this Regulation, comprising material with a peak acceleration of less than 60 g when measured in accordance with Annex 17 to this Regulation. This requirement applies also to areas of impact shields which are in the head strike area.
- 7.1.3. Overturning
- 7.1.3.1. The child restraint shall be tested as prescribed in paragraph 8.1.2; the manikin shall not fall out of the device and, when the test seat is in the upside down position the manikin's head shall not move more than 300 mm from its original position in a vertical direction relative to the test seat.
- 7.1.4. Dynamic test
- 7.1.4.1. General
- The child restraint shall be subjected to a dynamic test in conformity with paragraph 8.1.3 below.
- 7.1.4.1.1. Child restraints of the 'universal', 'restricted' and 'semi-universal' categories shall be tested on the test trolley by means of the test seat prescribed in paragraph 6, and in conformity with paragraph 8.1.3.1.
- 7.1.4.1.2. Child restraints of the 'specific vehicle' category shall be tested with each vehicle model for which the child restraint is intended. The technical service responsible for conducting the test may reduce the number of vehicle models tested if they do not differ greatly in the aspects listed in paragraph 7.1.4.1.2.3. The child restraint may be tested in one of the following ways:
- 7.1.4.1.2.1. On a complete vehicle, as prescribed in paragraph 8.1.3.3;

- 7.1.4.1.2.2. in a vehicle body shell on the test trolley, as prescribed in paragraph 8.1.3.2; or,
- 7.1.4.1.2.3. in sufficient parts of the vehicle bodyshell to be representative of the vehicle structure and impact surfaces. If the child restraint is intended for use in the rear seat, these shall include the back of the front seat, the rear seat, the floor pan, the B and C pillars and the roof. If the child restraint is intended for use in the front seat, the parts shall include the dashboard, the A pillars, the windscreen, any levers or knobs installed in the floor or on a console, the front seat, the floor pan and the roof. Furthermore, if the child restraint is intended for use in combination with the adult safety belt, the parts shall include the appropriate adult belt(s). The technical service responsible for conducting the test may permit items to be excluded if they are found to be superfluous. Testing shall be as prescribed in paragraph 8.1.3.2.
- 7.1.4.1.3. The dynamic test shall be performed on child restraints which have not previously been under load.
- 7.1.4.1.4. During the dynamic tests, no part of the child restraint actually helping to keep the child in position shall break, and no buckles or locking system or displacement system shall release.
- 7.1.4.1.5. In the case of 'non-integral type' the seat belt used shall be the standard belt and its anchorage brackets prescribed in Annex 13 to this Regulation. This does not apply to 'specific vehicle' approvals where the actual belt of the vehicle shall be used.
- 7.1.4.1.6. If a 'specific vehicle' child restraint system is installed in the area behind the rearmost forward facing adult seat positions (for example, the luggage area), one test with the largest dummy/dummies on a complete vehicle as prescribed in paragraph 8.1.3.3.3 shall be performed. The other tests, including the conformity of production, may be done as prescribed in paragraph 8.1.3.2, if the manufacturer so wishes.
- 7.1.4.1.7. In the case of a 'Special Needs Restraint' every dynamic test specified by this Regulation for each mass group shall be performed twice: first, using the primary means of restraint and second, with all restraining devices in use. In these tests, special attention shall be given to the requirements in paragraphs 6.2.3 and 6.2.4.
- 7.1.4.1.8. During the dynamic tests, the standard safety-belt used to install the child restraint shall not become disengaged from any guide or locking device utilised for the test conducted.
- 7.1.4.2. Chest acceleration ⁽¹⁾
- 7.1.4.2.1. The resultant chest acceleration shall not exceed 55 g except during periods whose sum does not exceed 3 ms.
- 7.1.4.2.2. The vertical component of the acceleration from the abdomen towards the head shall not exceed 30 g except during periods whose sum does not exceed 3 ms.
- 7.1.4.3. Abdominal penetration ⁽²⁾
- 7.1.4.3.1. During the verification described in Annex 8, Appendix 1, paragraph 5.3, there shall be no visible signs of penetration of the modelling clay of the abdomen caused by any part of the restraining device.

⁽¹⁾ Chest acceleration limits do not apply when using the 'new born' manikin as it is not instrumented.

⁽²⁾ The new-born manikin is not fitted with any abdominal insert. Therefore only a subjective analysis can be used as a guide to abdominal penetration.

7.1.4.4. Manikin displacement

7.1.4.4.1. Child restraints of the 'universal', 'restricted' and 'semi-universal' categories:

7.1.4.4.1.1. Forward facing child restraints: the head of the manikin shall not pass beyond the planes BA and DA as defined in Figure 1 below.

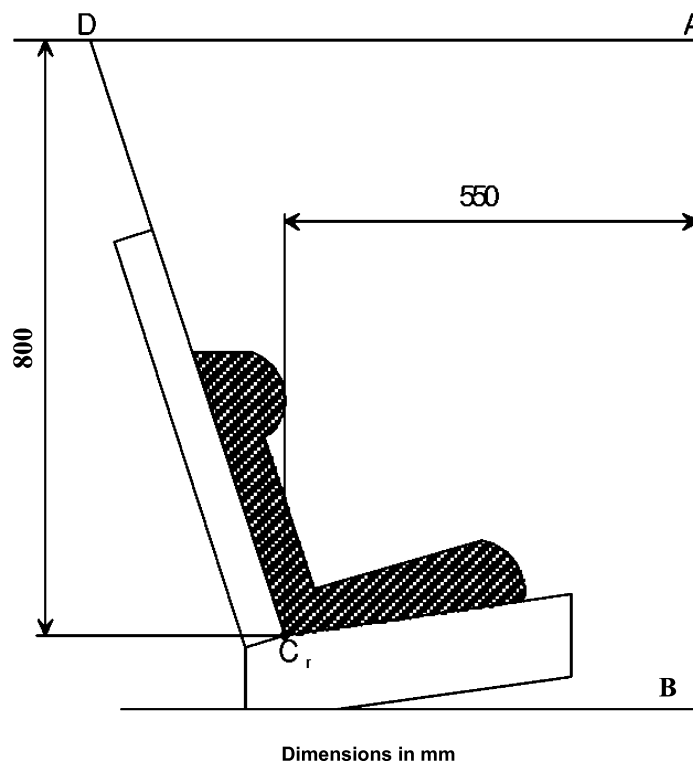


Figure 1: Arrangement for testing a forward-facing device

7.1.4.4.1.2. Rear-facing child restraints:

7.1.4.4.1.2.1. Child restraints supported by dashboard: the head of the manikin shall not pass beyond the planes AD and DCr, as defined in Figure 2 below.

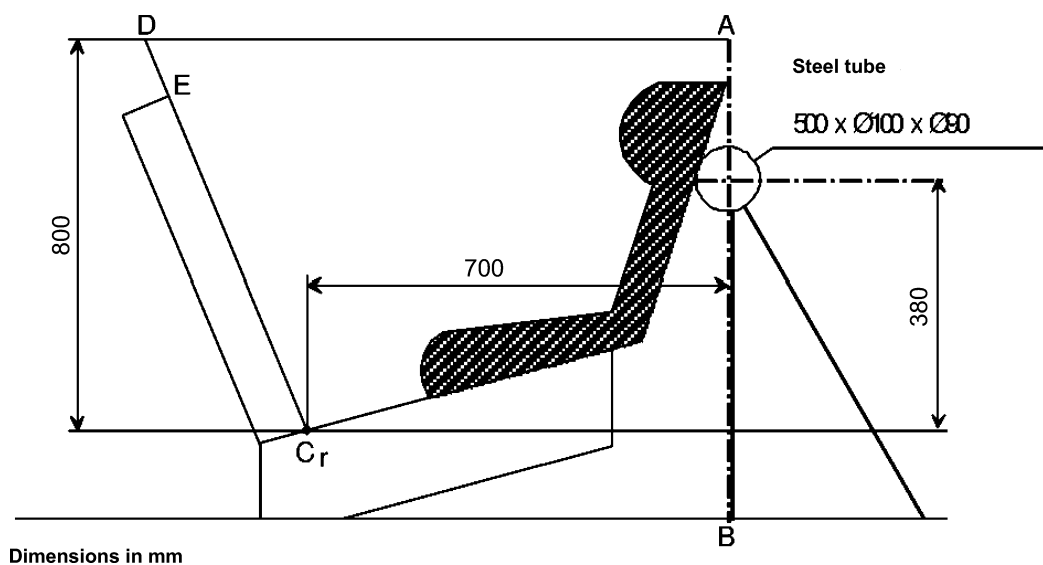


Figure 2: Arrangement for testing a rearward-facing device

7.1.4.4.1.2.2. Child restraints in group 0 not supported by the dashboard, and carrycots: the head of the manikin shall not pass the planes AB, AD and DE as shown in Figure 3 below.

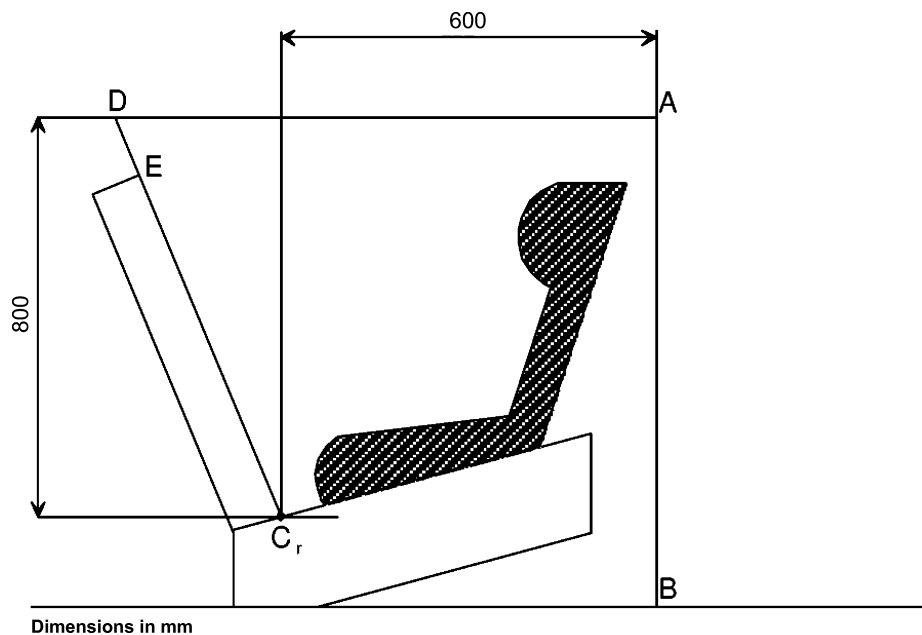


Figure 3: Arrangement for testing child restraint devices group 0, not supported by the dashboard

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

The head of the manikin shall not pass the planes FD, FG and DE, as shown in Figure 4 below.

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

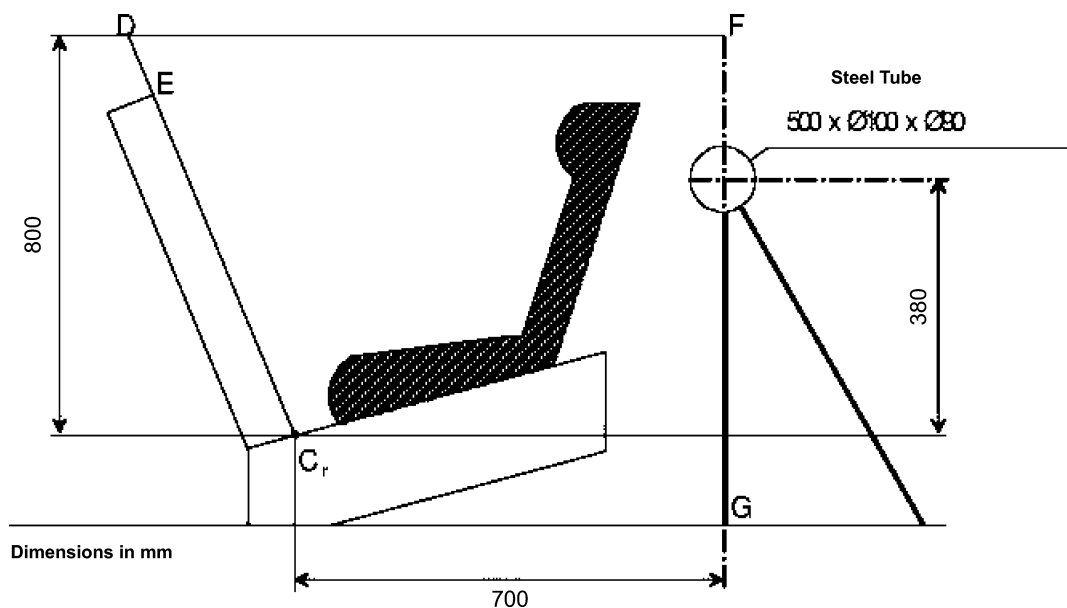


Figure 4: Arrangement for testing rearward-facing devices, except group 0, not supported by the dashboard

- 7.1.4.4.2. Child restraints of the 'specific vehicle' category: when tested in a complete vehicle or a vehicle body shell, the head shall not come into contact with any part of the vehicle. However, if there is contact, the speed of impact of the head shall be less than 24 km/h and the part contacted shall meet the requirements of the energy absorption test laid down in Regulation No 21, Annex 4. In tests with complete vehicles it shall be possible to remove the manikins from the child restraint without the use of tools after the test.
- 7.1.5. Resistance to temperature
- 7.1.5.1. Buckle assemblies, retractors, adjusters and lock-off devices that are liable to be affected by temperature, shall be subject to the temperature test specified in paragraph 8.2.8 below.
- 7.1.5.2. After the temperature test as prescribed in paragraph 8.2.8.1, no signs of deterioration likely to impair the proper functioning of the child restraint, shall be visible to the unaided eye of a qualified observer.
- 7.2. *Provisions applicable to individual components of the restraint*
- 7.2.1. Buckle
- 7.2.1.1. The buckle shall be so designed as to preclude any possibility of incorrect manipulation. This means, *inter alia*, that it must not be possible for the buckle to be left in a partially closed position; it must not be possible to exchange the buckle parts inadvertently when the buckle is being locked; the buckle must only lock when all parts are engaged. Wherever the buckle is in contact with the child, it shall not be narrower than the minimum width of strap as specified in paragraph 7.2.4.1.1 below. This paragraph is not applicable to belt assemblies already approved according to ECE Regulation No 16 or any equivalent standard in force. In the case of a 'Special Needs Restraint' only the buckle on the primary means of restraint need comply with the requirements of paragraphs 7.2.1.1 to 7.2.1.9 inclusive.
- 7.2.1.2. The buckle, even when not under tension, shall remain closed whatever its position. It shall be easy to operate and to grasp. It shall be possible to open it by pressure on a button or on a similar device. The surface to which this pressure must be applied must have in the position of actual unlocking: for enclosed devices, an area of not less than 4,5 cm² with a width of not less than 15 mm; for non-enclosed devices, an area of 2,5 cm² and a width of not less than 10 mm. The width shall be the smaller of the two dimensions forming the prescribed area and shall be measured rectangular to the direction of movement of the release button.
- 7.2.1.3. The buckle release area shall be coloured red. No other part of the buckle shall be of this colour.
- 7.2.1.4. It shall be possible to release the child from the restraint by a single operation on a single buckle. For groups 0 and 0+ it is allowed to remove the child together with devices such as infant carrier/carry-cot/carry-cot restraints if the child restraint system can be released by operation of a maximum of two buckles.
- 7.2.1.4.1. A clip connection between the shoulder straps of a harness belt is deemed not to comply with the single operation requirement given in paragraph 7.2.1.4 above.
- 7.2.1.5. For groups II and III the buckle shall be so placed that the child occupant can reach it. In addition it shall for all groups be so placed that its purpose and mode of operation are immediately obvious to a rescuer in an emergency.
- 7.2.1.6. Opening of the buckle shall enable the child to be removed independently of the 'chair', 'chair support' or 'impact shield', if fitted, and if the device includes a crotch strap the crotch strap shall be released by operation of the same buckle.
- 7.2.1.7. The buckle shall be capable of withstanding the temperature test operation requirements given in paragraph 8.2.8.1 and repeated operation, and shall, before the dynamic test prescribed in paragraph 8.1.3 undergo a test comprising 5 000 ± 5 opening and closing cycles under normal conditions for use.

- 7.2.1.8. The buckle shall be subjected to the following tests of opening:
 - 7.2.1.8.1. Test under load
 - 7.2.1.8.1.1. A child restraint having already undergone the dynamic test prescribed in paragraph 8.1.3 below shall be used for this test.
 - 7.2.1.8.1.2. The force required to open the buckle in the test prescribed in paragraph 8.2.1.1 below shall not exceed 80 N.
 - 7.2.1.8.2. No-load test
 - 7.2.1.8.2.1. A buckle which has not previously been subjected to a load shall be used for this test. The force needed to open the buckle when it is not under load shall be in the range of 40-80 N in the tests prescribed in paragraph 8.2.1.2 below.
- 7.2.1.9. Strength
 - 7.2.1.9.1. During the test in accordance with paragraph 8.2.1.3.2 no part of the buckle or the adjacent straps or adjusters shall break or be detached.
 - 7.2.1.9.2. A harness buckle of mass groups 0 and 0+ shall withstand 4 000 N.
 - 7.2.1.9.3. A harness buckle of mass group I and higher shall withstand 10 000 N.
 - 7.2.1.9.4. The competent authority may dispense with the buckle strength test if information already available renders the test superfluous.
- 7.2.2. Adjusting device
 - 7.2.2.1. The range of adjustment shall be sufficient to permit correct adjustment of the child restraint throughout the weight group for which the device is intended and to permit satisfactory installation in all specified vehicle models.
 - 7.2.2.2. All adjusting devices shall be of the 'quick adjuster' type, except that adjusting devices used only for the initial installation of the restraint in the vehicle may be of other than the 'quick adjuster' type.
 - 7.2.2.3. Devices of the 'quick adjuster' type shall be easy to reach when the child restraint is correctly installed and the child or manikin is in position.
 - 7.2.2.4. A device of the 'quick adjuster' type shall be easily adjustable to the child's physique. In particular, in a test performed in accordance with paragraph 8.2.2.1, the force required to operate a manual adjusting device shall not exceed 50 N.
 - 7.2.2.5. Two samples of the child-restraint adjusting devices shall be tested as prescribed by the temperature test operation requirements given in paragraph 8.2.8.1 and in paragraph 8.2.3 below.
 - 7.2.2.5.1. The amount of strap slip shall not exceed 25 mm for one adjusting device or 40 mm for all adjusting devices.
 - 7.2.2.6. The device must not break or become detached when tested as prescribed in paragraph 8.2.2.1 below.

- 7.2.2.7. An adjuster mounted directly on the child restraint shall be capable of withstanding repeated operation and shall, before the dynamic test prescribed in paragraph 8.1.3 undergo a test comprising $5\,000 \pm 5$ cycles as specified in paragraph 8.2.7.
- 7.2.3. Retractors
- 7.2.3.1. Automatically-locking retractors
- 7.2.3.1.1. The strap of a safety-belt equipped with an automatically-locking retractor shall not unwind by more than 30 mm between locking positions of the retractor. After a rearward movement of the wearer the belt must either remain in its initial position or return to that position automatically on subsequent forward movement of the wearer.
- 7.2.3.1.2. If the retractor is part of a lap belt, the retracting force of the strap shall be not less than 7 N as measured in the free length between the manikin and the retractor as prescribed in paragraph 8.2.4.1 below. If the retractor is part of a chest restraint, the retracting force of the strap shall be not less than 2 N or more than 7 N as similarly measured. If the strap passes through a guide or pulley, the retracting force shall be measured in the free length between the manikin and the guide or pulley. If the assembly incorporates a device, manually or automatically operated, that prevents the strap from being completely retracted, that device shall not be in operation when these measurements are effected.
- 7.2.3.1.3. The strap shall be repeatedly withdrawn from the retractor and allowed to retract, in the conditions prescribed in paragraph 8.2.4.2 below, until 5 000 cycles have been completed. The retractor shall then be subjected to the temperature test operation requirements given in paragraph 8.2.8.1 and corrosion test described in paragraph 8.1.1 and the dust-resistance test described in paragraph 8.2.4.5. It shall then satisfactorily complete a further 5 000 cycles of withdrawal and retraction. After the above tests the retractor shall continue to operate correctly and to meet the requirements of paragraphs 7.2.3.1.1 and 7.2.3.1.2 above.
- 7.2.3.2. Emergency-locking retractors
- 7.2.3.2.1. An emergency-locking retractor shall when tested as prescribed in paragraph 8.2.4.3 satisfy the conditions below:
- 7.2.3.2.1.1. It shall be locked when the deceleration of the vehicle reaches 0,45 g.
- 7.2.3.2.1.2. It shall not lock for strap accelerations of less than 0,8 g as measured in the axis of strap extraction.
- 7.2.3.2.1.3. It shall not lock when its sensing device is tilted by not more than 12° in any direction from the installation position specified by its manufacturer.
- 7.2.3.2.1.4. It shall lock when its sensing device is tilted by more than 27° in any direction from the installation position specified by its manufacturer.
- 7.2.3.2.2. Where the operation of a retractor depends on an external signal or power source, the design shall ensure that the retractor locks automatically upon failure or interruption of that signal or power source.
- 7.2.3.2.3. A multiple-sensitivity emergency-locking retractor shall meet the requirements set out above. In addition, if one of the sensitivity factors relates to strap extraction, locking must have occurred at a strap acceleration of 1,5 g as measured in the axis of strap extraction.
- 7.2.3.2.4. In the tests referred to in paragraphs 7.2.3.2.1.1 and 7.2.3.2.3 above, the amount of strap extraction occurring before the retractor locks shall not exceed 50 mm, starting at the length of unwinding specified in paragraph 8.2.4.3.1. In the test referred to in paragraph 7.2.3.2.1.2 above, locking shall not occur during the 50 mm of strap extraction starting at the length of unwinding specified in paragraph 8.2.4.3.1 below.

- 7.2.3.2.5. If the retractor is part of a lap belt, the retracting force of the strap shall be not less than 7 N as measured in the free length between the manikin and the retractor as prescribed in paragraph 8.2.4.1. If the retractor is part of a chest restraint, the retracting force of the strap shall be not less than 2 N or more than 7 N as similarly measured. If the strap passes through a guide or pulley, the retracting force shall be measured in the free length between the manikin and the guide or pulley. If the assembly incorporates a device, manually or automatically operated, that prevents the strap from being completely retracted, that device shall not be in operation when these measurements are effected.
- 7.2.3.2.6. The strap shall be repeatedly withdrawn from the retractor and allowed to retract, in the conditions prescribed in paragraph 8.2.4.2, until 40 000 cycles have been completed. The retractor shall then be subjected to the temperature test operation requirements given in paragraph 8.2.8.1 and corrosion test described in paragraph 8.1.1 and to the dust-resistance test described in paragraph 8.2.4.5. It shall then satisfactorily complete a further 5 000 cycles of withdrawal and retraction (making 45 000 in all). After the above tests the retractor shall continue to operate correctly and to meet the requirements of paragraphs 7.2.3.2.1 to 7.2.3.2.5 above.
- 7.2.4. Straps
- 7.2.4.1. Width
- 7.2.4.1.1. The minimum width at the child-restraint straps which contact the dummy shall be 25 mm for groups 0, 0+ and I, and 38 mm for groups II and III. These dimensions shall be measured during the strap strength test prescribed in paragraph 8.2.5.1, without stopping the machine and under a load equal to 75 per cent of the breaking load of the strap.
- 7.2.4.2. Strength after room conditioning
- 7.2.4.2.1. On two sample straps conditioned as prescribed in paragraph 8.2.5.2.1, the breaking load of the strap shall be determined as prescribed in paragraph 8.2.5.1.2 below.
- 7.2.4.2.2. The difference between the breaking loads of the two samples shall not exceed 10 per cent of the greater of the two breaking loads measured.
- 7.2.4.3. Strength after special conditioning
- 7.2.4.3.1. On two straps conditioned as prescribed in one of the provisions of paragraph 8.2.5.2 (except paragraph 8.2.5.2.1), the breaking load of the strap shall be not less than 75 per cent of the average of the loads determined in the test referred to in paragraph 8.2.5.1 below.
- 7.2.4.3.2. In addition, the breaking load shall be not less than 3,6 kN for the restraints of the groups 0, 0+ and I, 5 kN for those of group II, and 7,2 kN for those of group III.
- 7.2.4.3.3. The competent authority may dispense with one or more of these tests if the composition of the material used, or information already available, renders the test or tests superfluous.
- 7.2.4.3.4. The abrasion conditioning procedure of type 1 defined in paragraph 8.2.5.2.6 shall only be performed when the microslip test defined in paragraph 8.2.3 below gives a result above 50 per cent of the limit prescribed in paragraph 7.2.2.5.1 above.
- 7.2.4.4. It shall not be possible to pull the complete strap through any adjusters, buckles or anchoring points.
- 7.2.5. Lock-off device
- 7.2.5.1. The lock-off device must be permanently attached to the child restraint.
- 7.2.5.2. The lock-off device must not impair the durability of the adult belt and undergo temperature test operation requirements given in paragraph 8.2.8.1.

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

7.2.5.4. Class A devices.

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

7.2.5.5. Class B devices.

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

8. DESCRIPTION OF TESTS ⁽¹⁾

8.1. *Tests of the assembled restraint*

8.1.1. Corrosion

8.1.1.1. The metal items of the child restraint shall be positioned in a test chamber as prescribed in Annex 4. In the case of a child restraint incorporating a retractor, the strap shall be unwound to full length less 100 ± 3 mm. Except for short interruptions that may be necessary, for example, to check and replenish the salt solution, the exposure test shall proceed continuously for a period of $50 \pm 0,5$ hours.

8.1.1.2. On completion of the exposure test the metal items of the child restraint shall be gently washed, or dipped, in clean running water with a temperature not higher than 38 °C to remove any salt deposit that may have formed and then allowed to dry at room temperature of 18 to 25 °C for 24 ± 1 hours before inspection in accordance with paragraph 7.1.1.2 above.

8.1.2. Overturning

8.1.2.1. The manikin shall be placed in the restraints installed in accordance with this Regulation and taking into account the manufacturer's instructions and with the standard slack as specified in paragraph 8.1.3.6 below.

8.1.2.2. The restraint shall be fastened to the test seat or vehicle seat. The whole seat shall be rotated around a horizontal axis contained in the median longitudinal plane of the seat through an angle of 360° at a speed of 2-5 degrees/second. For the purposes of this test, devices intended for use in specific cars may be attached to the test seat described in Annex 6.

8.1.2.3. This test shall be carried out again rotating in the reverse direction after having replaced, if necessary, the manikin in its initial position. With the rotational axis in the horizontal plane and at 90° to that of the two earlier tests, the procedure shall be repeated in the two directions of rotation.

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

⁽¹⁾ Tolerances on dimensions unless otherwise stated, not valid for boundaries.

Range of Dimensions (mm)	Less than 6	above 6 to 30	above 30 to 120	above 120 to 315	above 315 to 1 000	Above 1 000
Tolerance (mm)	$\pm 0,5$	± 1	$\pm 1,5$	± 2	± 3	± 4

Angular tolerances unless otherwise stated: ± 1 .

- 8.1.3. Dynamic tests
 - 8.1.3.1. Tests on the trolley and test seat
 - 8.1.3.1.1. Forward-facing
 - 8.1.3.1.1.1. The trolley and test seat used in the dynamic test shall meet the requirements of Annex 6 to this Regulation, and the dynamic crash test installation procedure is to be in accordance with Annex 21.
 - 8.1.3.1.1.2. The trolley shall remain horizontal throughout deceleration.
 - 8.1.3.1.1.3. The deceleration of the trolley shall be achieved by using the apparatus prescribed in Annex 6 to this Regulation or any other device giving equivalent results. This apparatus shall be capable of the performance specified in paragraph 8.1.3.4 and Annex 7 of this Regulation.
 - 8.1.3.1.1.4. The following measurements shall be made:
 - 8.1.3.1.1.4.1. the trolley speed immediately before impact;
 - 8.1.3.1.1.4.2. the stopping distance;
 - 8.1.3.1.1.4.3. the displacement of the manikin's head in the vertical and horizontal planes for groups I, II and III and for groups 0 and 0+ the displacement of the manikin without considering its limbs;
 - 8.1.3.1.1.4.4. the chest acceleration in three mutually perpendicular directions except for new-born manikin;
 - 8.1.3.1.1.4.5. any visible signs of penetration of the modelling clay in the abdomen (see paragraph 7.1.4.3.1) except for new-born manikin.
 - 8.1.3.1.1.5. After impact, the child restraint shall be inspected visually, without opening the buckle, to determine whether there has been any failure or breakage.
 - 8.1.3.1.2. Rearward-facing
 - 8.1.3.1.2.1. The test seat shall be rotated 180° when testing in compliance with the requirements of the rear impact test.
 - 8.1.3.1.2.2. When testing a rearward-facing child restraint intended for use in the front seating position, the vehicle fascia shall be represented by a rigid bar attached to the trolley in such a way that all the energy absorption takes place in the child restraint.
 - 8.1.3.1.2.3. The deceleration conditions shall satisfy the requirements of paragraph 8.1.3.4 below.
 - 8.1.3.1.2.4. The measurements to be made shall be similar to those listed in paragraphs 8.1.3.1.1.4 to 8.1.3.1.1.4.5 above.
 - 8.1.3.1.2.5. After impact, the child restraint shall be inspected visually without opening the buckle, to determine whether there has been any failure or breakage.

- 8.1.3.2. Test on trolley and vehicle body shell
 - 8.1.3.2.1. Forward-facing
 - 8.1.3.2.1.1. The method used to secure the vehicle during the test shall not be such as to strengthen the anchorages of the vehicle seats, adult safety belts and any additional anchorages required to secure the child restraint or to lessen the normal deformation of the structure. No part of the vehicle shall be present which, by limiting the movement of the manikin, would reduce the load imposed on the child restraint during the test. The parts of the structure eliminated may be replaced by parts of equivalent strength, provided they do not hinder the movement of the manikin.
 - 8.1.3.2.1.2. A securing device shall be regarded as satisfactory if it produces no effect on an area extending over the whole width of the structure and if the vehicle or structure is blocked or fixed in front at a distance of not less than 500 mm from the anchorage of the restraint system. At the rear the structure shall be secured at a sufficient distance behind the anchorages to ensure that all requirements of paragraph 8.1.3.2.1.1 above are fulfilled.
 - 8.1.3.2.1.3. The vehicle seat and child restraint shall be fitted and shall be placed in a position chosen by the technical service conducting approval tests to give the most adverse conditions in respect of strength, compatible with installing the manikin in the vehicle. The position of the vehicle seat-back and child restraint shall be stated in the report. The vehicle seat-back, if adjustable for inclination, shall be locked as specified by the manufacturer or, in the absence of any specification, at an actual seat-back angle as near as possible to 25°.
 - 8.1.3.2.1.4. Unless the instructions for fitting and use require otherwise, the front seat shall be placed in the most forward normally used position for child restraints intended for use in the front seating position, and in the rearmost normally used position for child restraints intended for use in the rear seating position.
 - 8.1.3.2.1.5. The deceleration conditions shall satisfy the requirements of paragraph 8.1.3.4 below. The test seat will be the seat of the actual vehicle.
 - 8.1.3.2.1.6. The following measurements shall be made:
 - 8.1.3.2.1.6.1. the trolley speed immediately before impact;
 - 8.1.3.2.1.6.2. the stopping distance;
 - 8.1.3.2.1.6.3. any contact of the manikin's head with the interior of the vehicle body shell;
 - 8.1.3.2.1.6.4. the chest deceleration in three mutually perpendicular directions, except for new-born manikin;
 - 8.1.3.2.1.6.5. any visible signs of penetration of the modelling clay in the abdomen (see paragraph 7.1.4.3.1), except for new-born manikin.
 - 8.1.3.2.1.7. After impact, the child restraint shall be inspected visually, without opening the buckle, to determine whether there has been any failure.
 - 8.1.3.2.2. Rearward-facing
 - 8.1.3.2.2.1. For rear impact tests the vehicle body shell shall be rotated 180° on the test trolley.
 - 8.1.3.2.2.2. Same requirements as for frontal impact.
- 8.1.3.3. Test with complete vehicle
 - 8.1.3.3.1. The deceleration conditions shall satisfy the requirements of paragraph 8.1.3.4 below.

- 8.1.3.3.2. For frontal impact tests the procedure shall be that set out in Annex 9 to this Regulation.
- 8.1.3.3.3. For rear impact tests the procedure shall be that set out in Annex 10 to this Regulation.
- 8.1.3.3.4. The following measurements shall be made:
- 8.1.3.3.4.1. the speed of the vehicle/impactor immediately before impact;
- 8.1.3.3.4.2. any contact of the manikin's head (in the case of group 0 the manikin without considering its limbs) with the interior of the vehicle;
- 8.1.3.3.4.3. the chest acceleration in three mutually perpendicular directions, except for new-born manikin;
- 8.1.3.3.4.4. any visible signs of penetration of the modelling clay in the abdomen (see paragraph 7.1.4.3.1), except for new-born manikin.
- 8.1.3.3.5. The front seats, if adjustable for inclination, shall be locked as specified by the manufacturer or, in the absence of any specification, at an actual seat-back angle as near as possible to 25°.
- 8.1.3.3.6. After impact, the child restraint shall be inspected visually, without opening the buckle, to determine whether there has been any failure or breakage.
- 8.1.3.4. The conditions for dynamic test are summarized in the table below.

Test	Restraint	FRONTAL IMPACT			REAR IMPACT		
		Speed (km/h)	Test pulse	Stopping distance during test (mm)	Speed (km/h)	Test pulse	Stopping distance during test (mm)
Trolley with test seat	Forward facing front and rear seats universal, semi-universal or restricted (*)	50+0 - 2	1	650±50	—	—	—
	Rearward facing front and rear seats universal, semi-universal or restricted (**)	50+0 - 2	1	650±50	30+2 - 0	2	275±25
Vehicle body on trolley	Forward facing (*)	50+0 - 2	1 or 3	650±50	—	—	—
	Rearward facing (**)	50+2 - 2	1 or 3	650±50	30+2 - 0	2 or 4	275±25
Whole Vehicle barrier test	Forward facing	50+0 - 2	3	Not specified	—	—	—
	Rearward facing	50+0 - 2	3	Not specified	30+2 - 0	4	Not specified

(*) During calibration, the stopping distance should be 650 ± 30 mm

(**) During calibration, the stopping distance should be 275 ± 20 mm.

Note: All restraint systems for groups 0 and 0+ shall be tested according to 'Rearward-facing' conditions in frontal and rearwards impact.

Legend:

Test Pulse No 1: As prescribed in Annex 7 — frontal impact.

Test Pulse No 2: As prescribed in Annex 7 — rear impact.

Test Pulse No 3: Deceleration pulse of vehicle subjected to frontal impact.

Test Pulse No 4: Deceleration pulse of vehicle subjected to rear impact.

- 8.1.3.5. Child restraints incorporating the use of additional anchorages
 - 8.1.3.5.1. In the case of child restraints intended for use as specified in paragraph 2.1.2.3 and incorporating the use of additional anchorages, the requirement for a frontal impact test, in accordance with paragraph 8.1.3.4, shall be carried out as follows:
 - 8.1.3.5.2. For devices with short upper attachment straps, e.g. intended to be attached to the rear parcel shelf, the upper anchorage configuration on the test trolley shall be as prescribed in Annex 6, Appendix 3.
 - 8.1.3.5.3. For devices with long upper attachment straps, e.g. intended for use where there is no rigid parcel shelf and where the upper anchorage straps are attached to the vehicle floor, the anchorages on the test trolley shall be as prescribed in Annex 6, Appendix 3.
 - 8.1.3.5.4. For devices, intended for use in both configurations, the tests prescribed in paragraphs 8.1.3.5.2 and 8.1.3.5.3 shall be carried out with the exception that, in case of the test carried out in accordance with the requirements of paragraph 8.1.3.5.3 above, only the heavier manikin shall be used.
 - 8.1.3.5.5. For rearward-facing devices, the lower anchorage of configuration on the test trolley shall be as prescribed in Annex 6, Appendix 3.
- 8.1.3.6. Test manikins
 - 8.1.3.6.1. The child restraint and manikins shall be installed in such a way that the requirements of paragraph 8.1.3.6.3 are met.
 - 8.1.3.6.2. The child restraint shall be tested using the manikins prescribed in Annex 8 to this Regulation.
 - 8.1.3.6.3. Installation of the manikin.
 - 8.1.3.6.3.1. The manikin shall be placed so that the gap is between the rear of the manikin and the restraint. In the case of carry-cots the manikin is placed in a straight horizontal position as close as possible to the centre line of the carry-cot.
 - 8.1.3.6.3.2. Place the child chair on the test seat.

Place the manikin in the child chair.

Place a hinged board or a similar flexible device 2,5 cm thick and 6 cm wide and of length equal to the shoulder height (sitting, Annex 8) less the hip centre height (sitting, in Annex 8 popliteus height plus half of thigh height, sitting) relevant to the manikin size being tested between the manikin and the seat back seatback of the chair. The board should follow as closely as possible the curvature of the chair and its lower end should be at the height of the manikin's hip joint.

Adjust the belt in accordance with the manufacturer's instructions, but to a tension of 250 ± 25 N above the adjuster force, with a deflection angle of the strap at the adjuster of $45 \pm 5^\circ$, or alternatively, the angle prescribed by the manufacturer.

Complete the installation of the child chair to the test seat in accordance with Annex 21 to this Regulation.

Remove the flexible device.

This only applies to harness restraints and to restraints where the child is restrained by the adult three-point belt and where a lock-off device is used and does not apply to child restraining straps connected directly to a retractor.

- 8.1.3.6.3.3. The longitudinal plane passing through the centre line of the dummy shall be set midway between the two lower belt anchorages, however note shall also be taken of paragraph 8.1.3.2.1.3. In case of booster cushions to be tested with the manikin representing a 10-year-old child, the longitudinal plane passing through the centre line of the manikin shall be positioned 75 ± 5 mm to the left or right with regard to the point midway between the two lower belt anchorages.
- 8.1.3.6.3.4. In the case of devices requiring the use of a standard belt, the shoulder strap may be positioned on the manikin prior to the dynamic test by the use of a light-weight masking tape of sufficient width and length. In case of rearward facing devices the head may be held against the backrest of the restraint system using a light-weight masking tape of sufficient length and width. In the case of rear-facing restraints, it is permitted to use a light-weight masking tape to connect the dummy's head to the 100 mm bar or the back of the restraint during the sled acceleration.
- 8.1.3.7. Category of manikin to be used
- 8.1.3.7.1. Group 0 device: test using the 'new-born' manikin and a manikin of 9 kg;
- 8.1.3.7.2. Group 0+ device: test using the new-born manikin and a manikin of 11 kg;
- 8.1.3.7.3. Group I device: tests using a manikin of mass 9 kg and 15 kg respectively;
- 8.1.3.7.4. Group II device: tests using a manikin of mass 15 kg and 22 kg respectively;
- 8.1.3.7.5. Group III device: tests using a manikin of mass 22 kg and 32 kg respectively.
- 8.1.3.7.6. If the child restraint system is suitable for two or more mass groups, the tests shall be carried out using the lightest and heaviest manikins specified above for all the groups concerned. However, if the configuration of the device alters considerably from one group to the next, for instance when the configuration of the harness or the harness length is changed, the laboratory conducting the tests may, if it deems it advisable, add a test with a manikin of intermediate weight.
- 8.1.3.7.7. If the child restraint system is designed for two or more children, one test shall be carried out with the heaviest manikins occupying all seat positions. A second test with the lightest and the heaviest manikins specified above shall be carried out. The tests shall be conducted using the test seat as shown in Annex 6, Appendix 3, figure 3. The laboratory conducting the tests may, if it deems it advisable, add a third test with any combination of manikins or empty seat positions.
- 8.1.4. Restraint of booster cushions
- Place a cotton cloth on the seating surface of the test bench. Position the booster cushion on the test bench, position the lower torso body block as described in Annex 22, figure 1, on the seating surface, fit and apply the 3-point adult safety-belt and tension as prescribed in Annex 21. With a piece of 25 mm width webbing or similar tied round the booster, apply a load of 250 ± 5 N in the direction of arrow A, see Annex 22, figure 2, in line with the seating surface of the test bench.
- 8.2. *Tests of individual components*
- 8.2.1. Buckle
- 8.2.1.1. Opening test under load
- 8.2.1.1.1. A child restraint already having been subjected to the dynamic test specified in paragraph 8.1.3 shall be used for this test.

- 8.2.1.1.2. The child restraint shall be removed from the test trolley or the vehicle without opening the buckle. A load shall be applied to the buckle by direct traction via the strap tied to it so that all the straps are subjected to the force of $80/n$ daN; in this ratio 'n' is the number of straps linked to the buckle when it is in a locked position, its minimum is deemed to be 2, if the buckle is connected to a rigid part. Account must be taken, when the force is applied, of the angle formed by the buckle and the rigid part during the dynamic test.
- 8.2.1.1.3. A load shall be applied at a speed of 400 ± 20 mm/min to the geometric centre of the buckle-release button along a fixed axis running parallel to the initial direction of motion of the button; the geometric centre applies to that part of the surface of the buckle to which the release pressure is to be applied. The buckle shall be secured against a rigid support during the application of the opening force.
- 8.2.1.1.4. The buckle opening force shall be applied, using a dynamometer or similar device in the manner and direction of normal use. The contact end shall be a polished metal hemisphere with radius $2,5 \pm 0,1$ mm.
- 8.2.1.1.5. The buckle opening force shall be measured and any failure noted.
- 8.2.1.2. Opening test under zero load
- 8.2.1.2.1. A buckle assembly which has not previously been subjected to a load shall be mounted and positioned under a 'no load' condition.
- 8.2.1.2.2. The method of measuring the buckle opening force shall be as prescribed in paragraphs 8.2.1.1.3 and 8.2.1.1.4.
- 8.2.1.2.3. The buckle opening force shall be measured.
- 8.2.1.3. Strength test
- 8.2.1.3.1. For the strength test two samples have to be used. All adjusters, except for adjusters mounted directly on a child restraint are included in the test.
- 8.2.1.3.2. Annex 20 shows a typical device for a buckle strength test. The buckle is placed on the upper round plate (A) within the relief. All adjacent straps have a length of at least 250 mm and are arranged hanging down from the upper plate respective to their position at the buckle. The free strap ends are then wound round the lower round plate (B) until they come out at the plate's inner opening. All straps have to be vertical between A and B. The round clamping plate (C) is then lightly clamped against the lower face of (B), still allowing a certain strap movement between them. With a small force at the tensile machine the straps are tensioned and pulled between (B) and (C) until all straps are loaded respective to their arrangement. The buckle must stay free from plate (A) or any parts at (A) during this operation and the test itself. (B) and (C) are then clamped firmly together and the tensile force is increased at a traverse speed of 100 ± 20 mm/min until the required values are reached.
- 8.2.2. Adjusting device
- 8.2.2.1. Ease of adjustment
- 8.2.2.1.1. When testing a manual adjusting device, the strap shall be drawn steadily through the adjusting device, having regard for the normal conditions of use, at a rate of 100 ± 20 mm/min and the maximum force measured to the nearest integer value of N after the first 25 ± 5 mm of strap movement.

- 8.2.2.1.2. The test shall be carried out in both directions of strap travel through the device, the strap being subjected to the full travel cycle 10 times prior to the measurement.
- 8.2.3. Microslip test (see Annex 5, figure 3)
- 8.2.3.1. The components or devices to be subjected to the microslip test shall be kept for a minimum of 24 hours before testing in an atmosphere having a temperature of 20 ± 5 °C and a relative humidity of 65 ± 5 per cent. The test shall be carried out at a temperature between 15 and 30 °C.
- 8.2.3.2. The free end of the strap shall be arranged in the same configuration as when the device is in use in the vehicle, and shall not be attached to any other part.
- 8.2.3.3. The adjusting device shall be placed on a vertical piece of strap one end of which bears a load of $50 \pm 0,5$ N (guided in a manner which prevents the load from swinging and the strap from twisting). The free end of the strap from the adjusting device shall be mounted vertically upwards or downwards as it is in the vehicle. The other end shall pass over a deflector roller with its horizontal axis parallel to the plane of the section of strap supporting the load, the section passing over the roller being horizontal.
- 8.2.3.4. The device being tested shall be arranged in such a way that its centre, in the highest position to which it can be raised, is 300 ± 5 mm from a support table, and the load of 50 N shall be 100 ± 5 mm from that support table.
- 8.2.3.5. 20 ± 2 pre-test cycles shall then be completed and $1\,000 \pm 5$ cycles shall then be completed at a frequency of 30 ± 10 cycles per minute, the total amplitude being 300 ± 20 mm or as specified in paragraph 8.2.5.2.6.2. The 50 N load shall be applied only during the time corresponding to a shift of 100 ± 20 mm for each half period. Microslip shall be measured from the position at the end of the 20 pre-test cycles.
- 8.2.4. Retractor
- 8.2.4.1. Retracting force
- 8.2.4.1.1. The retracting forces shall be measured with the safety belt assembly, fitted to a manikin as for the dynamic test prescribed in paragraph 8.1.3. The strap tension shall be measured at the point of contact with (but just clear of) the manikin while the strap is being retracted at the approximate rate of 0,6 m/min.
- 8.2.4.2. Durability of retractor mechanism
- 8.2.4.2.1. The strap shall be withdrawn and allowed to retract for the required number of cycles at a rate of not more than 30 cycles per minute. In the case of emergency-locking retractors, a jolt to lock the retractor shall be introduced at each fifth cycle. The jolts occur in equal numbers at each of five different extractions, namely, 90, 80, 75, 70 and 65 per cent of the total length of the strap on the retractor. However, where the length of the strap exceeds 900 mm the above percentages shall be related to the final 900 mm of strap which can be withdrawn from the retractor.
- 8.2.4.3. Locking of emergency-locking retractors
- 8.2.4.3.1. The retractor shall be tested once for locking, when the strap has been unwound to its full length less 300 ± 3 mm.
- 8.2.4.3.2. In the case of a retractor actuated by strap movement, the extraction shall be in the direction in which it normally occurs when the retractor is installed in a vehicle.

- 8.2.4.3.3. When retractors are being tested for sensitivity to vehicle accelerations, they shall be tested at the above extraction length in both directions along two mutually perpendicular axes which are horizontal if the retractors are to be installed in a vehicle as specified by the child restraint manufacturer. When this position is not specified, the testing authority shall consult the child restraint manufacturer. One of these test directions shall be chosen by the technical service conducting the approval tests to give the most adverse conditions with respect to actuation of the locking mechanism.
- 8.2.4.3.4. The design of the apparatus used shall be such that the required acceleration is given at an average rate of increase of acceleration of at least 25 g/s (*).
- 8.2.4.3.5. For testing compliance with the requirements of paragraphs 7.2.3.2.1.3 and 7.2.3.2.1.4 the retractor shall be mounted on a horizontal table and the table tilted at a speed not exceeding 2E per second until locking has occurred. The test shall be repeated with tilting in other directions to ensure that the requirements are fulfilled.
- 8.2.4.4. Corrosion test
- 8.2.4.4.1. The corrosion test is described in paragraph 8.1.1 above.
- 8.2.4.5. Dust resistance test
- 8.2.4.5.1. The retractor shall be positioned in a test chamber as described in Annex 3 to this Regulation. It shall be mounted in an orientation similar to that in which it is mounted in the vehicle. The test chamber shall contain dust as specified in paragraph 8.2.4.5.2 below. A length of 500 mm of the strap shall be extracted from the retractor and kept extracted, except that it shall be subjected to 10 complete cycles of retraction and withdrawal within one or two minutes after each agitation of the dust. For a period of five hours, the dust shall be agitated every 20 minutes for five seconds by compressed air free of oil and moisture at a gauge pressure of $5,5 \pm 0,5$ bars entering through an orifice $1,5 \pm 0,1$ mm in diameter.
- 8.2.4.5.2. The dust used in the test described in paragraph 8.2.4.5.1 shall consist of about 1 kg of dry quartz. The particle size distribution shall be as follows:
- (a) passing 150 μm aperture, 104 μm wire diameter: 99 to 100 per cent;
 - (b) passing 105 μm aperture, 64 μm wire diameter: 76 to 86 per cent;
 - (c) passing 75 μm aperture, 52 μm wire diameter: 60 to 70 per cent.
- 8.2.5. Static test for straps
- 8.2.5.1. Strap strength test
- 8.2.5.1.1. Each test shall be carried out on two new samples of strap, conditioned as specified in paragraph 7.2.4.
- 8.2.5.1.2. Each strap shall be gripped between the clamps of a tensile strength-testing machine. The clamps shall be so designed as to avoid breakage of the strap at or near them. The speed of traverse shall be 100 ± 20 mm/min. The free length of the specimen between the clamps of the machine at the start of the test shall be $200 \text{ mm} \pm 40 \text{ mm}$.
- 8.2.5.1.3. The tension shall be increased until the strap breaks and the breaking load noted.
- 8.2.5.1.4. If the strap slips or breaks at or within 10 mm of either of the clamps, the test shall be invalid and a new test shall be carried out on another specimen.

(*) $g = 9,81 \text{ m/s}^2$.

- 8.2.5.2. Samples out from straps, as referred to in paragraph 3.2.3, shall be conditioned as follows:
- 8.2.5.2.1. Room conditioning
- 8.2.5.2.1.1. The strap shall be kept for 24 ± 1 hours in an atmosphere having a temperature of $23 \pm 5^\circ$ and a relative humidity of 50 ± 10 per cent. If the test is not carried out immediately after conditioning, the specimen shall be placed in a hermetically closed receptacle until the test begins. The breaking load shall be determined within five minutes after removal of the strap from the conditioning atmosphere or from the receptacle.
- 8.2.5.2.2. Light conditioning
- 8.2.5.2.2.1. The provisions of Recommendation ISO/105-B02(1978), shall apply. The strap shall be exposed to light for the time necessary to produce fading of Standard Blue Dye No 7 to a contrast equal to Grade 4 on the grey scale.
- 8.2.5.2.2.2. After exposure, the strap shall be kept for a minimum of 24 hours in an atmosphere having a temperature of $23 \pm 5^\circ \text{C}$ and a relative humidity of 50 ± 10 per cent. The breaking load shall be determined within five minutes after the removal of the strap from the conditioning installation.
- 8.2.5.2.3. Cold conditioning
- 8.2.5.2.3.1. The strap shall be kept for a minimum of 24 hours in an atmosphere having a temperature of $23 \pm 5^\circ \text{C}$ and a relative humidity of 50 ± 10 per cent.
- 8.2.5.2.3.2. The strap shall then be kept for 90 ± 5 minutes on a plain surface in a low-temperature chamber in which the air temperature is $-30 \pm 5^\circ \text{C}$. It shall then be folded and the fold shall be loaded with a weight of $2 \pm 0,2$ kg previously cooled to $-30 \pm 5^\circ \text{C}$. When the strap has been kept under load for 30 ± 5 minutes in the same low-temperature chamber, the weight shall be removed and the breaking load shall be measured within five minutes after removal of the strap from the low-temperature chamber.
- 8.2.5.2.4. Heat conditioning
- 8.2.5.2.4.1. The strap shall be kept for 180 ± 10 minutes in a heating-cabinet atmosphere having a temperature of $60 \pm 5^\circ \text{C}$ and a relative humidity 65 ± 5 per cent.
- 8.2.5.2.4.2. The breaking load shall be determined within five minutes after removal of the strap from the heating cabinet.
- 8.2.5.2.5. Exposure to water
- 8.2.5.2.5.1. The strap shall be kept fully immersed for 180 ± 10 minutes in distilled water, at a temperature of $20 \pm 5^\circ \text{C}$, to which a trace of wetting agent has been added. Any wetting agent suitable for the fibre being tested may be used.
- 8.2.5.2.5.2. The breaking load shall be determined within 10 minutes after removal of the strap from the water.
- 8.2.5.2.6. Abrasion conditioning
- 8.2.5.2.6.1. The components or devices to be submitted to the abrasion test shall be kept for a minimum of 24 hours before testing in an atmosphere having a temperature of $23 \pm 5^\circ \text{C}$ and a relative humidity of 50 ± 10 per cent. The room temperature during the testing shall be between 15° and 30°C .

8.2.5.2.6.2. The table below sets out the general conditions for each test:

	Load (N)	Cycles per minute	Cycles (No)
Type 1 procedure	10 ± 0,1	30 ± 10	1 000 ± 5
Type 2 procedure	5 ± 0,05	30 ± 10	5 000 ± 5

Where there is insufficient strap to test over 300 mm of shift, the test may be applied over a shorter length subject to a minimum of 100 mm.

8.2.5.2.6.3. Particular test conditions

- 8.2.5.2.6.3.1. Type 1 procedure: for cases where the strap slides through the quick adjusting device. The 10 N load shall be vertically and permanently applied on one of the straps. The other strap, set horizontally, shall be attached to a device, giving the webbing a back and forth motion. The adjusting device shall be so placed that the horizontal strap of the webbing remains under tension (see Annex 5, figure 1).
- 8.2.5.2.6.3.2. Type 2 procedure: for cases where the strap changes direction in passing through a rigid part. During this test, the angles of both webbing straps shall be as shown in Annex 5, figure 2. The 5 N load shall be permanently applied. For cases where the strap changes direction more than once in passing through a rigid part, the load of 5 N may be increased so as to achieve the prescribed 300 mm of strap movement through that rigid part.

8.2.6. Lock-off Devices

8.2.6.1. Class A Devices

The child restraint and the largest manikin for which the child restraint is intended shall be set up as shown in Figure 5 below. The webbing used shall be as specified in Annex 13 to this Regulation. The lock-off shall be fully applied and a mark made on the belt where the belt enters the lock-off. The force gauges shall be attached to the belt via a D ring, and a force equal to twice (± 5 per cent) the mass of the heaviest dummy of group I shall be applied for at least one second. The lower position shall be used for lock-offs in position A and the upper position for lock-offs in position B. The force shall be applied for a further 9 times. A further mark shall be made on the belt where it enters the lock-off and the distance between the two marks shall be measured. During this test, the retractor must be unlocked.

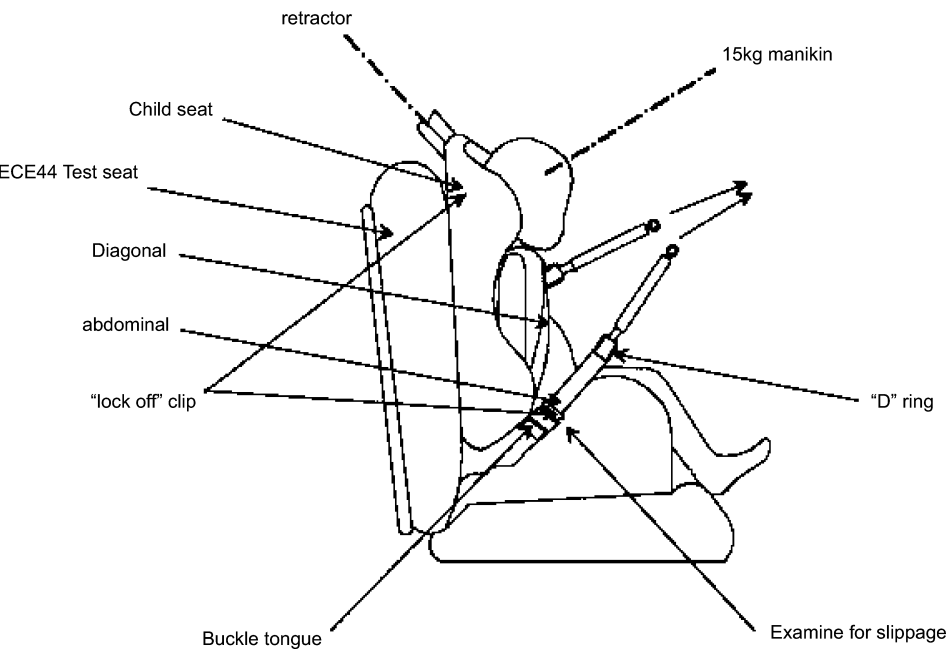


Figure 5

8.2.6.2. Class B Devices

The child restraint shall be firmly secured and webbing, as specified in Annex 13 to this Regulation, shall be passed through the lock-off and frame following the routing described in the manufacturer's instructions. The belt shall pass through the testing equipment as described in Figure 6 below and be attached to a mass of $5,25 \pm 0,05$ kg. There shall be 650 ± 40 mm of free webbing between the mass and the point where the webbing leaves the frame. The lock-off shall be fully applied and a mark made on the belt where it enters the lock-off. The mass shall be raised and released so that it falls freely over a distance of 25 ± 1 mm. This shall be repeated 100 ± 2 at a frequency of 60 ± 2 cycles per minute, to simulate the jerking action of a child restraint in a car. A further mark shall be made on the belt where it enters the lock-off and the distance between the two marks shall be measured. The lock-off device must cover the full width of the webbing in the installed condition with 15 kg dummy installed. This test is to be conducted using the same webbing angles as those formed in normal use. The free end of the lap belt portion shall be fixed. The test shall be conducted with the child restraint system firmly attached to the test bench used in the overturning or dynamic test. The loading strap can be attached to the simulated buckle.

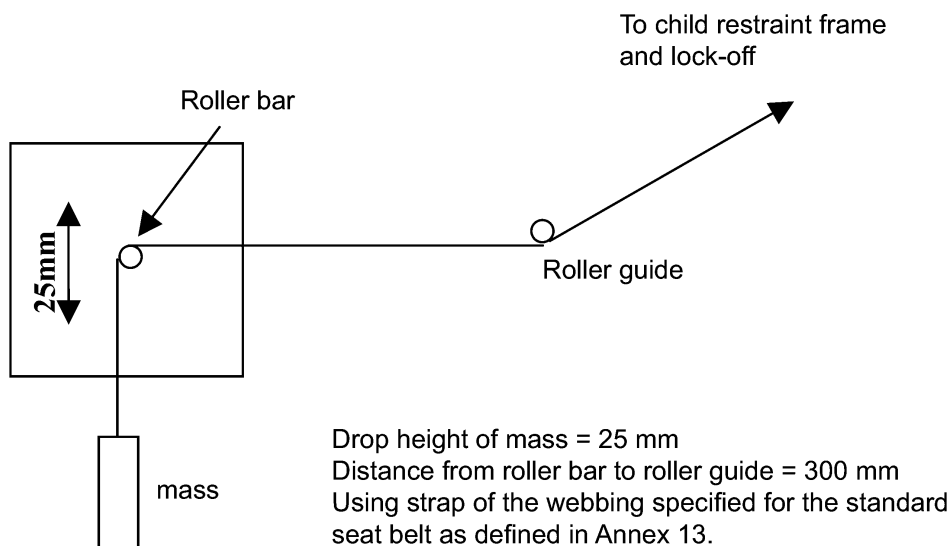


Figure 6: Schematic layout of Class B Lock-off test

8.2.7. Conditioning test for adjusters mounted directly on a child restraint

Install the largest dummy for which the restraint is intended, as if for the dynamic test, including the standard slack as specified in paragraph 8.1.3.6. Mark a reference line on the webbing where the free end of the webbing enters the adjuster.

Remove the dummy and place the restraint in the conditioning rig shown in Figure 1, Annex 19.

The webbing must be cycled for a total distance of not less than 150 mm through the adjuster. This movement shall be such that at least 100 mm of webbing on the side of the reference line towards the free end of the webbing and the remainder of the moving distance (approx. 50 mm) on the integral harness side of the reference line moves through the adjuster.

If the length of webbing from the reference line to the free end of the webbing is insufficient for the movement described above, the 150 mm of movement through the adjuster shall be from the fully extended harness position.

The frequency of cycling shall be 10 ± 1 cycles/minute, with a velocity on 'B' of 150 ± 10 mm/sec.

8.2.8. Temperature test

8.2.8.1. The components specified in paragraph 7.1.5.1 shall be exposed to an environment over a water surface within a closed space, the environment having a temperature of not less than 80 °C, for a continuous period of not less than 24 hours and then cooled in an environment having a temperature not exceeding 23 °C. The cooling period shall immediately be followed by three consecutive 24 hours cycles with each cycle comprising the following consecutive sequences:

- (i) an environment having a temperature of not less than 100 °C shall be maintained for a continuous period of 6 hours and this environment shall be attained within 80 minutes of commencement of the cycle; then
- (ii) an environment having a temperature of not more than 0 °C shall be maintained for a continuous period of 6 hours and this environment shall be attained within 90 minutes; then
- (iii) an environment having a temperature of not more than 23 °C shall be maintained during the remainder of the 24 hour cycle.

8.3. Certification of Test Bench Cushion

8.3.1. The test seat cushion shall be certified when new to establish initial values for impact penetration and peak deceleration, and then after every 50 dynamic tests or at least every month, whichever is the sooner, or before each test if the test rig is used frequently.

8.3.2. The certification and measuring procedures shall correspond to those specified in the latest version of ISO 6487; the measuring equipment shall correspond to the specification of a data channel with a channel filter class (CFC) 60.

Using the test device defined in Annex 17 to this Regulation, conduct 3 tests, 150 ± 5 mm from the front edge of the cushion on the centre line and at 150 ± 5 mm in each direction from the centre line.

Place the device vertically on a flat rigid surface. Lower the impact mass until it contacts the surface and set the penetration marker to the zero position. Place the device vertically above the test point, raise the mass 500 ± 5 mm and allow it to fall freely to make impact on the seat surface. Record the penetration and the deceleration curve.

8.3.3. The peak values recorded shall not deviate by more than 15 per cent from the initial values.

8.4. High-speed films and videos

8.4.1. In order to determine the behaviour of the manikin and its displacements, all dynamic tests shall be filmed with cine film or video at a frequency of at least 400 frames/second.

8.4.2. Suitable calibration markings shall be mounted firmly on the trolley or in the vehicle structure so that the displacement of the manikin can be determined.

8.5. Electrical measurements

The measuring procedures shall correspond to those defined in the latest edition of ISO 6487. The channel frequency classes shall be:

Type of measurement	CFC (Hz)
Belt loads	60
Head(form) acceleration	1 000
Chest Acceleration	180
Trolley Acceleration	60

The sample rate should be a minimum of eight times the F_H (i.e. in installations with class 1 000 pre-sample filters, this corresponds to a minimum sampling rate of approx. 8 000 samples per second per channel).

9. TEST REPORT

9.1. The test report shall record the results of all tests and measurements and the trolley speeds, the place occupied by the buckle during the test, if it can be varied, and any failure or breakage.

9.2. If provisions relating to anchorages contained in Annex 6, Appendix 3, to this Regulation have not been respected, the test report shall describe how the child restraint is installed and shall specify important angles and dimensions.

9.3. When the child restraint is tested in a vehicle or vehicle structure, the test report shall specify the manner of attaching the vehicle structure to the trolley, the position of the child restraint and vehicle seat and the inclination of the vehicle seat-back.

10. MODIFICATIONS AND EXTENSION OF APPROVAL OF A TYPE OF CHILD RESTRAINT SYSTEM

10.1. Every modification of a child restraint shall be notified to the administrative department which approved the child restraint. The department may then either:

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

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

10.2. 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 applying this Regulation.

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

11. CONFORMITY OF PRODUCTION

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

11.1. Any child restraint system approved to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 6 to 8 above.

11.2. The minimum requirements for conformity of production control procedures set forth in Annex 16 to this Regulation shall be complied with.

11.3. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be twice a year.

12. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

12.1. The approval granted in respect of a child restraint pursuant to this Regulation may be withdrawn if a child restraint bearing the particulars referred to in paragraph 5.4 fails to pass the random checks described in paragraph 11 or does not conform to the type approved.

12.2. 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 communication form conforming to the model in Annex 1 to this Regulation.

13. PRODUCTION DEFINITELY DISCONTINUED

13.1. If the holder of the approval completely ceases to manufacture a specific type of child restraint under this Regulation, he shall inform thereof the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform the other Parties to the Agreement which apply this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

14. INSTRUCTIONS

14.1. Each child restraint shall be accompanied by instructions in the language of the country where the device is sold with the following content:

14.2. Instructions on installation shall include the following points:

14.2.1. For 'universal' category child restraints the following label shall be clearly visible at the point of sale without removing the packing:

Notice

1. This is a 'Universal' child restraint. It is approved to Regulation No 44, 03 series of amendments, for general use in vehicles and it will fit most, but not all, car seats.
2. A correct fit is likely if the vehicle manufacturer has declared in the vehicle handbook that the vehicle is capable of accepting a 'Universal' child restraint for this age group.
3. This child restraint has been classified as 'Universal' under more stringent conditions than those which applied to earlier designs which do not carry this notice.
4. If in doubt, consult either the child restraint manufacturer or the retailer.

14.2.2. For 'restricted' and 'semi-universal' category child restraints the following information shall be clearly visible at the point of sale without removing the packing:

This Child Restraint is classified for '(Restricted/Semi-universal)' use and is suitable for fixing into the seat positions of the following cars

CAR	FRONT	REAR
(Model)	Yes	Outer Centre
		Yes No

Seat positions in other cars may also be suitable to accept this child restraint. If in doubt, consult either the child restraint manufacturer or the retailer.

14.2.3. For 'Specific vehicle' category child restraints information on the applicable vehicle shall be clearly visible at the point of sale without removing the packing.

- 14.2.4. If the device requires an adult safety-belt, the following wording should also be clearly visible at the point of sale without removing the packing:

‘Only suitable if the approved vehicles are fitted with lap/3 point/static/with retractor safety-belts, approved to UN/ECE Regulation No 16 or other equivalent standards.’ (Strike out what does not apply.)

In the case of carry-cot restraints a list of carry-cots for which the device is suited should be included.

- 14.2.5. The child restraint manufacturer shall provide information on the packing box as to the address to which the customer can write to obtain further information on fitting the child restraint in specific cars.

- 14.2.6. the method of installation illustrated by photographs and/or very clear drawings;

- 14.2.7. the user shall be advised that the rigid items and plastic parts of a child restraint must be so located and installed that they are not liable, during everyday use of the vehicle, to become trapped by a movable seat or in a door of the vehicle;

- 14.2.8. the user should be advised to use carry-cots perpendicular to the longitudinal axis of the vehicle;

- 14.2.9. in the case of rearward facing systems the customer shall be advised not to use them in seating positions where there is an airbag installed. This information shall be clearly visible at the point of sale without removing the packaging;

- 14.2.10. for ‘Special Needs Restraints’ the following information shall be clearly visible at the point of sale without removing the packing:

This ‘Special Needs Restraint’ is designed to give extra support to children who have difficulty in sitting correctly in conventional seats. Always consult your doctor to make sure that this restraint system is suitable for your child.

- 14.3. The instructions for use shall include the following points:

- 14.3.1. the weight groups for which the device is intended:

- 14.3.2. when the device is used in combination with an adult safety-belt to be used by means of the following wording: Only suitable for use in the listed vehicles fitted with lap/3 point/static/with retractor safety-belts, approved to ECE Regulation No 16 or other equivalent standards. (Strike out what does not apply.)

- 14.3.3. the method of use shall be shown by photographs and/or very clear drawings. In the case of seats that can be used both forward and rear-facing, clear warning must be given to keep the restraint rear-facing until the child’s mass is greater than a stated limit, or some other dimensional criterion is exceeded.

- 14.3.4. the operation of the buckle and adjusting devices shall be explained clearly;

- 14.3.5. it shall be recommended that any straps holding the restraint to the vehicle should be tight, that any straps restraining the child should be adjusted to the child’s body, and that straps should not be twisted;

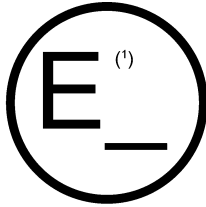
- 14.3.6. the importance of ensuring that any lap strap is worn low down, so that the pelvis is firmly engaged, shall be stressed;

- 14.3.7. it shall be recommended that the device should be changed when it has been subject to violent stresses in an accident;
- 14.3.8. instructions for cleaning shall be given;
- 14.3.9. a general warning shall be given to the user concerning the danger of making any alterations or additions to the device without the approval of the competent authority, and a danger of not following closely the installation instructions provided by the child restraint manufacturer;
- 14.3.10. when the chair is not provided with a textile cover, it shall be recommended that the chair should be kept away from sunlight, otherwise it may be too hot for the child's skin;
- 14.3.11. it shall be recommended that children are not left in their child restraint system unattended;
- 14.3.12. it shall be recommended that any luggage or other objects liable to cause injuries in the event of a collision shall be properly secured.
- 14.3.13. It shall be recommended that:
- (a) The child restraint must not be used without the cover.
 - (b) The seat cover should not be replaced with any other than the one recommended by the manufacturer, because the cover constitutes an integral part of the restraint performance.
- 14.3.14. There shall be a text or a diagram indicating how a user can identify an unsatisfactory position of the adult safety-belt buckle relative to the main load bearing contact points on the restraint. The user shall be advised to contact the child restraint manufacturer if in doubt about this point.
- 14.3.15. If the child restraint offers an alternative load bearing contact point, its use shall be described clearly. The user shall be informed about how to judge if use of this alternative route is satisfactory. The user shall be advised to contact the child restraint manufacturer if in doubt about this point. The user shall be clearly advised to begin the child restraint installation, in vehicle seating positions categorised as "Universal" in the vehicle owner's manual, by using the primary belt route.
- 14.3.16. There shall be provisions made so that the instructions can be retained on the child restraint for its life period or in the vehicle handbook in the case of built-in restraints.
- 14.3.17. There shall be explicit warning not to use any load bearing contact points other than those described in the instructions and marked in the child restraint.
15. NAMES AND ADDRESS OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS
- 15.1. The Parties to the Agreement which apply this Regulation shall communicate to the United Nations secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, issued in other countries, are to be sent.
-

ANNEX 1

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by:

Name of administration:

.....

.....

.....

concerning ⁽²⁾:

APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of restraining devices for child occupants of power-driven vehicles, pursuant to Regulation No 44.

Approval No:

Extension No:

1.1. Forward-facing child restraint/rearward-facing child restraint/carry-cot

1.2. Integral/non-integral/partial/booster cushion

1.3. Belt type: (adult) three-point belt

(adult) lap belt

special type belt/retractor

1.4. Other features: chair assembly/impact shield

2. Trade name or mark:

3. Manufacturer's designation of the child restraint:

4. Manufacturer's name:

5. If applicable, name of his representative:

6. Address:

7. Submitted for approval on:

8. Technical service conducting approval tests:

9. Date of test report issued by that service:

10. Number of test report issued by that service:

11. Approval granted/extended/refused/withdrawn ⁽²⁾ for use in Groups 0, 0+, I, II or III and for universal/semi-universal/restricted use or use in a specific vehicle or for use as a «special needs restraint», position in vehicle

12. Position and nature of the marking:

13. Place:

14. Date:

15. Signature:

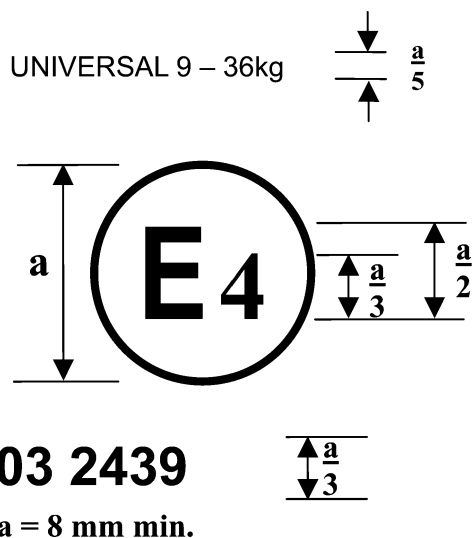
16. The following documents, bearing the approval number shown above, are attached to this communication:

- drawings, diagrams and plans of the child restraint, including any retractor, chair assembly, impact shield fitted;
- drawings, diagrams and plans of the vehicle structure and the seat structure, as well as of the adjustment system and the attachments, including any energy absorber fitted;
- photographs of the child restraint and/or vehicle structure and seat structure;
- instructions for fitting and use;
- list of vehicle models for which the restraint is intended.

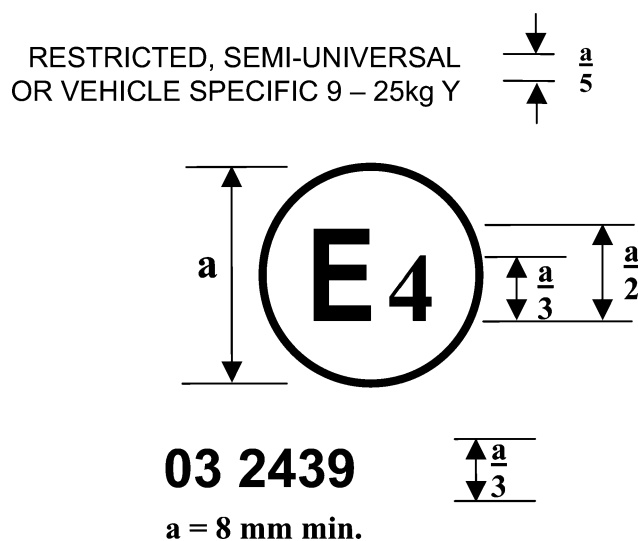
⁽¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).⁽²⁾ Strike out what does not apply.

ANNEX 2

ARRANGEMENTS OF APPROVAL MARKS



The child restraint system bearing the above approval mark is a device capable of being fitted in any vehicle and of being used for the 9 kg-36 kg mass range (Groups I to III); it is approved in the Netherlands (E4) under the number 032439. The approval number indicates that the approval was granted in accordance with the requirements of the Regulation concerning the approval of restraining devices for child occupants of power-driven vehicles ('child restraint system') as amended by the 03 series of amendments.



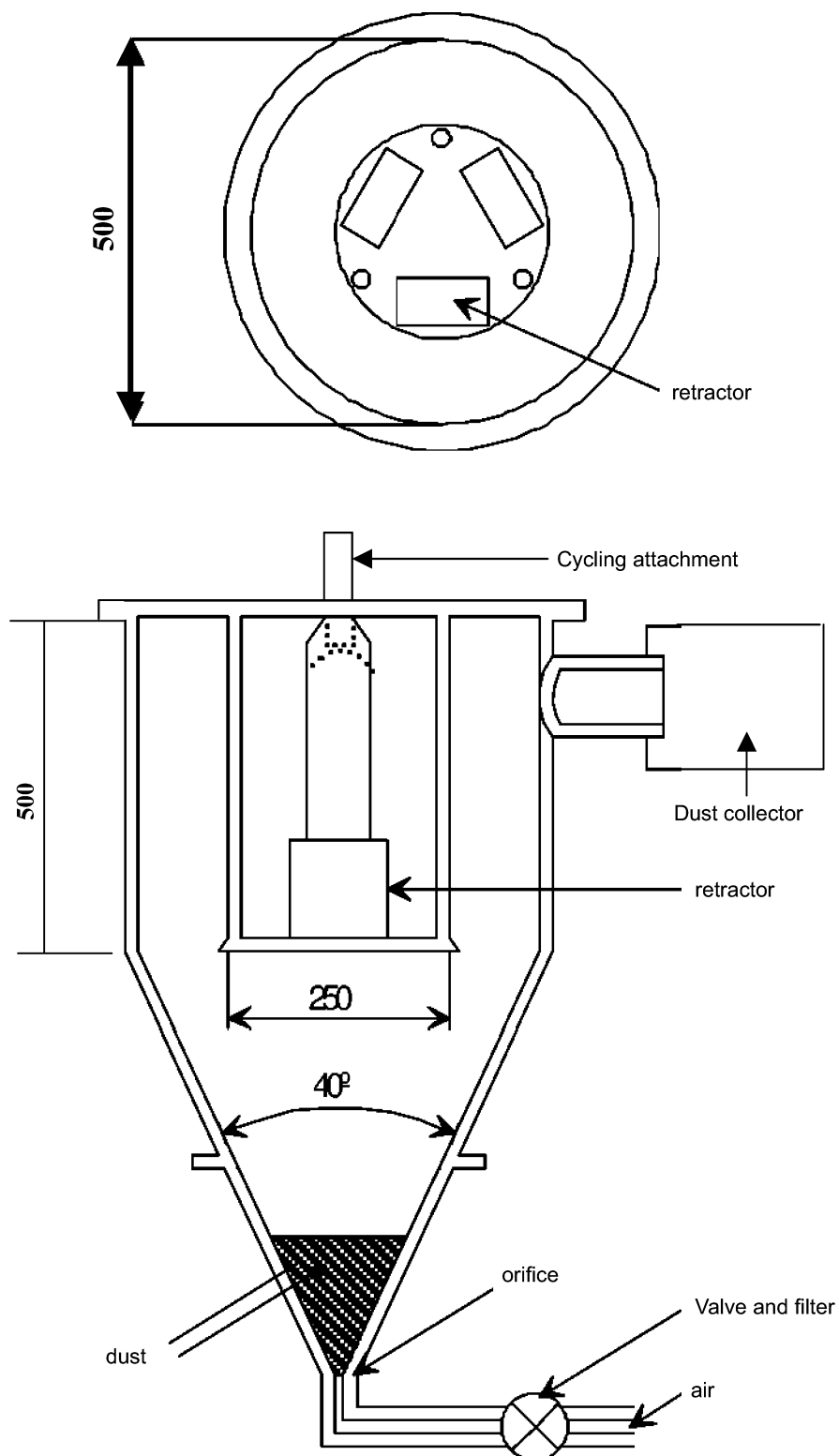
The child restraint system bearing the above approval mark is a device not capable of being fitted in every vehicle and of being used for the 9 kg-25 kg mass range (Groups I and II); it is approved in the Netherlands (E4) under the number 032439. The approval number indicates that the approval was granted in accordance with the requirements of the Regulation concerning the approval of restraining devices for child occupants of power-driven vehicles ('child restraint system') as amended by the 03 series of amendments. The symbol 'Y' indicates that the system contains a crotch strap.

Note: The approval number and additional symbol(s) must be placed close to the circle and either above or below the 'E' or to left or right of it. The digits of the approval number must be on the same side of the 'E' and oriented in the same direction. The additional symbol(s) must be diametrically 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 3

ARRANGEMENT OF APPARATUS FOR DUST RESISTANCE TEST

(dimensions in millimetres)



ANNEX 4

CORROSION TEST**1. TEST APPARATUS**

- 1.1. The apparatus shall consist of a mist chamber, a salt solution reservoir, a supply of suitably conditioned compressed air, one or more atomizing nozzles, sample supports, provision for heating the chamber, and necessary means of control. The size and detailed construction of the apparatus shall be optional, provided that the test conditions are met.
- 1.2. It is important to ensure that drops of solution accumulated on the ceiling or cover of the chamber do not fall on test samples.
- 1.3. Drops of solution which fall from test samples shall not be returned to the reservoir for respraying.
- 1.4. The apparatus shall not be constructed of materials that will affect the corrosiveness of the mist.

2. LOCATION OF TEST SAMPLES IN THE MIST CABINET

- 2.1. Samples, except retractors, shall be supported or suspended between 15° and 30° from the vertical and preferably parallel to the principal direction of horizontal flow of mist through the chamber, based upon the dominant surface being tested.
- 2.2. Retractors shall be supported or suspended so that the axes of the reel for storing the strap shall be perpendicular to the principal direction of horizontal flow of mist through the chamber. The strap opening in the retractor shall also be facing in this principal direction.
- 2.3. Each sample shall be so placed as to permit free settling of mist on all samples.
- 2.4. Each sample shall be so placed as to prevent salt solution from one sample dripping on to any other sample.

3. SALT SOLUTION

- 3.1. The salt solution shall be prepared by dissolving 5 ± 1 parts by mass of sodium chloride in 95 parts of distilled water. The salt shall be sodium chloride substantially free of nickel and copper and containing not more than 0,1 per cent of sodium iodide and not more than 0,3 per cent of total impurities in the dry state.
- 3.2. The solution shall be such that, when atomized at 35 °C, the collected solution is in the pH range of 6,5 to 7,2.

4. COMPRESSED AIR

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

5. CONDITIONS IN THE MIST CHAMBER

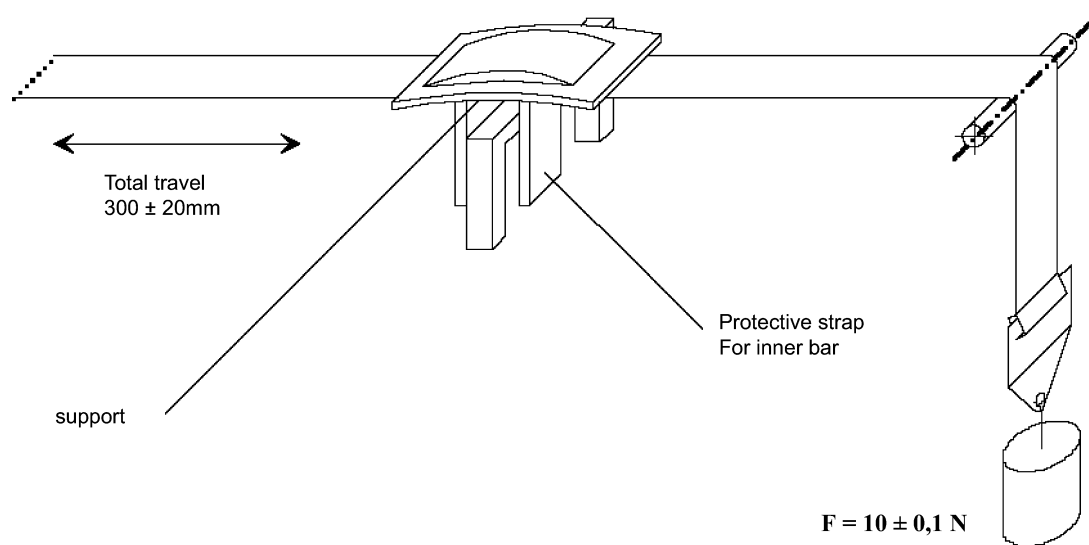
- 5.1. The exposure zone of the mist chamber shall be maintained at 35 ± 5 °C. At least two clean mist collectors shall be placed within the exposure zone, so that no drops of solution from the test samples or any other sources are collected. The collectors shall be placed near the test samples, one as near as possible to any nozzle and one as far as possible from all nozzles. The mist shall be such that, for each 80 cm² of horizontal collecting area, from 1,0 to 2,0 ml of solution per hour, when measured over an average of at least 16 hours, is collected in each collector.
 - 5.2. The nozzle or nozzles shall be directed or baffled, so that the spray does not impinge directly on the test samples.
-

ANNEX 5

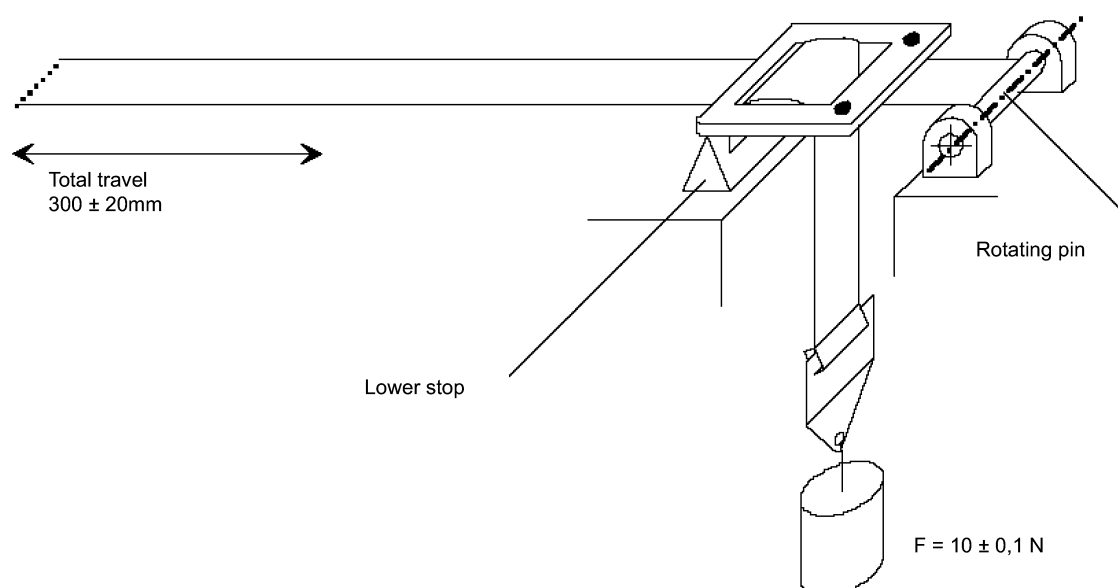
ABRASION AND MICROSLIP TEST

Example a

Figure 1: Procedure type 1



Example b



Examples of test arrangements corresponding to the type of adjusting device.

Figure 2: Procedure type 2

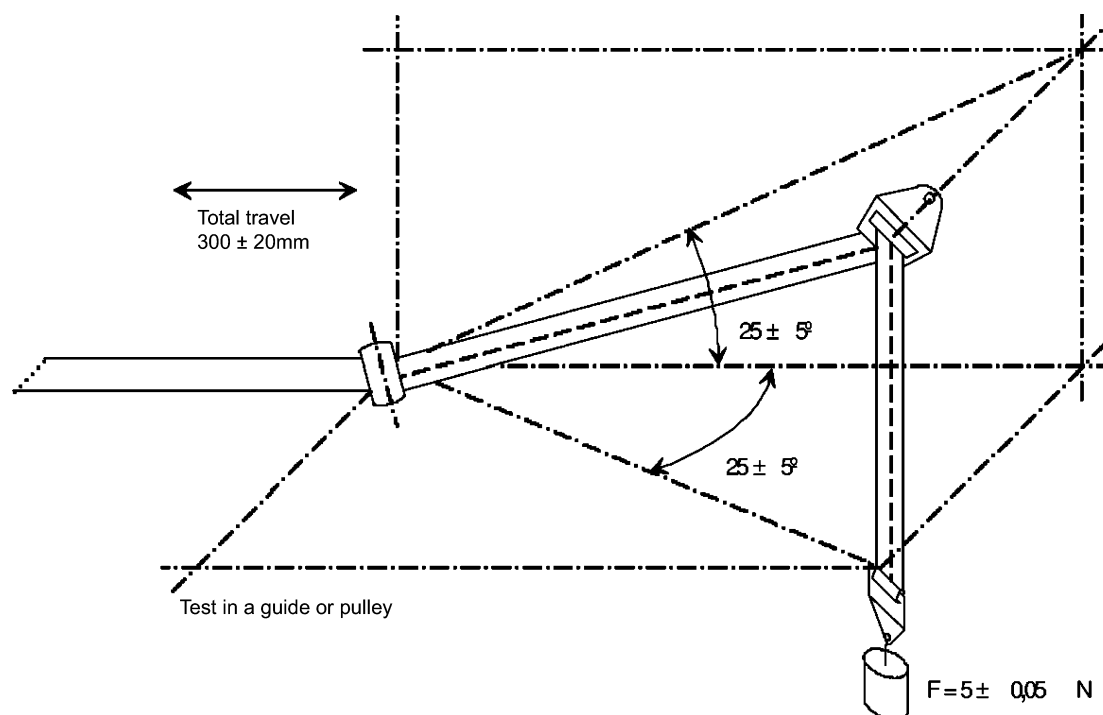
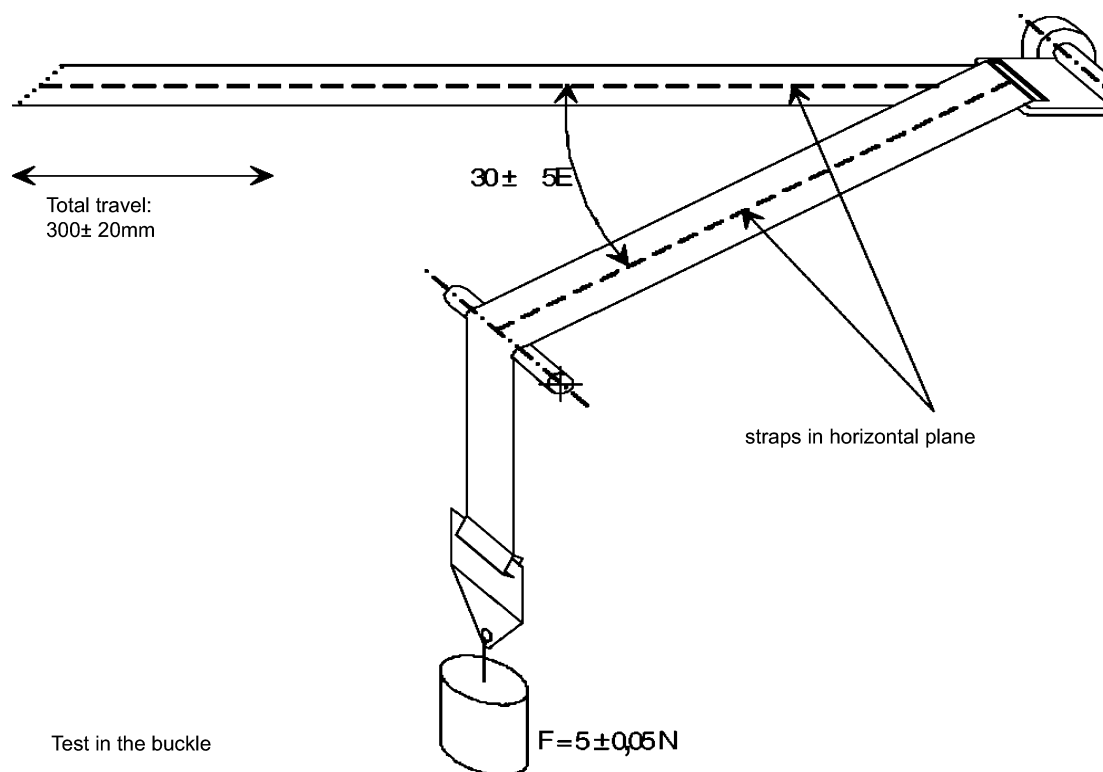
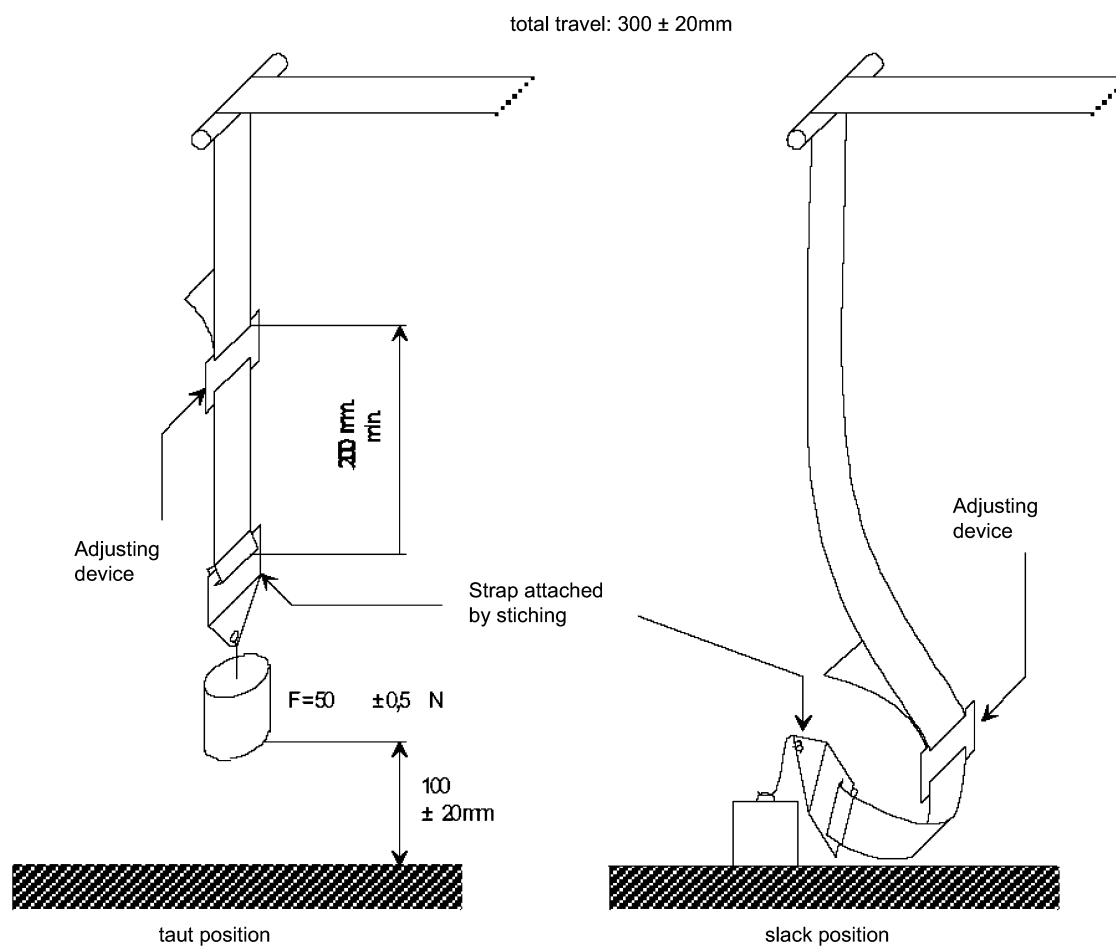


Figure 3: Microslip test



The load of 50 N on the testing device shall be vertically guided in such a way as to prevent load-swing and twisting of the strap.

The attaching device shall be fixed to the load of 50 N in the same manner as in the vehicle.

ANNEX 6

DESCRIPTION OF TROLLEY

1. TROLLEY

- 1.1. For tests on safety belts, the trolley, carrying the seat only, shall have a mass of 400 ± 20 kg. For tests on restraint systems, the trolley with the attached vehicle structure shall have a mass of 800 kg. However, the total mass of the trolley and vehicle structure may, if necessary, be increased by increments of 200 kg. In no case shall the total mass differ from the nominal value by more than ± 40 kg.

2. CALIBRATION SCREEN

- 2.1. A calibration screen shall be attached firmly to the trolley with a movement limit line plainly marked on it to enable compliance with forward movement criteria to be determined from photographic records.

3. SEAT

- 3.1. The seat shall be constructed as follows:

- 3.1.1. A rigid back, fixed, dimensions of which are given in Appendix 1 to this Annex. The lower part and the upper part is made of a 20 mm diameter tube;

- 3.1.2. Rigid seating, dimensions of which are given in Appendix 1 to this Annex. The rear part of the seating is made from a rigid sheet metal, the upper edge of which is a 20 mm diameter tube. The front part of the seating is also made of a 20 mm diameter tube;

- 3.1.3. For access to the anchor brackets, openings shall be made at the rear of the cushion of the seat, as prescribed in Appendix 1 to this Annex;

- 3.1.4. The width of the seat shall be 800 mm;

- 3.1.5. The back and the seating shall be covered with polyurethane foam, the characteristics of which are given in Table 1. The dimensions of the cushion are given in Appendix 1 to this Annex;

Table 1

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

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

Table 2

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

- 3.1.7. Covering the seat and the seat back ⁽¹⁾
- 3.1.7.1. The seat foam cushion is produced out of a square foam block (800 × 575 × 135 mm) in such a way (see Figure 1 of Appendix 1 to this Annex) that its shape resembles the shape of the aluminium bottom-plate specified in Figure 2 of Appendix 1 to this Annex.
- 3.1.7.2. Six holes are drilled in the bottom-plate in order to fasten it to the trolley with bolts. The holes are drilled along-side the longest side of the plate, three on each side, their position being dependent on the construction of the trolley. Six bolts are put through the holes. It is recommended to glue the bolts on the plate with an appropriate adhesive. Afterwards, the bolts are fastened with nuts.
- 3.1.7.3. The cover material (1 250 × 1 200 mm, see Figure 3 of Appendix 1 to this Annex) is cut across the width in such a way that it is not possible for the material to overlap after covering. There should be a gap of about 100 mm between the edges of the cover material. Therefore the material has to be cut at about 1 200 mm.
- 3.1.7.4. The cover material is marked with two lines which run across the width. They are drawn 375 mm from the centreline of the cover material (see Figure 3 of Appendix 1 to this Annex).
- 3.1.7.5. The seat foam cushion is placed upside down on the cover material with the aluminium bottom-plate on top.
- 3.1.7.6. On both sides the cover material is stretched until the lines drawn on it match the edges of the aluminium bottom-plate. At each bolt position, small incisions are made and the cover material is pulled over the bolts.
- 3.1.7.7. At the position of the grooves in the bottom-plate and in the foam, the cover material should be incised.
- 3.1.7.8. The cover is glued to the aluminium plate with a flexible glue. The nuts have to be removed before gluing.
- 3.1.7.9. The flaps on the side are folded onto the plate and are glued as well.
- 3.1.7.10. The flaps in the grooves are folded inside and taped with a strong tape.
- 3.1.7.11. The flexible glue has to dry for at least 12 hours.
- 3.1.7.12. The seat back cushion is covered in exactly the same way as the seat, only the lines on the cover material (1 250 × 850 mm) are drawn 320 mm apart from the centreline of the material.
- 3.1.8. Line Cr is coincident with the intersection line between the top plane of the seat and the front lane of the seat back.
- 3.2. *Test of rearward-facing devices*
- 3.2.1. A special frame shall be fitted on the trolley in order to support the child restraint as shown in figure 1.

⁽¹⁾ Details of materials used in this process can be obtained from TNO (Research Institute for Road Vehicles), Schoemakerstraat 97, 2628 VK Delft, The Netherlands.

- 3.2.2. A steel tube shall be attached firmly to the trolley in such a way that a load of $5\,000 \pm 50$ N applied horizontally to the centre of the tube does not cause a movement greater than 2 mm.
- 3.2.3. The dimensions of the tube shall be: $500 \times 100 \times 90$ mm.

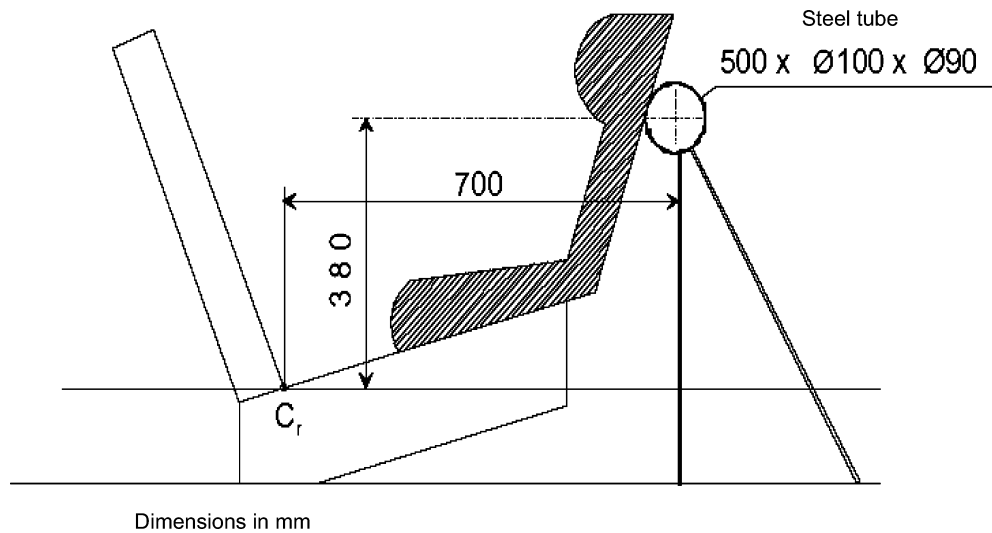


Figure 1: Arrangement for testing a rearward-facing device

4. STOPPING DEVICE
- 4.1. The device consists of two identical absorbers mounted in parallel.
- 4.2. If necessary, an additional absorber shall be used for each 200 kg increase in nominal mass. Each absorber shall comprise:
- 4.2.1. an outer casing formed from a steel tube;
 - 4.2.2. a polyurethane energy-absorber tube;
 - 4.2.3. a polished-steel olive-shaped knob penetrating into the absorber; and
 - 4.2.4. a shaft and an impact plate.
- 4.3. The dimensions of the various parts of this absorber are shown in the diagram reproduced in Appendix 2 to this Annex.
- 4.4. The characteristics of the absorbing material are given in Table 3 and Table 4 of this Annex.
- 4.5. The stopping device assembly shall be maintained for at least 12 hours at a temperature between 15° and 25° °C before being used for the calibration tests described in Annex 7 to this Regulation. The stopping device shall, for each type of test, meet the performance requirements laid down in Annex 7, appendices 1 and 2. For dynamic tests of a child restraint, the stopping device assembly shall be maintained for at least 12 hours at the same temperature, to within $\pm 2^\circ$ °C, as that of the calibration test. Any other device giving equivalent results can be accepted.

Table 3

CHARACTERISTICS OF THE ABSORBING MATERIAL 'A'

(ASTM Method D 735 unless otherwise stated)

Shore hardness A		95 ± 2 at 20 ± 5 °C temperature
Breaking strength		R _o 350 kg/cm ²
Minimum elongation		A _o 400 %
Module	at 100 % elongation	110 kg/cm ²
	at 300 % elongation	240 kg/cm ²
Low temperature brittleness (ASTM Method D736)		5 hours at – 55 °C
Compression set (Method B)		22 hours at 70 °C: 45 %
Density at 25 °C		1,05 to 1,10
Ageing in air (ASTM Method D 573)		70 hours at 100 °C: — Shore hardness: max. variation ± 3 — Breaking strength: decrease < 10 % of R _o — Elongation: decrease < 10 % of A _o — Eight: decrease < 1 %
Immersion in oil (ASTM Method No 1 Oil)		70 hours at 100 °C: — Shore hardness: max. variation ± 4 — Breaking strength: decrease < 15 % of R _o — Elongation: decrease < 10 % of A _o — Volume: swelling < 5 %
Immersion in oil (ASTM Method No 3 Oil)		70 hours at 100 °C: — Breaking strength: decrease < 15 % of R _o — Elongation: decrease < 15 % of A _o — Volume: swelling < 20 %
Immersion in distilled water		Breaking strength: decrease < 35 % of R _o
1 week at 70 °C		Elongation: increase < 20 % of A _o

Table 4

CHARACTERISTICS OF THE ABSORBING MATERIAL 'B'

(ASTM Method 2000 (1980) unless otherwise stated)

Shore hardness A		88 ± 2 at 20 ± 5 °C temperature
Breaking strength		R _o 300 kg/cm ²
Minimum elongation		A _o 400 %
Module at	at 100 % elongation	70 kg/cm ²
	at 300 % elongation	130 kg/cm ²
Low temperature brittleness (ASTM Method D736)		5 hours at – 55 °C
Compression set (Method B)		22 hours at 70 °C: 45 %
Density at 25 °C		1,08 to 1,12

Ageing in air (ASTM Method D 573 (1981))	70 hours at 100 °C: — Shore hardness: max. variation ± 3 — Breaking strength: decrease $< 10\%$ of R_o — Elongation: decrease $< 10\%$ of A_o — Elongation: decrease $< 1\%$
Immersion in oil (ASTM Method D 471 (1979) Oil No 1)	70 hours at 100 °C: — Shore hardness: max. variation ± 4 — Breaking strength: decrease $< 15\%$ of R_o — Elongation: decrease $< 10\%$ of A_o — Volume: swelling $< 5\%$
Immersion in oil (ASTM Method D 471 (1979) Oil No 3):	70 hours at 100 °C: — Breaking strength: decrease $< 15\%$ of R_o — Elongation: decrease $< 15\%$ of A_o — Volume: swelling $< 20\%$
Immersion in distilled water	Breaking strength: decrease $< 35\%$ of R_o
1 week at 70 °C	Elongation: increase $< 20\%$ of A_o

ANNEX 6

Appendix 1

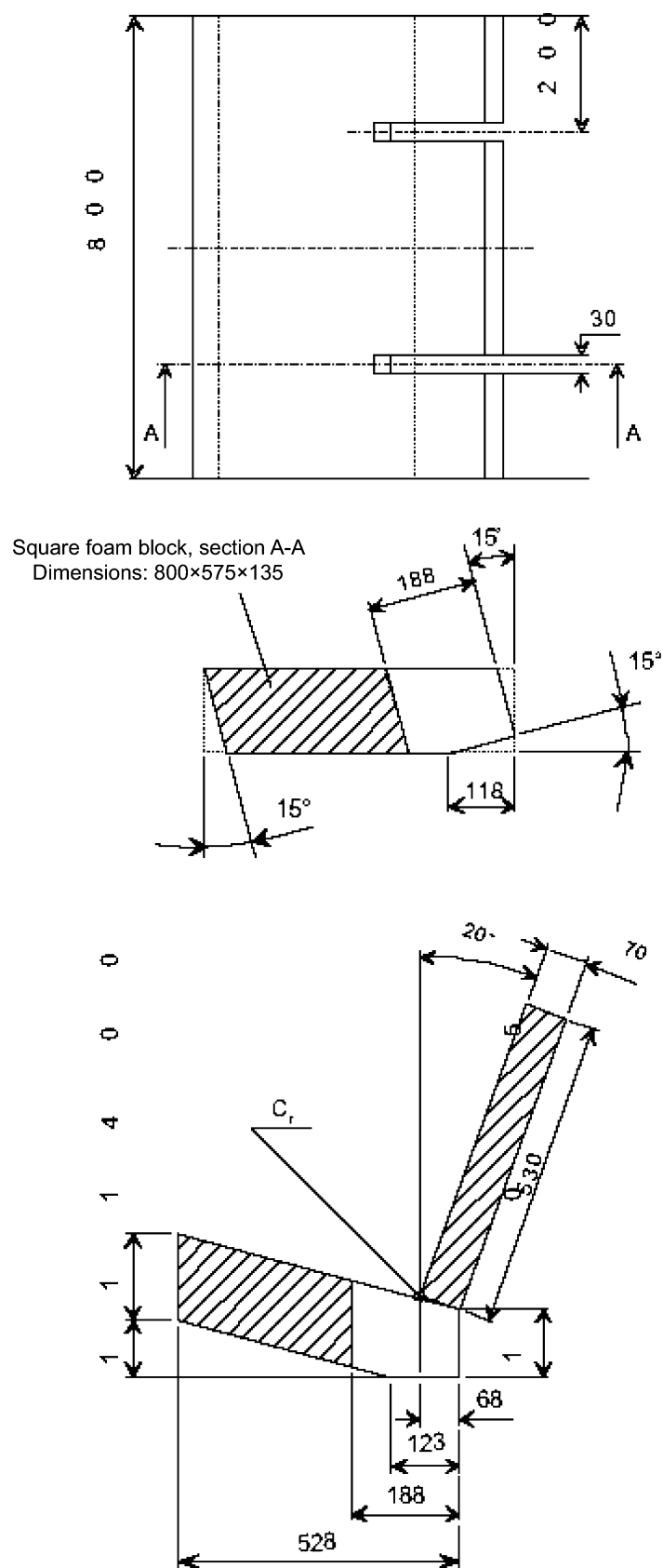


Figure 1: Dimensions of the seat and the seat cushions

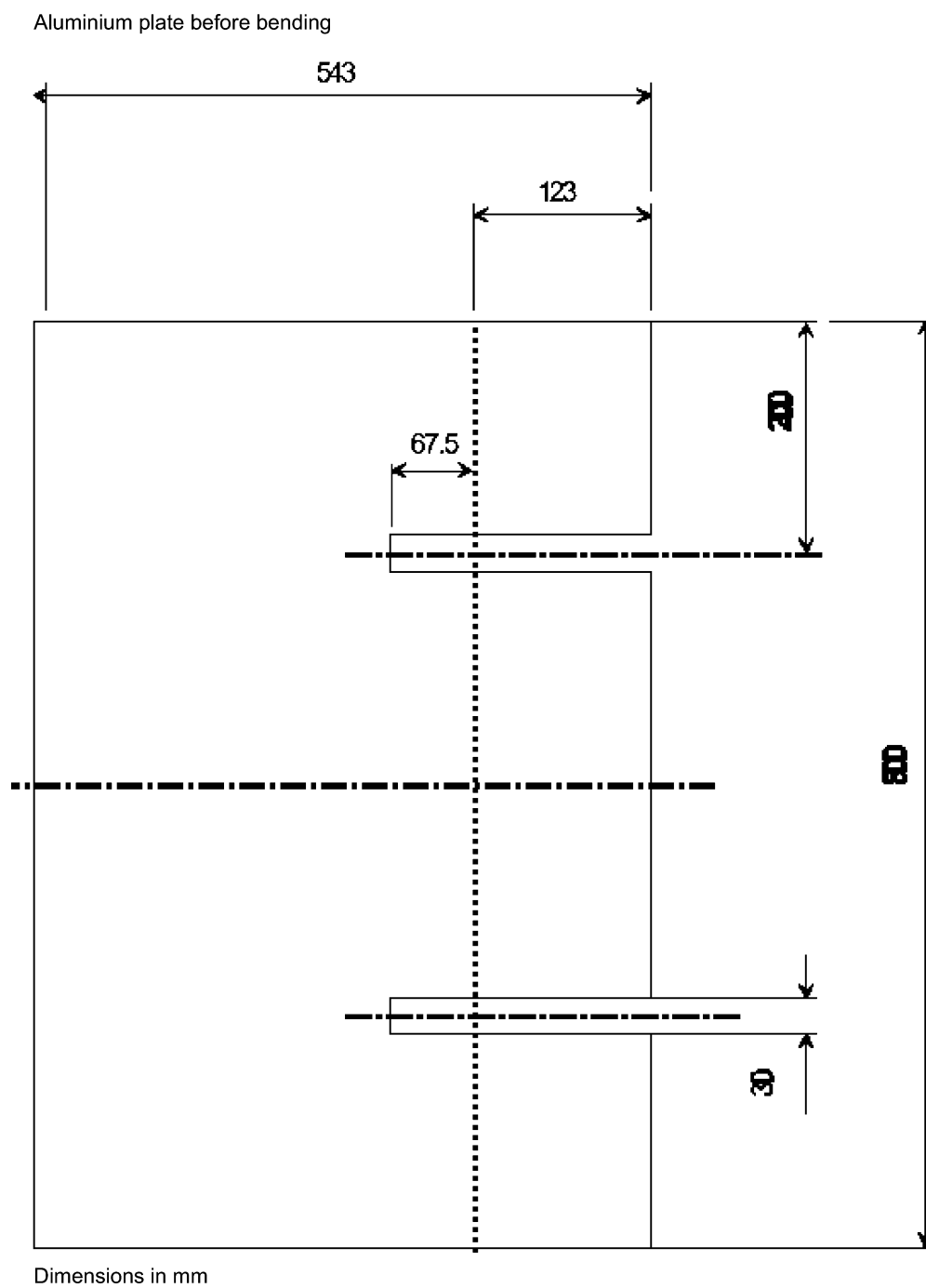


Figure 2: Dimensions of the aluminium bottom plate

Draw lines on the material

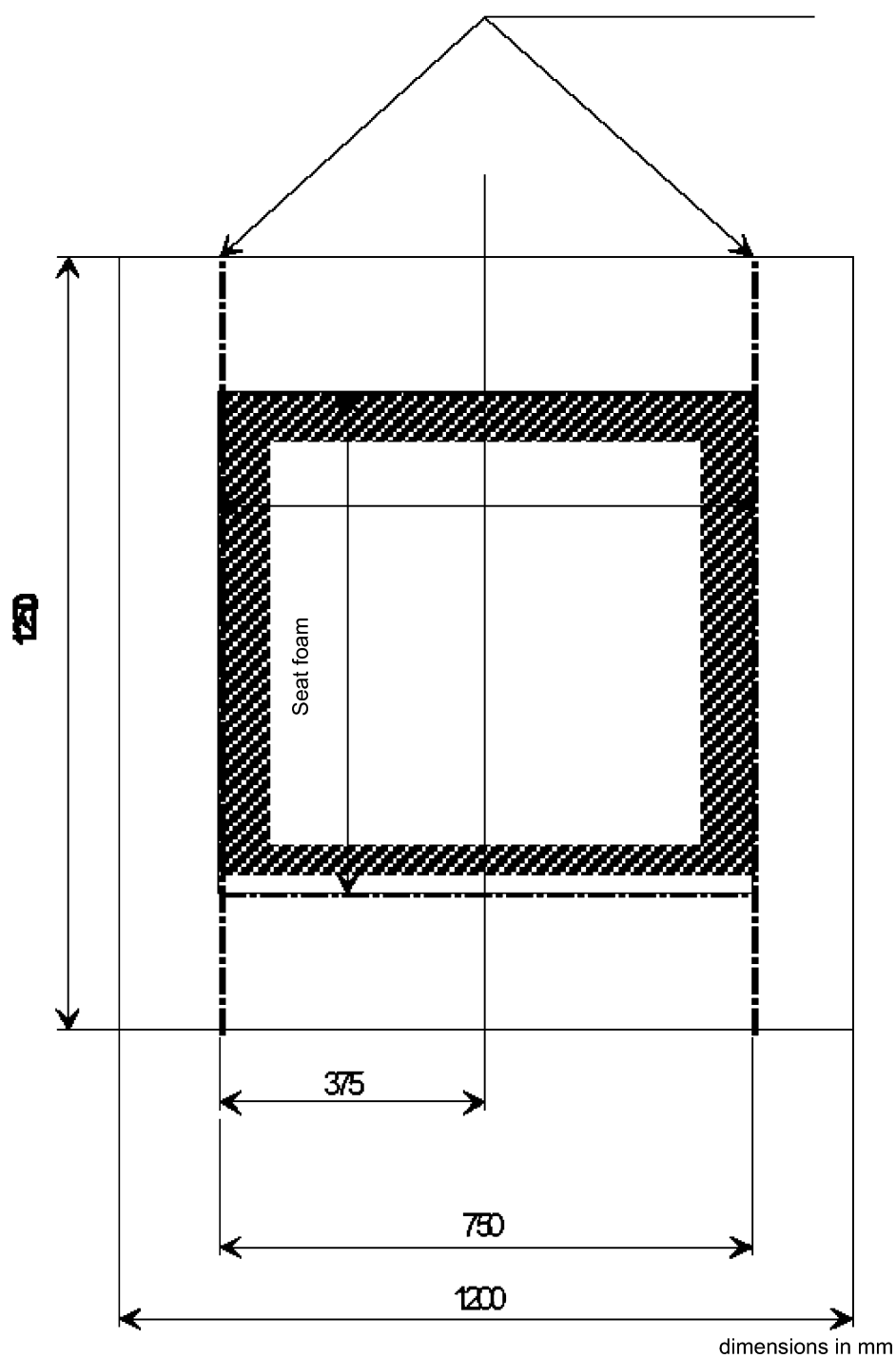


Figure 3: Dimensions of the cover material

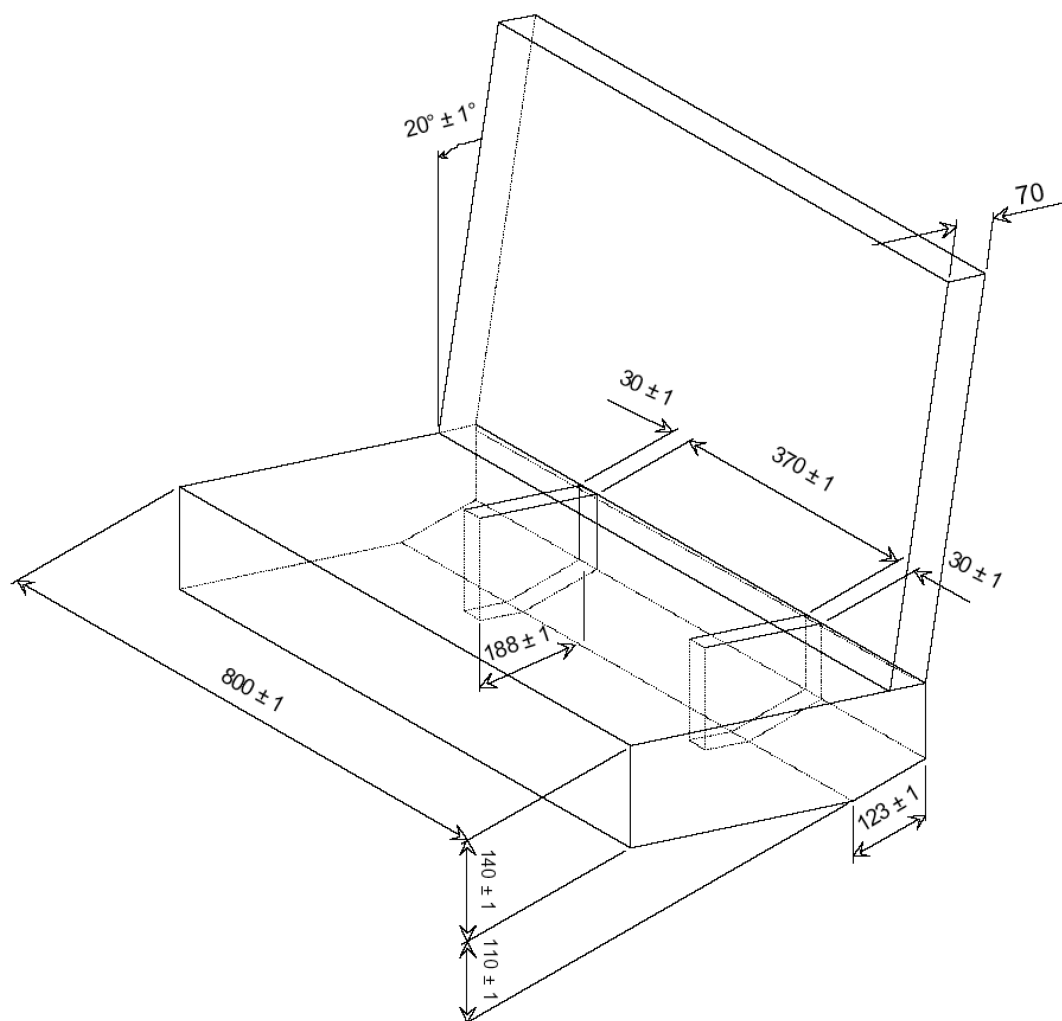


Figure 4: 3-Dimensional view of seat

Appendix 2

Stopping device
Frontal impact dimensions (in mm)

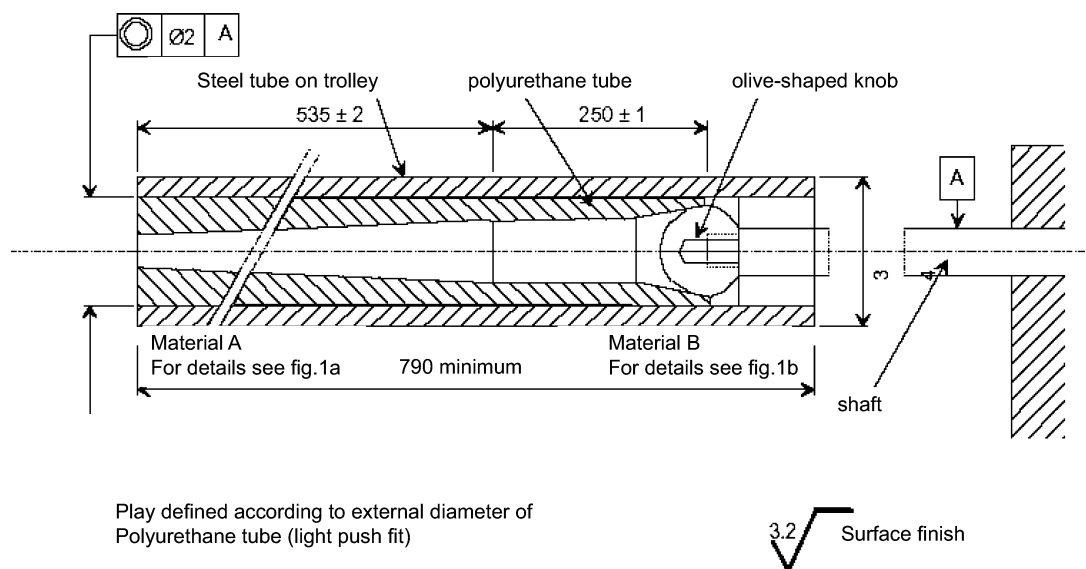


Figure 1

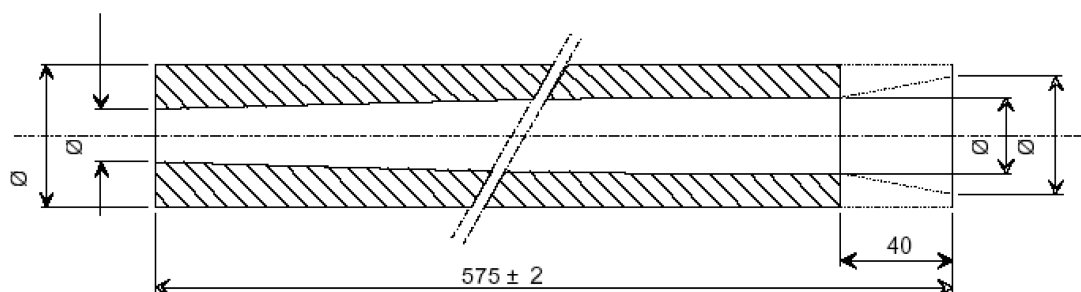


Figure 1a: Material A

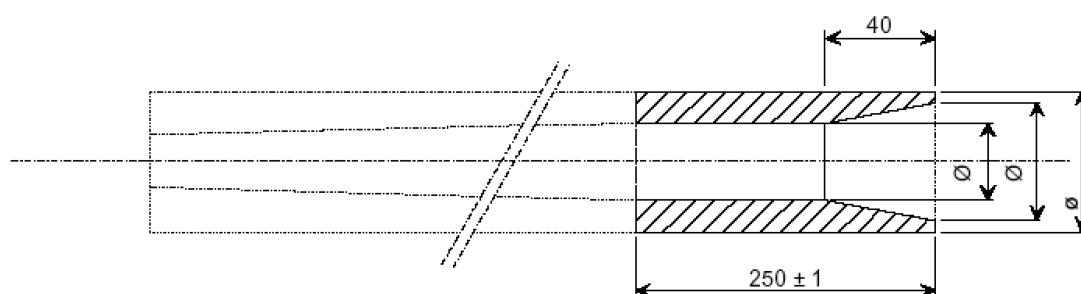


Figure 1b: Material B

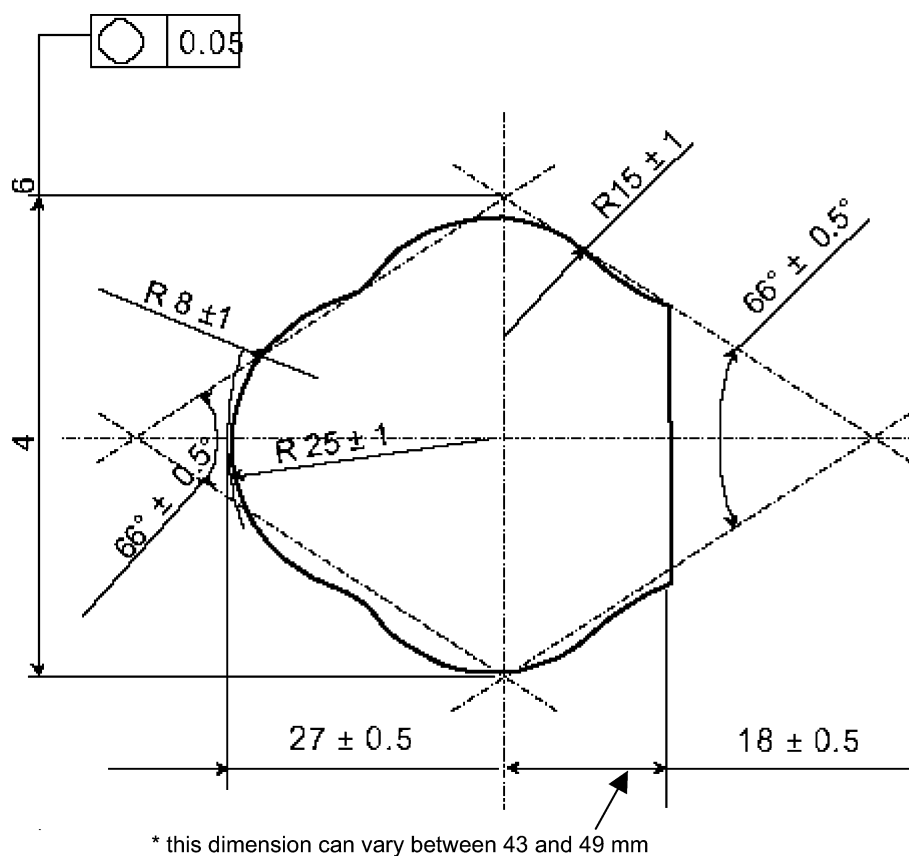


Figure 2: Stopping device olive-shaped knob

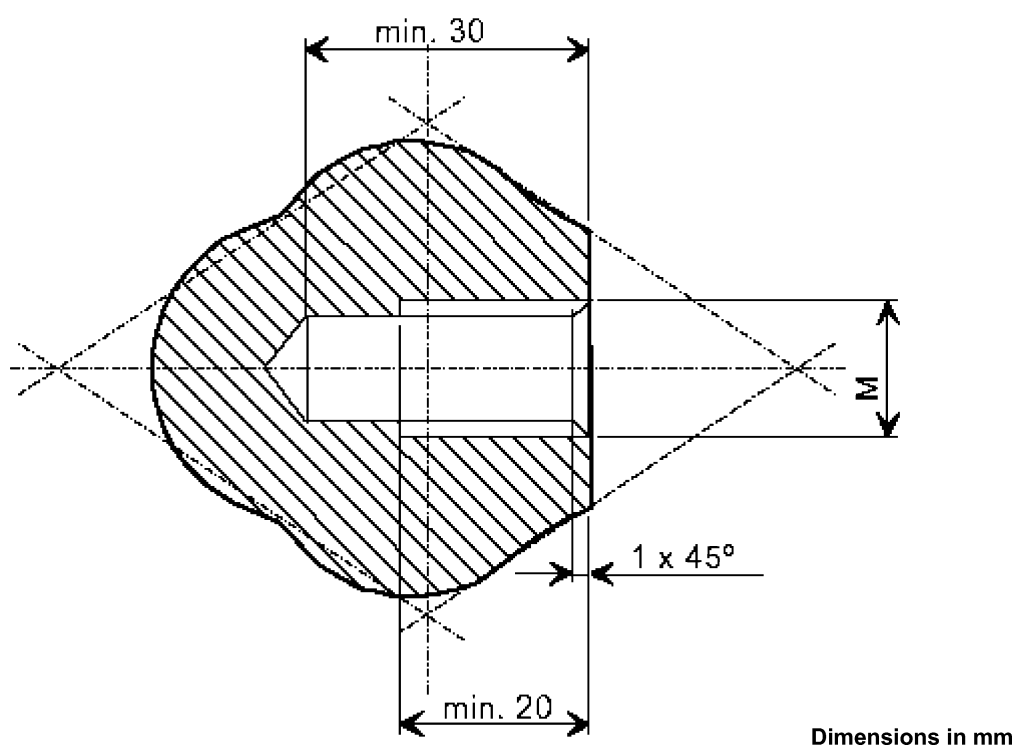
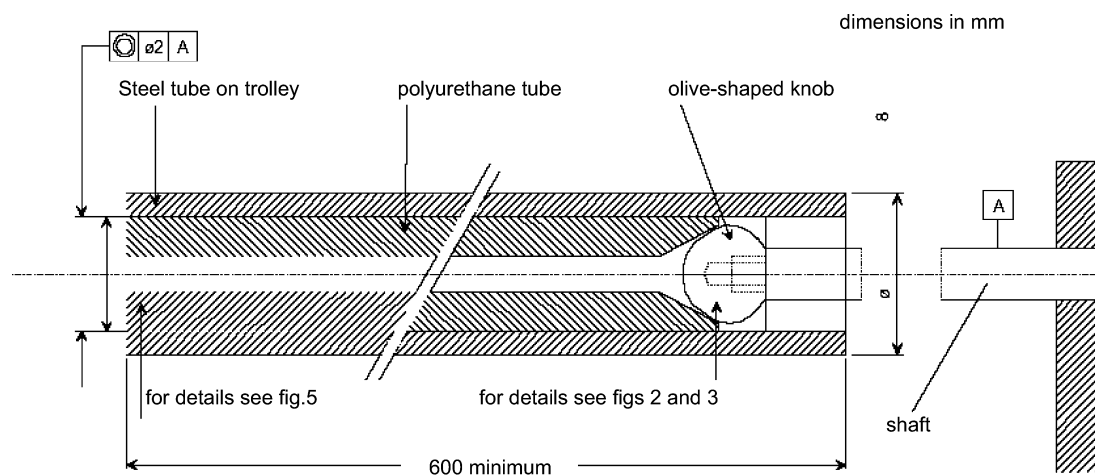


Figure 3: Stopping device olive-shaped knob

Stopping device (assembled)**Rear impact**

play defines according to external diameter of the polyurethane tube (light push fit)

Figure 4

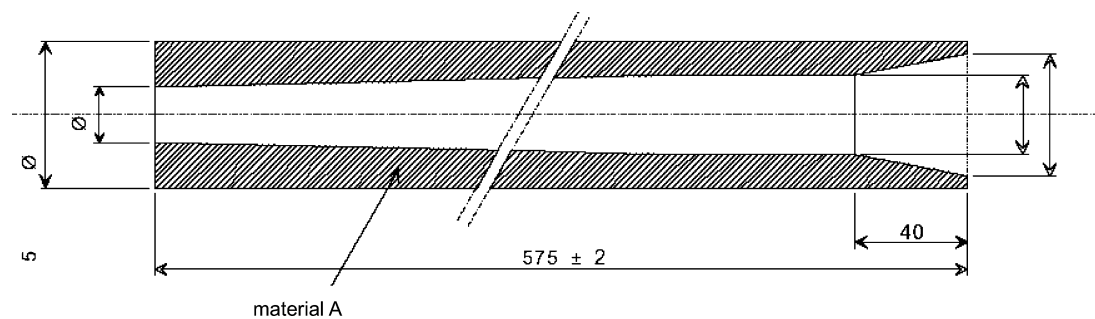
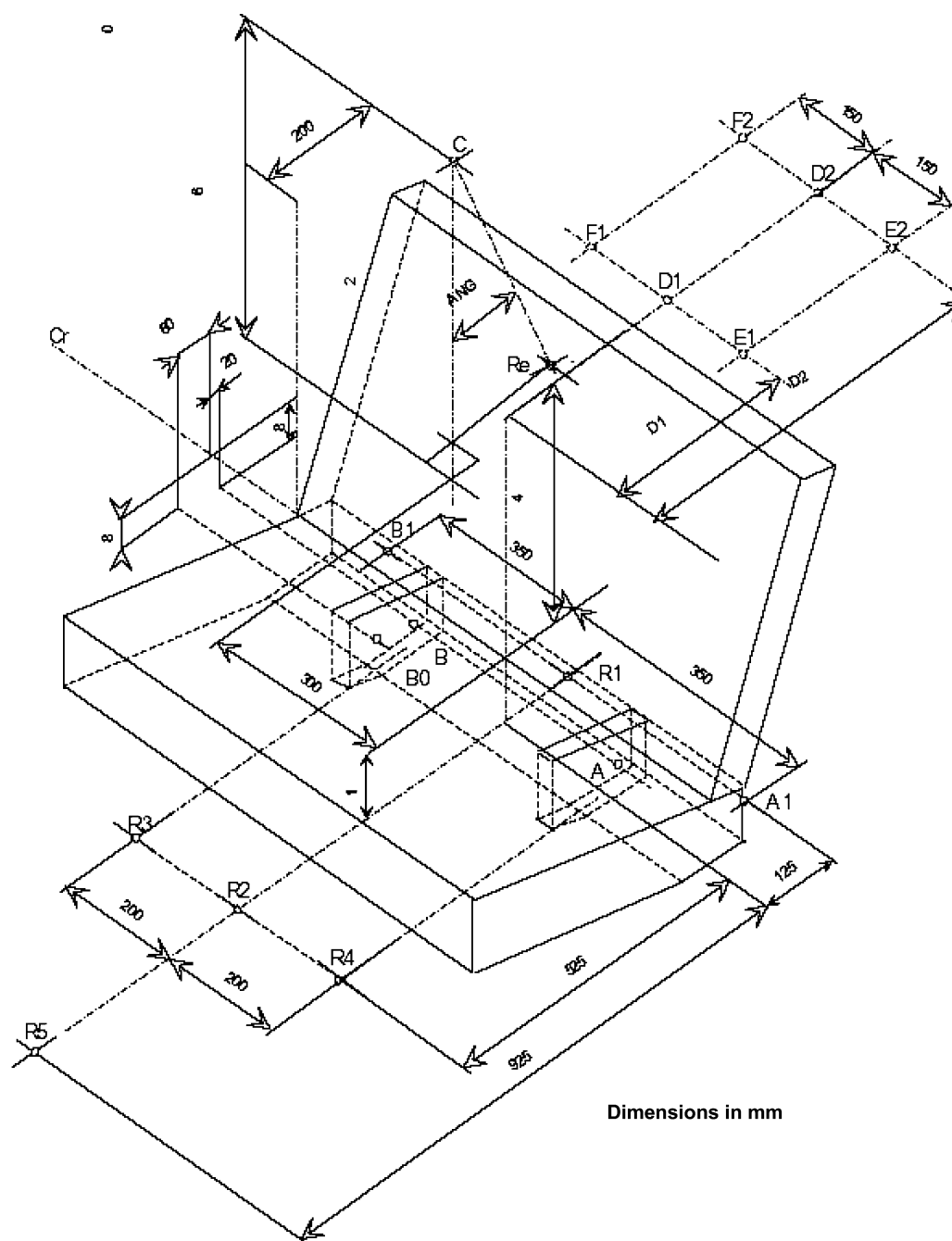
Stopping device Polyurethane tube**Rear impact**

Figure 5

Appendix 3

ARRANGEMENT AND USE OF ANCHORAGES ON THE TEST TROLLEY

1. The anchorages shall be positioned as shown in the figure below.
2. Child restraints in the 'universal' and 'restricted' categories shall use the following anchorage points:
 - 2.1. For child restraints approved for use with lap belts, points A and B;
 - 2.2. For child restraints approved for use with lap and diagonal belts, points A, B0, and C.
3. Anchorages A, B and D shall be used for child restraints in the 'semi-universal' category having only one additional upper anchorage.
4. Anchorages A, B, E and F shall be used for child restraints in the 'semi-universal' category having two additional upper anchorages.
5. Anchorage points R1, R2, R3, R4 and R5 are the additional anchorage points for rearward-facing child restraint systems in the 'semi-universal' category having one or more additional anchorages (see paragraph 8.1.3.5.3).
6. Except in the case of point C (which represents the pillar loop position), the points, which correspond to the arrangement of the anchorages show where the ends of the belt are to be connected to the trolley or to the load transducer, as the case may be. The structure carrying the anchorages shall be rigid. The upper anchorages must not be displaced by more than 0,2 mm in the longitudinal direction when a load of 980 N is applied to them in that direction. The trolley shall be so constructed that no permanent deformation shall occur in the parts bearing the anchorages during the test.
7. For carry-cots in group 0, the points A1 and/or B1 can be used alternatively, as specified by the manufacturer of the restraint systems. A1 and B1 are located on a transverse line through R1 at a distance of 350 mm from R1.
8. For testing of child restraints in the 'universal' and 'restricted' categories, a standard retractor belt, as specified in Annex 13, shall be fitted to the test seat.



**Dimensions referring to Cr
Are toleranced with: ± 2 mm**

Distance C - Re = 550 mm

Angle «ANG» = 30° maximum

The distance D1 and D2 shall be:

D1 = 325 mm for vehicles with parcel shelf (F1 D1 E1)

D1 = 1 025 mm for vehicles with folding back rear seats (estate type) (F2 D2 E2)

Figure 1

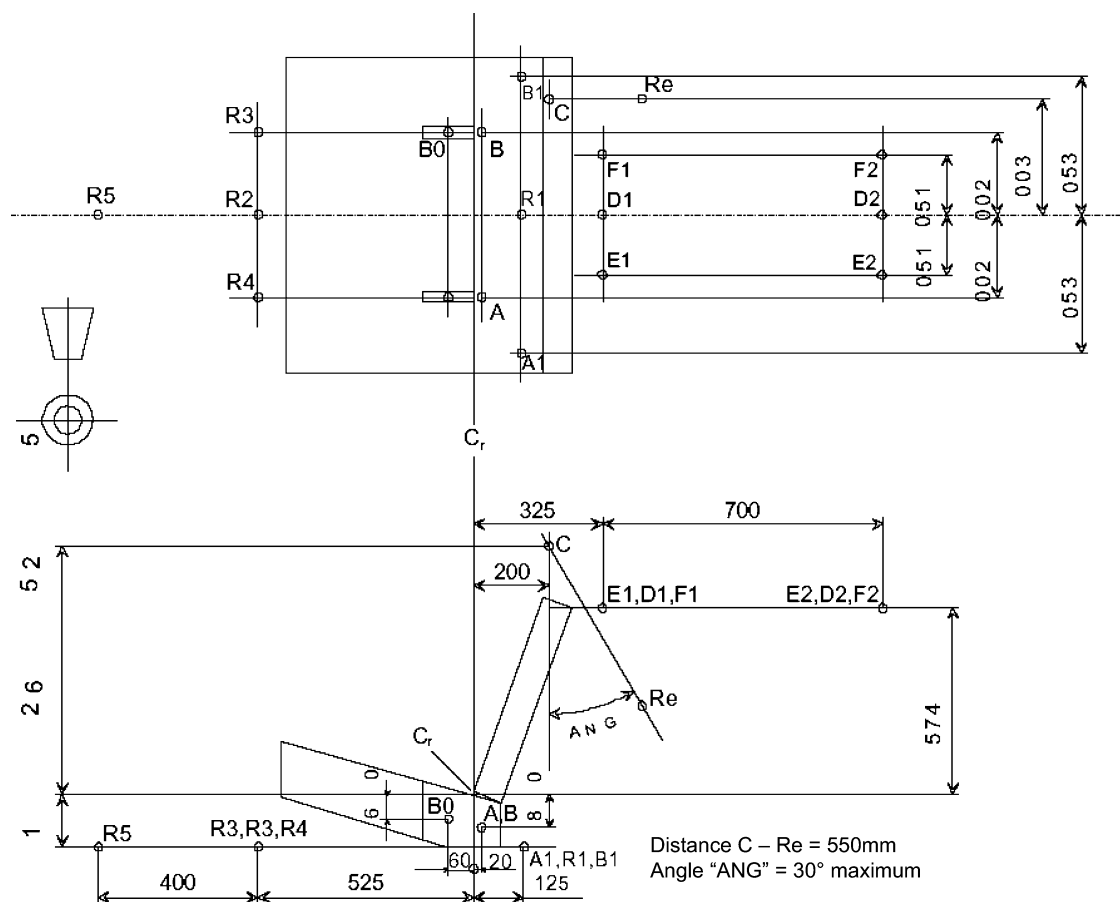


Figure 2

ANNEX 7

CURVE OF THE TROLLEY'S DECELERATION AS A FUNCTION OF TIME

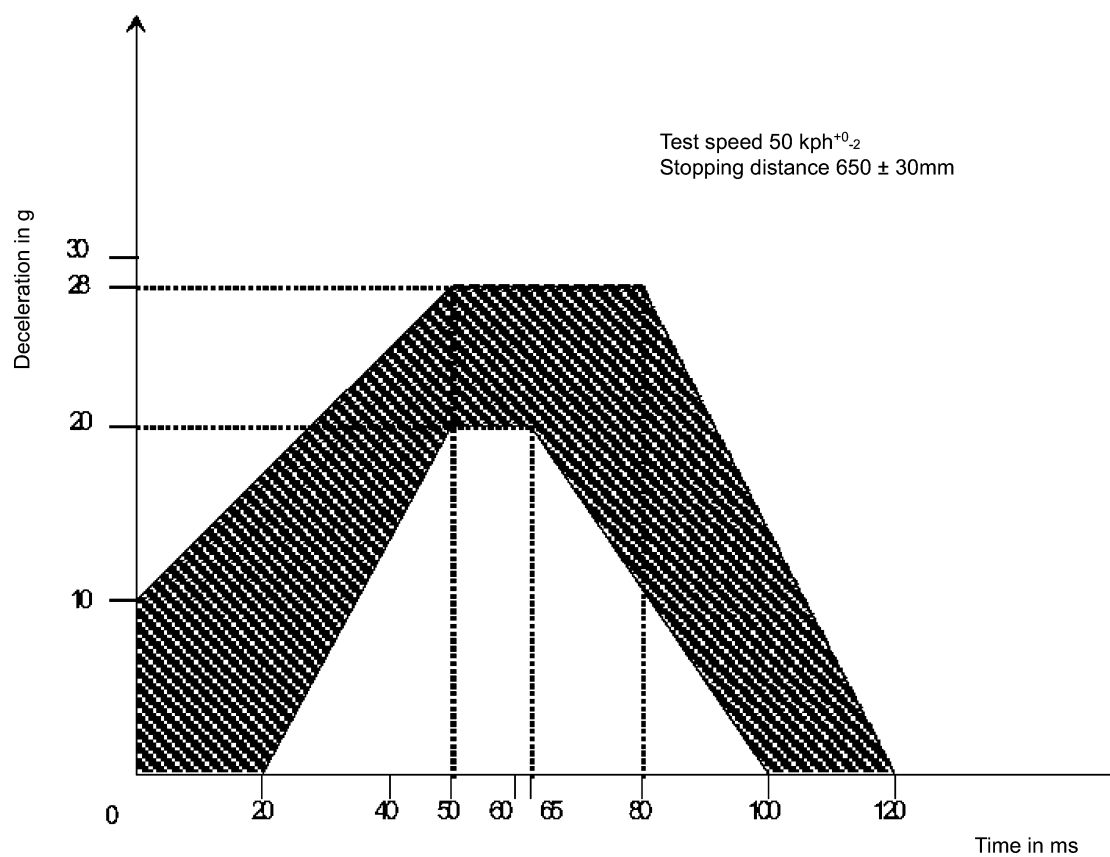
1. The deceleration curve of the trolley weighted with inert masses to produce a total mass of 455 ± 20 kg in the case of child restraint tests performed in accordance with paragraph 8.1.3.1 of this Regulation, and of 910 ± 40 kg in the case of child restraint tests performed in accordance with paragraph 8.1.3.2 of this Regulation, where the nominal mass of the trolley and vehicle structure is 800 kg, must remain, in the case of frontal impact, within the hatched area shown in Appendix 1 to this Annex, and, in the case of rear impact, within the hatched area shown in Appendix 2 to this Annex.
 2. If necessary, the nominal mass of the trolley and attached vehicle structure may be increased for each increment of 200 kg by an additional inert mass of 28 kg. In no case shall the total mass of the trolley and the vehicle structure and inert masses differ from the nominal value for calibration tests by more than ± 40 kg. During calibration of the stopping device, the stopping distance shall be 650 ± 30 mm for frontal impact, and 275 ± 20 mm for rear impact.
 3. The calibration and measuring procedures shall correspond to those defined in the international standard ISO 6487 (1980), the measuring equipment shall correspond to the specification of a data channel, with a channel frequency class (CFC) 60.
-

Appendix 1

Curves of the trolley deceleration as a function of time

(curve for calibrating stopping device)

Frontal impact

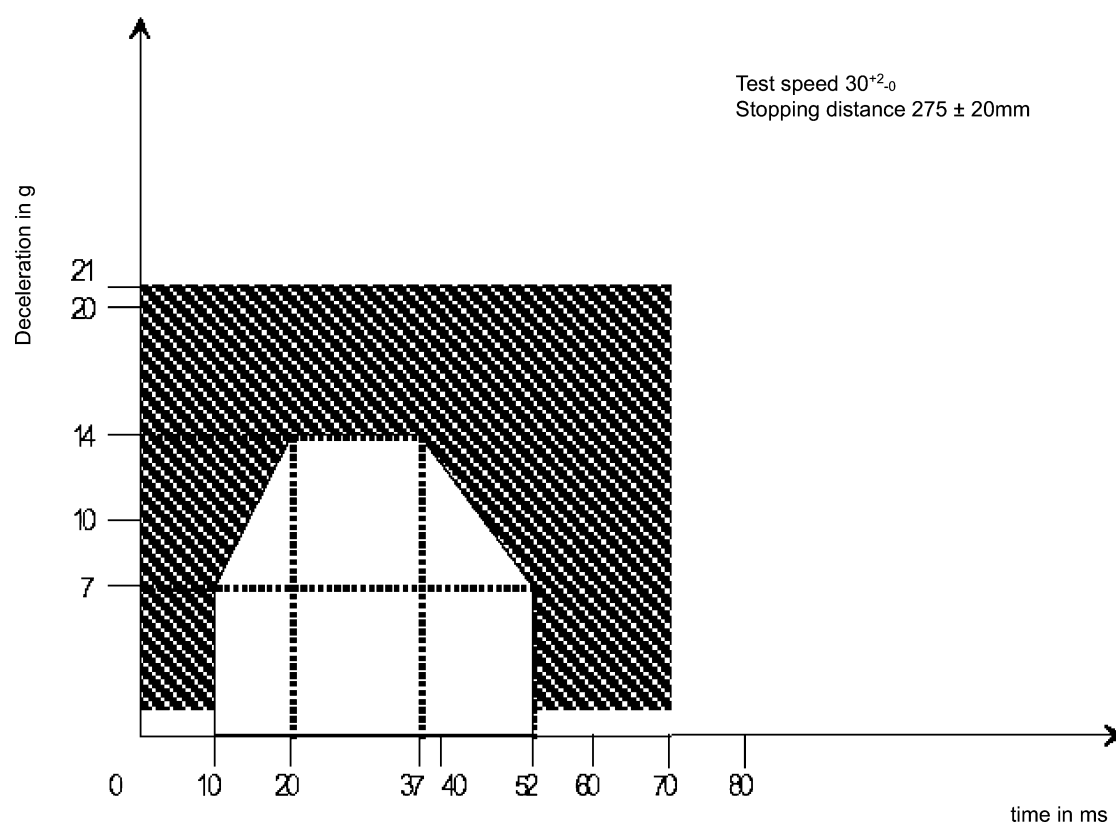


Appendix 2

Curves of the trolley deceleration as a function of time

(curve for calibrating stopping device)

Rear impact



ANNEX 8

DESCRIPTION OF MANIKINS

1. GENERAL

- 1.1. The manikins prescribed in this Regulation are described in Appendices 1 to 3 to this Annex, and in technical drawings produced by the TNO (Research Institute for Road Vehicles), Schoemakerstraat 97, 2628 VK Delft, The Netherlands.
- 1.2. Alternative manikins may be used provided that:
 - 1.2.1. Their equivalence can be demonstrated to the satisfaction of the competent authority, and
 - 1.2.2. Their use is recorded in the test report, and in the communication form described in Annex 1 to this Regulation.

Appendix 1

DESCRIPTION OF THE 9 MONTHS AND 3, 6 AND 10-YEAR MANIKINS

1. GENERAL

- 1.1. The dimensions and masses of the manikins described below are based on the anthropometry of 50th percentile children aged 9 months and 3, 6 and 10 years respectively.
- 1.2. The manikins consist of a metal and polyester skeleton with cast polyurethane body components.
- 1.3. For an exploded view of the manikin, see Figure 9.

2. CONSTRUCTION

2.1. *Head*

- 2.1.1. The head is made of polyurethane and reinforced by metal strips. Inside the head it is possible to install measuring equipment on a polyamide block at the centre of gravity.

2.2. *Vertebrae*

2.2.1. Neck vertebrae

- 2.2.1.1. The neck is made of 5 rings of polyurethane containing a core of polyamide elements. The Atlas-Axis block is made of polyamide.

2.2.2. Lumbar vertebrae

- 2.2.2.1. The five lumbar vertebrae are made of polyamide.

2.3. *Chest*

- 2.3.1. The skeleton of the chest consists of a tubular steel frame on which the arm joints are mounted. The spine consists of a steel cable with four threaded terminals.
- 2.3.2. The skeleton is coated with polyurethane. Measuring equipment can be housed in the chest cavity.

2.4. *Limbs*

- 2.4.1. The arms and legs are also made of polyurethane, reinforced by metal elements in the form of square tubes, strips and plates. The knees and elbows are provided with adjustable hinge joints. The joints of the upper arm and upper leg consist of adjustable ball and socket joints.

2.5. *Pelvis*

- 2.5.1. The pelvis is made of glass reinforced polyester also coated with polyurethane.

2.5.2. The shape of the upper side of the pelvis, which is important for determining sensitivity to abdominal loading, is simulated as far as possible from the shape of a child's pelvis.

2.5.3. The hip joints are situated just below the pelvis.

2.6. *Assembly of the manikin*

2.6.1. Neck-chest-pelvis

2.6.1.1. The lumbar vertebrae and the pelvis are threaded on to the steel cable and their tension is adjusted by a nut. The neck vertebrae are mounted and adjusted in the same way. Since the steel cable must not be free to move through the chest, it must not be possible to adjust the tension of lumbar vertebrae from the neck or vice-versa.

2.6.2. Head-neck

2.6.2.1. The head may be mounted and adjusted by means of a bolt and nut through the Atlas-Axis block.

2.6.3. Torso-limbs

2.6.3.1. The arms and legs may be mounted and adjusted to the torso by means of ball and socket joints.

2.6.3.2. For the arm joints the balls are connected to the torso; in the case of the leg joints, they are connected to the legs.

3. MAIN CHARACTERISTICS

3.1. *Mass*

Table 1

Component	Mass in kg by age group							
	9 months		3 years		6 years		10 years	
Head +	2,20	± 0,10	2,70	± 0,10	3,45	± 0,10	3,60	± 0,10
Torso	3,40	± 0,10	5,80	± 0,15	8,45	± 0,20	12,30	± 0,30
Upper	0,70	± 0,05	1,10	± 0,05	1,85	± 0,10	2,00	± 0,10
Lower	0,45	± 0,05	0,70	± 0,05	1,15	± 0,05	1,60	± 0,10
Upper	1,40	± 0,05	3,00	± 0,10	4,10	± 0,15	7,50	± 0,15
Lower	0,85	± 0,05	1,70	± 0,10	3,00	± 0,10	5,00	± 0,15
Total	9,00	± 0,20	15,00	± 0,30	22,00	± 0,50	32,00	± 0,70

3.2. *Principal dimensions*

3.2.1. The principal dimensions, based on figure 1 of this Annex, are given in table 2.

Principle dimensions of manikin

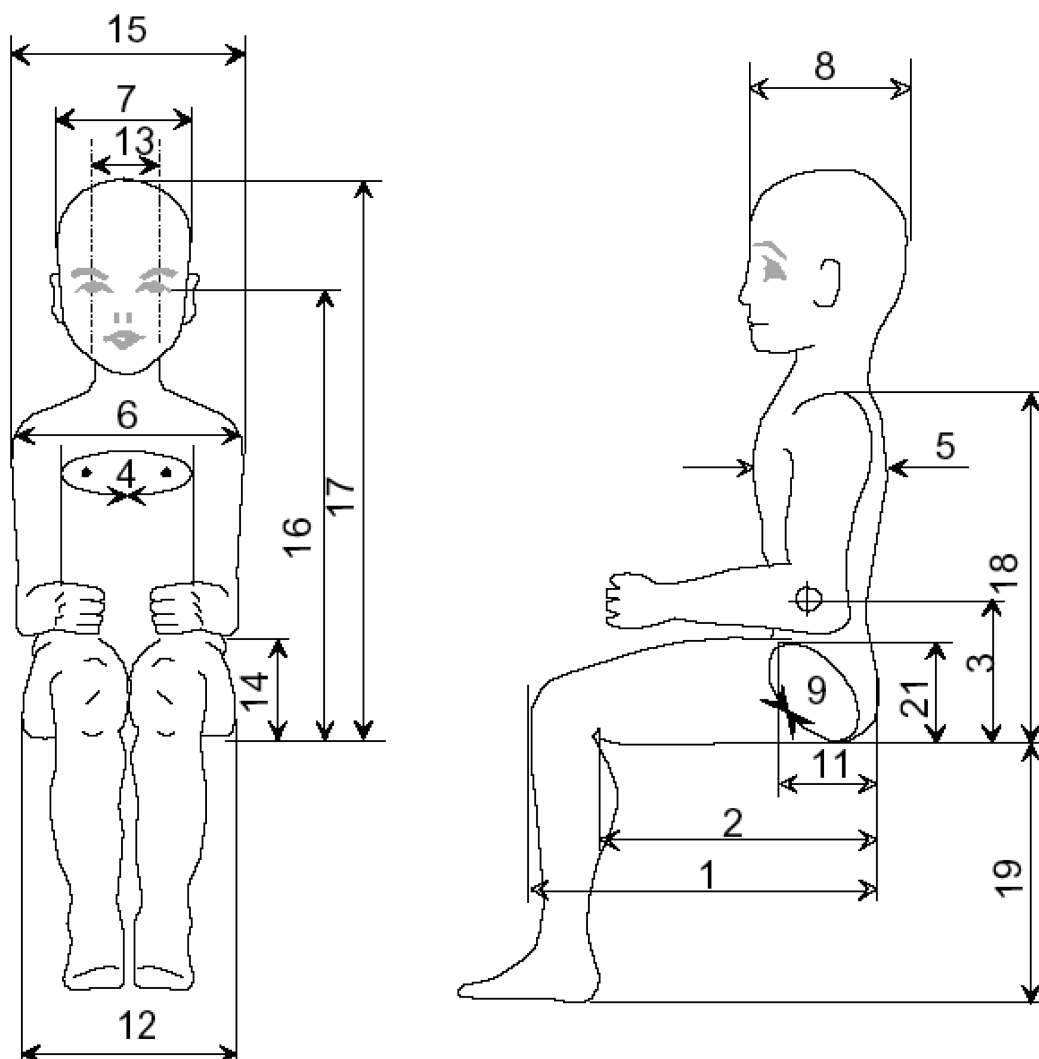


Figure 1

Table 2

No	Dimensions	Dimensions in mm by age group			
		9 months	3 years	6 years	10 years
1	Back of buttocks to front knee	195	334	378	456
2	Back of buttocks to popliteus, sitting	145	262	312	376
3	Centre of gravity to seat	180	190	190	200
4	Chest circumference	440	510	580	660
5	Chest depth	102	125	135	142
6	Distance between shoulder blades	170	215	250	295
7	Head width	125	137	141	141
8	Head length	166	174	175	181
9	Hip circumference, sitting	510	590	668	780
10	Hip circumference, standing (not shown)	470	550	628	740

No	Dimensions	Dimensions in mm by age group			
		9 months	3 years	6 years	10 years
11	Hip depth, sitting	125	147	168	180
12	Hip width, sitting	166	206	229	255
13	Neck width	60	71	79	89
14	Seat to elbow	135	153	155	186
15	Shoulder width	216	249	295	345
16	Eye height sitting	350	460	536	625
17	Height, sitting	450	560	636	725
18	Shoulder height, sitting	280	335	403	483
19	Sole to popliteus, sitting	125	205	283	355
20	Stature (not shown)	708	980	1 166	1 376
21	Thigh height, sitting	70	85	95	106

4. ADJUSTMENT OF JOINTS

4.1. General

- 4.1.1. In order to achieve reproducible results using the manikins, it is essential to specify and adjust the friction in the various joints, the tension in the neck and lumbar cables, and the stiffness of the abdominal insert.

4.2. Adjustment of the neck cable

- 4.2.1. Place the torso on its back in a horizontal plane.
- 4.2.2. Mount the complete neck assembly without the head.
- 4.2.3. Tighten the tensioner nut on the Atlas-Axis block.
- 4.2.4. Place a suitable bar or bolt through the Atlas-Axis block.
- 4.2.5. Loosen the tensioner nut until the Atlas-Axis block is lowered by 10 ± 1 mm when a load of 50 N directed downwards is applied to the bar or bolt through the Atlas-Axis block (see figure 2).

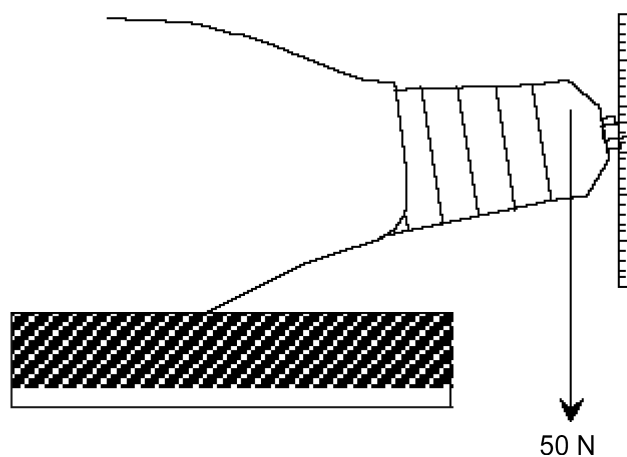


Figure 2

4.3. *Atlas-Axis joint*

- 4.3.1. Place the torso on its back in a horizontal plane.
- 4.3.2. Mount the complete neck and head assembly.
- 4.3.3. Tighten the bolt and adjustment nut through the head and the Atlas-Axis block with the head in a horizontal position.
- 4.3.4. Loosen the adjustment nut until the head starts moving (see figure 3).

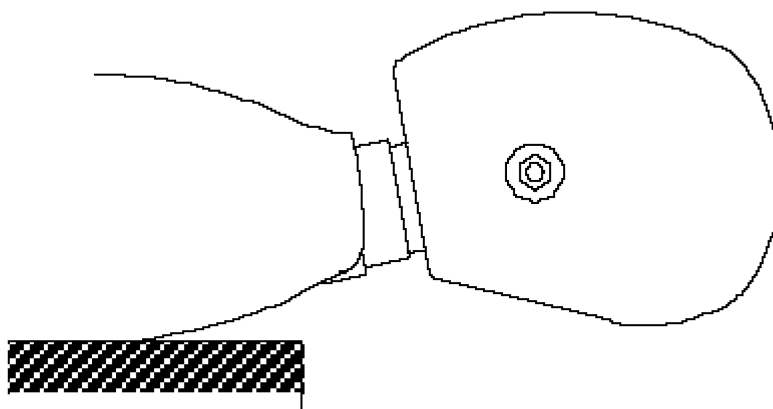


Figure 3

4.4. *Hip joint*

- 4.4.1. Place the pelvis on its front in a horizontal plane.
- 4.4.2. Mount the upper leg without the lower leg.
- 4.4.3. Tighten the adjustment nut with the upper leg in a horizontal position.
- 4.4.4. Loosen the adjustment nut until the upper leg starts moving.
- 4.4.5. The hip joint should be checked frequently in the initial stages because of 'running-in' problems (see figure 4).

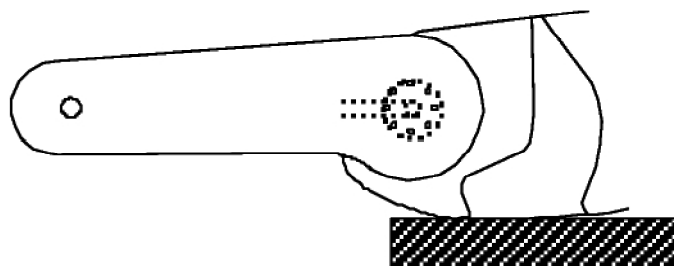


Figure 4

4.5. *Knee joint*

- 4.5.1. Place the upper leg in a horizontal position.
- 4.5.2. Mount the lower leg.
- 4.5.3. Tighten the adjustment nut of the knee joint with the lower leg in a horizontal position.
- 4.5.4. Loosen the adjustment nut until the lower leg starts moving (see figure 5).

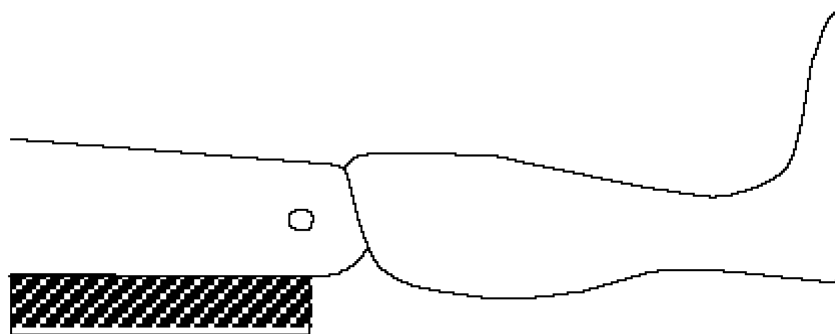


Figure 5

4.6. *Shoulder joint*

- 4.6.1. Place the torso upright.
- 4.6.2. Mount the upper arm without the lower arm.
- 4.6.3. Tighten the adjustment nuts of the shoulder with the upper arm in a horizontal position.
- 4.6.4. Loosen the adjustment nuts until the upper arm starts moving (see figure 6).

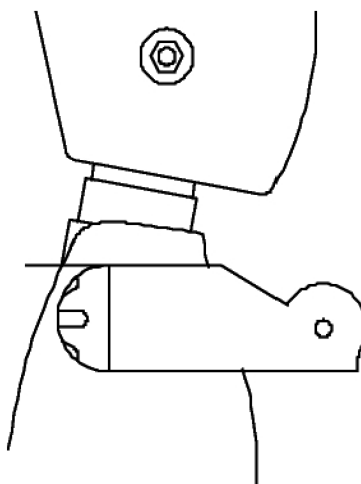


Figure 6

- 4.6.5. The shoulder joints should be checked frequently in the initial stages because of 'running-in' problems.

4.7. *Elbow joint*

- 4.7.1. Place the upper arm in a vertical position.
- 4.7.2. Mount the lower arm.
- 4.7.3. Tighten the adjustment nut of the elbow with the lower arm in a horizontal position.
- 4.7.4. Loosen the adjustment nut until the lower arm starts moving (see figure 7).

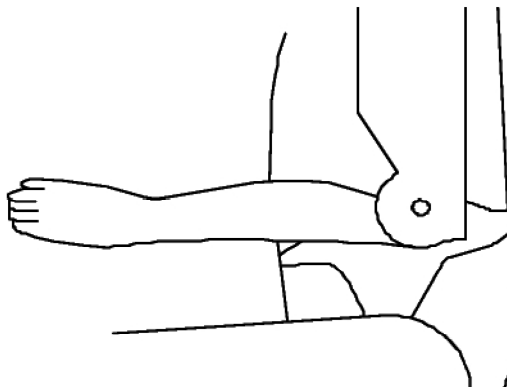


Figure 7

4.8. *Lumbar cable*

- 4.8.1. Assemble the upper torso, lumbar vertebrae, lower torso, abdominal insert, cable and spring.
- 4.8.2. Tighten the cable adjustment nut in the lower torso until the spring is compressed to $\frac{2}{3}$ of its unloaded length (see figure 8).

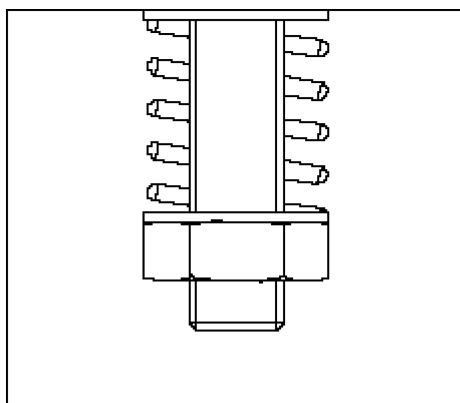


Figure 8

4.9. *Calibration of the abdominal insert*

4.9.1. General

- 4.9.1.1. The test shall be carried out by means of a suitable tension-producing machine.

- 4.9.2. Place the abdominal insert on a rigid block with the same length and width as the lumbar spinal column. The thickness of this block shall be at least twice the thickness of the lumbar spinal column (see figure 9).

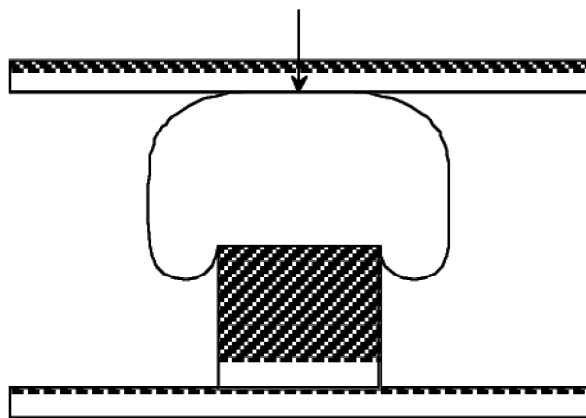


Figure 9

- 4.9.3. An initial load of 20 N shall be applied.
- 4.9.4. A constant load of 50 N shall be applied.
- 4.9.5. The deflection of the abdominal insert after 2 minutes shall be:

for the	9 months dummy	$11,5 \pm 2,0$ mm
	3 years dummy	$11,5 \pm 2,0$ mm
	6 years dummy	$13,0 \pm 2,0$ mm
	10 years dummy	$13,0 \pm 2,0$ mm

5. INSTRUMENTATION

5.1. General

- 5.1.1. The calibration and measuring procedures shall be based upon the international standards ISO 6487 (1980).

5.2. Installation of the accelerometer in the chest

The accelerometer shall be mounted in the protected cavity in the chest.

5.3. Indication of abdominal penetration

- 5.3.1. A sample of modelling clay shall be vertically connected to the front of the lumbar vertebrae by means of thin adhesive tape.
- 5.3.2. A deflection of the modelling clay does not necessarily mean that penetration has taken place.

- 5.3.3. The modelling clay samples shall be of the same length and width as the lumbar spinal column; the thickness of the samples shall be 25 ± 2 mm.
 - 5.3.4. Only the modelling clay supplied with the manikins shall be used.
 - 5.3.5. The temperature of the modelling clay during the test shall be 30 ± 5 °C.
-

Appendix 2

DESCRIPTION OF THE 'NEW-BORN' MANIKIN

The manikin comprises a head, torso, arms and legs as a single unit. The torso, arms and legs are a single moulding of Sorbothane covered with a PVC skin and containing a steel spring spine. The head is a polyurethane foam moulding covered by a PVC skin and is permanently attached to the torso. The manikin is provided with a close fitting stretch cotton/polyester suit.

The dimensions and mass distribution of the dummy are based on those of a 50th percentile new-born baby and are given in tables 1 and 2 and in figure 1.

Table 1

Principal dimensions of the 'new-born' manikin

Dimension		mm
A	Rump-Crown	345
B	Rump - Sole (with straight leg)	250
C	Head width	105
D	Head depth	125
E	Shoulder width	150
F	Chest width	105
G	Chest depth	100
H	Hip width	105
I	C of G from top of head	235

Table 2

Mass distribution of the 'new-born' manikin ⁽¹⁾

Head and neck	0,7 kg
Torso	1,1 kg
Arms	0,5 kg
Legs	1,1 kg
Total mass	3,4 kg

Calibration of infant manikin

1. SHOULDER STIFFNESS

- 1.1. Place manikin on its back on a horizontal surface and support torso on one side, to prevent movement (figure 2).
- 1.2. Apply a load of 150 N, on a 40 mm diameter flat faced plunger, horizontally, in a direction perpendicular to the manikin's superior-inferior axis. The axis of the plunger should be in the centre of the manikin's shoulder and adjacent to point A on the shoulder (see figure 2). The lateral deflection of the plunger from the point of first contact with the arm should be between 30 mm and 50 mm.
- 1.3. Repeat on the opposite shoulder — reversing the support.

2. LEG JOINT STIFFNESS

- 2.1. Place manikin on its back on a horizontal plane (figure 3) and strap the two lower legs together, bringing the inside of the knee into contact.

⁽¹⁾ The thickness of the PVC skin should be $1 \pm 0,5$ mm
The specific gravity should be $0,865 \pm 0,1$.

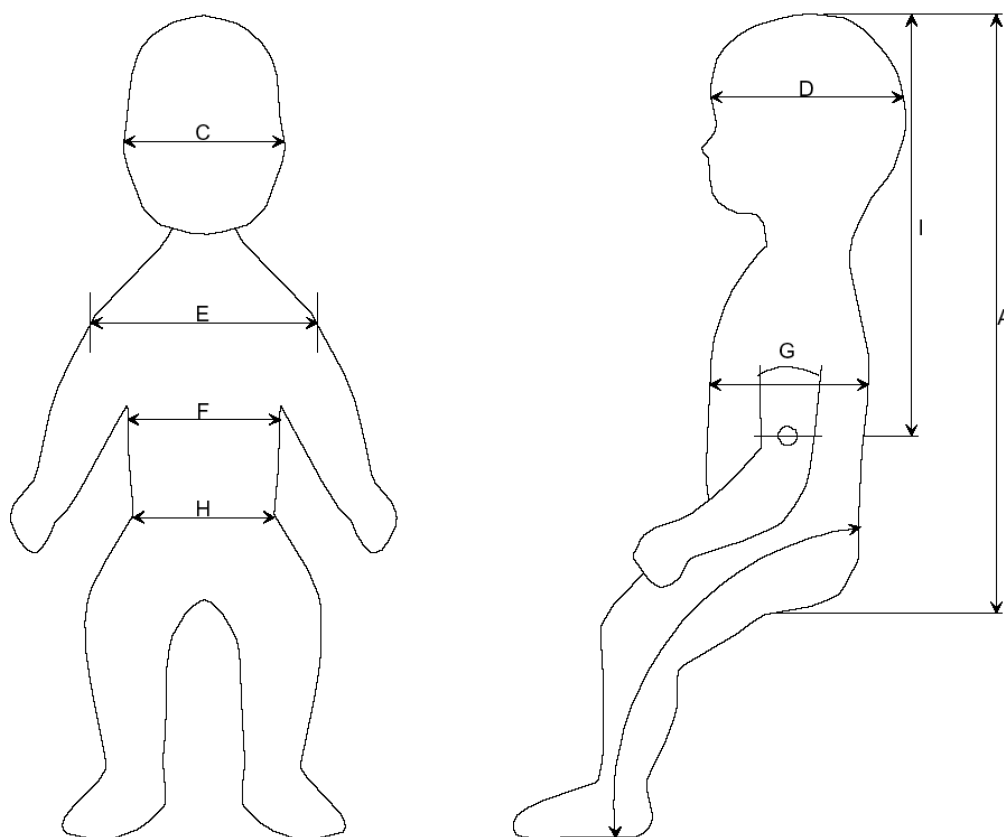


Figure 1

- 2.2. Apply a vertical load over the knees with a 35 mm × 95 mm flat faced plunger with the centre line of the plunger over the highest point of the knees.
- 2.3. Apply sufficient force to the plunger to bend the hips until the face of the plunger is 85 mm above the support plane. This force should be between 30 N and 70 N. Ensure lower limbs do not contact any surface during the test.

3. TEMPERATURE

Calibration should be carried out of a temperature between 15 °C and 30 °C.

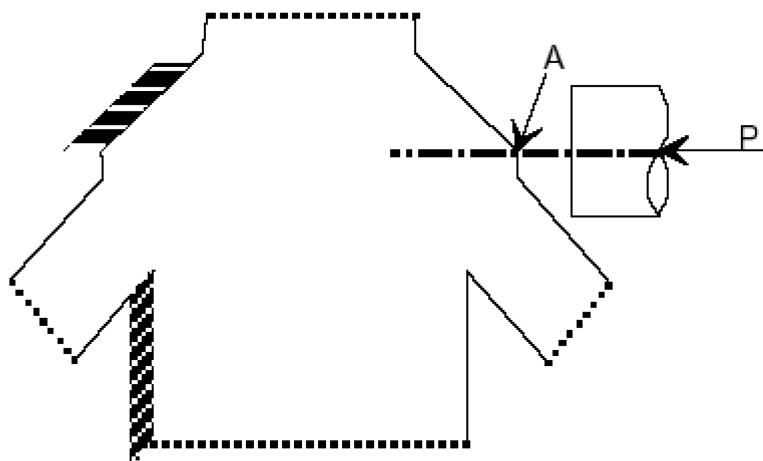


Figure 2

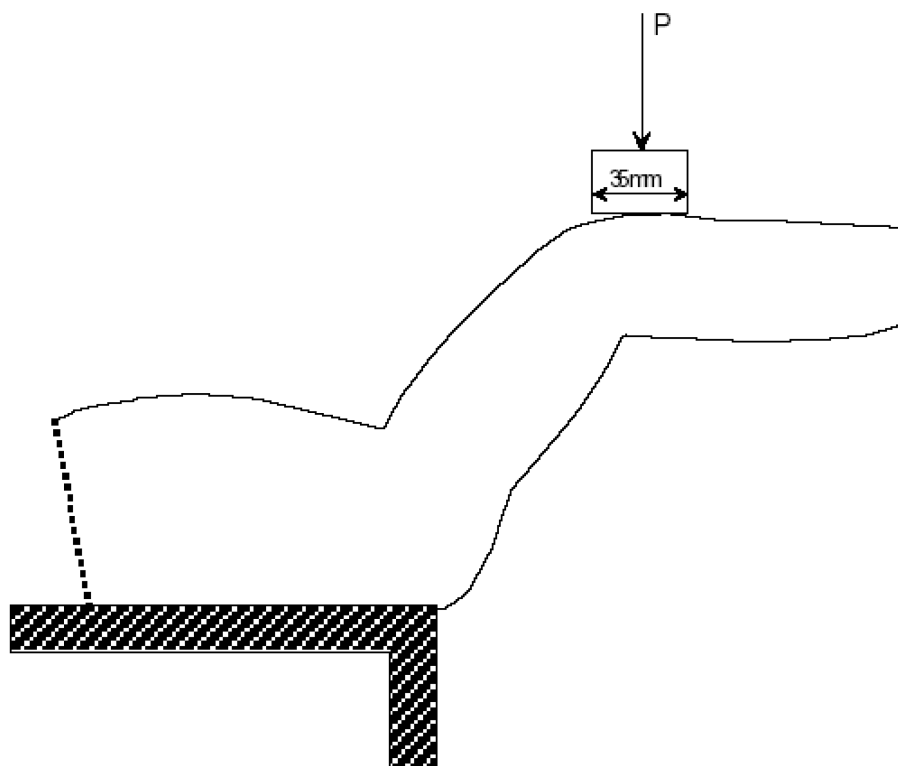


Figure 3

Appendix 3

DESCRIPTION OF THE 18 MONTHS MANIKIN

1. GENERAL

- 1.1. The dimensions and masses of the manikin are based on the anthropometry of 50th percentile child, 18 months old.

2. CONSTRUCTION

2.1. *Head*

- 2.1.1. The head consists of a semi-rigid plastic skull covered with a head skin. The skull has a cavity which allows for the mounting of (optional) instrumentation.

2.2. *Neck*

- 2.2.1. The neck consists of three parts:

- 2.2.2. A solid rubber column,

- 2.2.3. An adjustable OC joint at the top of the rubber column, allowing rotation under adjustable friction around the lateral axis.

- 2.2.4. A non-adjustable spherical joint at the base of the neck.

2.3. *Torso*

- 2.3.1. The torso consists of a plastic skeleton, covered with a flesh/skin system. The torso has a cavity in front of the skeleton and accepts a foam filling to achieve the correct stiffness of the thorax. The torso has a cavity at the back which allows for the mounting of instrumentation.

2.4. *Abdomen*

- 2.4.1. The abdomen of the dummy is a one part deformable element which is inserted into the opening between the thorax and the pelvis.

2.5. *Lumbar spine*

- 2.5.1. The lumbar spine consists of a rubber column which is mounted between the thoracic skeleton and the pelvis. The stiffness of the lumbar spine is pre-set using a metal cable which runs through the hollow core of the rubber column.

2.6. *Pelvis*

- 2.6.1. The pelvis is made of a semi-rigid plastic, and is moulded in the shape of a child's pelvis. It is covered with a flesh skin system, simulating the flesh/skin around the pelvis and buttocks.

2.7. *Hip joint*

- 2.7.1. The hip joints mount to the lower part of the pelvis. The joint allows for rotation around a lateral axis as well as rotation around an axis at a right angle to the lateral axis using a gimbal joint. Adjustable friction applies to both axes.

2.8. *Knee joint*

- 2.8.1. The knee joint allows flexion and extension of the lower leg under adjustable friction.

2.9. *Shoulder joint*

2.9.1. The shoulder joint mounts to the thoracic skeleton. Click-stops allow the positioning of the arm in two initial positions.

2.10. *Elbow joint*

2.10.1. The elbow joint allows flexion and extension of the lower arm. Click-stops allow the positioning of the lower arm in two initial positions.

2.11. *Assembly of the manikin*

2.11.1. The spine cable is mounted in the lumbar spine.

2.11.2. The lumbar spine is mounted in the skeleton between the pelvis and the thoracic spine.

2.11.3. The abdominal insert is fitted between the thorax and the pelvis.

2.11.4. The neck is mounted on the top of the thorax.

2.11.5. The head is mounted on top of the neck using the interface plate.

2.11.6. The arms and legs are mounted.

3. MAIN CHARACTERISTICS

3.1. Mass

Table 1

Mass distribution of the 18 months manikin

Component	Mass (kg)
Head+neck	2,73
Torso	5,06
Upper arm	0,27
Lower arm	0,25
Upper leg	0,61
Lower leg	0,48
Total mass	11,01

3.2. *Principal dimensions*

3.2.1. The principal dimensions, based on figure 1 of this annex (reproduced below), are given in table 2.

Table 2

No	Dimension	Value (mm)
1	Back of buttocks to front of knee	239
2	Back of buttocks to popliteus, sitting	201
3	Centre of gravity to seat	193
4	Chest circumference	474
5	Chest depth	113

Principal dimensions of manikin

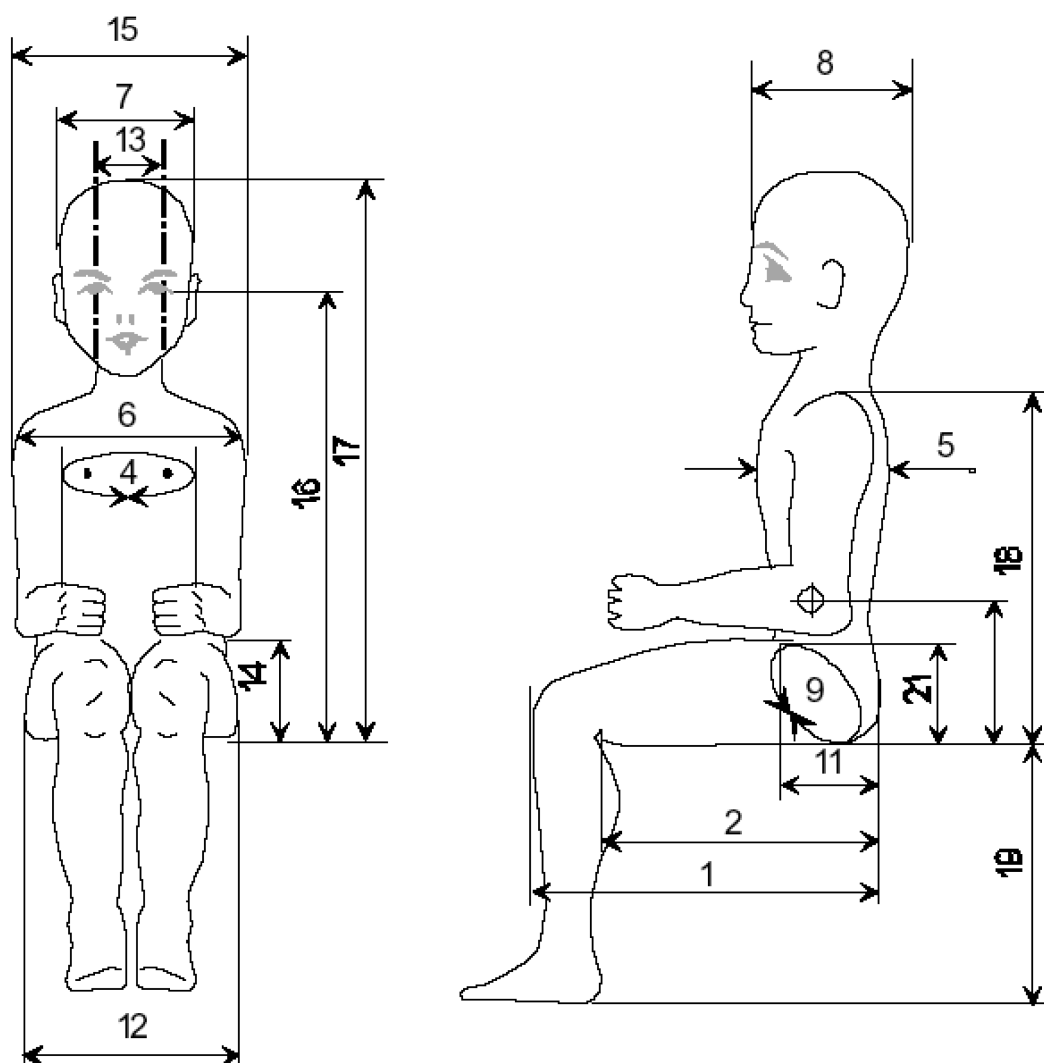


Figure 1: Principal dimensions of the 18 months manikin

No	Dimension	Value (mm)
7	Head width	124
8	Head length	160
9	Hip circumference, standing(not shown)	510
10	Hip circumference, standing(not shown)	471
11	Hip depth, sitting	125
12	Hip width, sitting	174
14	Seat to elbow	125
15	Shoulder width	224
17	Height, sitting	495 (*)
18	Shoulder height, sitting	305
19	Sole to popliteus, sitting	173
20	Stature (not shown)	820 (*)
21	Thigh height, sitting	66

(*) Manikin's buttocks, back and head resting against a vertical surface.

4. ADJUSTMENT OF JOINTS

4.1. General

- 4.1.1. In order to achieve reproducible results using the manikins, it is essential to adjust the friction in various joints, the tension in the lumbar spine, and the stiffness of the abdominal insert.

All parts must be checked for damage prior to these instructions.

4.2. Lumbar spine

- 4.2.1. The lumbar spine is calibrated before it is mounted in the dummy.

- 4.2.2. Attach the lower mounting plate of the lumbar spine to a setup such that the frontal side of the lumbar spine is located at the bottom (figure 2).

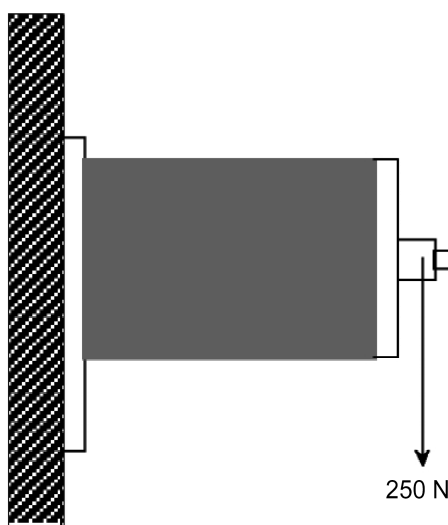


Figure 2

- 4.2.3. Apply a downward force of 250 N to the upper mounting plate. The resulting downward displacement should be recorded between 1 and 2 seconds after the onset of force application, and should be between 9 and 12 mm.

4.3. Abdomen

- 4.3.1. Mount the abdominal insert on a rigid block with the same length and width as the lumbar spine column. The thickness of this block shall be at least twice the thickness of the lumbar spine column (figure 3).

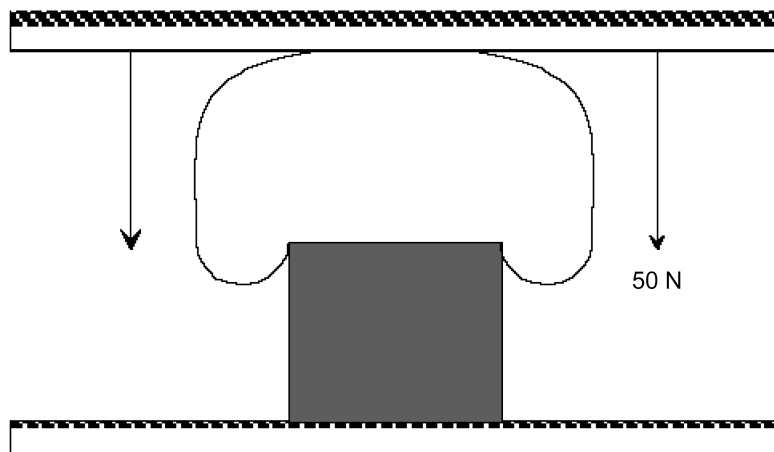


Figure 3

- 4.3.2. An initial load of 20 N shall be applied.
- 4.3.3. A constant load of 50 N shall be applied.
- 4.3.4. The deflection of the abdominal insert after two minutes shall be 12 ± 2 mm.
- 4.4. *Adjustment of the neck*
 - 4.4.1. Mount the complete neck, consisting of the rubber column, spherical base joint and OC joint against a vertical surface such that the frontal side is facing downward (figure 4).

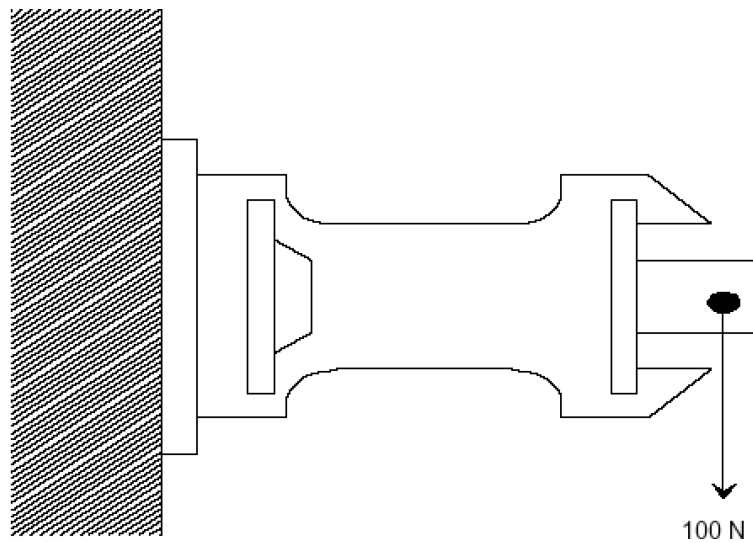


Figure 4

- 4.4.2. Apply a vertically directed force of 100 N on the axis of the OC joint. The position of the OC joint should display a downward displacement between 22 ± 2 mm
- 4.5. *OC Joint*
 - 4.5.1. Mount the complete neck and head assembly
 - 4.5.2. Place the torso on its back in a horizontal plane.
 - 4.5.3. Tighten the bolt and adjustment nut through the head and the OC joint using a torque wrench until the head is unable to move due to gravity.
- 4.6. *Hip*
 - 4.6.1. Mount the upper leg, without the lower leg, to the pelvis.
 - 4.6.2. Place the upper leg in a horizontal position.
 - 4.6.3. Increase friction exerted on the lateral axis until the leg cannot move due to gravity.
 - 4.6.4. Place the upper leg in a horizontal position, in the direction of the lateral axis.

- 4.6.5. Increase friction at the gimbal joint until the upper leg does not move due to gravity.
 - 4.7. *Knee*
 - 4.7.1. Mount the lower leg to the upper leg.
 - 4.7.2. Place the upper and lower legs in a horizontal position, with the upper leg supported.
 - 4.7.3. Tighten the adjustment nut at the knee until the lower leg cannot move due to gravity.
 - 4.8. *Shoulders*
 - 4.8.1. Extend the lower arm and place the upper arm in the highest position it will click into.
 - 4.8.2. The click-stops in the shoulder should be serviced or replaced if the arm does not remain in this position.
 - 4.9. *Elbow*
 - 4.9.1. Place the upper arm in the lowest position it will click into, and the lower arm in the upper click stop position.
 - 4.9.2. The click-stops in the elbow should be serviced or replaced if the lower arm does not remain in this position.
 - 5. INSTRUMENTATION
 - 5.1. *General*
 - 5.1.1. Although provisions have been made to equip the 18 months manikin with a number of transducers, it is standard equipped with replacements of equal size and weight.
 - 5.1.2. The calibration and measuring procedures shall be based upon the international standard ISO 6487:1980.
 - 5.2. *Installation of the accelerometer in the chest*
 - 5.2.1. The accelerometer shall be mounted in the cavity in the chest. This is done from the rear of the dummy.
 - 5.3. *Indication of abdominal penetration*
 - 5.3.1. The occurrence or absence of abdominal penetration must be assessed using high speed photography.
-

ANNEX 9

FRONTAL IMPACT TEST AGAINST A BARRIER**1. INSTALLATIONS, PROCEDURE AND MEASURING INSTRUMENTS****1.1. Testing ground**

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

1.2. Barrier

The barrier consists of a block of reinforced concrete not less than 3 m wide at the front and not less than 1,5 m high. The barrier must be of such thickness that it weighs at least 70 tonnes. The front face must be vertical, perpendicular to the axis of the run-up track, and covered with plywood boards 20 ± 1 mm thick in good condition. The barrier shall be either anchored in the ground or placed on the ground with, if necessary, additional arresting devices to limit its displacement. A barrier with different characteristics, but giving results at least equally conclusive, may likewise be used.

1.3. Propulsion of the vehicle

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

1.4. State of the vehicle

1.4.1. The vehicle under test must either be fitted with all the normal components and equipment included in its unladen service weight or be in such a condition as to fulfil this requirement in so far as the components and equipment of concern to the passenger compartment and the distribution of the service weight of the vehicle as a whole are concerned.

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

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

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

1.5. Impact velocity

The impact velocity must be 50 ± 2 km/h. However, if the test has been carried out at a higher impact velocity and the vehicle has satisfied the conditions prescribed, the test is considered satisfactory.

1.6. Measuring instruments

The instrument used to record the speed referred to in paragraph 1.5 above shall be accurate within 1 per cent.

ANNEX 10

REAR IMPACT TEST PROCEDURE

1. INSTALLATIONS, PROCEDURES AND MEASURING INSTRUMENTS

1.1. *Testing ground*

The test area shall be large enough to accommodate the propulsion system of the impactor and to permit after-impact displacement of the vehicle impacted and installation of the test equipment. The part in which vehicle impact and displacement occur shall be horizontal. (The slope shall be less than 3 per cent measured over any length of one metre.)

1.2. *Impactor*

1.2.1. The impactor shall be of steel and of rigid construction.

1.2.2. The impacting surface shall be flat and at least 2 500 mm wide and 800 mm high. Its edges shall be rounded to a radius of curvature of between 40 and 50 mm. It shall be clad with a layer of plywood 20 ± 1 mm thick.

1.2.3. At the moment of impact the following requirements shall be met:

1.2.3.1. the impacting surface shall be vertical and perpendicular to the median longitudinal plane of the impacted vehicle;

1.2.3.2. the direction of movement of the impactor shall be substantially horizontal and parallel to the median longitudinal plane of the impacted vehicle;

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

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

1.3. *Propulsion of the impactor*

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

1.4. *Special provisions applicable where a moving barrier is used*

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

1.4.2. The combined mass of carriage and impactor shall be $1\,100 \pm 20$ kg.

1.5. *Special provisions applicable where a pendulum is used*

1.5.1. The distance between the centre of the impacting surface and the axis of rotation of the pendulum shall be not less than 5 m.

1.5.2. The impactor shall be freely suspended by rigid arms, rigidly secured to it. The pendulum so constituted shall be substantially incapable of being deformed by the impact.

1.5.3. A stopping device shall be incorporated in the pendulum to prevent any secondary impact by the impactor on the test vehicle.

1.5.4. At the moment of impact, the velocity of the centre of percussion of the pendulum shall be between 30 and 32 km/h.

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

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

1.5.6. The reduced mass ' m_r ' shall be $1\,100 \pm 20$ kg.

1.6. *General provisions relating to the mass and velocity of the impactor*

If the test has been conducted at an impact velocity higher than those prescribed in paragraph 1.5.4 and/or with a mass greater than those prescribed in paragraphs 1.5.3 or 1.5.6, and the vehicle has met the requirements prescribed, the test shall be considered satisfactory.

1.7. *State of the vehicle during the test*

The vehicle being tested shall either be fitted with all the normal components and equipment included in its unladen service weight or be in such condition as to fulfil this requirement in so far as the distribution of the service weight of the vehicle as a whole is concerned.

1.8. The complete vehicle with the child restraint installed in accordance with the fitting instructions shall be placed on a hard, flat and level surface, with the handbrake off and in neutral gear. More than one child restraint may be tested in the same impact test.

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

ANNEX 11

**ADDITIONAL ANCHORAGES REQUIRED FOR ATTACHING CHILD RESTRAINTS
IN THE SEMI-UNIVERSAL CATEGORY TO MOTOR VEHICLES**

1. This annex applies only to the additional anchorages for attaching child restraints in the 'semi-universal' category or to bars or other special items used to secure child restraining devices to the bodywork, whether or not they make use of the Regulation No 14 anchorages.
2. The anchorages shall be determined by the manufacturer of the child restraint and details shall be submitted for approval to the technical service conducting the tests.

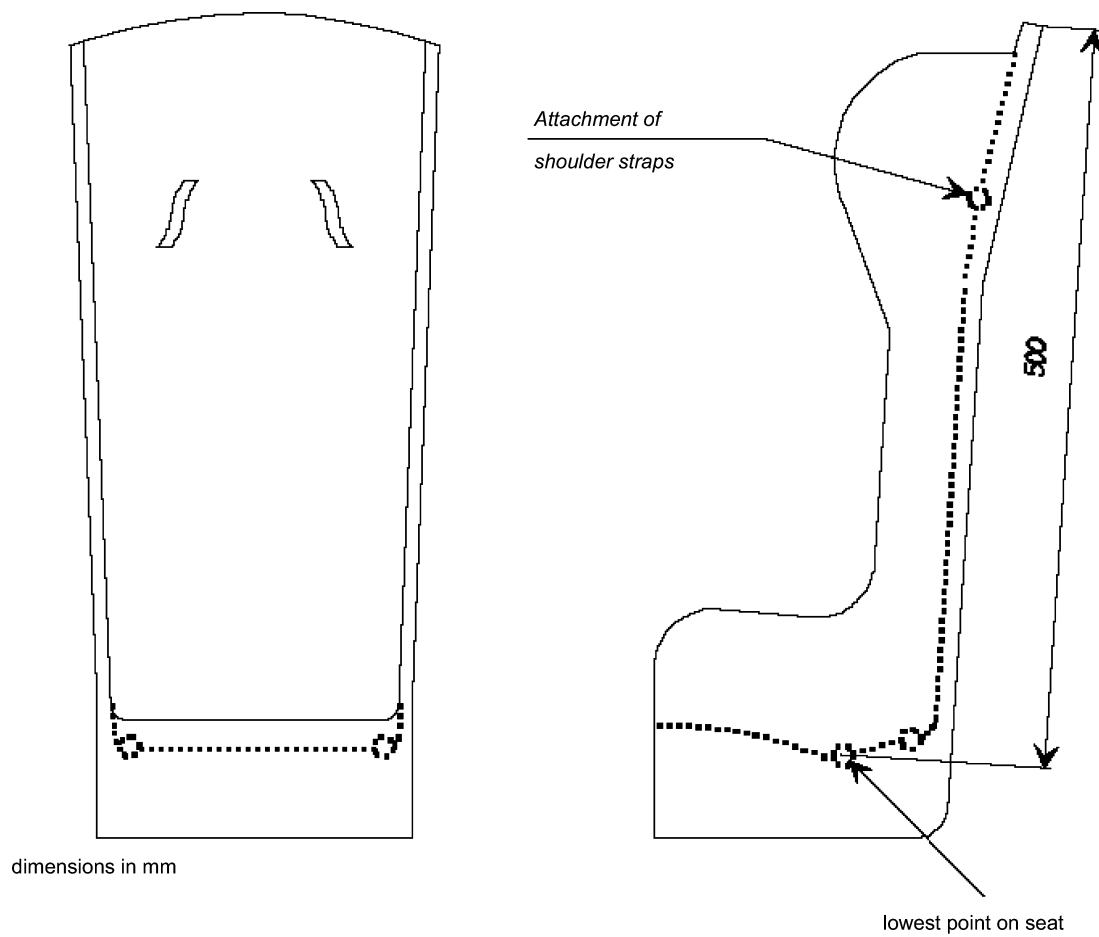
The technical services may take into account information obtained from the vehicle manufacturer.

3. The manufacturer of the child restraint shall provide the necessary parts for fitting the anchorages and a special plan for each vehicle showing their exact location.
4. The child restraint manufacturer shall indicate if the anchorages required for attaching the restraint to the car structure are in accordance with the position and strength requirements of paragraph 3 onwards in the recommendation given to Governments intending to adopt specific requirements relating to anchorages for child restraints used in passenger cars (*).

(*) See text of paragraph 1.13 and of annex 10 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) (TRANS/WP.29/78/Rev.1).

ANNEX 12

Chair



ANNEX 13

STANDARD SAFETY-BELT

1. The safety-belt for the dynamic test and for the maximum length requirement shall be made to one of the two configurations shown in Figure 1. These are a three-point retracting belt and a two-point static belt.

2. The three-point retracting belt has the following rigid parts:

a retractor (R), a pillar loop (P), two anchorage points (A1 and A2, see Figure 2) and a central part (C, see Figure 3). The retractor shall comply with the requirements of Regulation No. 16 for retraction force. The retractor spool diameter is $33 \pm 0,5$ mm.

3. The retracting belt shall be fitted to the anchorages on the test seat, described in annex 6, appendices 1 and 4, as follows:

Belt anchorage A1 shall be fitted to trolley anchorage B0 (outboard)

Belt anchorage A2 shall be fitted to trolley anchorage A (inboard)

Belt pillar loop P shall be fitted to trolley anchorage C.

Belt retractor R shall be fitted to trolley anchorage Re.

The value of X in Figure 1 below is 200 ± 5 mm. The value of P-A1 for 'universal' and 'semi-universal' restraints is $2\,220 \pm 5$ mm, measured parallel to the centreline of the strap with 150 ± 5 mm of strap on the spool of the retractor. The value of P-A1 for 'restricted' child restraints is at least $2\,220 \pm 5$ mm, measured parallel to the strap centreline with 150 ± 5 mm of strap on the spool of the retractor.

4. The strap requirements for the belt are as follows:

Material:	polyester spinnblack
— width:	48 ± 2 mm at 10 000 N
— thickness:	$1,0 \pm 0,2$ mm
— elongation:	8 ± 2 % at 10 000 N

5. The two-point static belt as shown in Figure 1 consists of two standard anchorage plates as shown in Figure 2 and a strap fulfilling the requirements of paragraph 4 above.
6. The two-point belt anchorage plates shall be fitted to trolley anchorages A and B. The value of Y in Figure 1 is $1\,300 \pm 5$ mm. This is the maximum length requirement for the approval of universal child restraints with two-point belts (see para. 6.1.9).

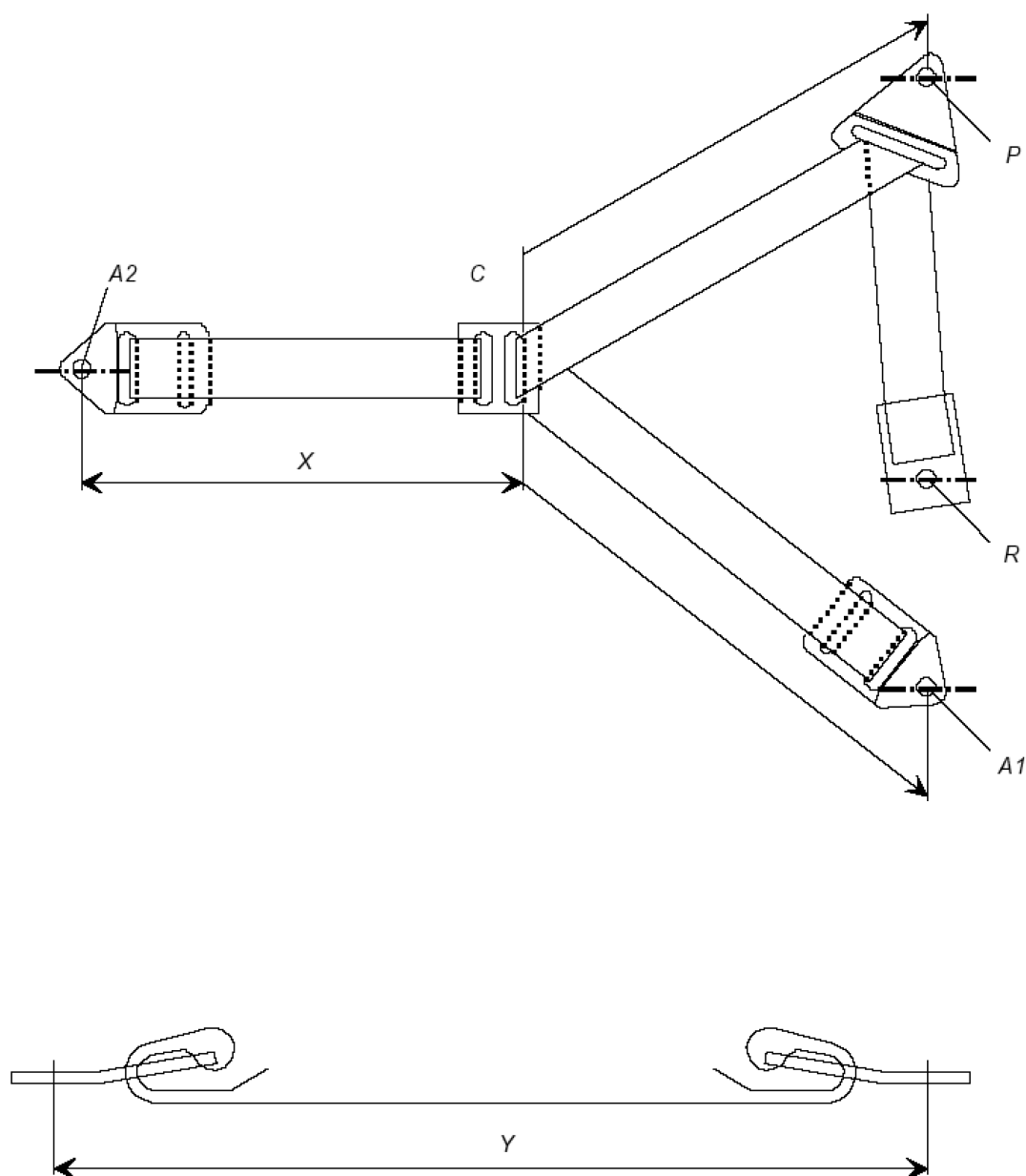


Figure 1: Standard seat belt configurations

Dimensions in mm

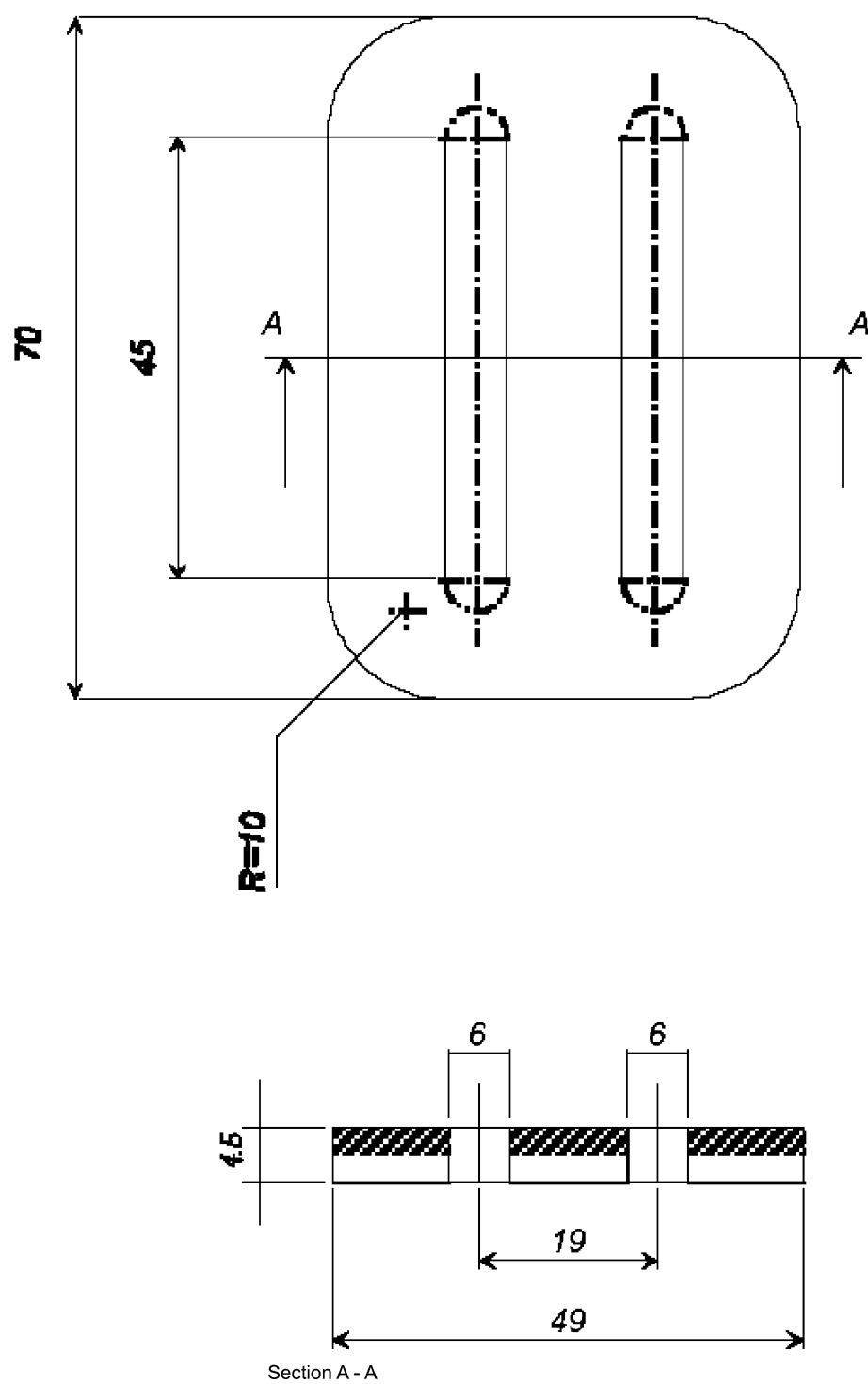


Figure 3: Central part of standard belt configuration

Finish: Chromium plated

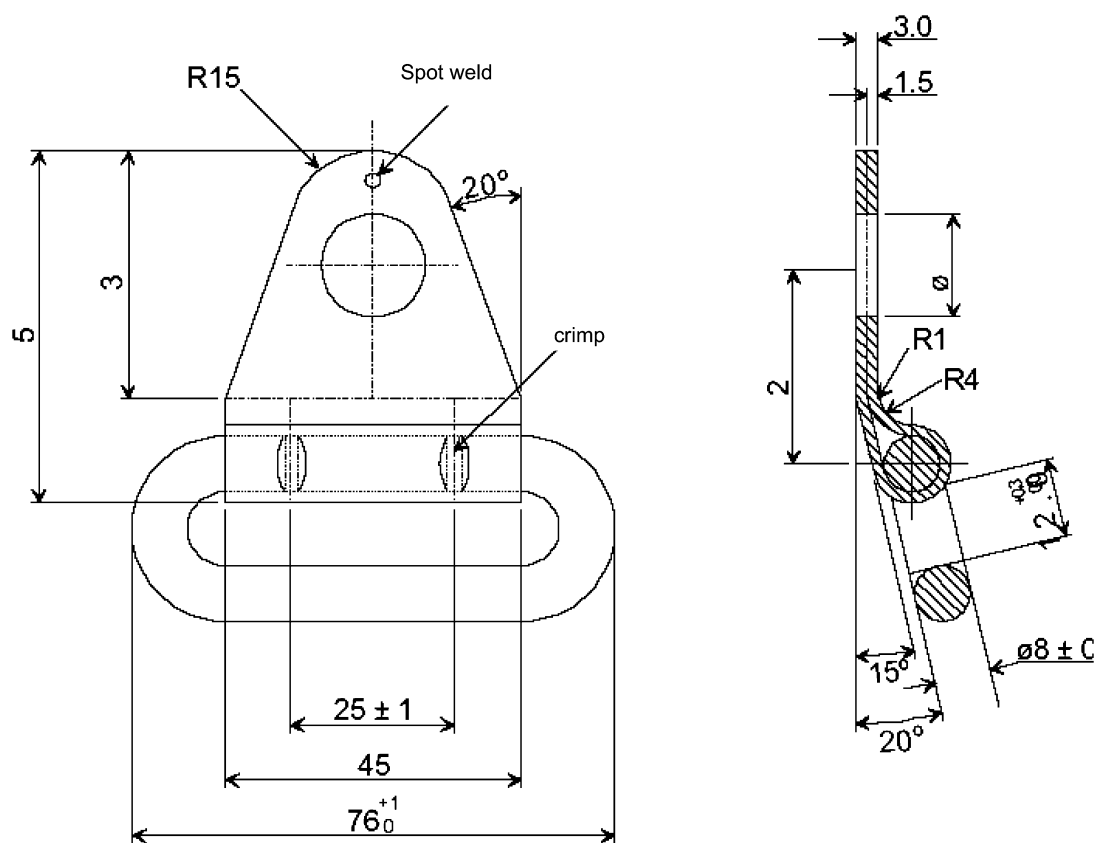


Figure 4: Pillar loop

ANNEX 14

(Not used — for the text of the former Annex 14, see Annex 8 — Appendix 2)

ANNEX 15

EXPLANATORY NOTES

They are meant as a guide for the technical services performing the tests.

- | | |
|--|--|
| Paragraph 2.10.1. | A quick adjuster can also be a device with a rotation shaft and spring similar to a retractor with a manual release. The adjuster should be tested to the requirements of paragraphs 7.2.2.5 and 7.2.3.1.3. |
| Paragraph 2.19.2. | A semi-universal restraint specified for fitting to the rear seat in both a saloon and an estate type vehicle in which the whole belt assembly is identical is one 'type'. |
| Paragraph 2.19.3. | The significance of changes in the dimensions and/or mass of the seat, padding or impact shield and the energy-absorbing characteristics or colour of the material are to be considered when deciding whether a new type has been created. |
| Paragraphs 2.19.4. and 2.19.5. | These paragraphs shall not apply to any safety belts separately approved in accordance with Regulation No 16 which is necessary to anchor the child restraint to the vehicle or to restrain the child. |
| Paragraph 6.1.2. | For rearward-facing child restraints the correct position of the top of the restraint relative to the child dummy head is ensured by installing the largest dummy, for which the device was specified, in the most reclined configuration, and making sure that a horizontal line at the eye height passes below the top of the seat. |
| Paragraph 6.1.8. | The 150 mm requirement also applies to carry cots, except if a special device is used to link the carry cot and the safety-belt. |
| Paragraph 6.2.4. | The limit of acceptable movement of the shoulder belt is that the lower edge of the shoulder portion of the standard safety-belt shall not be lower than the dummy's elbow at the point of maximum excursion of the dummy. |
| Paragraph 6.2.9. | Common understanding is that it applies also to devices that have such a lock-off even if they are not required for that group. Thus the test would be applied to a group 2 only device, but at the prescribed force, i.e. twice the mass of group 1 dummy. |
| Paragraph 7.1.2.1. and Annexes 17 and 18 | Either energy absorbing material, or the integral material of the child restraint structure can be tested for compliance with Annexes 17 and 18, where the structure is not homogeneous, or if there is likely to be varying performance over the child restraint system structure, the testing organization will determine the worst case for testing compliance. The energy absorbing material may form the whole or part of the child restraint system cover. |
| Paragraph 7.1.3. | The overturning test will be conducted using the same installation procedure and parameters as those defined for the dynamic test. |
| Paragraph 7.1.3.1. | Stopping of the rig during the overturning is not allowed. |
| Paragraph 7.1.4.2.2. | The wording of this paragraph refers to accelerations representing tensile loads in the spine of the dummy. |
| Paragraph 7.1.4.3.1. | Visible signs of penetration means penetration of the clay by the abdominal insert (under pressure from the restraint) but not bending of the clay without compression in a horizontal direction as for instance is brought about by simple bending of the spine. See also interpretation of paragraph 6.2.4. |
| Paragraph 7.2.1.5. | The first sentence is complied with if the hand of the dummy could reach the buckle. |
| Paragraph 7.2.2.1. | This shall be used to ensure that separately approved guide-straps shall be easily attached |

- Paragraph 7.2.4.1.1. Two straps are required. Measure the breaking load of the first strap. Measure the width of the second strap at 75 per cent of this load.
- Paragraph 7.2.4.4. Items which may be disassembled or unthreaded and where incorrect reassembly is probable for an untrained user and could result in a dangerous configuration shall not be allowed.
- Paragraph 8.1.2.2. 'Fastened to the seat' means the test seat as prescribed in Annex 6. 'Specific devices may' means that a 'specific' restraint would normally be tested for overturning when installed in the test seat, but that testing in the vehicle seat was allowed.
- Paragraph 8.2.2.1.1. 'Having regard to normal conditions of use' means that this test should be performed with the restraint mounted on the test or vehicle seat but without the dummy.
- The dummy shall be used only to position the adjusting device. In the first instance the straps should be adjusted in accordance with paragraphs 8.1.3.6.3.2 or 8.1.3.6.3.3 (whichever is appropriate). The test should then be conducted after removal of the dummy.
- Paragraph 8.2.5.2.6. This paragraph shall not apply to guide straps which are approved separately under this Regulation.
-

ANNEX 16

CONTROL OF CONFORMITY OF PRODUCTION

1. TESTS

Child restraint systems shall be required to demonstrate compliance with the requirements on which the following tests are based:

1.1. *Verification of the locking threshold and durability of emergency locking retractors*

According to the provisions of paragraph 8.2.4.3 in the most unfavourable direction as appropriate after having undergone the durability testing detailed in paragraphs 8.2.4.2, 8.2.4.4 and 8.2.4.5 as a requirement of paragraph 7.2.3.2.6.

1.2. *Verification of the durability of automatically locking retractors*

According to the provisions of paragraph 8.2.4.2 supplemented by the tests in paragraphs 8.2.4.4 and 8.2.4.5 as a requirement of paragraph 7.2.3.1.3.

1.3. *Test for strength of straps after conditioning*

According to the procedure described in paragraph 7.2.4.2 after conditioning according to the requirements of paragraphs 8.2.5.2.1 to 8.2.5.2.5.

1.3.1. *Test for strength of straps after abrasion*

According to the procedure described in paragraph 7.2.4.2 after conditioning according to the requirements described in paragraph 8.2.5.2.6.

1.4. *Microslip test*

According to the procedure described in paragraph 8.2.3 of this Regulation.

1.5. *Energy absorption*

According to the provisions of paragraph 7.1.2 of this Regulation.

1.6. *Verification of the performance requirements of the child restraint system when subjected to the appropriate dynamic test*

According to the provisions set out in paragraph 8.1.3 with any buckle having been pre-conditioned according to the requirements of paragraph 7.2.1.7 such that the appropriate requirements of paragraph 7.1.4 (for the overall performance of the child restraint) and paragraph 7.2.1.8.1 (for the performance of any buckle under load) are complied with.

1.7. *Temperature test*

According to the provisions of paragraph 7.1.5 of this Regulation.

2. TEST FREQUENCY AND RESULTS

2.1. The frequency of testing to the requirements of paragraphs 1.1 to 1.5 shall be on a statistically controlled and random basis in accordance with one of the regular quality assurance procedure.

2.1.1. Furthermore, in the case where emergency locking retractors are incorporated in the child restraint system, all such assemblies shall be checked:

- 2.1.1.1. either according to the provisions set out in paragraphs 8.2.4.3.1, 8.2.4.3.2, 8.2.4.3.3 and 8.2.4.3.4 of this Regulation, in the most unfavourable direction as specified in paragraph 8.2.4.3.3. Test results shall meet the requirements of paragraphs 7.2.3.2.1.1 and 7.2.3.2.4 of this Regulation,
- 2.1.1.2. or according to the provisions set out in paragraph 8.2.4.3.5 of this Regulation, in the most unfavourable direction. Nevertheless, the speed of inclination can be more than the prescribed speed in so far as it does not affect the test results. Test results shall meet the requirements of paragraph 7.2.3.2.1.4 of this Regulation.
- 2.2. For 'universal', 'restricted' and 'semi-universal' devices, the minimum frequency in order to verify compliance with the dynamic test according to paragraph 1.6 shall be 1 in 5 000 child restraint systems produced. However, in any case there shall be at least one test performed for each four weeks of production.

The requirements set out in paragraphs 7.1.4.1.4 and 7.2.1.8.1.2 of this Regulation shall be met for each test. Furthermore for one test out of two, the other requirements set out in paragraphs 7.1.4 and 7.2.1.8.1 shall be met also.

However a minimum frequency of one test per year shall be permitted where annual production is 1 000 child restraint systems or less.

In this case the requirements set out in paragraphs 7.1.4 and 7.2.1.8.1 shall be met.

- 2.3. For 'built-in' vehicle specific devices, the following test frequencies shall apply:

Child restraints, except booster cushions:	Once every 8 weeks
Booster cushions:	Once every 12 weeks

At each test all requirements according to paragraphs 7.1.4 and 7.2.1.8.1 must be fulfilled. If all tests during one year show satisfactory results, the manufacturer may, after agreement with the competent authority, reduce the frequencies as follows:

Child restraints, except booster cushions:	Once every 16 weeks
Booster cushions:	Once every 24 weeks

However, a minimum frequency of one test per year shall be permitted where annual production is 1 000 child restraint systems or less.

- 2.3.1. For vehicle-specific devices according to paragraph 2.1.2.4.1, the child restraint manufacturer may choose Conformity of Production procedures according to either paragraph 2.2, on a test seat, or paragraph 2.3, in a vehicle body shell.
- 2.4. Where a test sample fails a particular test to which it has been subjected, a further test to the same requirement shall be carried out on at least three other samples. In the case of dynamic tests if one of the latter fails the test, the holder of the approval or his duly accredited representative shall:
- 2.4.1. Notify the competent authority which has granted type approval indicating what steps have been taken to re-establish the conformity of production.
- 2.4.2. Raise the frequency to the higher one if the lower one was used according to paragraph 2.3.
- 2.5. The manufacturer must advise the competent authority on a quarterly basis, the volume of products produced against each approval number, providing a means of identifying which products correspond to that approval number.
-

ANNEX 17

TEST OF ENERGY ABSORBING MATERIAL

1. HEADFORM

- 1.1. The headform shall consist of a solid wooden hemisphere with an added smaller spherical segment as shown in Figure A below. It shall be constructed so that it can be dropped freely along the axis marked and it shall have provision for mounting an accelerometer in order to measure the acceleration along the direction of fall.
- 1.2. The headform shall have a total mass, including the accelerometer of $2,75 \pm 0,05$ kg.

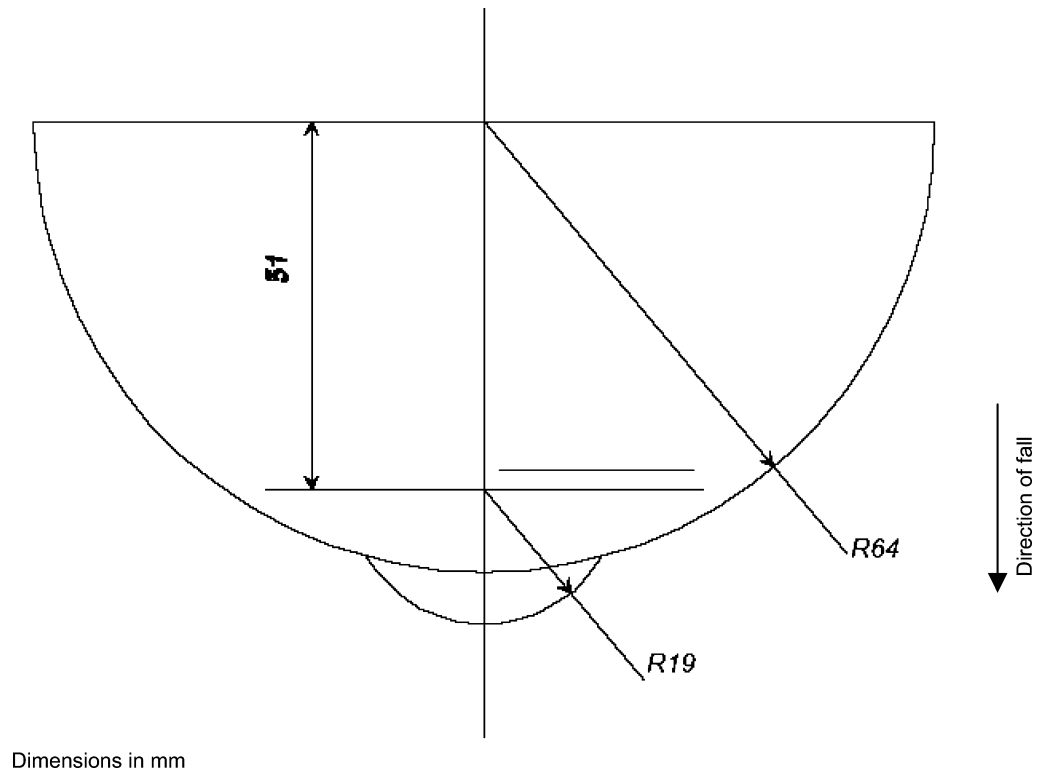


Figure A: Headform

2. INSTRUMENTATION

The acceleration shall be recorded during the test, using equipment in accordance with channel frequency class 1 000 as specified in the latest version of ISO 6487.

3. PROCEDURE

- 3.1. Take three samples of each material from one or more child restraints.
- 3.2. The sample shall be fully restrained on its outer surfaces in the region of impact and be supported directly beneath the point of impact on a smooth rigid base, for example a solid concrete plinth, such that only the energy absorbing characteristics of the material construction are measured.
- 3.3. Raise the headform to a height of $100 -0/+5$ mm from the upper surface of the sample to the lowest point on the headform, and allow it to fall. Record the acceleration experienced by the headform during impact. Repeat this procedure with the remaining samples.

ANNEX 18

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

1. Place the device on the test seat described in Annex 6. Reclinable devices shall be set in the most upright position. Place the smallest manikin in the device in accordance with the manufacturer's instructions. Mark a point 'A' on the backrest on the same horizontal level as the shoulder of the smallest manikin at a point 2 cm inside the outer edge of the arm. All internal surfaces above the horizontal plane passing through point A shall comprise special energy-absorbing material tested in accordance with Annex 17. This material shall cover the internal surfaces of the backrest and side wings, including the inner edges (zone of radius) of the side wings. The energy absorbing material may be an integral part of the child seat. In the case of carry cot devices the lower limit of area at which material complying with Annex 17 shall be used shall be all areas forward of the smaller dummy's rearward shoulder when measured with this dummy in the carry cot and the carry cot positioned on the test bench.
 2. For rearward-facing devices there shall be side wings with a depth of minimum 90 mm measured from the median of the surface of the backrest. These side wings shall start at the horizontal plane passing through point 'A' and continue to the top of the seat back. Starting from a point 90 mm below the top of the seat back, the depth of the side wing may be gradually reduced.
 3. The requirement in paragraph 2 above for a minimum size of side wings does not apply to child restraints of mass groups II and III in the specific vehicle category to be used in the luggage area according to paragraph 6.1.2 of this Regulation.
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ANNEX 19

DESCRIPTION OF CONDITIONING OF ADJUSTERS MOUNTED DIRECTLY ON CHILD RESTRAINTS

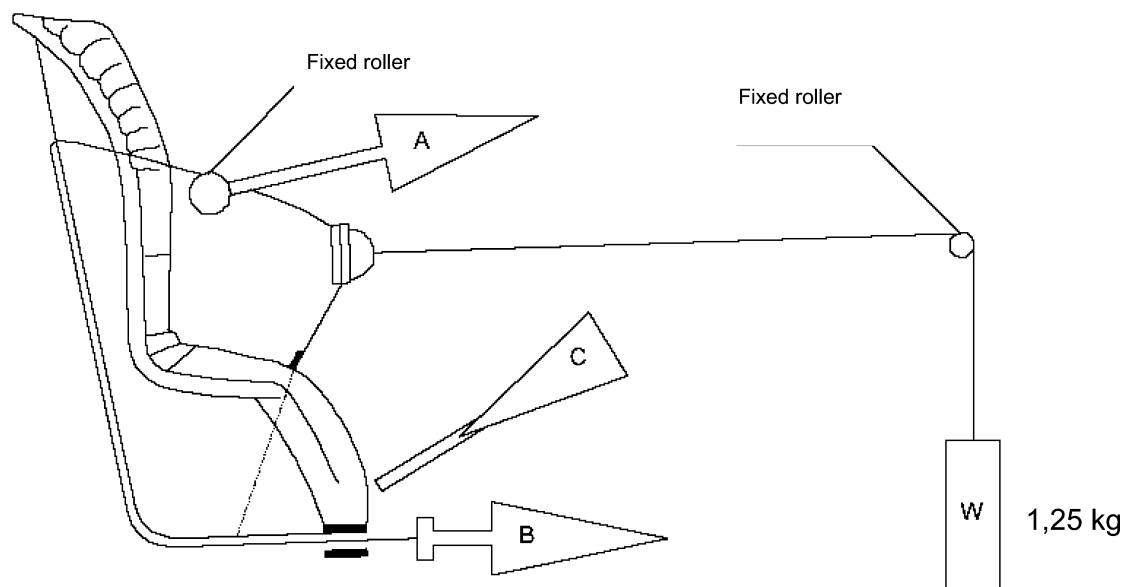


Figure 1

1. METHOD

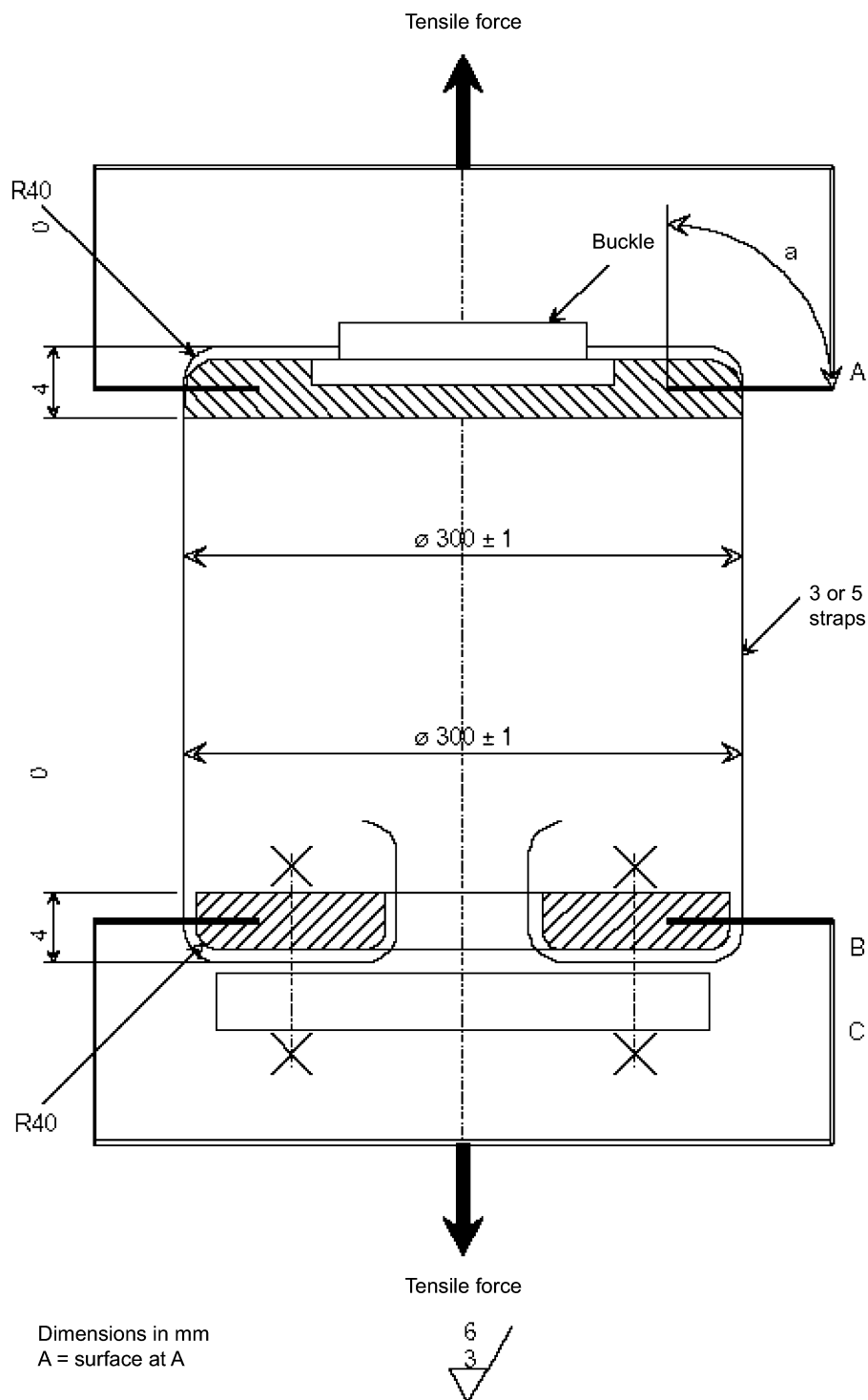
- 1.1. With the webbing set at the reference position described in paragraph 8.2.7, withdraw at least 50 mm of webbing from the integral harness by pulling on the free end of the webbing.
- 1.2. Attach the adjusted part of the integral harness to the pulling device A.
- 1.3. Activate the adjuster and pull at least 150 mm of webbing into the integral harness. This represents half of one cycle and puts pulling device A to the maximum webbing extraction position.
- 1.4. Connect free end of webbing to pulling device B.

2. THE CYCLE IS:

- 2.1. Pull B at least 150 mm whilst A exerts no tension on the integral harness.
- 2.2. Activate the adjusters and pull A whilst B exerts no tension on the free end of the webbing.
- 2.3. At the end of stroke, de-activate the adjuster.
- 2.4. Repeat cycle as specified in paragraph 7.2.2.7.

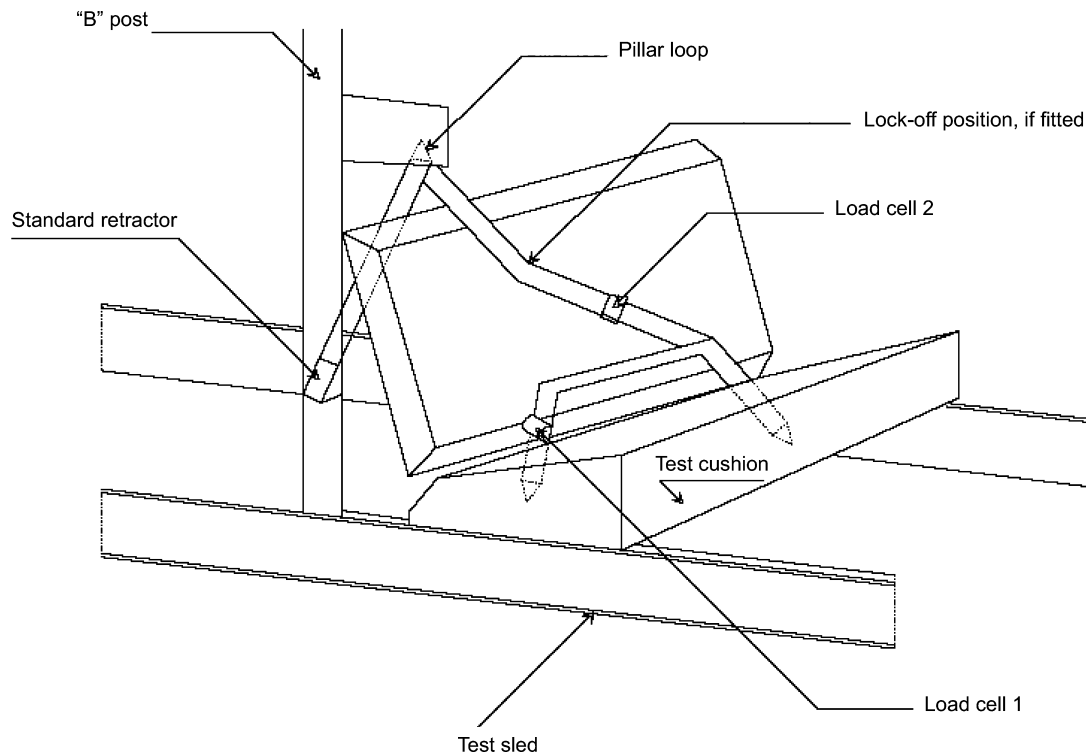
ANNEX 20

TYPICAL BUCKLE STRENGTH TEST DEVICE



ANNEX 21

DYNAMIC CRASH TEST INSTALLATION



1. METHOD

1.1. *Lap Belt Only*

Fit load cell 1 to the outboard position as shown above. Install the child restraint and tension the reference belt at the outboard position to achieve a load of $75\text{N} \pm 5\text{N}$ at the outboard position.

1.2. *Lap and Diagonal Belt*

1.2.1. Fit load cell 1 to the outboard position as shown above. Install the child restraint into the correct position. If a lock-off device is fitted to the child restraint and acts upon the diagonal belt, place load cell 2 at a convenient position behind the child restraint between the lock-off device and the buckle as shown above. If no lock-off device is fitted or if the lock-off device is fitted at the buckle, position load cell at a convenient position between the pillar loop and the child restraint.

1.2.2. Adjust the lap portion of the reference belt to achieve a tension load of $50\text{N} \pm 5\text{N}$ at load cell 1. Make a chalk mark on the webbing where it passes through the simulated buckle. Whilst maintaining the belt at this position adjust the diagonal to achieve a tension of $50\text{N} \pm 5\text{N}$ at load cell 2 by either locking the webbing at the child restraint webbing locker or by pulling the belt close to the standard retractor.

1.2.3. Extract all webbing from the retractor spool and allow the tension in the belt between the retractor and pillar loop to drop to the retractor tension. The spool shall be locked before the dynamic test. Conduct the dynamic crash test.

- 1.2.4. Before commencing the set-up, check the child restraint to determine compliance with paragraph 6.2.1.3. If there is a change in installation tension due to the change of angle function, then test for the condition which creates the slackest installation, conduct the set-up and tension in the tightest position and then reposition the child restraint to the worst case without re-tensioning the adult belt. Conduct the dynamic test.

NOTE

1. Installation is conducted after fitting the manikin into the restraint.
 2. Because the foam test cushion will compress after installation of the child restraint, the dynamic test must be conducted no more than 10 minutes after installation as possible. To allow the cushion to recover, the minimum period between two tests using the same cushion shall be 20 minutes.
 3. Load cells fitted directly onto the belt webbing may be disconnected electrically, but must be left in place during the dynamic test. The mass of each cell is not to exceed 250 grams. Alternatively the lap belt webbing load cell may be replaced by a load cell fixed at the anchorage point.
 4. In the case of restraints fitted with devices intended to increase the adult safety-belt tension, the test method shall be: Install the child restraint system as required in this annex and then apply the tensioner device as stated in the manufacturers instructions. If the device cannot be applied due to excess tension then it is deemed to be an unacceptable device.
-

ANNEX 22

LOWER TORSO BODY BLOCK TEST

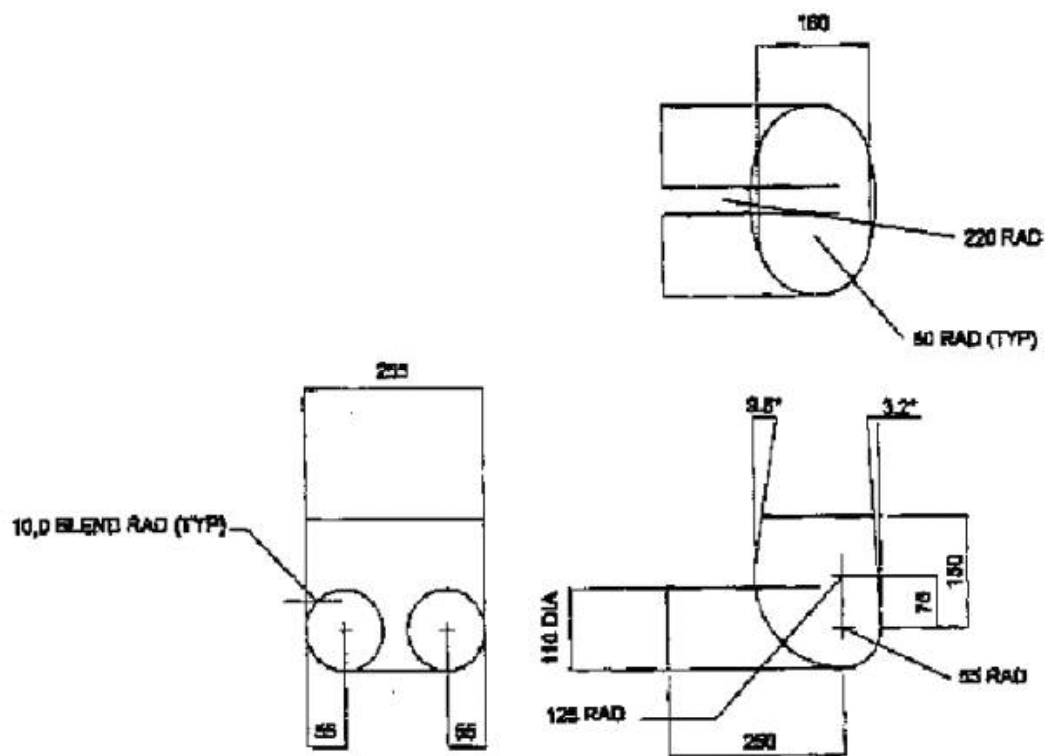


Figure 1: Truncated P10 manikin block
Material: EPS (40 to 45 g/l)

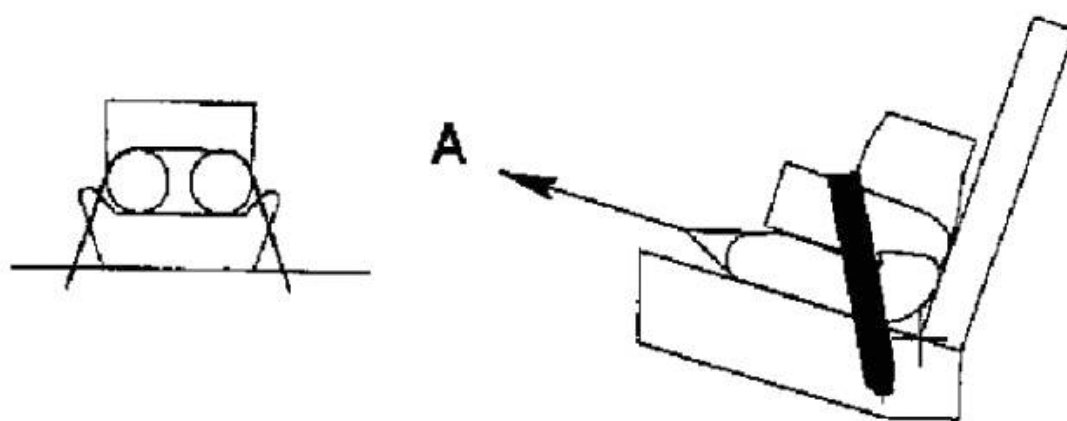


Figure 2: Booster pull test using manikin block

Regulation No 105 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of vehicles intended for the carriage of dangerous goods with regard to their specific constructional features (*)

1. SCOPE

The provisions of this Regulation apply to the construction of base vehicles of motor vehicles of category N and their trailers of categories O2, O3 and O4 ⁽¹⁾ which are intended for the transport of dangerous goods and subject to section 9.1.2 of Annex B of the European Agreement concerning the international Carriage of Dangerous Goods by Road (ADR).

2. DEFINITIONS

For the purpose of this Regulation:

- 2.1. 'Base vehicle' (hereinafter referred to as 'vehicle') means a chassis-cab vehicle, a tractor for semi-trailer, a trailer-chassis or a trailer with a self-supporting body intended for the transport of dangerous goods;
- 2.2. 'Vehicle type' means vehicles which do not differ essentially with regard to the constructional features specified in this Regulation.

3. APPLICATION FOR APPROVAL

- 3.1. The application for approval of a vehicle type with regard to its specific constructional features shall be submitted by the vehicle manufacturer or by his duly accredited representative.
- 3.2. The application for approval shall be accompanied by the undermentioned documents in triplicate and by the following particulars:
 - 3.2.1. A detailed description of the vehicle type with respect to its relevant structure, engine (compression-ignition, positive ignition), dimensions, configuration and constituent materials;
 - 3.2.2. Vehicle designation, according to paragraph 9.1.1.2 of the ADR EX/II, EX/III, AT, FL, OX);
 - 3.2.3. Drawings of the vehicle;
 - 3.2.4. The maximum technical mass (kg) of the complete vehicle.
- 3.3. A vehicle representative of the type to be approved shall be submitted to the technical service responsible for conducting the approval tests.

4. APPROVAL

- 4.1. If the vehicle submitted for approval pursuant to this Regulation meets the provisions of paragraph 5 below, approval of that vehicle type shall be granted.

(*) Incorporating:

Series 01 of amendments — date of entry into force: 13 January 2000.

Series 02 of amendments — date of entry into force: 5 December 2001.

Corrigendum 1 to series 02 of amendments — date of entry into force: 13 March 2002.

Corrigendum 2 to series 02 of amendments — date of entry into force: 13 November 2002.

Corrigendum 3 to series 02 of amendments — date of entry into force: 12 March 2003.

(¹) As defined in annex 7 to the Consolidated Resolution on the Construction of Vehicles (R.E.3) (document TRANS/WP.29/78/Rev.1/Amend.2).

- 4.2. An approval number shall be assigned to each type approved. Its first two digits (at present 02 for the Regulation in its 02 series of amendments) shall indicate the series of amendment incorporating the most recent major technical amendments made to the provisions at the time of issue of the approval. The same Contracting Party may not assign the same number to another vehicle type within the meaning of paragraph 2.2 above.
- 4.3. Notice of approval or of extension of approval of a vehicle type pursuant to this Regulation shall be communicated to the Contracting Parties by means of a form conforming to the model reproduced in annex 1 to this Regulation.
- 4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation an international approval mark consisting of:
- 4.4.1. A circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽¹⁾.
- 4.4.2. 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 4.4.1., and
- 4.4.3. An additional symbol separated from the approval number and consisting of the symbol identifying the vehicle designation in accordance with paragraph 9.1.1.2 of the ADR.
- 4.5. If the vehicle conforms to a vehicle type approved under one or more other Regulations annexed to this Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.4.1 need not be repeated; in this 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 4.4.1.
- 4.6. The approval mark shall be clearly legible and be indelible.
- 4.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 4.8. Annex 2 to this Regulation gives an example of the approval mark.

5. TECHNICAL PROVISIONS

- 5.1. Vehicles shall, depending on the vehicle designation, comply with the provisions below as assigned in the table overleaf ⁽²⁾.

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

⁽²⁾ In this Regulation, references to other ECE Regulations shall be deemed to refer also to any other international rules that apply the same technical requirements as the respective ECE Regulation. References to specific sections of the respective ECE Regulations shall be interpreted accordingly.

5.1.1. ELECTRICAL EQUIPMENT

5.1.1.1. General provisions

The electrical installation as a whole shall meet the following provisions, in accordance with the table of paragraph 5.1.

5.1.1.2. Wiring

5.1.1.2.1. The size of conductors shall be large enough to avoid overheating. Conductors shall be adequately insulated. All circuits shall be protected by fuses or automatic circuit breakers, except for the following:

- from the battery to the cold start and stopping systems of the engine
- from the battery to the alternator
- from the alternator to the fuse or circuit breaker box
- from the battery to the starter motor
- from the battery to the power control housing of the endurance braking system, if this system is electrical or electromagnetic
- from the battery to the electrical lifting mechanism for lifting the bogie axle.

The above unprotected circuits shall be as short as possible.

		Vehicle designation (according to paragraph 9.1 of the ADR)				
Technical provisions		EX/II	EX/III	AT	FL	OX
	Electrical equipment					
5.1.1.2	Wiring		X	X	X	X
5.1.1.3	Battery master switch		X		X	
5.1.1.3.1			X		X	
5.1.1.3.2			X		X	
5.1.1.3.3					X	
5.1.1.3.4			X		X	
5.1.1.4	Batteries	X	X		X	
5.1.1.5	Permanently energized circuits		X		X	
5.1.1.5.1					X	
5.1.1.5.2			X			
5.1.1.6	Electrical installation behind cab		X		X	
5.1.2	Prevention of fire risks					
5.1.2.2	Vehicle cab					
5.1.2.2.1		X	X			
5.1.2.2.2						X
5.1.2.3	Fuel tanks	X	X		X	X
5.1.2.4	Engine	X	X		X	X
5.1.2.5	Exhaust system	X	X		X	
5.1.2.6	Endurance braking system		X	X	X	X

		Vehicle designation (according to paragraph 9.1 of the ADR)				
Technical provisions		EX/II	EX/III	AT	FL	OX
5.1.2.7	Combustion heaters					
5.1.2.7.1 2 and 5		X	X	X	X	X
5.1.2.7.3 and 4					X	
5.1.2.7.6		X	X			
5.1.3	Braking equipment					
5.1.3.1	Braking equipment		X	X	X	X
5.1.3.2	Braking equipment	X				
5.1.4	Speed limitation device	X	X	X	X	X
5.1.5	Coupling devices for trailers	X	X			

5.1.1.2.2. Cables shall be securely fastened and positioned in such a way that the conductors are adequately protected against mechanical and thermal stresses.

5.1.1.3. Battery master switch

5.1.1.3.1. A switch for breaking the electrical circuits shall be placed as close to the battery as practicable.

5.1.1.3.2. A control device to facilitate the disconnecting and the reconnecting functions of the switch shall be installed in the driver's cab. It shall be readily accessible to the driver and distinctively marked. It shall be protected against inadvertent operation by either adding a protective cover, by using a dual movement control device, or by other suitable means. Additional control devices may be installed provided they are distinctively marked and protected against inadvertent operation.

5.1.1.3.3. The switch shall have a casing with protection degree IP65 in accordance with IEC Standard 529.

5.1.1.3.4. The cable connections on the switch shall have protection degree IP54. However, this does not apply if these connections are contained in a housing which may be the battery box. In this case it is sufficient to insulate the connections against short circuits, for example with a rubber cap.

5.1.1.4. Batteries

The battery terminals shall be electrically insulated or covered by the insulating battery box cover. If the batteries are not located under the engine bonnet, they shall be fitted in a vented box.

5.1.1.5. Permanently energized circuits

5.1.1.5.1. Those parts of the electrical installation, including the leads which shall remain energized when the battery master-switch is open, shall be suitable for use in hazardous areas. Such equipment shall meet the appropriate requirements of IEC 60079 ⁽¹⁾, parts 0 and 14 and the additional requirements applicable of IEC parts 1, 2, 5, 6, 7, 11, 15 or 18 ⁽²⁾.

For the application of IEC 60079 part 14 ⁽²⁾, the following classification shall be used:

Permanently energized electrical equipment including the leads that are not subject to paragraphs 5.1.1.3 and 5.1.1.4 shall meet the requirements for zone 1 for electrical equipment in general or meet the requirements for zone 2 for electrical equipment situated in the driver's cab. The requirements for explosion group IIC, temperature class T6, shall be met.

⁽¹⁾ The requirements of IEC 60079 part 14 do not take precedence over the requirements of this Regulation.

⁽²⁾ As an alternative, the general requirements of EN 50014 and the additional requirements of EN 50015, 50016, 50017, 50018, 50019, 50020, or 50028 may be used.

However, for permanently energized electrical equipment installed in an environment where the temperature caused by non-electrical equipment situated in that environment exceeds the T6 temperature limit, the temperature classification of the permanently energized electrical equipment shall be at least that of the T4 temperature class.

5.1.1.5.2. Bypass connections to the battery master switch for electrical equipment which must remain energized when the battery master switch is open shall be protected against overheating by suitable means, such as a fuse, a circuit breaker or a safety barrier (current limiter).

5.1.1.6. Provisions concerning that part of the electrical installation situated to the rear of the driver's cab

The whole installation shall be so designed, constructed and protected such that it cannot provoke any ignition or short-circuit under normal conditions of vehicle use and that these risks can be minimized in the event of an impact or deformation. In particular:

5.1.1.6.1. Wiring

The wiring located to the rear of the driver's cab shall be protected against impact, abrasion and chafing during normal vehicle operation. Examples of appropriate protection are given in the figures 1, 2, 3 and 4 below. However, the sensor cables of antilock braking devices do not need additional protection.

5.1.1.6.2. Lighting

Lamp bulbs with a screw cap shall not be used.

5.1.1.6.3. Electrical lifting mechanism

The electrical equipment of the mechanism for lifting a bogie axle shall be installed outside the chassis frame in a sealed housing.

5.1.2. PREVENTION OF FIRE RISKS

5.1.2.1. General provisions

The following technical provisions shall apply in accordance with the table of paragraph 5.1.

FIGURES

Figure No 1

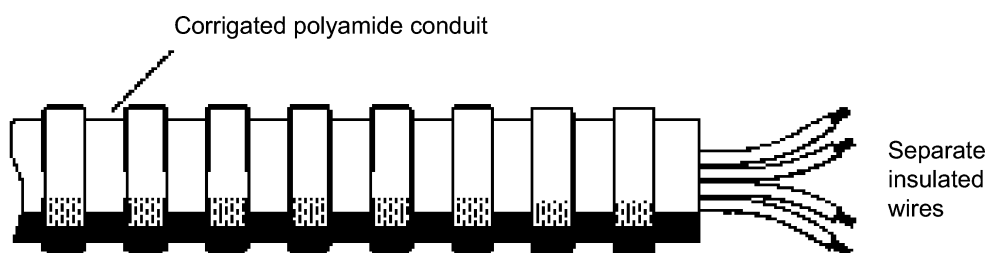


Figure No 2

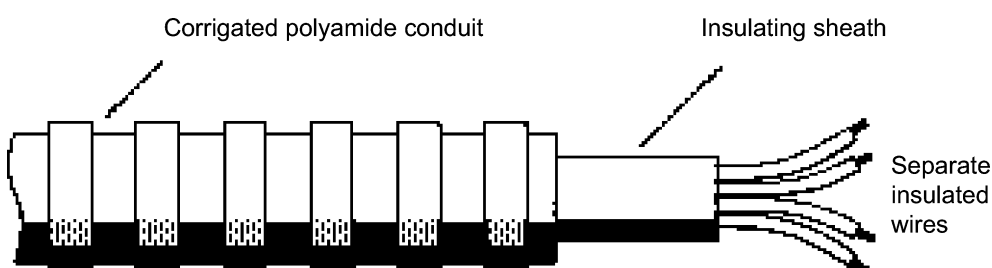


Figure No 3

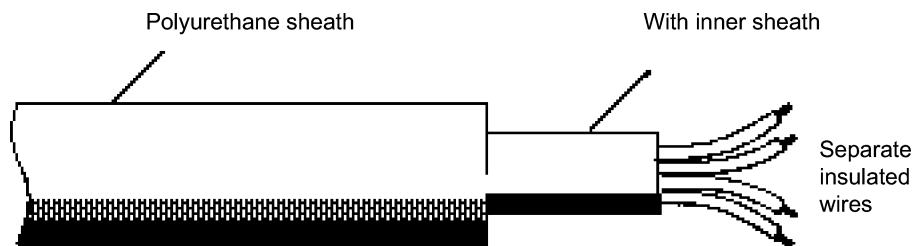
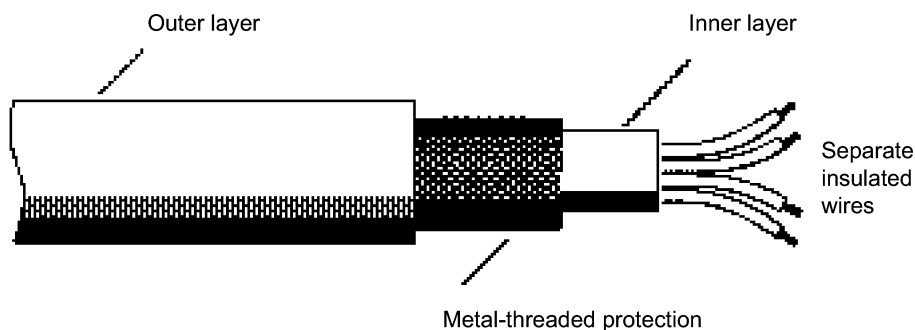


Figure No 4



5.1.2.2. Vehicle cab

5.1.2.2.1. Only material not readily flammable shall be used in the construction of the driver's cab. This provision will be deemed to be met if, in accordance with the procedure specified in ISO standard 3795:1989, samples of the following cab components have a burn rate not exceeding 100 mm/min: seat cushions, seat backs, safety belts, head lining, opening roofs, arm rests, all trim panels including door, front, rear and side panels, compartment shelves, head restraints, floor coverings, sun visors, curtains, shades, wheel housing covers, engine compartment covers, mattress covers and any other interior materials, including padding and crash-deployed elements, that are designed to absorb energy on contact by occupants in the event of a crash.

5.1.2.2.2. Unless the driver's cab is made of materials which are not readily flammable, a shield made of metal or other suitable material of the same width as the tank shall be fitted at the rear of the cab. Any window in the rear of the cab or in the shield shall be hermetically closed and made of fire resistant safety glass with fire resistant frames. Furthermore, there shall be a clear space of not less than 15 cm between the tank and the cab or the shield.

5.1.2.3. Fuel tanks

The fuel tanks for supplying the engine of the vehicle shall meet the following requirements:

5.1.2.3.1. In the event of any leakage, the fuel shall drain to the ground without coming into contact with hot parts of the vehicle or the load;

5.1.2.3.2. Fuel tanks containing petrol shall be equipped with an effective flame trap at the filler opening or with a closure with which the opening can be kept hermetically sealed.

5.1.2.4. Engine

The engine propelling the vehicle shall be so equipped and situated to avoid any danger to the load through heating or ignition. In the case of EX/II and EX/III vehicles the engine shall be of compression-ignition construction.

5.1.2.5. Exhaust system

The exhaust system as well as the exhaust pipes shall be so directed or protected to avoid any danger to the load through heating or ignition. Parts of the exhaust system situated directly below the fuel tank (diesel) shall have a clearance of at least 100 mm or be protected by a thermal shield.

5.1.2.6. Vehicle endurance braking

Vehicles equipped with endurance braking systems emitting high temperatures placed behind the rear wall of the driver's cab shall be equipped with a thermal shield securely fixed and located between this system and the tank or load so as to avoid any heating, even local, of the tank shell or the load. In addition, the thermal shield shall protect the braking system against any outflow or leakage, even accidental, of the load. For instance, a protection including a twin-shell shield shall be considered satisfactory.

5.1.2.7. Combustion heaters

5.1.2.7.1. (Reserved)

5.1.2.7.2. The combustion heaters and their exhaust gas routing shall be designed, located, protected or covered so as to prevent any risk of unacceptable heating or ignition of the load. This requirement shall be considered as fulfilled if the fuel tank and the exhaust system of the appliance conform to provisions similar to those prescribed for fuel tanks and exhaust systems of vehicles in paragraphs 5.1.2.3 and 5.1.2.5 respectively.

5.1.2.7.3. The combustion heaters shall be put out of operation by at least the following methods:

- (a) Intentional manual switching off from the driver's cabin;
- (b) Unintentional stopping of the vehicle engine; in this case the heating device may be restarted manually by the driver;
- (c) Start up of a feed pump on the motor vehicle for the dangerous goods carried.

5.1.2.7.4. Afterrunning is permitted after the combustion heaters have been put out of operation. For the methods of paragraphs 5.1.2.7.3 (b) and (c) above the supply of combustion air shall be interrupted by suitable measures after an afterrunning cycle of not more than 40 seconds.

Only heaters shall be used for which proof has been furnished that the heat exchanger is resistant to the reduced afterrunning cycle of 40 seconds for the time of their normal use.

5.1.2.7.5. The combustion heater shall be switched on manually. Programming devices shall be prohibited.

5.1.2.7.6. Combustion heaters with gaseous fuels are not permitted.

5.1.3. BRAKING EQUIPMENT

Vehicles subject to the requirements of marginal 10 221 of ADR shall fulfil all the relevant requirements of Regulation No 13 (including those of annex 5) as amended in accordance with the dates of application specified therein.

5.1.3.1. EX/III, AT, FL, and OX vehicles shall fulfil all relevant requirements of Regulation No 13 including those of annex 5.

- 5.1.3.2. EX/II vehicles shall fulfil all relevant requirements of Regulation No. 13. Nevertheless, the requirements of annex 5 are not applicable.

5.1.4. SPEED LIMITATION

Power driven vehicles (rigid vehicles and tractors for semitrailers) with a maximum mass exceeding 12 tonnes, shall be equipped with a speed limitation device according to the technical requirements of Regulation No. 89. The device shall be set in such a way that the speed cannot exceed 90 km/h, bearing in mind the technological tolerance of the device.

5.1.5. COUPLING DEVICES FOR TRAILER

Coupling devices for trailers shall comply with the technical requirements of Regulation No. 55 as amended in accordance with the dates of application specified therein.

6. **MODIFICATION OF THE VEHICLE TYPE AND EXTENSION OF APPROVAL**

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

- 6.1.1. 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

- 6.1.2. Require a further test report from the technical service responsible for conducting the tests.

- 6.2. Confirmation or refusal of approval, specifying the alteration, shall be communicated by the procedure specified in paragraph 4.3 to the Contracting Parties.

- 6.3. The competent authority issuing an extension of approval shall assign a series number to each communication form drawn up for such an extension and inform thereof the other Parties by means of a communication form conforming to the model in annex 1 to this Regulation.

7. **CONFORMITY OF PRODUCTION**

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

- 7.1. Vehicles approved to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraph 5 above.

- 7.2. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production facility. The normal frequency of these verifications shall be once per two years.

8. **PENALTIES FOR NON-CONFORMITY OF PRODUCTION**

- 8.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 7. above is not complied with.

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

9. **PRODUCTION DEFINITELY DISCONTINUED**

If the holder of the approval completely ceases to manufacture a type of vehicle under this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation.

10. **TRANSITIONAL PROVISIONS**

10.1. As from the official date of entry into force of the 02 series of amendments, no Contracting Party applying this Regulation shall refuse to grant ECE approval under this Regulation as amended by the 02 series of amendments.

10.2. Contracting Parties applying this Regulation shall continue to grant approvals and extensions to such approvals to types of vehicles which comply with the requirements of this Regulation as amended by the preceding series of amendments until 31 December 2002.

10.3. As from 1 January 2003 Contracting Parties applying this Regulation shall grant ECE approvals and extensions of such approvals only if the vehicle type to be approved meets the requirements of this Regulation as amended by the 02 series of amendments.

10.4. No Contracting Party applying this Regulation shall refuse national type approval of a vehicle type approved to the 02 series of amendments to this Regulation.

10.5. Until 31 December 2002 no Contracting Party applying this Regulation shall refuse national type approval of a vehicle type approved to the preceding series of amendments to this Regulation.

10.6. As from 1 January 2003 Contracting Parties applying this Regulation may refuse first national registration (first entry into service) of a vehicle which does not meet the requirements.

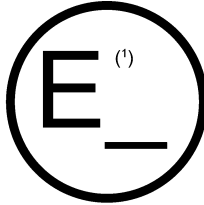
11. **NAMES AND ADDRESSES OF TECHNICAL SERVICES CONDUCTING APPROVAL TESTS, AND ADMINISTRATIVE DEPARTMENTS**

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

ANNEX I

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by:

Name of administration:

.....

concerning ⁽²⁾:

APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a vehicle type with regard to specific constructional features for the transport of dangerous goods.

Approval No.:

Extension No.:

1. Trade name or mark of the vehicle:
2. Vehicle category: N1, N2, N3, O2, O3, or O4:
(chassis-cab, tractor for semi-trailer, trailer-chassis, trailer with a self-supporting body ⁽²⁾).
3. Vehicle type:
4. Vehicle designation (EX/II, EX/III, FL, OX, AT):
5. Manufacturer's name and address:
6. If applicable, name and address of manufacturer's representative:
7. Mass of the vehicle:
- 7.1. Technical maximum mass of complete vehicle:
8. Specific equipment of the vehicle:
- 8.1. The vehicle is/is not ⁽²⁾ equipped with specific electrical devices.
Summary description:
- 8.2. The vehicle is/is not ⁽²⁾ equipped with devices for the prevention of fire risks.
Summary description:
- 8.3. In the case of a motor vehicle:
- 8.3.1. Type of engine: positive-ignition, compression-ignition ⁽²⁾
9. Vehicle submitted for approval on:
10. Technical service responsible for carrying out approval inspections:
11. Date of report issued by that service:
12. Number of report issued by that service:
13. Approval granted/refused/extended/withdrawn:
14. Position of approval mark on the vehicle:
15. Place:
16. Date:
17. Signature:

⁽¹⁾ Distinguishing number of the country which has granted/extended/refused or withdrawn approval (see footnote 1 to paragraph 4.4.1).

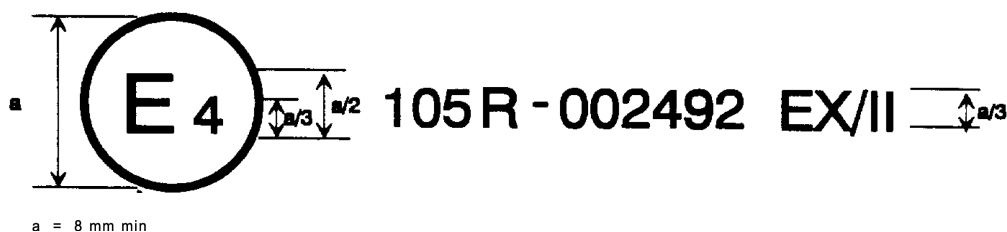
⁽²⁾ Strike out what does not apply.

ANNEX II

ARRANGEMENT OF APPROVAL MARKS

MODEL A

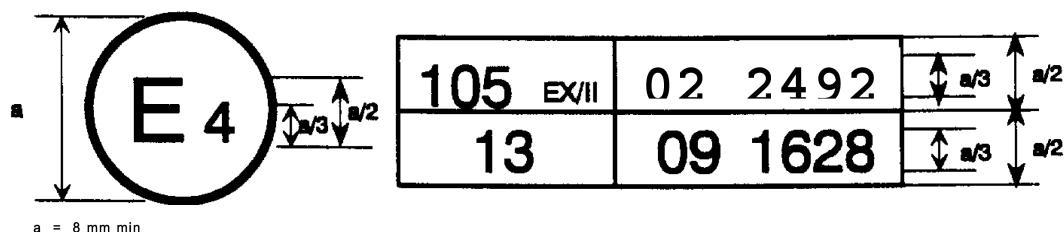
(see paragraph 4.4 of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned, intended for the transport of dangerous goods, has been approved in the Netherlands (E4), pursuant to Regulation No 105, under the approval number 002492 and designated EX/II (according to marginal 220 301(2) of the ADR). The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of Regulation No 105, as amended by the 02 series of amendments.

MODEL B

(see paragraph 4.5 of this Regulation)



The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E4) pursuant to Regulations Nos 105 and 13 ⁽¹⁾. The first two digits of the approval numbers indicate that, at the dates when respective approvals were granted, Regulation No 105 included the 02 series of amendments, while Regulation No 13 already included the 09 series of amendments.

⁽¹⁾ The second Regulation number is given merely as an example.

Regulation No 112 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of motor vehicle headlamps emitting an asymmetrical passing beam or a driving beam or both and equipped with filament lamps (*)

A. ADMINISTRATIVE PROVISIONS

0. SCOPE (1)

This Regulation applies to motor vehicle headlamps emitting an asymmetrical passing beam and/or driving beam, which may incorporate lenses of glass or plastic material and which are equipped with replaceable filament lamps.

1. DEFINITIONS

For the purpose of this Regulation,

- 1.1. 'Lens' means the outermost component of the headlamp (unit) which transmits light through the illuminating surface;
- 1.2. 'Coating' means any product or products applied in one or more layers to the outer face of a lens;
- 1.3. Headlamps of different 'types' mean headlamps which differ in such essential respects as:
 - 1.3.1. the trade name or mark;
 - 1.3.2. the characteristics of the optical system;
 - 1.3.3. the inclusion or elimination of components capable of altering the optical effects by reflection, refraction, absorption and/or deformation during operation.
 - 1.3.4. suitability for right-hand or left-hand traffic or for both traffic systems;
 - 1.3.5. the kind of beam produced (passing beam, driving beam or both);
 - 1.3.6. the materials constituting the lenses and coating, if any;
 - 1.3.7. The category of filament lamp used.
- 1.4. Headlamps of different 'Classes' (A or B) mean headlamps identified by particular photometric provisions.
- 1.5. The definitions given in Regulation No 48 and its series of amendments in force at the time of application for type approval shall apply to this Regulation.

2. APPLICATION FOR APPROVAL OF A HEADLAMP

- 2.1. The application for approval shall be submitted by the owner of the trade name or mark or by his duly accredited representative. It shall specify:

(*) Incorporating:

Supplement 1 to the original version of the Regulation — Date of entry into force: 11 August 2002.

Supplement 2 to the original version of the Regulation — Date of entry into force: 10 December 2002.

Supplement 3 to the original version of the Regulation — Date of entry into force: 30 October 2003.

(1) Nothing in this Regulation shall prevent a Party to the Agreement applying this Regulation from prohibiting the combination of a headlamp incorporating a lens of plastic material approved under this Regulation with a mechanical headlamp-cleaning device (with wipers).

- 2.1.1. whether the headlamp is intended to provide both a passing beam and a driving beam or only one of these beams;
- 2.1.2. whether, if the headlamp is intended to provide a passing beam, it is designed for both left-hand and right-hand traffic or for either left-hand or right-hand traffic only;
- 2.1.3. if the headlamp is equipped with an adjustable reflector, the mounting position(s) of the headlamp in relation to the ground and the longitudinal median plane of the vehicle;
- 2.1.4. whether it concerns a Class A or B headlamp;
- 2.1.5. the category of the filament lamp(s) used, as listed in Regulation No 37.
- 2.2. Every application for approval shall be accompanied by:
 - 2.2.1. drawings in triplicate in sufficient detail to permit identification of the type and representing a frontal view of the headlamp, with details of lens ribbing if any, and the cross-section; the drawings shall indicate the space reserved for the approval mark;
 - 2.2.1.1. if the headlamp is equipped with an adjustable reflector, an indication of the mounting position(s) of the headlamp in relation to the ground and the longitudinal median plane of the vehicle, if the headlamp is for use in that (those) position(s) only;
 - 2.2.2. a brief technical description including, in the case where headlamps are used to produce bend lighting, the extreme positions according to paragraph 6.2.9. below;
 - 2.2.3. two samples of the type of headlamp.
 - 2.2.4. For the test of plastic material of which the lenses are made:
 - 2.2.4.1. thirteen lenses;
 - 2.2.4.1.1. six of these lenses may be replaced by six samples of material at least 60 × 80 mm in size, having a flat or convex outer surface and a substantially flat area (radius of curvature not less than 300 mm) in the middle measuring at least 15 × 15 mm;
 - 2.2.4.1.2. every such lens or sample of material shall be produced by the method to be used in mass production;
 - 2.2.4.2. a reflector to which the lenses can be fitted in accordance with the manufacturer's instructions.
- 2.3. The materials making up the lenses and coatings, if any, shall be accompanied by the test report of the characteristics of these materials and coatings if they have already been tested.
- 3. MARKINGS ⁽¹⁾
 - 3.1. Headlamps submitted for approval shall bear the trade name or mark of the applicant.
 - 3.2. They shall comprise, on the lens and on the main body ⁽²⁾, spaces of sufficient size for the approval mark and the additional symbols referred to in paragraph 4; these spaces shall be indicated on the drawings referred to in paragraph 2.2.1 above.

⁽¹⁾ In the case of headlamps designed to meet the requirements of traffic moving on one side of the road only (either right or left), it is further recommended that the area which can be occulted to prevent discomfort to users in a country where traffic moves on the side of the road opposite to that of the country for which the headlamp was designed should be outlined indelibly on the front lens. This marking is not necessary, however, where the area is clearly apparent from the design.

⁽²⁾ If the lens cannot be detached from the main body of the headlamp, a unique marking as per paragraph 4.2.5 shall be sufficient.

- 3.3. Headlamps designed to satisfy the requirements both of right-hand and of left-hand traffic shall bear markings indicating the two settings of the optical unit on the vehicle or of the filament lamp on the reflector; these markings shall consist of the letters 'R/D' for the position for right-hand traffic and the letters 'L/G' for the position for left-hand traffic.

4. APPROVAL

4.1. **General**

- 4.1.1. If all the samples of a type of headlamp submitted pursuant to paragraph 2 above satisfy the provisions of this Regulation, approval shall be granted.
- 4.1.2. Where grouped, combined or reciprocally incorporated lamps satisfy the requirements of more than one Regulation, a single international approval mark may be affixed provided that each of the grouped, combined or reciprocally incorporated lamps satisfies the provisions applicable to it.
- 4.1.3. An approval number shall be assigned to each type approved. Its first two digits (at present 00) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of headlamp covered by this Regulation.
- 4.1.4. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a type of headlamp pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation, by means of a form conforming to the model in annex 1 to this Regulation, with the indications according to paragraph 2.2.1.1.
- 4.1.4.1. if the headlamp is equipped with an adjustable reflector and if this headlamp is to be used only in mounting positions according to the indications in paragraph 2.2.1.1 the applicant shall be obliged by approval to inform the user in a proper way about the correct mounting position(s).
- 4.1.5. In addition to the mark prescribed in paragraph 3.1, an approval mark as described in paragraphs 4.2 and 4.3 below shall be affixed in the spaces referred to in paragraph 3.2 above to every headlamp conforming to a type approved under this Regulation.

4.2. **Composition of the approval mark**

The approval mark shall consist of:

- 4.2.1. An international approval marking, comprising:
- 4.2.1.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽¹⁾;
- 4.2.1.2. the approval number prescribed in paragraph 4.1.3 above;

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

- 4.2.2. the following additional symbol (or symbols):
- 4.2.2.1. on headlamps meeting left-hand traffic requirements only, a horizontal arrow pointing to the right of an observer facing the headlamp, i.e. to the side of the road on which the traffic moves;
 - 4.2.2.2. on headlamps designed to meet the requirements of both traffic systems by means of an appropriate adjustment of the setting of the optical unit or the filament lamp, a horizontal arrow with a head on each end, the heads pointing respectively to the left and to the right;
 - 4.2.2.3. on headlamps meeting the requirements of this Regulation in respect of the passing beam only, the letters 'C' for Class A headlamp or 'HC' for Class B headlamp;
 - 4.2.2.4. on headlamps meeting the requirements of this Regulation in respect of the driving beam only, the letters 'R' for Class A headlamp or 'HR' for Class B headlamp;
 - 4.2.2.5. on headlamps meeting the requirements of this Regulation in respect of both the passing beam and the driving beam, the letters 'CR' for Class A headlamp or 'HCR' for Class B headlamp;
 - 4.2.2.6. on headlamps incorporating a lens of plastic material, the group of letters 'PL' to be affixed near the symbols prescribed in paragraphs 4.2.2.3 to 4.2.2.5 above;
 - 4.2.2.7. on headlamps meeting the requirements of this Regulation in respect of the driving beam, an indication of the maximum luminous intensity expressed by a reference mark, as defined in paragraph 6.3.2.1.2 below, placed near the circle surrounding the letter 'E';

In the case of grouped or reciprocally incorporated driving beam headlamps, indication of the maximum luminous intensity of the driving beams as a whole shall be expressed as above.

- 4.2.3. In every case the relevant operating mode used during the test procedure according to paragraph 1.1.1.1 of annex 4 and the permitted voltage(s) according to paragraph 1.1.1.2 of annex 4 shall be stipulated on the approval forms and on the communication forms transmitted to the countries which are Contracting Parties to the Agreement and which apply this Regulation.

In the corresponding cases the device shall be marked as follows:

- 4.2.3.1. on headlamps meeting the requirements of this Regulation which are so designed that the filament of the passing beam shall not be lit simultaneously with that of any other lighting function with which it may be reciprocally incorporated: an oblique stroke (/) shall be placed behind the passing lamp symbol in the approval mark.
- 4.2.3.2. on headlamps meeting the requirements of annex 4 to this Regulation only when supplied with a voltage of 6 V or 12 V, a symbol consisting of the number 24 crossed out by an oblique cross (×), shall be placed near the filament lamp holder.
- 4.2.4. The two digits of the approval number (at present 00) which indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval and, if necessary, the required arrow may be marked close to the above additional symbols.
- 4.2.5. The marks and symbols referred to in paragraphs 4.2.1 to 4.2.3 above shall be clearly legible and be indelible. They may be placed on an inner or outer part (transparent or not) of the headlamp, which cannot be separated from the transparent part of the headlamp emitting the light. In any case they shall be visible when the headlamp is fitted on the vehicle or when a movable part such as the hood is opened.

4.3. Arrangement of the approval mark

4.3.1. *Independent lamps*

Annex 2, figures 1 to 10, to this Regulation gives examples of arrangements of the approval mark with the above-mentioned additional symbols.

4.3.2. *Grouped, combined or reciprocally incorporated lamps*

4.3.2.1. Where grouped, combined or reciprocally incorporated lamps have been found to comply with the requirements of several Regulations, a single international approval mark may be affixed, consisting of a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted the approval, and an approval number. This approval mark may be located anywhere on the grouped, combined or reciprocally incorporated lamps, provided that:

4.3.2.1.1. it is visible as per paragraph 4.2.5;

4.3.2.1.2. no part of the grouped, combined or reciprocally incorporated lamps that transmits light can be removed without at the same time removing the approval mark.

4.3.2.2. The identification symbol for each lamp appropriate to each Regulation under which approval has been granted, together with the corresponding series of amendments incorporating the most recent major technical amendments to the Regulation at the time of issue of the approval, and if necessary, the required arrow shall be marked:

4.3.2.2.1. either on the appropriate light-emitting surface,

4.3.2.2.2. or in a group, in such a way that each of the grouped, combined or reciprocally incorporated lamps may be clearly identified (see four possible examples in annex 2).

4.3.2.3. The size of the components of a single approval mark shall not be less than the minimum size required for the smallest of the individual marks by the Regulation under which approval has been granted.

4.3.2.4. An approval number shall be assigned to each type approved. The same Contracting Party may not assign the same number to another type of grouped, combined or reciprocally incorporated lamps covered by this Regulation.

4.3.2.5. Annex 2, figure 11, to this Regulation gives examples of arrangements of approval marks for grouped, combined or reciprocally incorporated lamps with all the above-mentioned additional symbols.

4.3.3. *Lamps, the lens of which are used for different types of headlamps and which may be reciprocally incorporated or grouped with other lamps*

The provisions laid down in paragraph 4.3.2 above are applicable.

4.3.3.1. In addition, where the same lens is used, the latter may bear the different approval marks relating to the different types of headlamps or units of lamps, provided that the main body of the headlamp, even if it cannot be separated from the lens, also comprises the space described in paragraph 3.2 above and bears the approval marks of the actual functions.

If different types of headlamps comprise the same main body, the latter may bear the different approval marks.

4.3.3.2. Annex 2, figure 12, to this Regulation gives examples of arrangements of approval marks relating to the above case.

B. TECHNICAL REQUIREMENTS FOR HEADLAMPS ⁽¹⁾**5. GENERAL SPECIFICATIONS**

- 5.1. Each sample shall conform to the specifications set forth in paragraphs 6 to 8 below.
- 5.2. Headlamps shall be so made as to retain their prescribed photometric characteristics and to remain in good working order when in normal use, in spite of the vibrations to which they may be subjected.
- 5.2.1. Headlamps shall be fitted with a device enabling them to be so adjusted on the vehicles as to comply with the rules applicable to them. Such a device need not be fitted on units in which the reflector and the diffusing lens cannot be separated, provided the use of such units is confined to vehicles on which the headlamp setting can be adjusted by other means.
- Where a headlamp providing a passing beam and a headlamp providing a driving beam, each equipped with its own filament lamp, are assembled to form a composite unit the adjusting device shall enable each optical system individually to be duly adjusted.
- 5.2.2. However, these provisions shall not apply to headlamp assemblies whose reflectors are indivisible. For this type of assembly the requirements of paragraph 6.3 of this Regulation apply.
- 5.3. The headlamp shall be equipped with filament lamp(s) approved according to Regulation No 37. Any Regulation No 37 filament lamp may be used, provided that no restriction on the application is made in the table of contents of Regulation No 37 ⁽²⁾.
- 5.4. The components by which a filament lamp is fixed to the reflector shall be so made that, even in darkness, the filament lamp can be fixed in no position but the correct one ⁽³⁾.
- 5.5. The filament lamp holder shall conform to the characteristics given in IEC Publication 61-2, third edition, 1969. The holder data sheet relevant to the category of filament lamp used, applies.
- 5.6. Headlamps designed to satisfy the requirements both of right-hand and of left-hand traffic may be adapted for traffic on a given side of the road either by an appropriate initial setting when fitted on the vehicle or by selective setting by the user. Such initial or selective setting may consist, for example, of fixing either the optical unit at a given angle on the vehicle or the filament lamp at a given angle in relation to the optical unit. In all cases, only two different and clearly distinct settings, one for right-hand and one for left-hand traffic, shall be possible, and the design shall preclude inadvertent shifting from one setting to the other or setting in an intermediate position. Where two different setting positions are provided for the filament lamp, the components for attaching the filament lamp to the reflector must be so designed and made that, in each of its two settings, the filament lamp will be held in position with the precision required for headlamps designed for traffic on only one side of the road. Conformity with the requirements of this paragraph shall be verified by visual inspection and, where necessary, by a test fitting.
- 5.7. Complementary tests shall be done according to the requirements of annex 4 to ensure that in use there is no excessive change in photometric performance.
- 5.8. If the lens of the headlamp is of plastic material, tests shall be done according to the requirements of annex 6.

⁽¹⁾ Technical requirements for filament lamps: see Regulation No 37.

⁽²⁾ HIR1 and/or H9 filament lamps shall only be permitted to produce passing beam in conjunction with the installation of headlamp cleaning device(s) conforming to Regulation No 45. In addition, with respect to vertical inclination, the provision of paragraph 6.2.6.2.2 of Regulation No 48, 01 series of amendments, shall be applied when these lamps are installed.

⁽³⁾ A headlamp is regarded as satisfying the requirements of this paragraph if the filament lamp can be easily fitted into the headlamp and the positioning lugs can be correctly fitted into their slots even in darkness.

- 5.9. On headlamps designed to provide alternately a driving beam and a passing beam, or a passing beam and/or a driving beam designed to become bend lighting, any mechanical, electromechanical or other device incorporated in the headlamp for these purposes shall be so constructed that:
- 5.9.1. the device is strong enough to withstand 50 000 operations without suffering damage despite the vibrations to which it may be subjected in normal use;
- 5.9.2. in the case of failure the illumination above the line H-H shall not exceed the values of a passing beam according to paragraph 6.2.5; in addition, on headlamps designed to provide a passing and/or a driving beam to become a bend lighting, a minimum illumination of at least 5 lux shall be fulfilled in test point 25 V (VV line, D 75 cm);
- 5.9.3. either the passing beam or the driving beam shall always be obtained without any possibility of the mechanism stopping in between two positions;
- 5.9.4. the user cannot, with ordinary tools, change the shape or position of the moving parts.

6. ILLUMINATION

6.1. General provisions

- 6.1.1. Headlamps shall be so made that they give adequate illumination without dazzle when emitting the passing beam, and good illumination when emitting the driving beam. Bend lighting may be produced by activating one additional light source being part of the passing beam headlamp.
- 6.1.2. The illumination produced by the headlamp shall be determined by means of a vertical screen set up 25 m forward of the headlamp and at right angles to its axes as shown in annex 3 to this Regulation.
- 6.1.3. The headlamps shall be checked by means of an uncoloured standard (étalon) filament lamp designed for a rated voltage of 12 V. During the checking of the headlamp, the voltage at the terminals of the filament lamp shall be regulated so as to obtain the reference luminous flux as indicated at the relevant data sheet of Regulation No 37.
- 6.1.4. The headlamp shall be considered acceptable if it meets the requirements of this paragraph 6 with at least one standard (étalon) filament lamp, which may be submitted with the headlamp.

6.2. Provisions concerning passing beams

- 6.2.1. The passing beam must produce a sufficiently sharp 'cut-off' to permit a satisfactory adjustment with its aid. The 'cut-off' must be a horizontal straight line on the side opposite to the direction of the traffic for which the headlamp is intended; on the other side, it must not extend beyond either the broken line HV H₁ H₄ formed by a straight line HV H₁ making a 45° angle with the horizontal and the straight line H₁ H₄, 25 cm above the straight line hh, or the straight line HV H₃, inclined at an angle of 15° above the horizontal (see annex 3). A cut-off extending beyond both line HV H₂ and line H₂ H₄ and resulting from a combination of the two above possibilities shall in no circumstances be permitted.
- 6.2.2. The headlamp shall be so aimed that:
- 6.2.2.1. in the case of headlamps designed to meet the requirements of right-hand traffic, the 'cut-off' on the left-half of the screen ⁽¹⁾ is horizontal and, in the case of headlamps designed to meet the requirements of left-hand traffic, the 'cut-off' on the right-half of the screen is horizontal;

⁽¹⁾ The test screen must be sufficiently wide to allow examination of the 'cut-off' over a range of at least 5° on either side of the line vv.

6.2.2.2. this horizontal part of the 'cut-off' is situated on the screen 25 cm below the level hh (see annex 3);

6.2.2.3. the 'elbow' of the 'cut-off' is on line vv ⁽¹⁾.

6.2.3. When so aimed, the headlamp need, if its approval is sought solely for provision of a passing beam ⁽²⁾, comply only with the requirements set out in paragraphs 6.2.5 to 6.2.7 and 6.2.9 below; if it is intended to provide both a passing beam and a driving beam, it shall comply with the requirements set out in paragraphs 6.2.5 to 6.2.7 and 6.3.

6.2.4. Where a headlamp so aimed does not meet the requirements set out in paragraphs 6.2.5 to 6.2.7 and 6.3, its alignment may be changed, provided that the axis of the beam is not displaced laterally by more than 1° (= 44 cm) to the right or left ⁽³⁾.

To facilitate alignment by means of the 'cut-off', the headlamp may be partially occulted in order to sharpen the 'cut-off'.

6.2.5. The illumination produced on the screen by the passing beam shall meet the following requirements:

Point on measuring screen		Required illumination in lux	
Headlamps for Right-hand traffic	Headlamps for left-hand traffic	Class A headlamp	Class B headlamp
Point B 50 L	Point B 50 R	≤ 0,4	≤ 0,4
Point 75 R	Point 75 L	≥ 6	≥ 12
Point 75 L	Point 75 R	≤ 12	≤ 12
Point 50 L	Point 50 R	≤ 15	≤ 15
Point 50 R	Point 50 L	≥ 6	≥ 12
Point 50 V	Point 50 V	—	≥ 6
Point 25 L	Point 25 R	≥ 1,5	≥ 2
Point 25 R	Point 25 L	≥ 1,5	≥ 2
Any point in zone III		≤ 0,7	≤ 0,7
Any point in zone IV		≥ 2	≥ 3
Any point in zone I		≤ 20	≤ 2E ^(*)

^(*) E is the actually measured value in points 50R respectively 50L.

6.2.6. There shall be no lateral variations detrimental to good visibility in any of the zones I, II, III and IV.

6.2.7. The illumination values in zones 'A' and 'B' as shown in figure C in annex 3 shall be checked by the measurement of the photometric values of points 1 to 8 on this figure; these values shall lie within the following limits ⁽⁴⁾:

$$1 + 2 + 3 \geq 0,3 \text{ lux, and}$$

$$4 + 5 + 6 \geq 0,6 \text{ lux, and}$$

$$0,7 \text{ lux} \geq 7 \geq 0,1 \text{ lux and}$$

$$0,7 \text{ lux} \geq 8 \geq 0,2 \text{ lux.}$$

⁽¹⁾ If the beam does not have a cut-off with a clear 'elbow', the lateral adjustment shall be effected in the manner which best satisfies the requirements for illumination at points 75 R and 50 R for right-hand traffic and for points 75 L and 50 L for left-hand traffic.

⁽²⁾ Such a special 'passing beam' headlamp may incorporate a driving beam not subject to requirements.

⁽³⁾ The limit of realignment of 1° towards the right or left is not incompatible with upward or downward vertical realignment. The latter is limited only by the requirements of paragraph 6.3. However, the horizontal part of the 'cut-off' should not extend beyond the line hh (the provisions of paragraph 6.3. are not applicable to headlamps intended to meet the requirements of this Regulation only for provision of a passing beam).

⁽⁴⁾ Illumination values in any point of zones A and B, which also lies within zone III, shall not exceed 0,7 lux.

6.2.8. Headlamps designed to meet the requirements of both right-hand and left-hand traffic must, in each of the two setting positions of the optical unit or of the filament lamp, meet the requirements set forth above for the corresponding direction of traffic.

6.2.9. The requirements in paragraph 6.2.5 above shall also apply to headlamps designed to provide bend lighting.

If bend lighting is obtained by:

6.2.9.1. swivelling the passing beam or moving horizontally the kink of the elbow of the cut-off, the measurements shall be carried out after the complete headlamp assembly has been re-aimed horizontally, e.g. by means of a goniometer;

6.2.9.2. moving one or more optical parts of the headlamp without moving horizontally the kink of the elbow of the cut-off, measurements shall be carried out with these parts being in their extreme operating position;

6.2.9.3. means of one additional light source without moving horizontally the kink of the elbow of the cut-off, measurements shall be carried out with this light source activated.

6.3. Provisions concerning driving beams

6.3.1. In the case of a headlamp designed to provide a driving beam and a passing beam, measurements of the illumination produced on the screen by the driving beam shall be taken with the same headlamp alignment as for measurements under paragraphs 6.2.5 to 6.2.7 above; in the case of a headlamp providing a driving beam only, it shall be so adjusted that the area of maximum illumination is centred on the point of intersection of lines hh and vv; such a headlamp need meet only the requirements referred to in paragraph 6.3. Where more than one light source is used to provide the driving beam, the combined functions shall be used to determine the maximum value of the illumination (E_M).

6.3.2. The illumination produced on the screen by the driving beam shall meet the following requirements.

6.3.2.1. The point of intersection (HV) of lines hh and vv shall be situated within the isolux 80 per cent of maximum illumination. This maximum value (E_M) shall not be less than 32 lux for Class A headlamps and 48 lux for Class B headlamps. The maximum value shall in no circumstances exceed 240 lux; in addition, in the case of a combined passing and driving headlamp, this maximum value shall not be more than 16 times the illumination measured for the passing beam at point 75 R (or 75 L).

6.3.2.1.1. The maximum intensity (I_M) of the driving beam expressed in thousands of candelas shall be calculated by the formula:

$$I_M = 0,625 E_M$$

6.3.2.1.2. The reference mark (I'_M) of this maximum intensity, referred to in paragraph 4.2.2.7 above, shall be obtained by the ratio:

$$I'_M = \frac{I_M}{3} = 0,208 E_M$$

This value shall be rounded off to the value 7,5 — 10 — 12,5 — 17,5 — 20 — 25 — 27,5 — 30 — 37,5 — 40 — 45 — 50.

6.3.2.2. Starting from point HV, horizontally to the right and left, the illumination shall be not less than 16 lux for Class A headlamp and 24 lux for Class B headlamp up to a distance of 1,125 m and not less than 4 lux for Class A headlamp and 6 lux for Class B headlamp up to a distance of 2,25 m.

- 6.4. In the case of headlamps with adjustable reflector the requirements of paragraphs 6.2 and 6.3 are applicable for each mounting position indicated according to paragraph 2.1.3. For verification the following procedure shall be used:
- 6.4.1. Each applied position is realized on the test goniometer with respect to a line joining the centre of the light source and point HV on a aiming screen. The adjustable reflector is then moved into such a position that the light pattern on the screen corresponds to the aiming prescriptions of paragraphs 6.2.1 to 6.2.2.3 and/or 6.3.1;
- 6.4.2. with the reflector initially fixed according to paragraph 6.4.1, the headlamp must meet the relevant photometric requirements of paragraphs 6.2 and 6.3;
- 6.4.3. additional tests are made after the reflector has been moved vertically $\pm 2^\circ$ or at least into the maximum position, if less than 2° , from its initial position by means of the headlamps adjusting device. Having re-aimed the headlamp as a whole (by means of the goniometer for example) in the corresponding opposite direction the light output in the following directions shall be controlled and lie within the required limits:
- passing beam: points HV and 75 R (75 L respectively);
- driving beam: E_M and point HV (percentage of E_M).
- 6.4.4. if the applicant has not indicated more than one mounting position, the procedure of paragraphs 6.4.1 to 6.4.3 shall be repeated for all other positions;
- 6.4.5. if the applicant has not asked for special mounting positions, the headlamp shall be aimed for measurements of paragraphs 6.2 and 6.3 with the headlamps adjusting device in its mean position. The additional test of paragraph 6.4.3 shall be made with the reflector moved into its extreme positions (instead of $\pm 2^\circ$) by means of the headlamps adjusting device.
- 6.5. The screen illumination values mentioned in paragraphs 6.2.5 to 6.2.7 and 6.3 above shall be measured by means of a photoreceptor, the effective area of which shall be contained within a square of 65 mm side.

7. COLOUR

- 7.1. The colour of the light emitted shall be white. Expressed in CIE trichromatic coordinates, the light of the beams shall be in the following boundaries:

limit towards blue	$x \geq 0,310$
limit towards yellow	$x \leq 0,500$
limit towards green	$y \leq 0,150 + 0,640 x$
limit towards green	$y \leq 0,440$
limit towards purple	$y \geq 0,050 + 0,750 x$
limit towards red	$y \geq 0,382$

8. GAUGING OF DISCOMFORT

The discomfort caused by the passing beam of headlamps shall be gauged ⁽¹⁾.

C. FURTHER ADMINISTRATIVE PROVISIONS

9. MODIFICATION OF THE HEADLAMP TYPE AND EXTENSION OF APPROVAL

- 9.1. Every modification of the headlamp type shall be notified to the administrative department which approved the headlamp type. The said department may then either:

⁽¹⁾ This requirement will be the subject of a recommendation to administrations.

- 9.1.1. Consider that the modifications made are unlikely to have appreciable adverse effects and that in any event the headlamp 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 4.1.4 above to the Parties to the Agreement which apply this Regulation.
- 9.3. The competent authority issuing the extension of approval shall assign a series number to each communication form drawn up for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation.

10. CONFORMITY OF PRODUCTION

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

- 10.1. Headlamps approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 6 and 7.
- 10.2. the minimum requirements for conformity of production control procedures set forth in annex 5 to this Regulation shall be complied with.
- 10.3. The minimum requirements for sampling by an inspector set forth in annex 7 to this Regulation shall be complied with.
- 10.4. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.
- 10.5. Headlamps with apparent defects are disregarded.
- 10.6. The reference mark is disregarded.

11. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 11.1. The approval granted in respect of a type of headlamp pursuant to this Regulation may be withdrawn if the requirements are not complied with or if a headlamp bearing the approval mark does not conform to the type approved.
- 11.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by means of a communication form conforming to the model in annex 1 to this Regulation.

12. PRODUCTION DEFINITELY DISCONTINUED

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

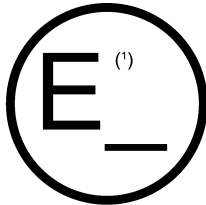
13. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

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

ANNEX I

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by:

Name of administration:

.....

concerning ⁽²⁾:

APPROVAL GRANTED
 APPROVAL EXTENDED
 APPROVAL REFUSED
 APPROVAL WITHDRAWN
 PRODUCTION DEFINITELY DISCONTINUED

of a type of headlamp pursuant to Regulation No:

Approval No:

Extension No:

1. Trade name or mark of the device:
2. Manufacturer's name for the type of device:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Submitted for approval on:
6. Technical service responsible for conducting approval tests:
7. Date of report issued by that service:
8. Number of report issued by that service:
9. Brief description:
 Category as described by the relevant marking ⁽³⁾:
 Number and category(ies) of filament lamp(s):
10. Approval mark position:
11. Reason(s) for extension of approval:
12. Approval granted/extended/refused/withdrawn ⁽²⁾:
13. Place:
14. Date:
15. Signature:
16. The list of documents deposited with the Administrative Service which has granted approval is annexed to this communication and may be obtained on request.

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

⁽²⁾ Strike out which does not apply.

⁽³⁾ Indicate the appropriate marking selected from the list below:

C, C , C , R, R PL, CR, CR, CR , C/R, C/R, C/R , C/, C/, C/ ,
 --> <--> --> <--> --> <--> --> <-->

C PL, C PL, C PL, CR PL, CR PL, CR PL, C/R PL, C/R PL, C/R PL,
 -----> <-----> -----> <-----> -----> <----->

C/PL, C/PL, C/PL
 -----> <----->

HC, HC , HC , HR, HR PL, HCR, HCR, HCR , HC/R, HC/R, HC/R, HC/, HC/, HC/ ,
 -----> <-----> -----> <-----> -----> <-----> -----> <----->

HC PL, HC PL, HC PL, HCR PL, HCR PL, HCR PL, HC/R PL, HC/R PL, HC/R PL,
 -----> <-----> -----> <-----> -----> <-----> -----> <----->

HC/PL, HC/PL, HC/PL
 -----> <----->

ANNEX 2

EXAMPLES OF ARRANGEMENT OF APPROVAL MARKS

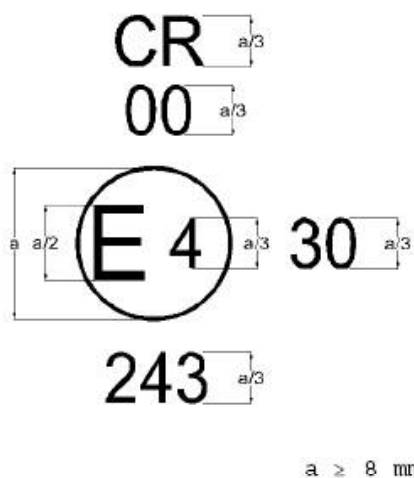


Figure 1

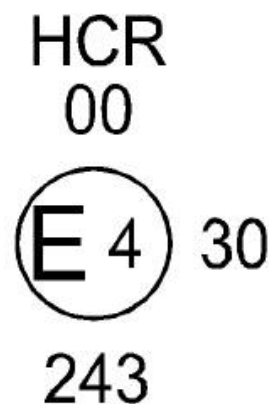


Figure 2

The headlamp bearing one of the above approval marks has been approved in the Netherlands (E 4) pursuant to Regulation No XXX under approval number 243, meeting the requirements of this Regulation in its original form (00). The passing beam is designed for right-hand traffic only. The letters CR (Figure 1) indicate that it concerns a Class A passing and driving beam and the letters HCR (Figure 2) indicate that it concerns a Class B passing and driving beam.

The figure 30 indicates that the maximum luminous intensity of the driving beam is between 86 250 and 101 250 candelas.

Note: The approval number and additional symbols shall be placed close to the circle and either above or below the letter 'E', or to the right or left of that letter. The digits of the approval number shall be on the same side of the letter 'E' and face in the same direction.

The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

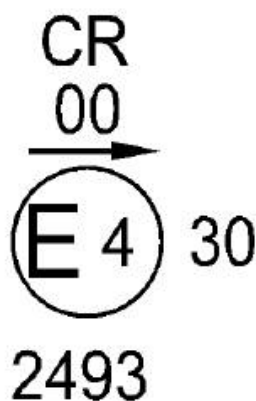


Figure 3

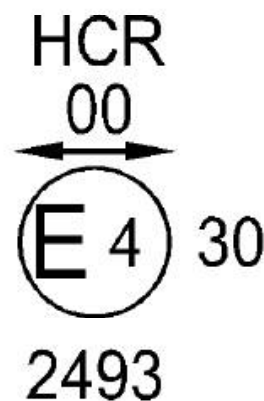


Figure 4a



Figure 4b

The headlamp bearing the above approval mark meets the requirements of this Regulation in respect of both the passing beam and the driving beam and is designed:

Figure 3: Class A for left hand traffic only.

Figures 4a and 4b: Class B for both traffic systems by means of an appropriate adjustment of the setting of the optical unit or the filament lamp on the vehicle.

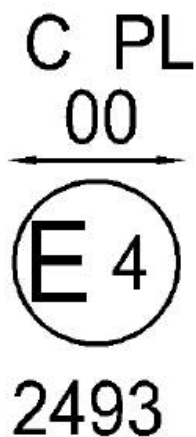


Figure 5

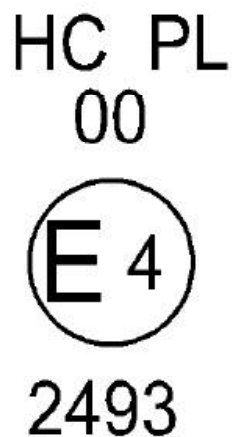


Figure 6

The headlamp bearing the above approval mark is a headlamp incorporating a lens of plastic material meeting the requirements of this Regulation in respect of the passing beam only and is designed:

Figure 5: Class A for both traffic systems.

Figure 6: Class B for right-hand traffic only.

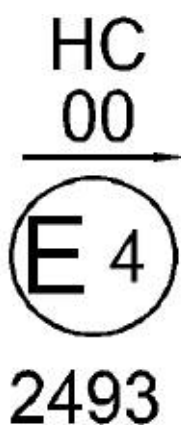


Figure 7

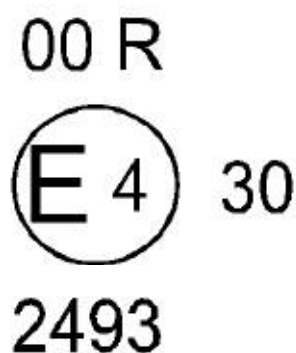
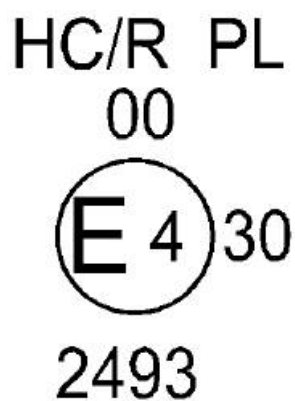
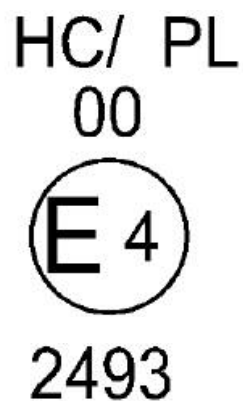


Figure 8

The headlamp bearing the above approval mark is a headlamp meeting the requirements of this Regulation:

Figure 7: Class B in respect of the passing beam only and is designed for left-hand traffic only.

Figure 8: Class A in respect of the driving beam only.

*Figure 9**Figure 10*

Identification of a headlamp incorporating a lens of plastic material meeting the requirements of this Regulation:

Figure 9: Class B in respect to both the passing beam and driving beam and designed for right-hand traffic only.

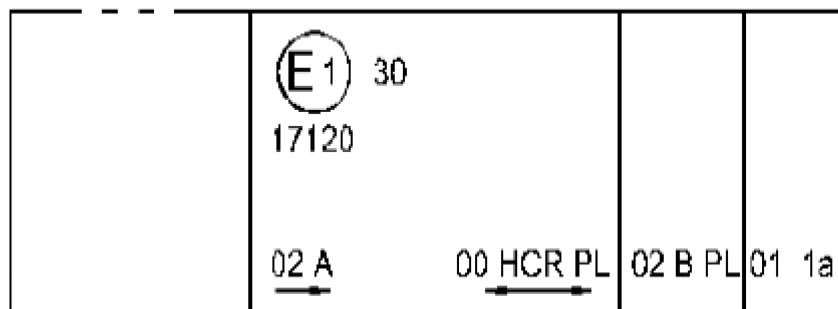
Figure 10: Class B in respect to the passing beam only and designed for right-hand traffic only.

The passing beam shall not be operated simultaneously with the driving beam and/or another reciprocally incorporated headlamp.

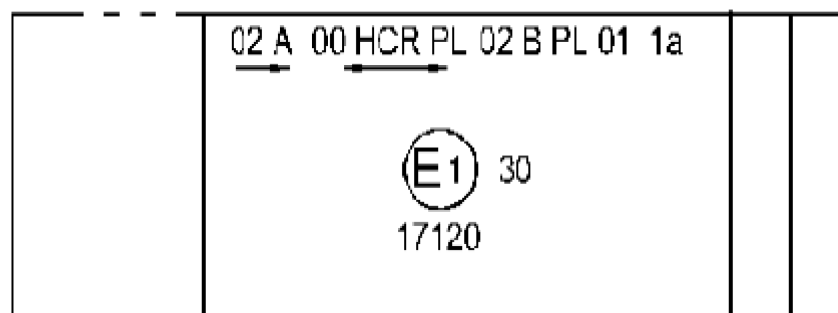
Simplified marking for grouped, combined or reciprocally incorporated lamps

(The vertical and horizontal lines schematize the shape of the light-signalling device. They are not part of the approval mark.)

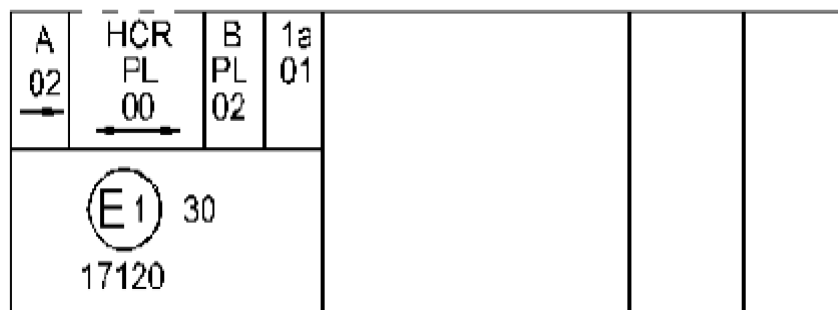
Model A



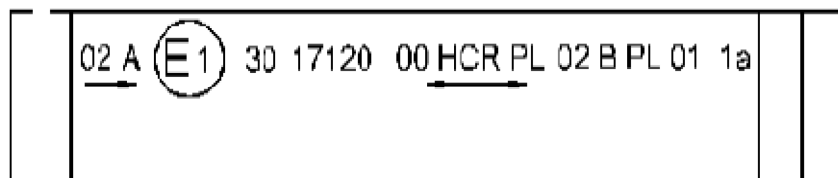
Model B



Model C



Model D



Note: The four examples above correspond to a lighting device bearing an approval mark comprising:

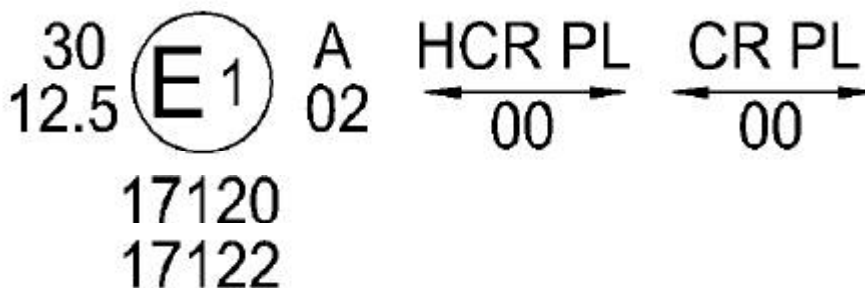
A front position lamp approved in accordance with the 02 series of amendments to Regulation No 7,

A headlamp, Class B, with a passing beam designed for right- and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas (as indicated by the number 30), approved in accordance with the requirements of this Regulation in its original form (00) and incorporating a lens of plastic material,

A front fog lamp approved in accordance with the 02 series of amendments to Regulation No 19 and incorporating a lens of plastic material,

A front direction indicator lamp of category 1a approved in accordance with the 01 series of amendments to Regulation No 6.

Figure 12

Lamp reciprocally incorporated with a headlamp**Example 1**

The above example corresponds to the marking of a lens of plastic material intended to be used in different types of headlamps, namely:

Either A headlamp, Class B, with a passing beam designed for both traffic systems and a driving beam with a maximum luminous intensity comprised between 86 250 and 101 250 candelas (as indicated by the number 30), approved in Germany (E1) in accordance with the requirements of this Regulation in its original form (00),

which is reciprocally incorporated with

A front position lamp approved in accordance with the 02 series of amendments to Regulation No 7;

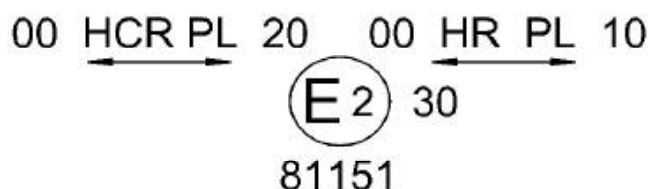
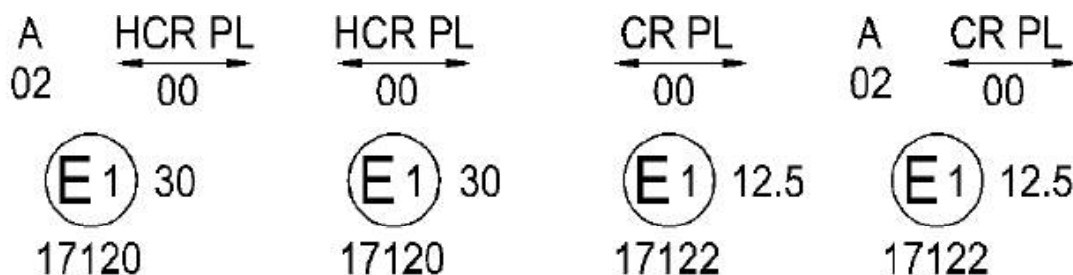
Or A headlamp, Class A, with a passing beam designed for both traffic systems and a driving beam with a maximum luminous intensity comprised between 33 750 cd and 45 000 cd (as indicated by the number 12.5), approved in Germany (E1) in accordance with the requirements of this Regulation in its original form (00),

which is reciprocally incorporated with

The same front position lamp as above;

Or even either of the above-mentioned-headlamps approved as a single lamp.

The main body of the headlamp shall bear the only valid approval number, for instance:



The above example corresponds to the marking of a lens of plastic material used in a unit of two headlamps approved in France (E2) under approval number 811 51, consisting of:

A headlamp, Class B, emitting a passing beam and a driving beam with a maximum luminous intensity between x and y candelas, meeting the requirements of this Regulation, and

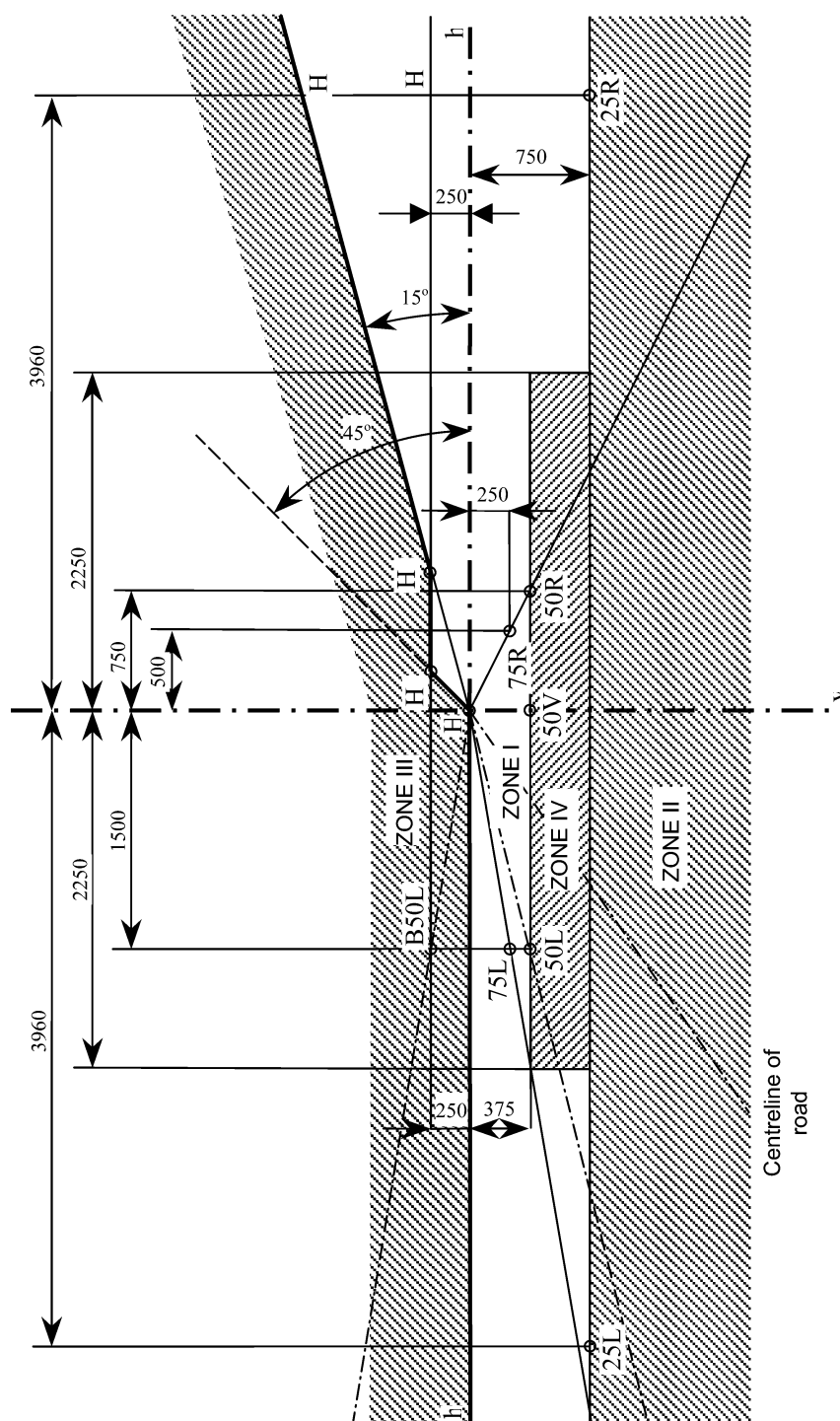
A headlamp, Class B, emitting a driving beam designed for both traffic systems with a maximum luminous intensity between w and z candelas, meeting the requirements of this Regulation, the maximum luminous intensities of the driving beams as a whole being comprised between 86 250 and 101 250 candelas.

ANNEX 3

MEASURING SCREEN

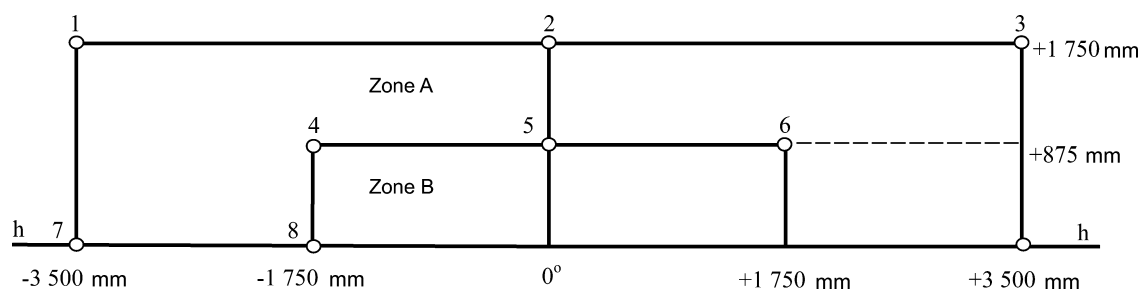
A. Headlamp for right-hand traffic

(dimension in mm with screen at 25 m distance)



h-h: horizontal plane } passing through focus of headlamp
v-v: vertical plane }

Figure C



Note: Figure C shows the measuring points for right-hand traffic. Points 7 and 8 move to their corresponding location at the right-hand side of the picture for left-hand traffic.

ANNEX 4

**TESTS FOR STABILITY OF PHOTOMETRIC PERFORMANCE OF HEADLAMPS
IN OPERATION**

TESTS ON COMPLETE HEADLAMPS

Once the photometric values have been measured according to the prescriptions of this Regulation, in the point for $E_{\max}$ for driving beam and in points HV, 50 R, B 50 L for passing beam (or HV, 50 L, B 50 R for headlamps designed for left-hand traffic) a complete headlamp sample shall be tested for stability of photometric performance in operation. 'Complete headlamp' shall be understood to mean the complete lamp itself including those surrounding body parts and lamps which could influence its thermal dissipation.

1. TEST FOR STABILITY OF PHOTOMETRIC PERFORMANCE

The tests shall be carried out in a dry and still atmosphere at an ambient temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the complete headlamp being mounted on a base representing the correct installation on the vehicle.

1.1. Clean headlamp

The headlamp shall be operated for 12 hours as described in paragraph 1.1.1 and checked as prescribed in paragraph 1.1.2.

1.1.1. Test procedure ⁽¹⁾

The headlamp shall be operated for a period according to the specified time, so that:

1.1.1.1. (a) In the case where only one lighting function (driving or passing beam or front fog lamp) is to be approved, the corresponding filament is lit for the prescribed time ⁽²⁾,

(b) In the case of a headlamp with a passing beam and one or more driving beams or in case of a headlamp with a passing beam and a front fog lamp:

(i) the headlamp shall be subjected to the following cycle until the time specified is reached:

15 minutes, passing-beam filament lit;

5 minutes, all filaments lit.

(ii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) lit ⁽³⁾ at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam half of the time and the driving beam(s) (simultaneously) for half the time specified in paragraph 1.1 above.

(c) in the case of a headlamp with a front fog lamp and one or more driving beams:

(i) the headlamp shall be subjected to the following cycle until the time specified is reached:

15 minutes, front fog lamp lit;

5 minutes, all filaments lit.

⁽¹⁾ For the test schedule see annex 8 to this Regulation.

⁽²⁾ When the tested headlamp includes signalling lamps, the latter shall be lit for the duration of the test. In the case of a direction indicator lamp, it shall be lit in flashing mode with an on/off time of approximately one to one.

⁽³⁾ Should two or more lamp filaments be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of the filaments simultaneously.

- (ii) if the applicant declares that the headlamp is to be used with only the front fog lamp lit or only the driving beam(s) lit ⁽¹⁾ at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the front fog lamp half of the time and the driving beam(s) (simultaneously) for half the time specified in paragraph 1.1 above.
- (d) In the case of headlamp with a passing beam, one or more driving beams and a front fog lamp:
 - (i) the headlamp shall be subjected to the following cycle until the time specified is reached:
 - 15 minutes, passing-beam filament lit;
 - 5 minutes, all filaments lit.
 - (ii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) ⁽¹⁾ lit at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam half of the time and the driving beam(s) for half the time specified in paragraph 1.1 above, while the front fog lamp is subjected to a cycle of 15 minutes off and 5 minutes lit for half of the time and during the operation of the driving beam;
 - (iii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the front fog lamp ⁽¹⁾ lit at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam half of the time and the front fog lamp for half of the time specified in paragraph 1.1 above, while the driving beam(s) is(are) subjected to a cycle of 15 minutes off and 5 minutes lit for half of the time and during the operation of the passing beam;
 - (iv) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) ⁽¹⁾ lit or only the front fog lamp ⁽¹⁾ lit at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam one third of the time, the driving beam(s) one third of the time and the front fog lamp for one third of the time specified in paragraph 1.1 above.
- (e) In the case of a passing beam designed to provide bend lighting with the addition of a light source, this light source shall be switched on for 1 minute, and switched off for 9 minutes during the activation of the passing beam only (see Annex 4 — Appendix 1).

1.1.1.2. Test voltage

The voltage shall be adjusted so as to supply 90 per cent of the maximum wattage specified in Regulation No. 37 for the filament lamp(s) used.

The applied wattage shall in all cases comply with the corresponding value of a filament lamp of 12 V rated voltage, except if the applicant for approval specifies that the headlamp may be used at a different voltage. In the latter case, the test shall be carried out with the filament lamp whose wattage is the highest that can be used.

1.1.2. Test results

1.1.2.1. Visual inspection

Once the headlamp has been stabilized to the ambient temperature, the headlamp lens and the external lens, if any, shall be cleaned with a clean, damp cotton cloth. It shall then be inspected visually; no distortion, deformation, cracking or change in colour of either the headlamp lens or the external lens, if any, shall be noticeable.

1.1.2.2. Photometric test

To comply with the requirements of this Regulation, the photometric values shall be verified in the following points:

Passing beam:

- 50 R — B 50 L — HV for headlamps designed for right-hand traffic,
- 50 L — B 50 R — HV for headlamps designed for left-hand traffic.

⁽¹⁾ Should two or more lamp filaments be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of the filaments simultaneously.

⁽²⁾ When the tested headlamp includes signalling lamps, the latter shall be lit for the duration of the test. In the case of a direction indicator lamp, it shall be lit in flashing mode with an on/off time of approximately one to one.

Driving beam: Point of $E_{\max}$

Another aiming may be carried out to allow for any deformation of the headlamp base due to heat (the change of the position of the cut-off line is covered in paragraph 2 of this annex).

A 10 per cent discrepancy between the photometric characteristics and the values measured prior to the test is permissible including the tolerances of the photometric procedure.

1.2. Dirty headlamp

After being tested as specified in paragraph 1.1 above, the headlamp shall be operated for one hour as described in paragraph 1.1.1, after being prepared as prescribed in paragraph 1.2.1, and checked as prescribed in paragraph 1.1.2.

1.2.1. Preparations of the headlamp

1.2.1.1. Test mixture

1.2.1.1.1. For headlamp with the outside lens in glass:

The mixture of water and a polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 μm , 1 part by weight of vegetal carbon dust (beechwood) with a particle size of 0-100 μm , 0,2 parts by weight of NaCMC ⁽¹⁾, and an appropriate quantity of distilled water, with a conductivity of $\leq 1 \text{ mS/m}$. The mixture must not be more than 14 days old.

1.2.1.1.2. For headlamp with outside lens in plastic material:

The mixture of water and polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 μm , 1 part by weight of vegetal carbon dust (beechwood) with a particle size of 0-100 μm , 0,2 part by weight of NaCMC ⁽¹⁾, 13 parts by weight of distilled water with a conductivity of $\leq 1 \text{ mS/m}$, and 2 ± 1 parts by weight of surface-actant ⁽²⁾. The mixture must not be more than 14 days old.

1.2.1.2. Application of the test mixture to the headlamp

The test mixture shall be uniformly applied to the entire light-emitting surface of the headlamp and then left to dry. This procedure shall be repeated until the illumination value has dropped to 15-20 per cent of the values measured for each following point under the conditions described in this annex:

Point of $E_{\max}$ in passing beam/driving beam and in driving beam only,

50 R and 50 V ⁽³⁾ for a passing lamp only, designed for right-hand traffic,

50 L and 50 V ⁽³⁾ for a passing lamp only, designed for left-hand traffic.

1.2.1.3. Measuring equipment

The measuring equipment shall be equivalent to that used during headlamp approval tests. A standard (étalon) filament lamp shall be used for the photometric verification.

2. TEST FOR CHANGE IN VERTICAL POSITION OF THE CUT-OFF LINE UNDER THE INFLUENCE OF HEAT

This test consists of verifying that the vertical drift of the cut-off line under the influence of heat does not exceed a specified value for an operating passing lamp.

⁽¹⁾ NaCMC represents the sodium salt of carboxymethylcellulose, customarily referred to as CMC. The NaCMC used in the dirt mixture shall have a degree of substitution (DS) of 0,6-0,7 and a viscosity of 200-300 cP for a 2 per cent solution at 20 °C.

⁽²⁾ The tolerance on quantity is due to the necessity of obtaining a dirt that correctly spreads out on all the plastic lens.

⁽³⁾ Point 50 V is situated 375 mm below HV on the vertical line v-v on the screen at 25 m distance.

The headlamp tested in accordance with paragraph 1, shall be subjected to the test described in paragraph 2.1, without being removed from or readjusted in relation to its test fixture.

2.1. Test

The test shall be carried out in a dry and still atmosphere at an ambient temperature of $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

Using a mass production filament lamp, which has been aged for at least one hour the headlamp shall be operated on passing beam without being dismantled from or readjusted in relation to its test fixture (for the purpose of this test, the voltage shall be adjusted as specified in paragraph 1.1.1.2). The position of the cut-off line in its horizontal part (between vv and the vertical line passing through point B 50 L for right-hand traffic or B 50 R for left-hand traffic) shall be verified 3 minutes (r3) and 60 minutes (r60) respectively after operation.

The measurement of the variation in the cut-off line position as described above shall be carried out by any method giving acceptable accuracy and reproducible results.

2.2. Test results

2.2.1. The result in milliradians (mrad) shall be considered as acceptable for a passing lamp, only when the absolute value $\Delta r_1 = |r_3 - r_{60}|$ recorded on the headlamp is not more than 1,0 mrad ($\Delta r_1 \leq 1,0\text{ mrad}$).

2.2.2. However, if this value is more than 1,0 mrad but not more than 1,5 mrad ($1,0\text{ mrad} < \Delta r_1 \leq 1,5\text{ mrad}$) a second headlamp shall be tested as described in paragraph 2.1. after being subjected three consecutive times to the cycle as described below, in order to stabilize the position of mechanical parts of the headlamp on a base representative of the correct installation on the vehicle:

Operation of the passing beam for one hour (the voltage shall be adjusted as specified in paragraph 1.1.1.2),

Period of rest for one hour.

The headlamp type shall be considered as acceptable if the mean value of the absolute values Δr_I measured on the first sample and Δr_{II} measured on the second sample is not more than 1,0 mrad.

$$\left(\frac{\Delta r_I + \Delta r_{II}}{2} \leq 1\text{ mrad} \right)$$

APPENDIX 1

Overview of operational periods concerning test for stability of photometric performance

- Abbreviations:
- P: passing beam lamp

D: driving beam lamp (D₁ + D₂ means two driving beams)

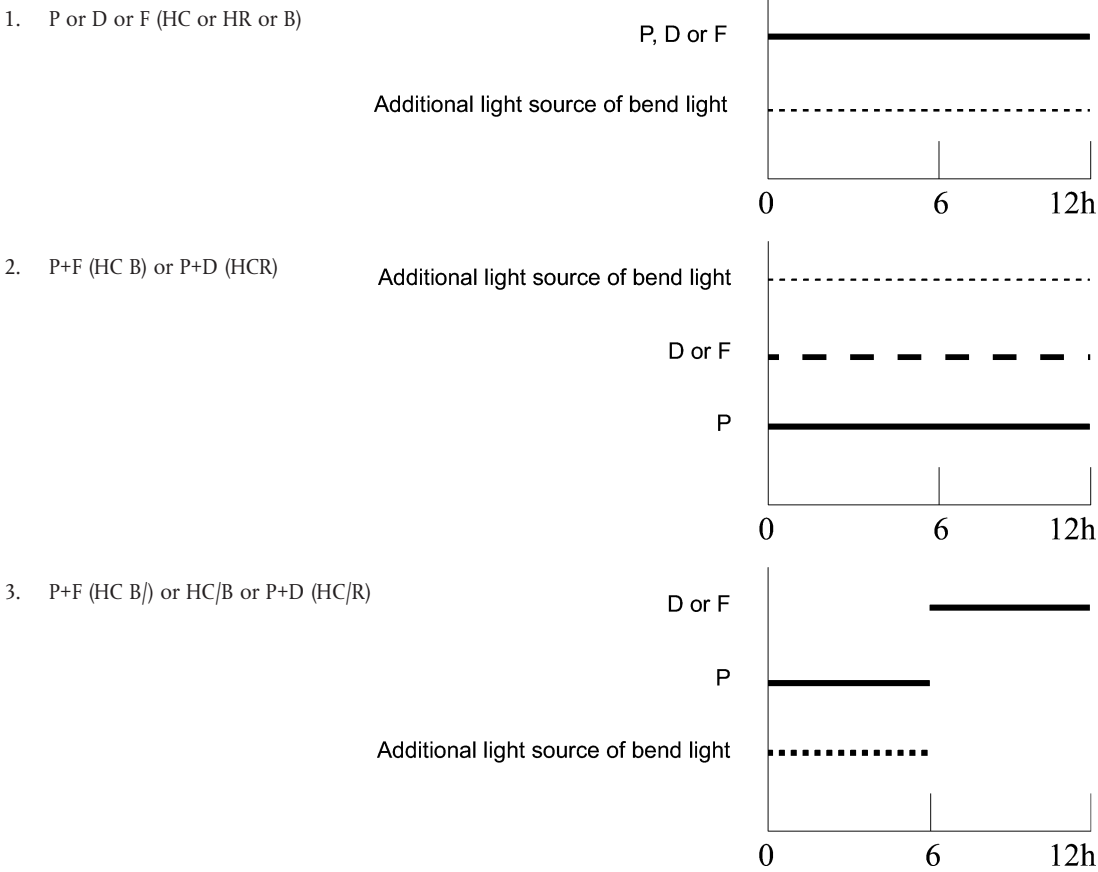
F: front fog lamp
- — — —

means a cycle of 15 minutes off and 5 minutes lit

.....

means a cycle of 9 minutes off and 1 minutes lit

All following grouped headlamps and front fog lamps together with the added marking symbols are given as examples and are not exhaustive.



ANNEX 5

Minimum requirements for conformity of production control procedures

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometrical standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation. This condition also applies to colour.

1.2. With respect to photometric performances, the conformity of mass-produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random and equipped with a standard (étalon) filament lamp:

1.2.1. no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation. For values B 50 L (or R) and zone III, the maximum unfavourable deviation may be respectively:

B 50 L (or R):	0,2 lx equivalent 20 per cent
	0,3 lx equivalent 30 per cent
Zone III	0,3 lx equivalent 20 per cent
	0,45 lx equivalent 30 per cent

1.2.2. or if

1.2.2.1. for the passing beam, the values prescribed in this Regulation are met at HV (with a tolerance of + 0,2 lx) and related to that aiming at least one point of each area delimited on the measuring screen (at 25 m) by a circle 15 cm in radius around points B 50 L (or R) ⁽¹⁾ (with a tolerance of + 0,1 lx), 75 R (or L), 50 V, 25 R, 25 L, and in the entire area of zone IV which is not more than 22,5 cm above line 25 R and 25 L;

1.2.2.2. and if, for the driving beam, HV being situated within the isolux 0.75 E_{max}, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraph 6.3.2 of this Regulation.

1.2.3. If the results of the test described above do not meet the requirements, the alignment of the headlamp may be changed, provided that the axis of the beam is not displaced laterally by more than 1° to the right or left ⁽²⁾.

1.2.4. If the results of the tests described above do not meet the requirements, tests shall be repeated using another standard (étalon) filament lamp.

1.3. With respect to the verification of the change in vertical position of the cut-off line under the influence of heat, the following procedure shall be applied:

One of the sampled headlamps shall be tested according to the procedure described in paragraph 2.1 of annex 4 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 4.

The headlamp shall be considered as acceptable if Δr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, a second sample shall be subjected to the test after which the mean of the absolute values recorded on both samples shall not exceed 1,5 mrad.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of headlamp the holder of the approval mark shall carry out at least the following tests, at appropriate intervals. The tests shall be carried out in accordance with the provision of this Regulation.

⁽¹⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ See footnote 11 in the text of this Regulation.

If any sampling shows non-conformity with regard to the type of test concerned, further samples shall be taken and tested. The manufacturer shall take steps to ensure the conformity of the production concerned.

2.1. Nature of tests

Tests of conformity in this Regulation shall cover the photometric characteristics and the verification of the change in vertical position of the cut-off line under the influence of heat.

2.2. Methods used in tests

2.2.1. Tests shall generally be carried out in accordance with the methods set out in this Regulation.

2.2.2. In any test of conformity carried out by the manufacturer, equivalent methods may be used with the consent of the competent authority responsible for approval tests. The manufacturer is responsible for proving that the applied methods are equivalent to those laid down in this Regulation.

2.2.3. The application of paragraphs 2.2.1 and 2.2.2 requires regular calibration of test apparatus and its correlation with measurement made by a competent authority.

2.2.4. In all cases the reference methods shall be those of this Regulation, particular for the purpose of administrative verification and sampling.

2.3. Nature of sampling

Samples of headlamps shall be selected at random from the production of a uniform batch. A uniform batch means a set of headlamps of the same type, defined according to the production methods of the manufacturer.

The assessment shall, in general, cover series production from individual factories. However, a manufacturer may group together records concerning the same type from several factories provided these operate under the same quality system and quality management.

2.4. Measured and recorded photometric characteristics

The sampled headlamps shall be subjected to photometric measurements at the points provided for in the Regulation, the reading being limited at the points E_{max} , HV ⁽¹⁾, HL, HR ⁽²⁾ in the case of a driving beam, and to points B 50 L (or R), HV, 50 V, 75 R (or L) and 25 L (or R) in the case of the passing beam (see figure in annex 3).

2.5. Criteria governing acceptability

The manufacturer is responsible for carrying out a statistical study of the test results and for defining, in agreement with the competent authority, criteria governing acceptability of his products in order to meet the specification laid down for verification of conformity of products in paragraph 10.1 of this Regulation.

The criteria governing acceptability shall be such that, with a confidence level of 95 per cent, the minimum probability of passing a spot check in accordance with annex 7 (first sampling) would be 0,95.

⁽¹⁾ When the driving beam is reciprocally incorporated with the passing beam, HV in the case of the driving beam shall be the same measuring point as in the case of the passing beam.

⁽²⁾ HL and HR: points 'hh' located at 1,125 m to the left and to the right of point HV respectively.

ANNEX 6

Requirements for lamps incorporating lenses of plastic material — Testing of lens or material samples and of complete lamps

1. GENERAL SPECIFICATIONS

- 1.1. The samples supplied pursuant to paragraph 2.2.4 of this Regulation shall satisfy the specifications indicated in paragraphs 2.1 to 2.5 below.
- 1.2. The two samples of complete lamps supplied pursuant to paragraph 2.2.3 of this Regulation and incorporating lenses of plastic material shall, with regard to the lens material, satisfy the specifications indicated in paragraph 2.6 below.
- 1.3. The samples of lenses of plastic material or samples of material shall be subjected, with the reflector to which they are intended to be fitted (where applicable), to approval tests in the chronological order indicated in table A reproduced in appendix 1 to this annex.
- 1.4. However, if the lamp manufacturer can prove that the product has already passed the tests prescribed in paragraphs 2.1 to 2.5 below, or the equivalent tests pursuant to another regulation, those tests need not be repeated; only the tests prescribed in appendix 1, table B, shall be mandatory.

2. TESTS

2.1. Resistance to temperature changes

2.1.1. Tests

Three new samples (lenses) shall be subjected to five cycles of temperature and humidity (RH = relative humidity) change in accordance with the following programme:

- 3 hours at $40\text{ °C} \pm 2\text{ °C}$ and 85-95 per cent RH;
- 1 hour at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 per cent RH;
- 15 hours at $-30\text{ °C} \pm 2\text{ °C}$;
- 1 hour at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 per cent RH;
- 3 hours at $80\text{ °C} \pm 2\text{ °C}$;
- 1 hour at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 per cent RH;

Before this test, the samples shall be kept at $23\text{ °C} \pm 5\text{ °C}$ and 60-75 per cent RH for at least four hours.

Note: The periods of one hour at $23\text{ °C} \pm 5\text{ °C}$ shall include the periods of transition from one temperature to another which are needed in order to avoid thermal shock effects.

2.1.2. Photometric measurements

2.1.2.1. Method

Photometric measurements shall be carried out on the samples before and after the test.

These measurements shall be made using a standard (étalon) lamp, at the following points:

B 50 L and 50 R for the passing beam of a passing lamp or a passing/driving lamp (B 50 R and 50 L in the case of headlamps intended for left-hand traffic);

E_{max} route for the driving beam of a driving lamp or a passing/driving lamp.

2.1.2.2. Results

The variation between the photometric values measured on each sample before and after the test shall not exceed 10 per cent including the tolerances of the photometric procedure.

2.2. Resistance to atmospheric and chemical agents

2.2.1. Resistance to atmospheric agents

Three new samples (lenses or samples of material) shall be exposed to radiation from a source having a spectral energy distribution similar to that of a black body at a temperature between 5 500 K and 6 000 K. Appropriate filters shall be placed between the source and the samples so as to reduce as far as possible radiations with wave lengths smaller than 295 nm and greater than 2 500 nm. The samples shall be exposed to an energetic illumination of $1\,200\text{ W/m}^2 \pm 200\text{ W/m}^2$ for a period such that the luminous energy that they receive is equal to $4\,500\text{ MJ/m}^2 \pm 200\text{ MJ/m}^2$. Within the enclosure, the temperature measured on the black panel placed on a level with the samples shall be $50\text{ °C} \pm 5\text{ °C}$. In order to ensure a regular exposure, the samples shall revolve around the source of radiation at a speed between 1 and 5 1/min.

The samples shall be sprayed with distilled water of conductivity lower than 1 mS/m at a temperature of $23\text{ °C} \pm 5\text{ °C}$, in accordance with the following cycle:

spraying: 5 minutes; drying: 25 minutes.

2.2.2. Resistance to chemical agents

After the test described in paragraph 2.2.1 above and the measurement described in paragraph 2.2.3.1 below have been carried out, the outer face of the said three samples shall be treated as described in paragraph 2.2.2.2 with the mixture defined in paragraph 2.2.2.1 below.

2.2.2.1. Test mixture

The test mixture shall be composed of 61,5 per cent n-heptane, 12,5 per cent toluene, 7,5 per cent ethyl tetra-chloride, 12,5 per cent trichloroethylene and 6 per cent xylene (volume per cent).

2.2.2.2. Application of the test mixture

Soak a piece of cotton cloth (as per ISO 105) until saturation with the mixture defined in paragraph 2.2.2.1 above and, within 10 seconds, apply it for 10 minutes to the outer face of the sample at a pressure of 50 N/cm^2 , corresponding to an effort of 100 N applied on a test surface of $14 \times 14\text{ mm}$.

During this 10-minute period, the cloth pad shall be soaked again with the mixture so that the composition of the liquid applied is continuously identical with that of the test mixture prescribed.

During the period of application, it is permissible to compensate the pressure applied to the sample in order to prevent it from causing cracks.

2.2.2.3. Cleaning

At the end of the application of the test mixture, the samples shall be dried in the open air and then washed with the solution described in paragraph 2.3 (resistance to detergents) $23\text{ °C} \pm 5\text{ °C}$.

Afterwards the samples shall be carefully rinsed with distilled water containing not more than 0,2 per cent impurities at $23\text{ °C} \pm 5\text{ °C}$ and then wiped off with a soft cloth.

2.2.3. Results

- 2.2.3.1. After the test of resistance to atmospheric agents, the outer face of the samples shall be free from cracks, scratches, chipping and deformation, and the mean variation in transmission $\Delta t = \frac{T_2 - T_3}{T_2}$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,020 ($\Delta t_m \leq 0,020$).

- 2.2.3.2. After the test of resistance to chemical agents, the samples shall not bear any traces of chemical staining likely to cause a variation of flux diffusion, whose mean variation $\Delta t = \frac{T_5 - T_4}{T_2}$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,020 ($\Delta d_m \leq 0,020$).

2.3. Resistance to detergents and hydrocarbons

2.3.1. Resistance to detergents

The outer face of three samples (lenses or samples of material) shall be heated to $50\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$ and then immersed for five minutes in a mixture maintained at $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$ and composed of 99 parts distilled water containing not more than 0,02 per cent impurities and one part alkylaryl sulphonate.

At the end of the test, the samples shall be dried at $50\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$.

The surface of the samples shall be cleaned with a moist cloth.

2.3.2. Resistance to hydrocarbons

The outer face of these three samples shall then be lightly rubbed for one minute with a cotton cloth soaked in a mixture composed of 70 per cent n-heptane and 30 per cent toluene (volume per cent), and shall then be dried in the open air.

2.3.3. Results

After the above two tests have been performed successively, the mean value of the variation in transmission $\Delta t = \frac{T_2 - T_3}{T_2}$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,010 ($\Delta t_m \leq 0,010$).

2.4. Resistance to mechanical deterioration

2.4.1. Mechanical deterioration method

The outer face of the three new samples (lenses) shall be subjected to the uniform mechanical deterioration test by the method described in appendix 3 to this annex.

2.4.2. Results

After this test, the variations:

$$\text{in transmission: } \Delta t = \frac{T_2 - T_3}{T_2}$$

$$\text{and in diffusion: } \Delta d = \frac{T_5 - T_4}{T_2}$$

shall be measured according to the procedure described in appendix 2 in the area specified in paragraph 2.2.4.1.1 of this Regulation. The mean value of the three samples shall be such that:

$$\Delta t_m \leq 0,100;$$

$$\Delta d_m \leq 0,050.$$

2.5. Test of adherence of coatings, if any

2.5.1. Preparation of the sample

A surface of $20\text{ mm} \times 20\text{ mm}$ in area of the coating of a lens shall be cut with a razor blade or a needle into a grid of squares approximately $2\text{ mm} \times 2\text{ mm}$. The pressure on the blade or needle shall be sufficient to cut at least the coating.

2.5.2. Description of the test

Use an adhesive tape with a force adhesion of 2 N/(cm of width) $\pm$ 20 per cent measured under the standardized conditions specified in appendix 4 to this annex. This adhesive tape, which shall be at least 25 mm wide, shall be pressed for at least five minutes to the surface prepared as prescribed in paragraph 2.5.1.

Then the end of the adhesive tape shall be loaded in such a way that the force of adhesion to the surface considered is balanced by a force perpendicular to that surface. At this stage, the tape shall be torn off at a constant speed of 1,5 m/s $\pm$ 0,2 m/s.

2.5.3. Results

There shall be no appreciable impairment of the gridded area. Impairments at the intersections between squares or at the edges of the cuts shall be permitted, provided that the impaired area does not exceed 15 per cent of the gridded surface.

2.6. Tests of the complete headlamp incorporating a lens of plastic material

2.6.1. Resistance to mechanical deterioration of the lens surface

2.6.1.1. Tests

The lens of lamp sample No 1 shall be subjected to the test described in paragraph 2.4.1 above.

2.6.1.2. Results

After the test, the results of photometric measurements carried out on the headlamp in accordance with this Regulation shall not exceed by more than 30 per cent the maximum values prescribed at points B 50 L and HV and not be more than 10 per cent below the minimum values prescribed at point 75 R (in the case of headlamps intended for left-hand traffic, the points to be considered are B 50 R, HV and 75 L).

2.6.2. Test of adherence of coatings, if any

The lens of lamp sample No 2 shall be subjected to the test described in paragraph 2.5 above.

3. VERIFICATION OF THE CONFORMITY OF PRODUCTION

3.1. With regard to the materials used for the manufacture of lenses, the lamps of a series shall be recognized as complying with this Regulation if:

3.1.1. After the test for resistance to chemical agents and the test for resistance to detergents and hydrocarbons, the outer face of the samples exhibits no cracks, chipping or deformation visible to the naked eye (see paragraphs 2.2.2, 2.3.1 and 2.3.2);

3.1.2. After the test described in paragraph 2.6.1.1, the photometric values at the points of measurement considered in paragraph 2.6.1.2 are within the limits prescribed for conformity of production by this Regulation.

3.2. If the test results fail to satisfy the requirements, the tests shall be repeated on another sample of headlamps selected at random.

APPENDIX 1

CHRONOLOGICAL ORDER OF APPROVAL TESTS

A. Tests on plastic materials (lenses or samples of material supplied pursuant to paragraph 2.2.4 of this Regulation).

Samples — Tests	Lenses or samples of material						Lenses						
	1	2	3	4	5	6	7	8	9	10	11	12	13
1.1. Limited photometry (para. 2.1.2)										x	x	x	
1.1.1. Temperature change (para. 2.1.1)										x	x	x	
1.1.2. Limited photometry (para. 2.1.2)										x	x	x	
1.2.1. Transmission measurement	x	x	x	x	x	x	x	x	x				
1.2.2. Diffusion measurement	x	x	x				x	x	x				
1.3. Atmospheric agents (para. 2.2.1)	x	x	x										
1.3.1. Transmission measurement	x	x	x										
1.4. Chemical agents (para. 2.2.2)	x	x	x										
1.4.1. Diffusion measurement	x	x	x										
1.5. Detergents (para. 2.3.1)				x	x	x							
1.6. Hydrocarbons (para. 2.3.2)				x	x	x							
1.6.1. Transmission measurement					x	x	x						
1.7. Deterioration (para. 2.4.1)							x	x	x				
1.7.1. Transmission measurement							x	x	x				
1.7.2. Diffusion measurement							x	x	x				
1.8. Adherence (para. 2.5)													x

B. Tests on complete headlamps (supplied pursuant to paragraph 2.2.3. of this Regulation).

Tests	Complete headlamp	
	Sample No.	
	1	2
2.1. Deterioration (para. 2.6.1.1)	x	
2.2. Photometry (para. 2.6.1.2)	x	
2.3. Adherence (para. 2.6.2)		x

APPENDIX 2

METHOD OF MEASUREMENT OF THE DIFFUSION AND TRANSMISSION OF LIGHT

1. EQUIPMENT (see figure)

The beam of a collimator K with a half divergence $\beta/2 = 17,4 \times 10^4$ rd is limited by a diaphragm D_t with an opening of 6 mm against which the sample stand is placed.

A convergent achromatic lens L_2 , corrected for spherical aberrations links the diaphragm D_t with the receiver R; the diameter of the lens L_2 shall be such that it does not diaphragm the light diffused by the sample in a cone with a half top angle of $\beta/2 = 14^\circ$.

An annular diaphragm D_D , with angles $\alpha/2 = 1^\circ$ and $\alpha_{\max}/2 = 12^\circ$ is placed in an image focal plane of the lens L_2 .

The non-transparent central part of the diaphragm is necessary in order to eliminate the light arriving directly from the light source. It shall be possible to remove the central part of the diaphragm from the light beam in such a manner that it returns exactly to its original position.

The distance $L_2 D_t$ and the focal length F_2 ⁽¹⁾ of the lens L_2 shall be so chosen that the image of D_t completely covers the receiver R.

When the initial incident flux is referred to 1 000 units, the absolute precision of each reading shall be better than 1 unit.

2. MEASUREMENTS

The following readings shall be taken:

Reading	With sample	With central part of D_D	Quantity represented
T_1	no	no	Incident flux in initial reading
T_2	yes (before test)	no	Flux transmitted by the new material in a field of 24°
T_3	yes (after test)	no	Flux transmitted by the tested material in a field of 24°
T_4	yes (before test)	yes	Flux diffused by the new material
T_5	yes (after test)	yes	Flux diffused by the tested material

⁽¹⁾ For L_2 it is recommended to use a focal distance of about 80 mm.

APPENDIX 3

SPRAY TESTING METHOD

1. Test equipment

1.1. Spray gun

The spray gun used shall be equipped with a nozzle 1,3 mm in diameter allowing a liquid flow rate of $0,24 \pm 0,02$ l/minute at an operating pressure of 6,0 bars – 0, + 0,5 bar.

Under these operation conditions the fan pattern obtained shall be 170 mm $\pm$ 50 mm in diameter on the surface exposed to deterioration, at a distance of 380 mm $\pm$ 10 mm from the nozzle.

1.2. Test mixture

The test mixture shall be composed of:

Silica sand of hardness 7 on the Mohr scale, with a grain size between 0 and 0,2 mm and an almost normal distribution, with an angular factor of 1,8 to 2;

Water of hardness not exceeding 205 g/m³ for a mixture comprising 25 g of sand per litre of water.

2. Test

The outer surface of the lamp lenses shall be subjected once or more than once to the action of the sand jet produced as described above. The jet shall be sprayed almost perpendicular to the surface to be tested.

The deterioration shall be checked by means of one or more samples of glass placed as a reference near the lenses to be tested. The mixture shall be sprayed until the variation in the diffusion of light on the sample or samples measured by the method described in appendix 2, is such that:

$$\Delta d = \frac{T_5 - T_4}{T_2} = 0,0250 \pm 0,0025$$

Several reference samples may be used to check that the whole surface to be tested has deteriorated homogeneously.

APPENDIX 4

ADHESIVE TAPE ADHERENCE TEST**1. PURPOSE**

This method allows to determine under standard conditions the linear force of adhesion of an adhesive tape to a glass plate.

2. PRINCIPLE

Measurement of the force necessary to unstick an adhesive tape from a glass plate at an angle of 90°.

3. SPECIFIED ATMOSPHERIC CONDITIONS

The ambient conditions shall be at $23\text{ °C} \pm 5\text{ °C}$ and 65 ± 15 per cent RH.

4. TEST PIECES

Before the test, the sample roll of adhesive tape shall be conditioned for 24 hours in the specified atmosphere (see para. 3 above).

Five test pieces each 400 mm long shall be tested from each roll. These test pieces shall be taken from the roll after the first three turns were discarded.

5. PROCEDURE

The test shall be under the ambient conditions specified in paragraph 3.

Take the five test pieces while unrolling the tape radially at a speed of approximately 300 mm/s, then apply them within 15 seconds in the following manner:

Apply the tape to the glass plate progressively with a slight length-wise rubbing movement of the finger, without excessive pressure, in such a manner as to leave no air bubble between the tape and the glass plate.

Leave the assembly in the specified atmospheric conditions for 10 minutes.

Unstick about 25 mm of the test piece from the plate in a plane perpendicular to the axis of the test piece.

Fix the plate and fold back the free end of the tape at 90°. Apply force in such a manner that the separation line between the tape and the plate is perpendicular to this force and perpendicular to the plate.

Pull to unstick at a speed of $300\text{ mm/s} \pm 30\text{ mm/s}$ and record the force required.

6. RESULTS

The five values obtained shall be arranged in order and the median value taken as a result of the measurement. This value shall be expressed in Newtons per centimetre of width of the tape.

ANNEX 7

MINIMUM REQUIREMENTS FOR SAMPLING BY AN INSPECTOR

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometrical standpoint in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations. This condition also applies to colour.

1.2. With respect to photometric performances, the conformity of mass-produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random and equipped with a standard filament lamp:

1.2.1. no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation. For values B 50 L (or R) and zone III, the maximum unfavourable deviation may be respectively:

B 50 L (or R):	0,2 lx equivalent 20 per cent
	0,3 lx equivalent 30 per cent
Zone III	0,3 lx equivalent 20 per cent
	0,45 lx equivalent 30 per cent

1.2.2. or if

1.2.2.1. for the passing beam, the values prescribed in this Regulation are met at HV (with a tolerance of 0,2 lx) and related to that aiming at least one point of each area delimited on the measuring screen (at 25 m) by a circle 15 cm in radius around points B 50 L (or R) (with a tolerance of 0,1 lx), 75 R (or L), 50 V, 25 R, 25 L, and in the entire area of zone IV which is not more than 22,5 cm above line 25 R and 25 L;

1.2.2.2. and if, for the driving beam, HV being situated within the isolux $0,75 E_{\max}$, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraph 6.3.2 of this Regulation. The reference mark is disregarded.

1.2.3. If the results of the test described above do not meet the requirements, the alignment of the headlamp may be changed, provided that the axis of the beam is not displaced laterally by more than 1° to the right or left ⁽¹⁾.

1.2.4. If the results of the tests described above do not meet the requirements, tests shall be repeated using another standard filament lamp.

1.2.5. Headlamps with apparent defects are disregarded.

1.2.6. The reference mark is disregarded.

2. FIRST SAMPLING

In the first sampling four headlamps are selected at random. The first sample of two is marked A, the second sample of two is marked B.

2.1. The conformity is not contested

Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall not be contested if the deviations of the measured values of the headlamps in the unfavourable directions are:

⁽¹⁾ See footnote 11 in the text of this Regulation.

2.1.1.1. sample A

A1:	one headlamp		0 per cent
	one headlamp	not more than	20 per cent
A2:	both headlamps	more than	0 per cent
	but	not more than	20 per cent
	go to sample B		

sample B

B1:	both headlamps		0 per cent
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2.1.2. or if the conditions of paragraph 1.2.2 for sample A are fulfilled.

2.2. The conformity is contested

Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the headlamps are:

2.2.1.1. sample A

A3:	one headlamp	not more than	20 per cent
	one headlamp	more than	20 per cent
	but	not more than	30 per cent

2.2.1.2. sample B

B2:	in the case of A2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	not more than	20 per cent
B3:	in the case of A2		
	one headlamp		0 per cent
	one headlamp	more than	20 per cent
	but	not more than	30 per cent

2.2.2. or if the conditions of paragraph 1.2.2 for sample A are not fulfilled.

2.3. Approval withdrawn

Conformity shall be contested and paragraph 11 applied if, following the sampling procedure shown in Figure 1 of this annex, the deviations of the measured values of the headlamps are:

2.3.1. sample A

A4:	one headlamp	not more than	20 per cent
	one headlamp	more than	30 per cent
A5:	Both headlamps	more than	20 per cent

2.3.2. sample B

B4:	in the case of A2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	more than	20 per cent
B5:	in the case of A2		
	both headlamps	more than	20 per cent
B6:	in the case of A2		
	one headlamp		0 per cent
	one headlamp	more than	30 per cent

2.3.3. or if the conditions of paragraph 1.2.2 for samples A and B are not fulfilled.

3. REPEATED SAMPLING

In the case of A3, B2, B3 a repeated sampling, third sample C of two headlamps, selected from stock manufactured after alignment, is necessary within two months' time after the notification.

3.1. The conformity is not contested

Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall not be contested if the deviations of the measured values of the headlamps are:

3.1.1.1. sample C

C1:	one headlamp		0 per cent
	one headlamp	not more than	20 per cent
C2:	both headlamps	more than	0 per cent
	but	not more than	20 per cent
	go to sample D		

sample D

D1:	in the case of C2		
	both headlamps		0 per cent

3.1.2. or if the conditions of paragraph 1.2.2 for sample C are fulfilled.

3.2. The conformity is contested

Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the headlamps are:

3.2.1.1. sample D

D2: in the case of C2

one headlamp	more than	0 per cent
but	not more than	20 per cent
one headlamp	not more than	20 per cent

3.2.1.2. or if the conditions of paragraph 1.2.2 for sample C are not fulfilled.

3.3. Approval withdrawn

Conformity shall be contested and paragraph 11 applied if, following the sampling procedure shown in Figure 1 of this annex, the deviations of the measured values of the headlamps are:

3.3.1. sample C

C3: one headlamp	not more than	20 per cent
one headlamp	more than	20 per cent
C4: both headlamps	more than	20 per cent

3.3.2. sample D

D3: in the case of C2

one headlamp	0 or more than	0 per cent
one headlamp	more than	20 per cent

3.3.3. or if the conditions of paragraph 1.2.2 for samples C and D are not fulfilled.

4. CHANGE OF THE VERTICAL POSITION OF THE CUT-OFF LINE

With respect to the verification of the change in vertical position of the cut-off line under the influence of heat, the following procedure shall be applied:

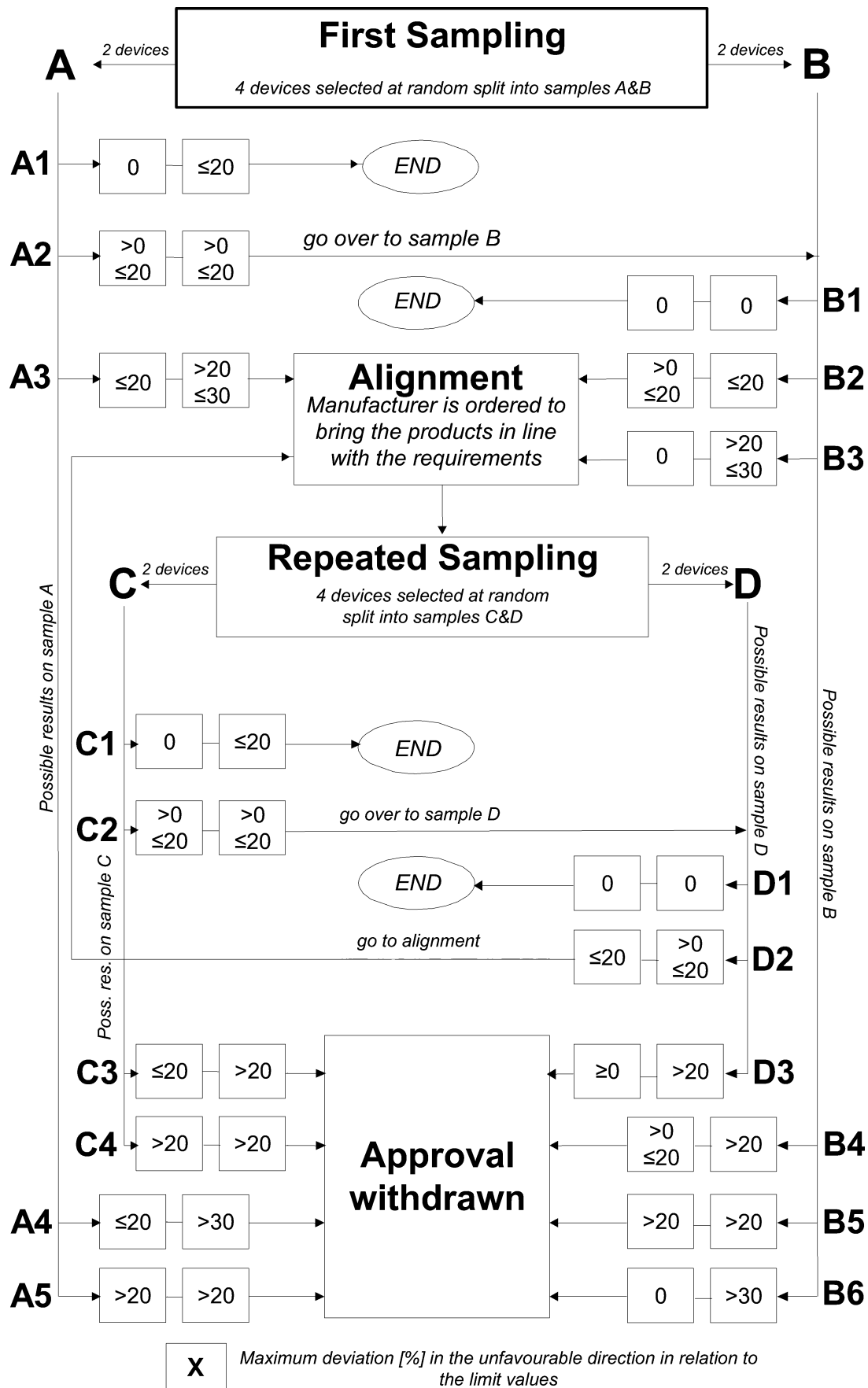
One of the headlamps of sample A after sampling procedure in Figure 1 of this annex shall be tested according to the procedure described in paragraph 2.1 of annex 4 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 4.

The headlamp shall be considered as acceptable if Δr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, the second headlamp of sample A shall be subjected to the test after which the mean of the absolute values recorded on both samples shall not exceed 1,5 mrad.

However, if this value of 1,5 mrad on sample A is not complied with, the two headlamps of sample B shall be subjected to the same procedure and the value of Δr for each of them shall not exceed 1,5 mrad.

Figure 1



ANNEX 8

OVERVIEW OF OPERATIONAL PERIODS CONCERNING TEST FOR STABILITY OF PHOTOMETRIC PERFORMANCE

Abbreviations:

P: passing beam lamp

D: driving beam lamp ($D_1 + D_2$ means two driving beams)

F: front fog lamp

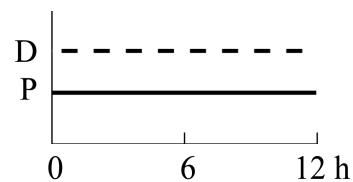
- - - - - : means a cycle of 15 minutes off and 5 minutes lit

All following grouped headlamps and front fog lamps together with the added class B marking symbols are given as examples and are not exhaustive.

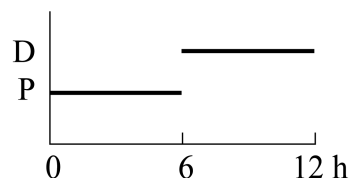
1. P or D or F (HC or HR or B)



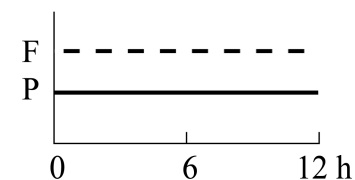
2. P+D (HCR) or P+ D_1 + D_2 (HCR HR)



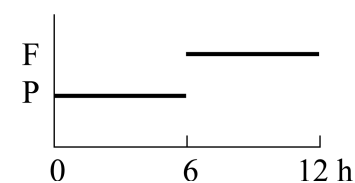
3. P+D (HC/R) or P+ D_1 + D_2 (HC/R HR)



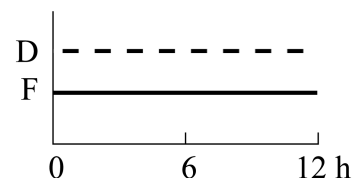
4. P+F (HC B)



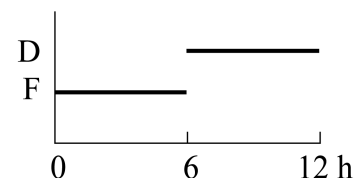
5. P+F (HC B)



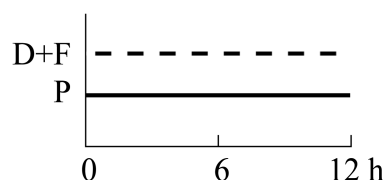
6. $D+F$ (HR B) or D_1+D_2+F (HR HR B)



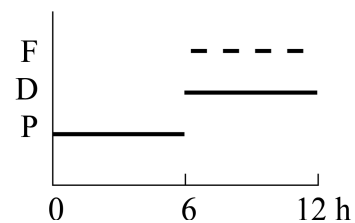
7. $D+F$ (HR B/) or D_1+D_2+F (HR HR B/)



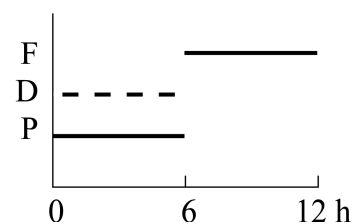
8. $P+D+F$ (HCR B) or $P+D_1+D_2+F$ (HCR HR B)



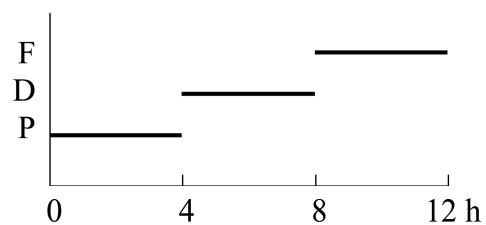
9. $P+D+F$ (HC/R B) or $P+D_1+D_2+F$ (HC/R HR B)



10. $P+D+F$ (HCR B/) or $P+D_1+D_2+F$ (HCR HR B/)



11. $P+D+F$ (HC/R B/) or $P+D_1+D_2+F$ (HC/R HR B/)



Regulation No 113 of the Economic Commission for Europe of the United Nations (UN/ECE) — Uniform provisions concerning the approval of motor vehicle headlamps emitting a symmetrical passing beam or a driving beam or both and equipped with filament lamps (*)

A. ADMINISTRATIVE PROVISIONS

0. SCOPE

This Regulation applies to motor vehicle headlamps emitting a symmetrical passing beam and/or driving beam, which may incorporate lenses of glass or plastic material and which are equipped with replaceable filament lamps ⁽¹⁾ ⁽²⁾.

1. DEFINITIONS

For the purpose of this Regulation,

- 1.1. 'Lens' means the outermost component of the headlamp (unit) which transmits light through the illuminating surface;
- 1.2. 'Coating' means any product or products applied in one or more layers to the outer face of a lens;
- 1.3. 'Headlamps of different "types"' mean headlamps which differ in such essential respects as:
 - 1.3.1. the trade name or mark;
 - 1.3.2. the characteristics of the optical system;
 - 1.3.3. the inclusion or elimination of components capable of altering the optical effects by reflection, refraction, absorption and/or deformation during operation;
 - 1.3.4. the kind of beam produced (passing beam, driving beam or both);
 - 1.3.5. the materials constituting the lenses and coating, if any;
 - 1.3.6. the category of filament lamp used;
- 1.4. 'Headlamps of different "Classes" (A or B or C or D)' means headlamps identified by particular photometric provisions.

(*) Incorporating:

Supplement 1 to the original version of the Regulation — Date of entry into force: 11 August 2002.

Corrigendum 1 to the original version of the Regulations — Date of entry into force: 13 November 2002.

Supplement 2 to the original version of the Regulation — Date of entry into force: 27 February 2004.

Corrigendum 1 to Supplement 2 to the original version of the Regulations — Date of entry into force: 10 March 2004.

⁽¹⁾ Application of headlamps is given in the relevant regulations on the installation of lighting and light-signalling devices.

⁽²⁾ Nothing in this Regulation shall prevent a Party to the Agreement applying this Regulation from prohibiting the combination of a headlamp incorporating a lens of plastic material approved under this Regulation with a mechanical headlamp-cleaning device (with wipers).

2. APPLICATION FOR APPROVAL OF A HEADLAMP
 - 2.1. The application for approval shall be submitted by the owner of the trade name or mark or by his duly accredited representative. It shall specify:
 - 2.1.1. whether the headlamp is intended to provide both a passing beam and a driving beam or only one of these beams;
 - 2.1.2. whether it concerns a Class A or B or C or D headlamp;
 - 2.1.3. the category of the filament lamp(s) used, as listed in Regulation No 37.
 - 2.2. Every application for approval shall be accompanied by:
 - 2.2.1. drawings in triplicate in sufficient detail to permit identification of the type and representing a frontal view of the headlamp, with details of lens ribbing if any, and the cross-section; the drawings shall indicate the space reserved for the approval mark;
 - 2.2.2. a brief technical description;
 - 2.2.3. two samples of the type of headlamp;
 - 2.2.4. for Class B or C or D headlamps only, for the test of plastic material of which the lenses are made:
 - 2.2.4.1. thirteen lenses;
 - 2.2.4.1.1. six of these lenses may be replaced by six samples of material at least 60 × 80 mm in size, having a flat or convex outer surface and a substantially flat area (radius of curvature not less than 300 mm) in the middle measuring at least 15 × 15 mm;
 - 2.2.4.1.2. every such lens or sample of material shall be produced by the method to be used in mass production;
 - 2.2.4.2. a reflector to which the lenses can be fitted in accordance with the manufacturer's instructions.
 - 2.3. The materials making up the lenses and coatings, if any, shall be accompanied by the test report of the characteristics of these materials and coatings if they have already been tested.
3. MARKINGS
 - 3.1. Headlamps submitted for approval shall bear the trade name or mark of the applicant.
 - 3.2. They shall comprise, on the lens and on the main body ⁽¹⁾ ⁽²⁾, spaces of sufficient size for the approval mark and the additional symbols referred to in paragraph 4; these spaces shall be indicated on the drawings referred to in paragraph 2.2.1 above.
 - 3.3. On the back of the headlamp the indication of the category of filament lamp used.

⁽¹⁾ The reflector is considered as main body.

⁽²⁾ If the lens cannot be detached from the main body of the headlamp, a unique marking as per paragraph 4.2.5 shall be sufficient.

4. APPROVAL
- 4.1. General
- 4.1.1. If all the samples of a type of headlamp submitted pursuant to paragraph 2 above satisfy the provisions of this Regulation, approval shall be granted.
- 4.1.2. Where grouped, combined or reciprocally incorporated lamps satisfy the requirements of more than one Regulation, a single international approval mark may be affixed provided that each of the grouped, combined or reciprocally incorporated lamps satisfies the provisions applicable to it.
- 4.1.3. An approval number shall be assigned to each type approved. Its first two digits (at present 00) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of headlamp covered by this Regulation.
- 4.1.4. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a type of headlamp pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement applying this Regulation, by means of a form conforming to the model in annex 1 to this Regulation.
- 4.1.5. In addition to the mark prescribed in paragraph 3.1, an approval mark as described in paragraphs 4.2 and 4.3 below shall be affixed in the spaces referred to in paragraph 3.2 above to every headlamp conforming to a type approved under this Regulation.
- 4.2. Composition of the approval mark
- The approval mark shall consist of:
- 4.2.1. An international approval marking, comprising:
- 4.2.1.1. a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽¹⁾;
- 4.2.1.2. the approval number prescribed in paragraph 4.1.3 above;
- 4.2.2. the following additional symbol:
- 4.2.2.1. a horizontal arrow with a head on each end, pointing to the left and to the right;
- 4.2.2.2. on headlamps meeting the requirements of this Regulation in respect of the passing beam only, the letters 'C-AS' for Class A headlamps or 'C-BS' for Class B headlamps or 'WC-CS' for Class C headlamp or 'WC-DS' for Class D headlamp;

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

- 4.2.2.3. on headlamps meeting the requirements of this Regulation in respect of the driving beam only, 'R-BS' for Class B headlamps or 'WR-CS' for Class C headlamp or 'WR-DS' for Class D headlamp;
- 4.2.2.4. on headlamps meeting the requirements of this Regulation in respect of both the passing beam and the driving beam, the letters 'CR-BS' for Class B headlamps or 'WCR-CS' for Class C headlamp or 'WCR-DS' for Class D headlamp;
- 4.2.2.5. on headlamps incorporating a lens of plastic material, the group of letters 'PL' to be affixed near the symbols prescribed in paragraphs 4.2.1 and 4.2.2 above.
- 4.2.2.6. on Class D headlamps meeting the requirements of this Regulation in respect of the driving beam, an indication of the maximum luminous intensity expressed by a reference mark, as defined in paragraph 6.3.2.1.2 below, placed near the circle surrounding the letter 'E';
- 4.2.3. In every case the relevant operating mode used during the test procedure according to paragraph 1.1.1.1 of annex 4 and the permitted voltage(s) according to paragraph 1.1.1.2 of annex 4 shall be stipulated on the approval forms and on the communication forms transmitted to the countries which are Contracting Parties to the Agreement and which apply this Regulation.

In the corresponding cases the device shall be marked as follows:

- 4.2.3.1. on headlamps meeting the requirements of this Regulation which are so designed that the filament of the passing beam shall not be lit simultaneously with that of any other lighting function with which it may be reciprocally incorporated: an oblique stroke (/) shall be placed behind the passing lamp symbol in the approval mark.
- 4.2.4. The two digits of the approval number (at present 00) which indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval and the arrow defined in paragraph 4.2.2.1 may be marked close to the above additional symbols.
- 4.2.5. The marks and symbols referred to in paragraphs 4.2.1 to 4.2.3 above shall be clearly legible and be indelible. They may be placed on an inner or outer part (transparent or not) of the headlamp, which cannot be separated from the transparent part of the headlamp emitting the light. In any case they shall be visible when the headlamp is fitted on the vehicle or when a movable part such as the hood is opened.
- 4.3. Arrangement of the approval mark
- 4.3.1. Annex 2, figures 1 to 10, to this Regulation gives examples of arrangements of the approval mark with the above-mentioned additional symbols.
- 4.3.2. Grouped, combined or reciprocally incorporated lamps:
 - 4.3.2.1. Where grouped, combined or reciprocally incorporated lamps have been found to comply with the requirements of several Regulations, a single international approval mark may be affixed, consisting of a circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted the approval, and an approval number. This approval mark may be located anywhere on the grouped, combined or reciprocally incorporated lamps, provided that:
 - 4.3.2.1.1. it is visible after their installation;
 - 4.3.2.1.2. no part of the grouped, combined or reciprocally incorporated lamps that transmits light can be removed without at the same time removing the approval mark.

- 4.3.2.2. The identification symbol for each lamp appropriate to each Regulation under which approval has been granted, together with the corresponding series of amendments incorporating the most recent major technical amendments to the Regulation at the time of issue of the approval, and if necessary, the required arrow shall be marked:
 - 4.3.2.2.1. either on the appropriate light-emitting surface,
 - 4.3.2.2.2. or in a group, in such a way that each of the grouped, combined or reciprocally incorporated lamps may be clearly identified.
- 4.3.2.3. The size of the components of a single approval mark shall not be less than the minimum size required for the smallest of the individual marks by the Regulation under which approval has been granted.
- 4.3.2.4. An approval number shall be assigned to each type approved. The same Contracting Party may not assign the same number to another type of grouped, combined or reciprocally incorporated lamps covered by this Regulation.
- 4.3.2.5. Annex 2, figure 11, to this Regulation gives examples of arrangements of approval marks for grouped, combined or reciprocally incorporated lamps with all the above-mentioned additional symbols.
- 4.3.3. Lamps, the lens of which are used for different types of headlamps and which may be reciprocally incorporated or grouped with other lamps:

The provisions laid down in paragraph 4.3.2 above are applicable.

- 4.3.3.1. In addition, where the same lens is used, the latter may bear the different approval marks relating to the different types of headlamps or units of lamps, provided that the main body of the headlamp, even if it cannot be separated from the lens, also comprises the space described in paragraph 3.2 above and bears the approval marks of the actual functions. If different types of headlamps comprise the same main body, the latter may bear the different approval marks.
- 4.3.3.2. Annex 2, figure 12, to this Regulation gives examples of arrangements of approval marks relating to the above case.

B. TECHNICAL REQUIREMENTS FOR HEADLAMPS ⁽¹⁾

5. GENERAL SPECIFICATIONS

- 5.1. Each sample shall conform to the specifications set forth in paragraphs 6 to 8 below.
- 5.2. Headlamps shall be so made as to retain their prescribed photometric characteristics and to remain in good working order when in normal use, in spite of the vibrations to which they may be subjected.
 - 5.2.1. Headlamps shall be fitted with a device enabling them to be so adjusted on the vehicles as to comply with the rules applicable to them. Such a device may or may not provide horizontal adjustment, provided that the headlamps are so designed that they can maintain a proper horizontal aiming even after the vertical aiming adjustment. Such a device need not be fitted on units in which the reflector and the diffusing lens cannot be separated, provided the use of such units is confined to vehicles on which the headlamp setting can be adjusted by other means.

Where a headlamp providing a passing beam and a headlamp providing a driving beam, each equipped with its own filament lamp, are assembled to form a composite unit the adjusting device shall enable each optical system individually to be duly adjusted.

⁽¹⁾ Technical requirements for filament lamps: see Regulation No. 37.

- 5.2.2. However, these provisions shall not apply to headlamp assemblies whose reflectors are indivisible. For this type of assembly the requirements of paragraph 6.3 of this Regulation apply.
- 5.3. The headlamp shall be equipped with filament lamp(s) approved according to Regulation No 37. Any Regulation No 37 filament lamp may be used, provided that:
- (a) no restriction on the application is made in the table of contents of that Regulation;
 - (b) for Class A and B, its reference luminous flux for dipped-beam does not exceed 600 mm;
 - (c) for Class C and D, its objective luminous flux for dipped-beam does not exceed 2 000 mm.
- 5.4. The components by which a filament lamp is fixed to the reflector shall be so made that, even in darkness, the filament lamp can be fixed in no position but the correct one ⁽¹⁾.
- 5.5. The filament lamp holder shall conform to the characteristics given in IEC Publication 61-2, third edition, 1969. The holder data sheet relevant to the category of filament lamp used, applies.
- 5.6. In addition, Class B or C or D headlamps shall be complementary tested according to the requirements of annex 4 to ensure that in use there is no excessive change in photometric performance.
- 5.7. If the lens of a Class B or C or D headlamp is of plastic material, tests shall be done according to the requirements of annex 6.
- 5.8. On headlamps designed to provide alternately a driving beam and a passing beam, any mechanical, electromechanical or other device incorporated in the headlamp for switching from one beam to the other shall be so constructed that:
- 5.8.1. the device is strong enough to withstand 50 000 operations without suffering damage despite the vibrations to which it may be subjected in normal use;
 - 5.8.2. in the case of failure it shall automatically obtain the passing beam position;
 - 5.8.3. either the passing beam or the driving beam shall always be obtained without any possibility of the mechanism stopping in between the two positions;
 - 5.8.4. the user cannot, with ordinary tools, change the shape or position of the moving parts.
6. ILLUMINATION
- 6.1. General provisions
- 6.1.1. Headlamps shall be so made that they give adequate illumination without dazzle when emitting the passing beam, and good illumination when emitting a driving beam.
 - 6.1.2. The illumination produced by the headlamp shall be determined by means of a vertical screen set up 25 m forward of the headlamp and at right angles to its axes as shown in annex 3 to this Regulation.
 - 6.1.3. Headlamps shall be checked by means of an uncoloured standard (étalon) filament lamp designed for a rated voltage as indicated in the relevant data sheet of Regulation No 37. During the checking of the headlamp, the voltage at the terminals of the filament lamp shall be regulated so as to obtain the reference luminous flux as indicated at the relevant data sheet of Regulation No 37.

⁽¹⁾ A headlamp is regarded as satisfying the requirements of this paragraph if the filament lamp can be easily fitted into the headlamp and the positioning lugs can be correctly fitted into their slots even in darkness.

- 6.1.4. The headlamp shall be considered acceptable if it meets the requirements of this paragraph 6 with at least one standard (étalon) filament lamp, which may be submitted with the headlamp.
- 6.2. Provisions concerning passing beams
- 6.2.1. The passing beam must produce a sufficiently sharp 'cut-off' to permit a satisfactory adjustment with its aid. The 'cut-off' must be substantially horizontal and as straight as possible over a horizontal length of at least $\pm 3^\circ$ for Class A, C and D headlamps and at least $\pm 5^\circ$ for Class B headlamps.
- 6.2.2. The headlamp shall be so aimed that:
- 6.2.2.1. laterally, the beam is as symmetrical as possible with the reference to line V-V, except for Class A or B headlamps that have no mechanism to adjust horizontal aim. Such headlamps shall be aligned so that they are in the same attitude as on the vehicle;
- 6.2.2.2. vertically, the headlamp shall be so aimed that the 'cut-off' is situated 250 mm below the line H-H. It shall be as horizontal as possible.
- 6.2.3. When so aimed, the headlamp need, if its approval is sought solely for provision of a passing beam ⁽¹⁾, comply only with the requirements set out in paragraphs 6.2.5 to 6.2.6 below; if it is intended to provide both a passing beam and a driving beam, it shall comply with the requirements set out in paragraphs 6.2.5, 6.2.6 and 6.3.
- 6.2.4. Where a headlamp so aimed does not meet the requirements set out in paragraphs 6.2.5, 6.2.6 and 6.3, its alignment may be changed, except for headlamps that have no mechanism to adjust horizontal aim, on condition that the axis of the beam is not displaced laterally by more than 1 degree (= 44 cm) to the right or left ⁽²⁾. To facilitate alignment by means of the 'cut-off', the headlamp may be partially occulted in order to sharpen the 'cut-off'. However, the 'cut-off' should not extend beyond the line H-H.
- 6.2.5. The illumination produced by the passing beam on the screens in annex 3 shall meet the following illumination requirements:
- 6.2.5.1. For Class A headlamps:

Any point on and above the line H-H:	$\leq 0,32$ lux
Any point on line 25L-25R	$\geq 1,28$ lux
Any point on line 12,5L-12,5R	$\geq 0,64$ lux

- 6.2.5.2. For Class B headlamps:

Any point on and above the line H-H:	$\leq 0,7$ lux
Any point on line 50L-50R except 50V ^(*)	$\geq 1,5$ lux
Point 50V	≥ 3 lux
Any point on line 25L-25R	≥ 3 lux
Any point in zone IV	$\geq 1,5$ lux
(*) ratio of intensities $\frac{50R}{50L} \geq 0,25$	

⁽¹⁾ Such a special 'passing beam' headlamp may incorporate a driving beam not subject to requirements.

⁽²⁾ The limit of realignment of 1° towards the right or left is not incompatible with upward or downward vertical realignment. The latter is limited only by the requirements of paragraph 6.3. (the provisions of paragraph 6.3 are not applicable to passing beam headlamps).

6.2.5.3. For Class C or D headlamp:

Test point/Line/zone	Position in B-b Grid in angular degrees Vertical b** Horizontal B**		Required illumination in lux at 25 m			
			Minimum		Maximum	
			Class D	Class C	Class D	Class C
			> 125cc	≤ 125cc	> 125cc	≤ 125cc
1	0,86 D	3,5 R	2,3		15,4	
2	0,86 D	0	5,8	2,9	—	
3	0,86 D	3,5 L	2,3		15,4	
4	0,50 U	1,50 L & 1,50 R	—		1,08	
6	2,00 D	15 L & 15 R	1,28	0,64	—	
7	4,00 D	20 L & 20 R	0,38	0,19	—	
8	0	0	—		1,92	
Line 11	2,00 D	9 L to 9 R	1,6		—	
Line 12	7,00 U	10 L to 10 R	—		0,3; but 0,96 if within 2° cone	
Line 13	10,00 U	10 L to 10 R	—		0,15; but 0,64 if within 2° cone	
Line 14	10 U to 90 U	0	—		0,15; but 0,64 if within 2° cone	
15*	4,00 U	8,0 L	0,1*		1,08	
16*	4,00 U	0	0,1*		1,08	
17*	4,00 U	8,0 R	0,1*		1,08	
18*	2,00 U	4,0 L	0,2*		1,08	
19*	2,00 U	0	0,2*		1,08	
20*	2,00 U	4,0 R	0,2*		1,08	
21*	0	8,0 L & 8,0 R	0,1*		—	
22*	0	4,0 L & 4,0 R	0,2*		1,08	
Zone 1	1U/8L-4U/8L-4U/8R-1U/8R-0/4R-0/1R-0,6U/0-0/1L-0/4L-1U/8L		—		1,08	
Zone 2	> 4 U to < 10 U	10 L to 10 R	—		0,3; but 0,96 if within 2° cone	
Zone 3	10 U to 90 U	10 L to 10 R	—		0,15; but 0,64 if within 2° cone	

Notes:

'D' means under the H-H line.

'U' means above the H-H line.

'R' means right of the V-V line.

'L' means left of the V-V line.

* During measurement of these points, the front position lamp approved to ECE Regulation No 50; if combined, grouped, or reciprocally incorporated-shall be switched on.

** 0,25° tolerance allowed independently at each test point for photometry unless indicated otherwise.

Other general text:

ECE type approval at reference luminous flux according to Regulation No 37 or at objective luminous flux for gas-discharge light sources according to Regulation No 99.

Nominal aim for photometry:

Vertical: 1 per cent D (0,57 °D)

Horizontal: 0°

Allowed tolerances for photometry:

Vertical: 0,3 °D to 0,8 °D

Horizontal: ± 0,5 °D L-R

- 6.2.6. The light shall be as evenly distributed as possible within zones 1, 2, and 3 for Class C or D headlamps.

- 6.3. Provisions concerning driving beams

- 6.3.1. In the case of a headlamp designed to provide a driving beam and a passing beam, measurements of the illumination produced on the screen by the driving beam shall be taken with the same headlamp alignment as applied to the condition of paragraphs 6.2 above; in the case of a headlamp providing a driving beam only, it shall be so adjusted that the area of maximum illumination is centred on the point of intersection of lines H-H and V-V; such a headlamp need meet only the requirements referred to in paragraph 6.3.

- 6.3.2. Except for Class A headlamp, the illumination produced on the screen by the driving beam shall meet the following requirements:

- 6.3.2.1. The point of intersection (HV) of lines H-H and V-V shall be situated within the isolux 80 per cent of maximum illumination. This maximum value (E_M) shall not be less than 32 lux for Class B or C headlamps and 51.2 lux for Class D headlamps. The maximum value shall in no circumstances exceed 240 lux in the case of Class B headlamps and 180 lux in the case of Class C and D headlamps.

- 6.3.2.1.1. The maximum intensity (I_M) of the driving beam expressed in thousands of candelas shall be calculated by the formula:

$$I_M = 0,625E_M$$

- 6.3.2.1.2. The reference mark (I'_M) of this maximum intensity, referred to in paragraph 4.2.2.6 above, shall be obtained by the ratio:

$$I'_M = \frac{I_M}{3} = 0,208E_M$$

This value shall be rounded off to the value 7,5 — 10 — 12,5 — 17,5 — 20 — 25 — 27,5 — 30 — 37,5 — 40 — 45 — 50.

- 6.3.2.2. Starting from point HV, horizontally to the right and left, the illumination shall be not less than 12 lux for Class B and C headlamp, and 24 lux for Class D headlamp to a distance of 1 125 mm and not less than 3 lux for Class B and C headlamp, and 6 lux for Class D headlamp to a distance of 2 250 mm.

In the case of a Class C and D headlamp, the intensities shall conform to the tables A or B in annex 3. Table A applies in the case where a primary driving beam is being produced with a single light source. Table B applies in the case where the driving beam is being produced by a secondary driving beam headlamp operated with a harmonized passing beam headlamp or a primary driving beam headlamp.

- 6.4. In the case of headlamps with an adjustable reflector, additional tests shall be made after the reflector has been moved vertically ± 2 degrees or at least into the maximum position, if less than 2 degrees, from its initial position by means of the headlamp adjusting device. The whole headlamp shall then be re-positioned (for example by means of the goniometer) by moving it through the same number of degrees in the opposite direction to the movement of the reflector. The following measurements shall be made and the points shall be within the required limits:

passing beam: points HV and 0.86D-V

driving beam: I_M and point HV (percentage of I_M).

- 6.5. The screen illumination values mentioned in paragraphs 6.2 and 6.3 above shall be measured by means of a photoreceptor, the effective area of which shall be contained within a square of 65 mm side.

7. COLOUR

- 7.1. The colour of the light emitted shall be white. Expressed in CIE trichromatic coordinates, the light of the beams shall be within the following boundaries:

limit towards blue	$x \geq 0,310$
limit towards yellow	$x \leq 0,500$
limit towards green	$y \leq 0,150 + 0,640 x$
limit towards green	$y \leq 0,440$
limit towards purple	$y \geq 0,050 + 0,750 x$
limit towards red	$y \geq 0,382$

C. FURTHER ADMINISTRATIVE PROVISIONS

8. MODIFICATION OF THE HEADLAMP TYPE AND EXTENSION OF APPROVAL

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

8.1.1. consider that the modifications made are unlikely to have appreciable adverse effects and that in any event the headlamp still complies with the requirements; or

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

- 8.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 4.1.4 above to the Parties to the Agreement which apply this Regulation.

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

9. CONFORMITY OF PRODUCTION

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

- 9.1. Headlamps approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 6 and 7.

- 9.2. The minimum requirements for conformity of production control procedures set forth in annex 5 to this Regulation shall be complied with.

- 9.3. The minimum requirements for sampling by an inspector set forth in annex 7 to this Regulation shall be complied with.

- 9.4. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.

- 9.5. Headlamps with apparent defects are disregarded.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

10.1. The approval granted in respect of a type of headlamp pursuant to this Regulation may be withdrawn if the requirements are not complied with or if a headlamp bearing the approval mark does not conform to the type approved.

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

11. PRODUCTION DEFINITELY DISCONTINUED

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

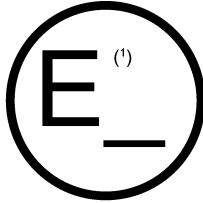
12. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

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

ANNEX 1

COMMUNICATION

(Maximum format: A4 (210 × 297 mm))



issued by:

Name of administration:

.....

.....

.....

concerning ⁽²⁾:

APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of a type of headlamp pursuant to Regulation No:

Approval No.:

Extension No.:

1. Trade name or mark of the device:
2. Manufacturer's name for the type of device:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative:
5. Submitted for approval on:
6. Technical service responsible for conducting approval tests:
7. Date of report issued by that service:
8. Number of report issued by that service:
9. Brief description:

Category as described by the relevant marking ⁽³⁾:

Number and category(ies) of filament lamp(s):
10. Approval mark position:
11. Reason(s) for extension of approval:
12. Approval granted/extended/refused/withdrawn ⁽²⁾:
13. Place:
14. Date:
15. Signature:
16. The list of documents deposited with the Administrative Service which has granted approval is annexed to this communication and may be obtained on request.

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

⁽²⁾ Strike out which does not apply.

⁽³⁾ Indicate the appropriate marking selected from the list below:

C-AS,	C-BS,	R-BS,	CR-BS,	C/-BS,	C/R-BS,
C-BS PL,	R-BS PL,	CR-BS PL,	C/-BS PL,	C/R-BS PL,	
WC-CS,	WC-DS,	WR-CS,	WR-DS,	WCR-CS,	WCR-DS,
WC/-CS,	WC/-DS,	WC/R-CS,	WC/R-DS,	WC-CS PL,	
WC-DS PL,	WR-CS PL,	WR-DS PL,	WCR-CS PL,	WCR-DS PL,	
WC/-CS PL,	WC/-DS PL,	WC/R-CS PL,	WC/R-DS PL,		
WC+CS,	WC+DS,	WC+R-CS,	WC+R-DS,	C+BS,	C+R-BS,
WC+CS PL,	WC+DS PL,	WC+R-CS PL,	WC+R-DS PL,	C+BS PL,	C+R-BS PL

ANNEX 2

EXAMPLES OF ARRANGEMENT OF APPROVAL MARKS

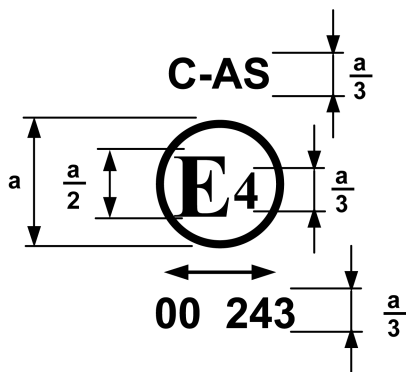


Figure 1

$a \geq 5$ mm for Class A headlamp



Figure 2

$a \geq 8$ mm for Class B, C and D headlamp

The headlamp bearing one of the above approval marks has been approved in the Netherlands (E 4) pursuant to Regulation No ... under approval number 243, meeting the requirements of this Regulation in its original form (00). The letters C-AS (Figure 1) indicate that it concerns a Class A passing beam headlamp and the letters CR-BS (Figure 2) indicate that it concerns a Class B passing and driving beam headlamp.

Note: The approval number and additional symbols shall be placed close to the circle and either above or below the letter 'E', or to the right or left of that letter. The digits of the approval number shall be on the same side of the letter 'E' and face in the same direction.

The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.



Figure 3



Figure 4

The headlamp bearing the above approval mark is a headlamp incorporating a lens of plastic material meeting the requirements of this Regulation and is designed:

Figure 3: Class B in respect of the passing beam only.

Figure 4: Class B in respect of the passing beam and driving beam.

C/R-BS

Figure 5

C/-BS

Figure 6

The headlamp bearing the above approval mark is a headlamp meeting the requirements of this Regulation:

Figure 5: Class B in respect of the passing beam and driving beam.

Figure 6: Class B in respect of the passing beam only.

The passing beam shall not be operated simultaneously with the driving beam and/or another reciprocally incorporated headlamp.

WC-CS PL

Figure 7

WCR-CS PL

Figure 8

The headlamp bearing the above approval mark is a headlamp incorporating a lens of plastic material meeting the requirements of this Regulation and is designed:

Figure 7: Class C in respect of the passing beam only.

Figure 8: Class C in respect of the passing beam and driving beam.

WC-DS PL

Figure 9

WCR-DS PL

Figure 10

The headlamp bearing the above approval mark is a headlamp meeting the requirements of this Regulation:

Figure 9: Class D in respect of the passing beam and driving beam.

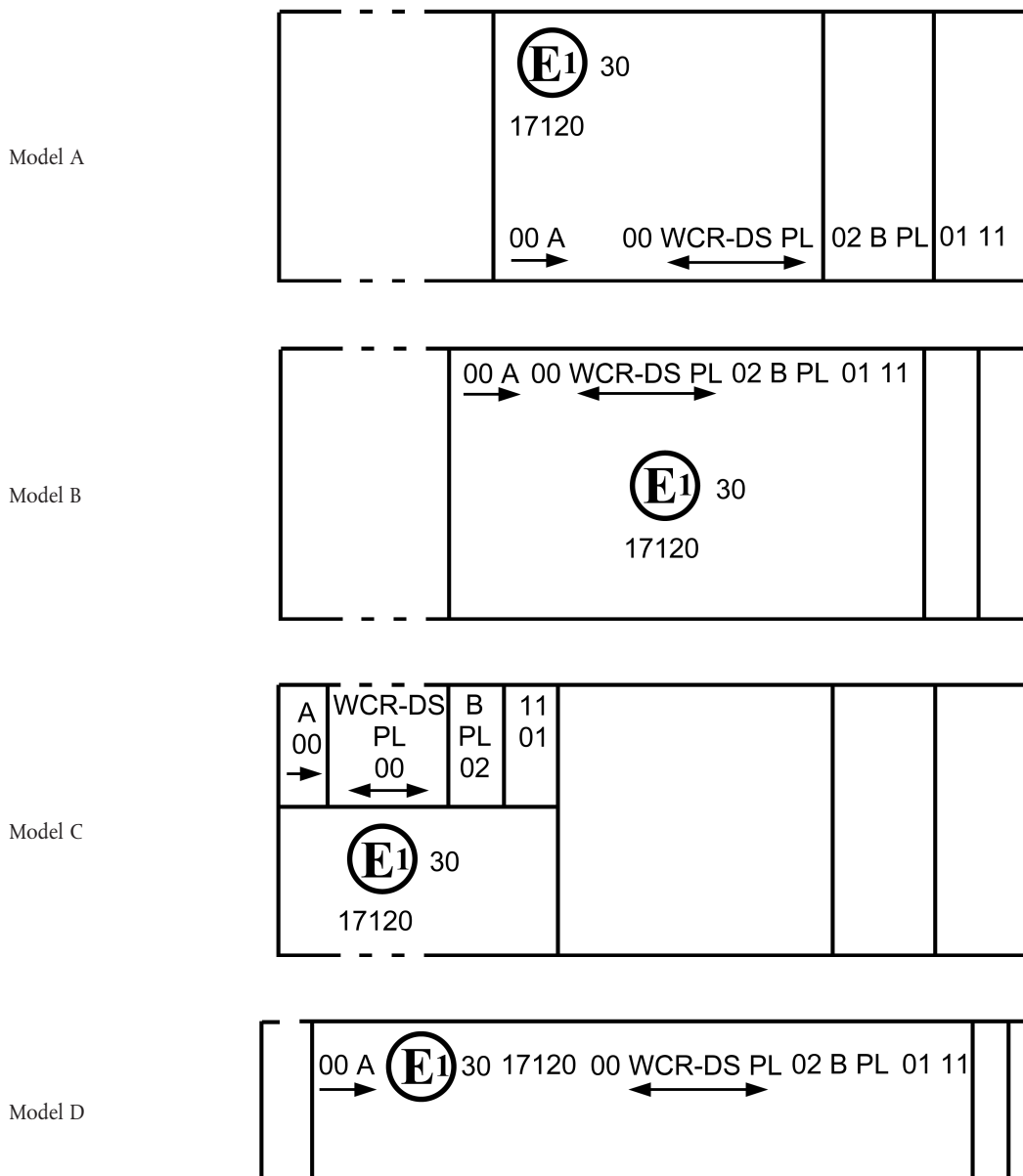
Figure 10: Class D in respect of the passing beam only.

The passing beam shall not be operated simultaneously with the driving beam and/or another reciprocally incorporated headlamp.

Simplified marking for grouped, combined or reciprocally incorporated lamps

Figure 11

(The vertical and horizontal lines schematize the shape of the light-signalling device. They are not part of the approval mark).



Note: The four examples above correspond to a lighting device bearing an approval mark comprising:

A front position lamp approved in accordance with Regulation No 50 in its original form (00),

A headlamp, Class D, with a passing beam and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas (as indicated by the number 30), approved in accordance with the requirements of this Regulation in its original form (00) and incorporating a lens of plastic material,

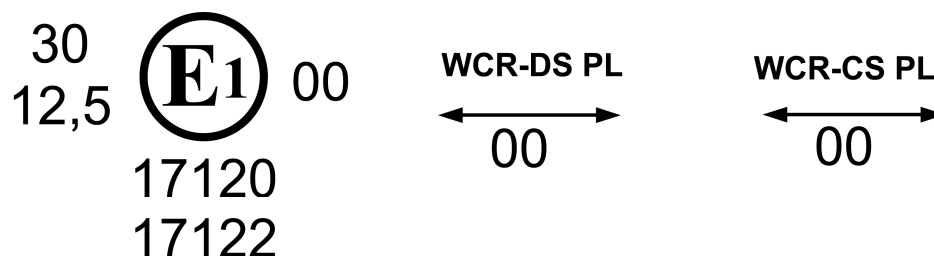
A front fog lamp approved in accordance with the 02 series of amendments to Regulation No 19 and incorporating a lens of plastic material,

A front direction indicator lamp of category 11 approved in accordance with the 01 series of amendments to Regulation No 50.

Lamp reciprocally incorporated with a headlamp

Figure 12

Example 1



The above example corresponds to the marking of a lens of plastic material intended to be used in different types of headlamps, namely:

- Either* A headlamp, Class D, with a passing and a driving beam with a maximum luminous intensity comprised between 86 250 and 101 250 candelas (as indicated by the number 30), approved in Germany (E1) in accordance with the requirements of this Regulation in its original form (00), which is reciprocally incorporated with a front position lamp approved in accordance with Regulation No 50 in its original form (00);
- Or* A headlamp, Class C, with a passing beam and a driving beam with a maximum luminous intensity comprised between 33 750 cd and 45 000 cd (as indicated by the number 12,5), approved in Germany (E1) in accordance with the requirements of this Regulation in its original form (00), which is reciprocally incorporated with the same front position lamp as above;

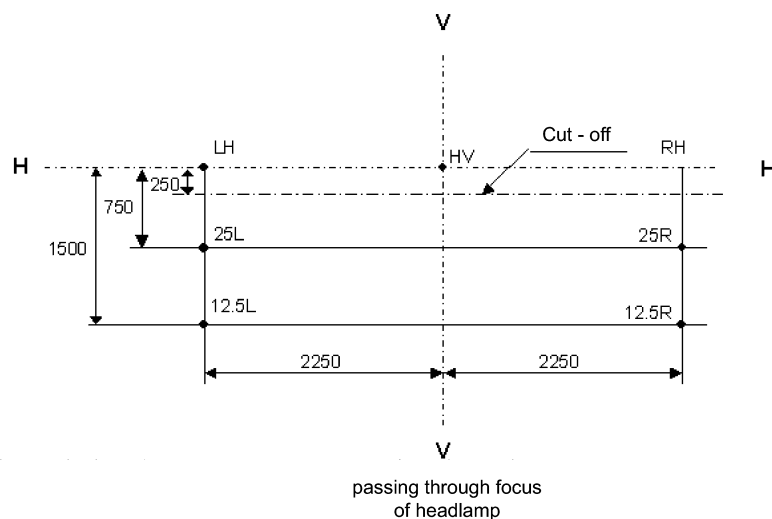
ANNEX 3

MEASURING SCREEN

for Class A headlamps

(Dimensions in mm with screen at 25 m distance)

Figure A



H-H: horizontal plane

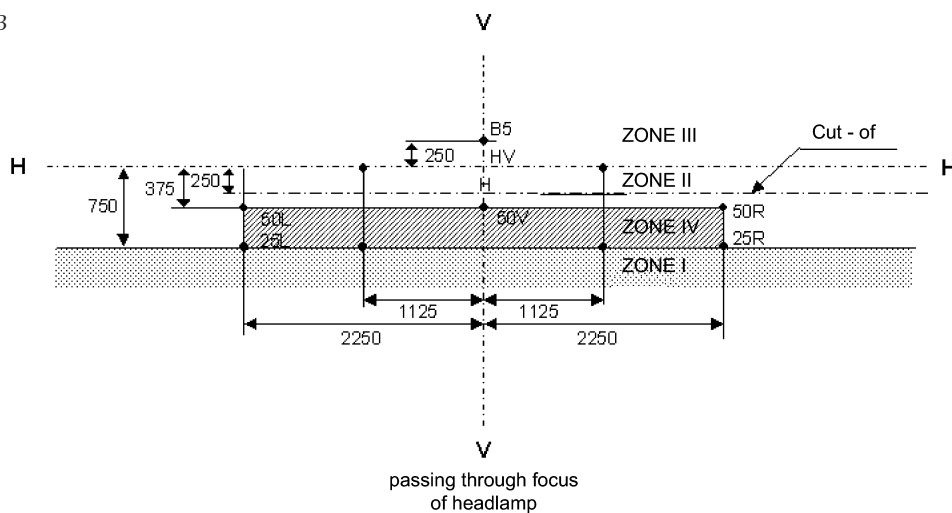
V-V: vertical plane

MEASURING SCREEN

for Class B headlamps

(Dimensions in mm with screen at 25 m distance)

Figure B



H-H: horizontal plane

V-V: vertical plane

MEASURING SCREEN

for Class C and D headlamps

(Dimensions in mm with screen at 25 m distance)

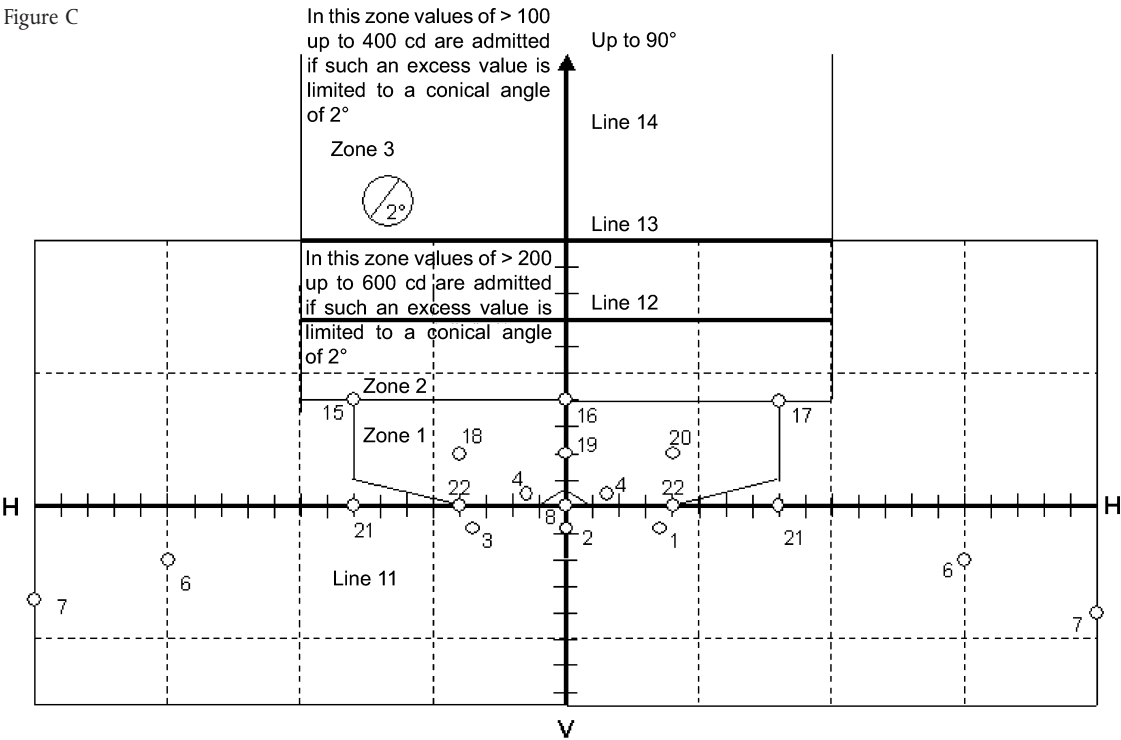


Table A Primary high beam headlamp

Refer to Figure D for details of test point positions

Test point number	Test point location	Required illumination in lux			
		Class D		Class C	
		> 125cc		≤ 125cc	
		Min.	Max.	Min.	Max.
1	H-V ⁽¹⁾	⁽¹⁾	—	⁽¹⁾	—
2	H-3R & 3L	19,2	—	12,8	—
3	H-6R & 6L	6,4	—	4,16	—
4	H-9R & 9L	3,84	—	2,56	—
5	H-12R & 12L	1,28	—	0,8	—
6	2U-V	1,92	—	1,28	—
7	4D-V	—	⁽²⁾	—	⁽²⁾
	Min. luminous intensity of the maximum	51,2	—	32	—
	Max. luminous intensity	—	180,0	—	180,0

⁽¹⁾ Intensity at H-V shall be equal to or greater than 80 per cent of the maximum intensity in the beam pattern.

⁽²⁾ Intensity at 4d-v shall be equal to or less than 30 per cent of the maximum intensity in the beam pattern.

Table B Secondary high beam headlamp operated with a harmonized passing beam headlamp or a primary driving beam headlamp

Refer to Figure E for details of test point positions

Test point number	Test point location	Required illumination in lux			
		Class D		Class C	
		> 125cc		≤ 125cc	
		Min.	Max.	Min.	Max.
1	H-V ⁽¹⁾	(¹⁾	—	(¹⁾	—
2	H-3R & 3L	19,2	—	12,8	—
3	H-6R & 6L	6,4	—	4,16	—
6	2U-V	1,92	—	1,28	—
7	4D-V	—	(²⁾	—	(²⁾
	Min. luminous intensity of the maximum	51,2	—	32	—
	Max. luminous intensity	—	180,0	—	180,0

(¹⁾ Intensity at H-V shall be equal to or greater than 80 per cent of the maximum intensity in the beam pattern.
(²⁾ Intensity at 4D-V shall be equal to or less than 30 per cent of the maximum intensity in the beam pattern.

Figure D
Primary Driving Beam

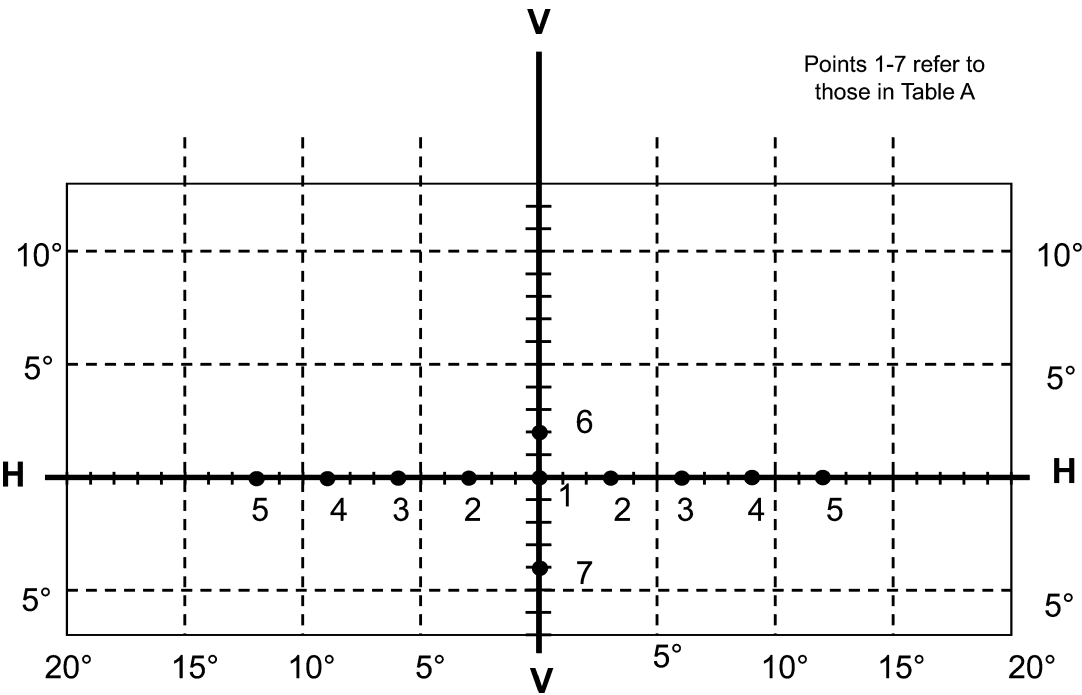
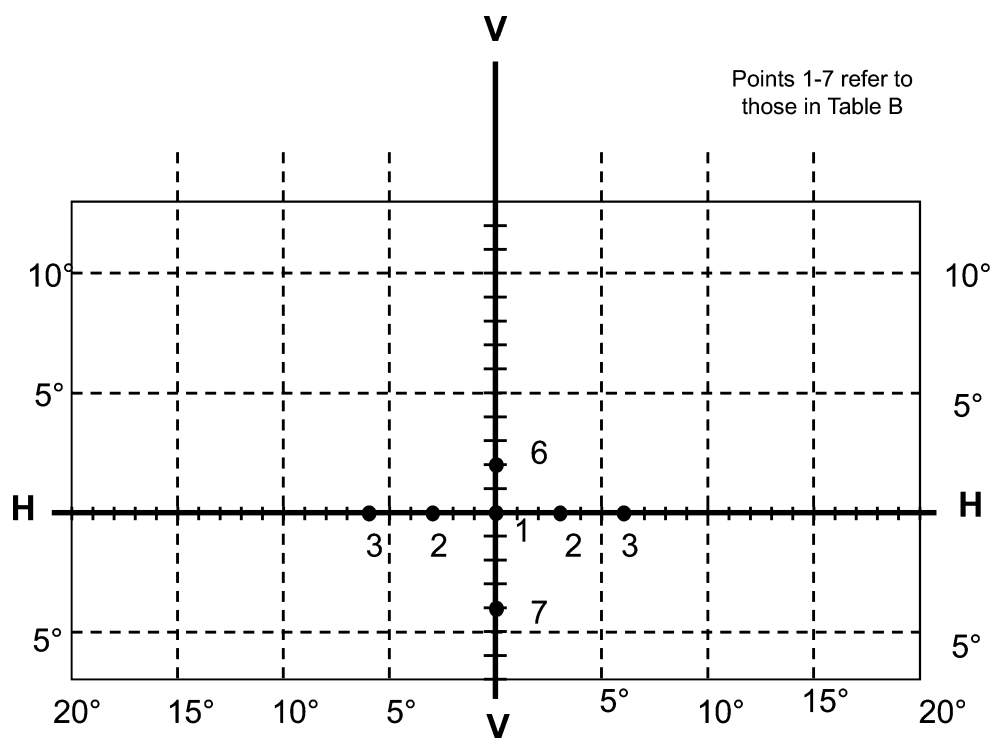


Figure E
Secondary Driving Beam



ANNEX 4

TESTS FOR STABILITY OF PHOTOMETRIC PERFORMANCE OF HEADLAMPS IN OPERATION

TESTS ON COMPLETE CLASS B, C AND D HEADLAMPS

Once the photometric values have been measured according to the prescriptions of this Regulation, in the point for $E_{\max}$ for driving beam and in points HV, 50R, 50L and B50 for passing beam a complete headlamp sample shall be tested for stability of photometric performance in operation. 'Complete headlamp' shall be understood to mean the complete lamp itself including those surrounding body parts and lamps which could influence its thermal dissipation.

1. TEST FOR STABILITY OF PHOTOMETRIC PERFORMANCE

The tests shall be carried out in a dry and still atmosphere at an ambient temperature of $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the complete headlamp being mounted on a base representing the correct installation on the vehicle.

1.1. Clean headlamp

The headlamp shall be operated for 12 hours as described in paragraph 1.1.1 and checked as prescribed in paragraph 1.1.2.

1.1.1. Test procedure ⁽¹⁾

The headlamp shall be operated for a period according to the specified time, so that:

- 1.1.1.1. (a) In the case where only one lighting function (driving or passing beam or front fog lamp) is to be approved, the corresponding filament is lit for the prescribed time ⁽²⁾,
 - (b) In the case of a headlamp with a passing beam and one or more driving beams or in case of a headlamp with a passing beam and a front fog lamp:
 - (i) the headlamp shall be subjected to the following cycle until the time specified is reached:
15 minutes, passing-beam filament lit;
5 minutes, all filaments lit.
 - (ii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) lit ⁽³⁾ at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam half of the time and the driving beam(s) (simultaneously) for half the time specified in paragraph 1.1 above.
 - (c) in the case of a headlamp with a front fog lamp and one or more driving beams:
 - (i) the headlamp shall be subjected to the following cycle until the time specified is reached:
15 minutes, front fog lamp lit;
5 minutes, all filaments lit.
 - (ii) if the applicant declares that the headlamp is to be used with only the front fog lamp lit or only the driving beam(s) lit ⁽³⁾ at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the front fog lamp half of the time and the driving beam(s) (simultaneously) for half the time specified in paragraph 1.1 above.

⁽¹⁾ For the test schedule see annex 8 to this Regulation.

⁽²⁾ When the tested headlamp includes signalling lamps, the latter shall be lit for the duration of the test. In the case of a direction indicator lamp, it shall be lit in flashing mode with an on/off time of approximately one to one.

⁽³⁾ Should two or more lamp filaments be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of the filaments simultaneously.

(d) In the case of headlamp with a passing beam, one or more driving beams and a front fog lamp:

(i) the headlamp shall be subjected to the following cycle until the time specified is reached:

15 minutes, passing-beam filament lit;

5 minutes, all filaments lit.

(ii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) ⁽¹⁾ lit at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam half of the time and the driving beam(s) for half the time specified in paragraph 1.1 above, while the front fog lamp is subjected to a cycle of 15 minutes off and 5 minutes lit for half of the time and during the operation of the driving beam;

(iii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the front fog lamp ⁽¹⁾ lit at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam half of the time and the front fog lamp for half of the time specified in paragraph 1.1 above, while the driving beam(s) is(are) subjected to a cycle of 15 minutes off and 5 minutes lit for half of the time and during the operation of the passing beam;

(iv) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) ⁽¹⁾ lit or only the front fog lamp ⁽¹⁾ lit at a time, the test shall be carried out in accordance with this condition, activating ⁽²⁾ successively the passing beam one third of the time, the driving beam(s) one third of the time and the front fog lamp for one third of the time specified in paragraph 1.1 above.

1.1.1.2. Test voltage

The voltage shall be adjusted so as to supply 90 per cent of the maximum wattage specified in Regulation No 37 for the filament lamp(s) used.

The applied wattage shall in all cases comply with the corresponding value of a filament lamp of 12 V rated voltage, except if the applicant for approval specifies that the headlamp may be used at a different voltage.

1.1.2. Test results

1.1.2.1. Visual inspection

Once the headlamp has been stabilized to the ambient temperature, the headlamp lens and the external lens, if any, shall be cleaned with a clean, damp cotton cloth. It shall then be inspected visually; no distortion, deformation, cracking or change in colour of either the headlamp lens or the external lens, if any, shall be noticeable.

1.1.2.2. Photometric test

To comply with the requirements of this Regulation, the photometric values shall be verified in the following points:

For Class B headlamp:

Passing beam: 50R – 50L — B50 — HV.

Driving beam: Point of $E_{\max}$

For Class C and D headlamp:

Passing beam: 0,86D/3,5R — 0,86D/3,5L — 0,50U/1,5L & 1,5R — HV.

Driving beam: Point of $E_{\max}$

⁽¹⁾ Should two or more lamp filaments be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of the filaments simultaneously.

⁽²⁾ When the tested headlamp includes signalling lamps, the latter shall be lit for the duration of the test. In the case of a direction indicator lamp, it shall be lit in flashing mode with an on/off time of approximately one to one.

Another aiming may be carried out to allow for any deformation of the headlamp base due to heat (the change of the position of the cut-off line is covered in paragraph 2 of this annex).

A 10 per cent discrepancy between the photometric characteristics and the values measured prior to the test is permissible including the tolerances of the photometric procedure.

1.2. Dirty headlamp

After being tested as specified in paragraph 1.1 above, the headlamp shall be operated for one hour as described in paragraph 1.1.1, after being prepared as prescribed in paragraph 1.2.1, and checked as prescribed in paragraph 1.1.2.

1.2.1. Preparations of the headlamp

1.2.1.1. Test mixture

1.2.1.1.1. For headlamp with the outside lens in glass:

The mixture of water and a polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 µm,

1 part by weight of vegetal carbon dust (beechwood) with a particle size of 0-100 µm,

0,2 parts by weight of NaCMC ⁽¹⁾, and

an appropriate quantity of distilled water, with a conductivity of ≤ 1 mS/m.

The mixture must not be more than 14 days old.

1.2.1.1.2. For headlamp with outside lens in plastic material:

The mixture of water and polluting agent to be applied to the headlamp shall be composed of:

9 parts by weight of silica sand with a particle size of 0-100 µm,

1 part by weight of vegetal carbon dust (beechwood) with a particle size of 0-100 µm,

0,2 part by weight of NaCMC ⁽¹⁾,

13 parts by weight of distilled water with a conductivity of ≤ 1 mS/m, and

2 ± 1 parts by weight of surface-actant ⁽²⁾.

The mixture must not be more than 14 days old.

1.2.1.2. Application of the test mixture to the headlamp

The test mixture shall be uniformly applied to the entire light-emitting surface of the headlamp and then left to dry. This procedure shall be repeated until the illumination value has dropped to 15-20 per cent of the values measured for each following point under the conditions described in this annex:

For Class B headlamp:

Passing beam/driving beam and driving beam only: Point of $E_{\max}$

Passing beam only: B 50 and 50 V

⁽¹⁾ NaCMC represents the sodium salt of carboxymethylcellulose, customarily referred to as CMC. The NaCMC used in the dirt mixture shall have a degree of substitution (DS) of 0,6-0,7 and a viscosity of 200-300 cP for a 2 per cent solution at 20 °C.

⁽²⁾ The tolerance on quantity is due to the necessity of obtaining a dirt that correctly spreads out on all the plastic lens.

For Class C and D headlamp:

Passing beam/driving beam and driving beam only: Point of $E_{\max}$
 Passing beam only: 0,50U/1,5L & 1,5R and 0,86D/V

1.2.1.3. Measuring equipment

The measuring equipment shall be equivalent to that used during headlamp approval tests. A standard (étalon) filament lamp shall be used for the photometric verification.

2. TEST FOR CHANGE IN VERTICAL POSITION OF THE CUT-OFF LINE UNDER THE INFLUENCE OF HEAT

This test consists of verifying that the vertical drift of the cut-off line under the influence of heat does not exceed a specified value for an operating passing lamp.

The headlamp tested in accordance with paragraph 1, shall be subjected to the test described in 2.1, without being removed from or readjusted in relation to its test fixture.

2.1. Test

The test shall be carried out in a dry and still atmosphere at an ambient temperature of $23\text{ °C} \pm 5\text{ °C}$.

Using a mass production filament lamp which has been aged for at least one hour the headlamp shall be operated on passing beam without being dismantled from or readjusted in relation to its test fixture. (For the purpose of this test, the voltage shall be adjusted as specified in paragraph 1.1.1.2). The position of the cut-off line in its horizontal part (between the vertical lines passing through point 50 L and 50 R for Class B headlamp, 3,5 L and 3,5 R for Class C and D headlamp) shall be verified 3 minutes (r_3) and 60 minutes (r_{60}) respectively after operation.

The measurement of the variation in the cut-off line position as described above shall be carried out by any method giving acceptable accuracy and reproducible results.

2.2. Test results

2.2.1. The result in milliradians (mrad) shall be considered as acceptable for a passing lamp, only when the absolute value $\Delta r_l = |r_3 - r_{60}|$ recorded on the headlamp is not more than 1,0 mrad ($\Delta r_l \leq 1,0\text{ mrad}$).

2.2.2. However, if this value is more than 1,0 mrad but not more than 1,5 mrad ($1,0\text{ mrad} < \Delta r_l \leq 1,5\text{ mrad}$) a second headlamp shall be tested as described in paragraph 2.1 after being subjected three consecutive times to the cycle as described below, in order to stabilize the position of mechanical parts of the headlamp on a base representative of the correct installation on the vehicle:

Operation of the passing beam for one hour (the voltage shall be adjusted as specified in paragraph 1.1.1.2),

Period of rest for one hour.

The headlamp type shall be considered as acceptable if the mean value of the absolute values Δr_l measured on the first sample and Δr_{II} measured on the second sample is not more than 1,0 mrad.

$$\frac{\Delta r_l + \Delta r_{II}}{2} \leq 1\text{ mrad}$$

ANNEX 5

MINIMUM REQUIREMENTS FOR CONFORMITY OF PRODUCTION CONTROL PROCEDURES**1. GENERAL**

- 1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometrical standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation. This condition also applies to colour.
- 1.2. With respect to photometric performances, the conformity of mass-produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random and equipped with a standard filament lamp,
 - 1.2.1. Class A headlamp: no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation.
 - 1.2.2. Class B, C and D headlamp:
 - 1.2.2.1. no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation. For values in zone III, for Class B headlamp, Zone 1 for Class C and D headlamp, the maximum unfavourable deviation may be respectively:

0,3 lux equivalent 20 per cent
0,45 lux equivalent 30 per cent
 - 1.2.2.2. and if, for the driving beam, HV being situated within the isolux $0,75 E_{\max}$, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraphs 6.2.3.2 and 6.3.2.2 of this Regulation.
 - 1.2.3. If the results of the tests described above do not meet the requirements, tests shall be repeated using another standard filament lamp.
 - 1.3. With respect to the verification of the change in vertical position of the cut-off line under the influence of heat, the following procedure shall be applied (Class B, C and D headlamps only):

One of the sample headlamps shall be tested according to the procedure described in paragraph 2.1 of annex 4 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 4.

The headlamp shall be considered as acceptable if Δr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, a second sample shall be subjected to the test after which the mean of the absolute values recorded on both samples shall not exceed 1,5 mrad.
- 1.4. Headlamps with apparent defects are disregarded.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of headlamp the holder of the approval mark shall carry out at least the following tests, at appropriate intervals. The tests shall be carried out in accordance with the provision of this Regulation.

If any sampling shows non-conformity with regard to the type of test concerned, further samples shall be taken and tested. The manufacturer shall take steps to ensure the conformity of the production concerned.

2.1. Nature of tests

Tests of conformity in this Regulation shall cover the photometric characteristics and for Class B, C and D headlamps the verification of the change in vertical position of the cut-off line under influence of heat.

2.2. Methods used in tests

2.2.1. Tests shall generally be carried out in accordance with the methods set out in this Regulation.

2.2.2. In any test of conformity carried out by the manufacturer, equivalent methods may be used with the consent of the competent authority responsible for approval tests. The manufacturer is responsible for proving that the applied methods are equivalent to those laid down in this Regulation.

2.2.3. The application of paragraphs 2.2.1 and 2.2.2 requires regular calibration of test apparatus and its correlation with measurement made by a competent authority.

2.2.4. In all cases the reference methods shall be those of this Regulation, particular for the purpose of administrative verification and sampling.

2.3. Nature of sampling

Samples of headlamps shall be selected at random from the production of a uniform batch. A uniform batch means a set of headlamps of the same type, defined according to the production methods of the manufacturer.

The assessment shall in general cover series production from individual factories. However, a manufacturer may group together records concerning the same type from several factories provided these operate under the same quality system and quality management.

2.4. Measured and recorded photometric characteristics

The sampled headlamps shall be subjected to photometric measurements at the points provided for in the Regulation, the reading being limited at the points:

2.4.1. For Class A headlamps: HV, LH, RH, 12,5L and 12,5R

2.4.2. For Class B headlamps: $E_{\max}$, HV ⁽¹⁾, in the case of the driving beam, and to the points HV, 50R, 50L, in the case of the passing beam.

2.4.3. For Class C and D headlamps: $E_{\max}$, HV ⁽¹⁾, in the case of the driving beam, and to the points HV, 0,86D/3,5R, 0,86D/3,5L, in the case of the passing beam.

2.5. Criteria governing acceptability

The manufacturer is responsible for carrying out a statistical study of the test results and for defining, in agreement with the competent authority, criteria governing acceptability of his products in order to meet the specification laid down for verification of conformity of products in paragraph 9.1 of this Regulation.

The criteria governing acceptability shall be such that, with a confidence level of 95 per cent, the minimum probability of passing a spot check in accordance with annex 7 (first sampling) would be 0,95.

⁽¹⁾ When the driving beam is reciprocally incorporated with the passing beam, HV in the case of the driving beam shall be the same measuring point as in the case of the passing beam.

ANNEX 6

REQUIREMENTS FOR LAMPS INCORPORATING LENSES OF PLASTIC MATERIAL — TESTING OF LENS OR MATERIAL SAMPLES AND OF COMPLETE LAMPS**1. GENERAL SPECIFICATIONS**

- 1.1. The samples supplied pursuant to paragraph 2.2.4 of this Regulation shall satisfy the specifications indicated in paragraphs 2.1 to 2.5 below.
- 1.2. The two samples of complete lamps supplied pursuant to paragraph 2.2.3 of this Regulation and incorporating lenses of plastic material shall, with regard to the lens material, satisfy the specifications indicated in paragraph 2.6 below.
- 1.3. The samples of lenses of plastic material or samples of material shall be subjected, with the reflector to which they are intended to be fitted (where applicable), to approval tests in the chronological order indicated in table A reproduced in appendix 1 to this annex.
- 1.4. However, if the lamp manufacturer can prove that the product has already passed the tests prescribed in paragraphs 2.1 to 2.5 below, or the equivalent tests pursuant to another regulation, those tests need not be repeated; only the tests prescribed in appendix 1, table B, shall be mandatory.

2. TESTS**2.1. Resistance to temperature changes****2.1.1. Tests**

Three new samples (lenses) shall be subjected to five cycles of temperature and humidity (RH = relative humidity) change in accordance with the following programme:

3 hours at $40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and 85-95 per cent RH;

1 hour at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 per cent RH;

15 hours at $-30\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$;

1 hour at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 per cent RH;

3 hours at $80\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$;

1 hour at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 per cent RH;

Before this test, the samples shall be kept at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 per cent RH for at least four hours.

Note: The periods of one hour at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ shall include the periods of transition from one temperature to another which are needed in order to avoid thermal shock effects.

2.1.2. Photometric measurements**2.1.2.1. Method**

Photometric measurements shall be carried out on the samples before and after the test.

These measurements shall be made using a standard (étalon) lamp, at the following points:

B 50, 50L and 50R for Class B headlamp, 0,86D/3,5R, 0,86D/3,5L, 0,50U/1,5L and 1,5R for Class C and D headlamp for the passing beam or a passing/driving lamp;

E_{max} for the driving beam of a driving lamp or a passing/driving lamp;

2.1.2.2. Results

The variation between the photometric values measured on each sample before and after the test shall not exceed 10 per cent including the tolerances of the photometric procedure.

2.2. Resistance to atmospheric and chemical agents

2.2.1. Resistance to atmospheric agents

Three new samples (lenses or samples of material) shall be exposed to radiation from a source having a spectral energy distribution similar to that of a black body at a temperature between 5 500 K and 6 000 K. Appropriate filters shall be placed between the source and the samples so as to reduce as far as possible radiations with wave lengths smaller than 295 nm and greater than 2 500 nm. The samples shall be exposed to an energetic illumination of $1\,200\text{ W/m}^2 \pm 200\text{ W/m}^2$ for a period such that the luminous energy that they receive is equal to $4\,500\text{ MJ/m}^2 \pm 200\text{ MJ/m}^2$. Within the enclosure, the temperature measured on the black panel placed on a level with the samples shall be $50\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$. In order to ensure a regular exposure, the samples shall revolve around the source of radiation at a speed between 1 and 5 1/min.

The samples shall be sprayed with distilled water of conductivity lower than 1 mS/m at a temperature of $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$, in accordance with the following cycle:

spraying: 5 minutes; drying: 25 minutes.

2.2.2. Resistance to chemical agents

After the test described in paragraph 2.2.1 above and the measurement described in paragraph 2.2.3.1 below have been carried out, the outer face of the said three samples shall be treated as described in paragraph 2.2.2.2 with the mixture defined in paragraph 2.2.2.1 below.

2.2.2.1. Test mixture

The test mixture shall be composed of 61,5 per cent n-heptane, 12,5 per cent toluene, 7,5 per cent ethyl tetra-chloride, 12,5 per cent trichloroethylene and 6 per cent xylene (volume per cent).

2.2.2.2. Application of the test mixture

Soak a piece of cotton cloth (as per ISO 105) until saturation with the mixture defined in paragraph 2.2.2.1 above and, within 10 seconds, apply it for 10 minutes to the outer face of the sample at a pressure of 50 N/cm, corresponding to an effort of 100 N applied on a test surface of $14 \times 14\text{ mm}$.

During this 10-minute period, the cloth pad shall be soaked again with the mixture so that the composition of the liquid applied is continuously identical with that of the test mixture prescribed.

During the period of application, it is permissible to compensate the pressure applied to the sample in order to prevent it from causing cracks.

2.2.2.3. Cleaning

At the end of the application of the test mixture, the samples shall be dried in the open air and then washed with the solution described in paragraph 2.3 (Resistance to detergents) $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$.

Afterwards the samples shall be carefully rinsed with distilled water containing not more than 0,2 per cent impurities at $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$ and then wiped off with a soft cloth.

2.2.3. Results

- 2.2.3.1. After the test of resistance to atmospheric agents, the outer face of the samples shall be free from cracks, scratches, chipping and deformation, and the mean variation in transmission $\Delta t = \frac{T_2 - T_3}{T_2}$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed $0,020(\Delta t_m \leq 0,020)$.

- 2.2.3.2. After the test of resistance to chemical agents, the samples shall not bear any traces of chemical staining likely to cause a variation of flux diffusion, whose mean variation $\Delta t = \frac{T_5 - T_4}{T_2}$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,020 ($\Delta d_m \leq 0,020$).

2.3. Resistance to detergents and hydrocarbons

2.3.1. Resistance to detergents

The outer face of three samples (lenses or samples of material) shall be heated to $50\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$ and then immersed for five minutes in a mixture maintained at $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$ and composed of 99 parts distilled water containing not more than 0,02 per cent impurities and one part alkylaryl sulphonate.

At the end of the test, the samples shall be dried at $50\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$.

The surface of the samples shall be cleaned with a moist cloth.

2.3.2. Resistance to hydrocarbons

The outer face of these three samples shall then be lightly rubbed for one minute with a cotton cloth soaked in a mixture composed of 70 per cent n-heptane and 30 per cent toluene (volume per cent), and shall then be dried in the open air.

2.3.3. Results

After the above two tests have been performed successively, the mean value of the variation in transmission

$\Delta t = \frac{T_2 - T_3}{T_2}$, measured on the three samples according to the procedure described in appendix 2 to this annex shall not exceed 0,010 ($\Delta t_m \leq 0,010$).

2.4. Resistance to mechanical deterioration

2.4.1. Mechanical deterioration method

The outer face of the three new samples (lenses) shall be subjected to the uniform mechanical deterioration test by the method described in appendix 3 to this annex.

2.4.2. Results

After this test, the variations:

in transmission: $\Delta t = \frac{T_2 - T_3}{T_2}$

and in diffusion: $\Delta d = \frac{T_5 - T_4}{T_2}$

shall be measured according to the procedure described in appendix 2 in the area specified in paragraph 2.2.4.1.1 of this Regulation. The mean value of the three samples shall be such that:

$$\Delta t_m \leq 0,100;$$

$$\Delta d_m \leq 0,050$$

2.5. Test of adherence of coatings, if any

2.5.1. Preparation of the sample

A surface of $20\text{ mm} \times 20\text{ mm}$ in area of the coating of a lens shall be cut with a razor blade or a needle into a grid of squares approximately $2\text{ mm} \times 2\text{ mm}$. The pressure on the blade or needle shall be sufficient to cut at least the coating.

2.5.2. Description of the test

Use an adhesive tape with a force adhesion of 2 N/(cm of width) $\pm$ 20 per cent measured under the standardized conditions specified in appendix 4 to this annex. This adhesive tape, which shall be at least 25 mm wide, shall be pressed for at least five minutes to the surface prepared as prescribed in paragraph 2.5.1.

Then the end of the adhesive tape shall be loaded in such a way that the force of adhesion to the surface considered is balanced by a force perpendicular to that surface. At this stage, the tape shall be torn off at a constant speed of 1,5 m/s $\pm$ 0,2 m/s.

2.5.3. Results

There shall be no appreciable impairment of the gridded area. Impairments at the intersections between squares or at the edges of the cuts shall be permitted, provided that the impaired area does not exceed 15 per cent of the gridded surface.

2.6. Tests of the complete headlamp incorporating a lens of plastic material

2.6.1. Resistance to mechanical deterioration of the lens surface

2.6.1.1. Tests

The lens of lamp sample No 1 shall be subjected to the test described in paragraph 2.4.1 above.

2.6.1.2. Results

After the test, the results of photometric measurements carried out on the headlamp in accordance with this Regulation shall not exceed by more than 30 per cent the maximum values prescribed at point HV and not be more than 10 per cent below the minimum values prescribed at point 50 L and 50 R for Class B headlamp, 0,86D/3,5R, 0,86D/3,5L for Class C and D headlamp.

2.6.2. Test of adherence of coatings, if any

The lens of lamp sample No 2 shall be subjected to the test described in paragraph 2.5 above.

3. VERIFICATION OF THE CONFORMITY OF PRODUCTION

3.1. With regard to the materials used for the manufacture of lenses, the lamps of a series shall be recognized as complying with this Regulation if:

3.1.1. After the test for resistance to chemical agents and the test for resistance to detergents and hydrocarbons, the outer face of the samples exhibits no cracks, chipping or deformation visible to the naked eye (see paras. 2.2.2, 2.3.1 and 2.3.2);

3.1.2. After the test described in paragraph 2.6.1.1, the photometric values at the points of measurement considered in paragraph 2.6.1.2 are within the limits prescribed for conformity of production by this Regulation.

3.2. If the test results fail to satisfy the requirements, the tests shall be repeated on another sample of headlamps selected at random.

APPENDIX 1

CHRONOLOGICAL ORDER OF APPROVAL TESTS

A. Tests on plastic materials (lenses or samples of material supplied pursuant to paragraph 2.2.4 of this Regulation).

Samples — Tests	Lenses or samples of material						Lenses						
	1	2	3	4	5	6	7	8	9	10	11	12	13
1.1. Limited photometry (para. 2.1.2)										x	x	x	
1.1.1. Temperature change (para. 2.1.1)										x	x	x	
1.1.2. Limited photometry (para. 2.1.2)										x	x	x	
1.2.1. Transmission measurement	x	x	x	x	x	x	x	x	x				
1.2.2. Diffusion measurement	x	x	x				x	x	x				
1.3. Atmospheric agents (para. 2.2.1)	x	x	x										
1.3.1. Transmission measurement	x	x	x										
1.4. Chemical agents (para. 2.2.2)	x	x	x										
1.4.1. Diffusion measurement	x	x	x										
1.5. Detergents (para. 2.3.1)				x	x	x							
1.6. Hydrocarbons (para. 2.3.2)				x	x	x							
1.6.1. Transmission measurement				x	x	x							
1.7. Deterioration (para. 2.4.1)							x	x	x				
1.7.1. Transmission measurement							x	x	x				
1.7.2. Diffusion measurement							x	x	x				
1.8. Adherence (para. 2.5)													x

B. Tests on complete headlamps (supplied pursuant to paragraph 2.2.3 of this Regulation).

Tests	Complete headlamp	
	Sample No	
	1	2
2.1. Deterioration (para. 2.6.1.1)	x	
2.2. Photometry (para. 2.6.1.2)	x	
2.3. Adherence (para. 2.6.2)		x

APPENDIX 2

METHOD OF MEASUREMENT OF THE DIFFUSION AND TRANSMISSION OF LIGHT

1. EQUIPMENT (see figure)

The beam of a collimator K with a half divergence $\beta/2 = 17,4 \times 10^{-4}$ rd is limited by a diaphragm D_t with an opening of 6 mm against which the sample stand is placed.

A convergent achromatic lens L_2 , corrected for spherical aberrations links the diaphragm D_t with the receiver R; the diameter of the lens L_2 shall be such that it does not diaphragm the light diffused by the sample in a cone with a half top angle of $\beta/2 = 14^\circ$.

An annular diaphragm D_D , with angles $\alpha_0/2 = 1^\circ$ and $\alpha_{\max}/2 = 12^\circ$ is placed in an image focal plane of the lens L_2 .

The non-transparent central part of the diaphragm is necessary in order to eliminate the light arriving directly from the light source. It shall be possible to remove the central part of the diaphragm from the light beam in such a manner that it returns exactly to its original position.

The distance $L_2 D_t$ and the focal length F_2 ⁽¹⁾ of the lens L_2 shall be so chosen that the image of D_t completely covers the receiver R.

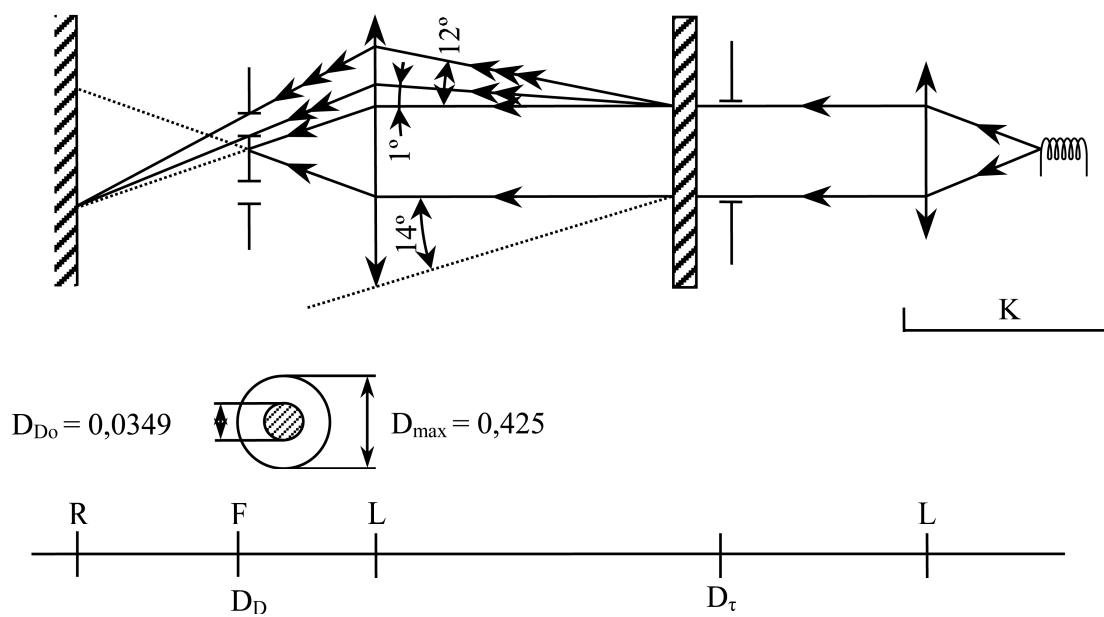
When the initial incident flux is referred to 1 000 units, the absolute precision of each reading shall be better than 1 unit.

2. MEASUREMENTS

The following readings shall be taken:

Reading	With sample	With central part of D_D	Quantity represented
T_1	no	no	Incident flux in initial reading
T_2	yes (before test)	no	Flux transmitted by the new material in a field of 24°
T_3	yes (after test)	no	Flux transmitted by the tested material in a field of 24°
T_4	yes (before test)	yes	Flux diffused by the new material
T_5	yes (after test)	yes	Flux diffused by the tested material

⁽¹⁾ For L_2 it is recommended to use a focal distance of about 80 mm.



APPENDIX 3

SPRAY TESTING METHOD

1. TEST EQUIPMENT

1.1. Spray gun

The spray gun used shall be equipped with a nozzle 1,3 mm in diameter allowing a liquid flow rate of $0,24 \pm 0,02$ l/minute at an operating pressure of 6,0 bars – 0, + 0,5 bar.

Under these operation conditions the fan pattern obtained shall be 170 mm $\pm$ 50 mm in diameter on the surface exposed to deterioration, at a distance of 380 mm $\pm$ 10 mm from the nozzle.

1.2. Test mixture

The test mixture shall be composed of:

Silica sand of hardness 7 on the Mohr scale, with a grain size between 0 and 0,2 mm and an almost normal distribution, with an angular factor of 1,8 to 2;

Water of hardness not exceeding 205 g/m³ for a mixture comprising 25 g of sand per litre of water.

2. TEST

The outer surface of the lamp lenses shall be subjected once or more than once to the action of the sand jet produced as described above. The jet shall be sprayed almost perpendicular to the surface to be tested.

The deterioration shall be checked by means of one or more samples of glass placed as a reference near the lenses to be tested. The mixture shall be sprayed until the variation in the diffusion of light on the sample or samples measured by the method described in appendix 2, is such that:

$$\Delta d = \frac{T_5 - T_4}{T_2} = 0,0250 \pm 0,0025$$

Several reference samples may be used to check that the whole surface to be tested has deteriorated homogeneously.

APPENDIX 4

ADHESIVE TAPE ADHERENCE TEST

1. PURPOSE

This method allows to determine under standard conditions the linear force of adhesion of an adhesive tape to a glass plate.

2. PRINCIPLE

Measurement of the force necessary to unstick an adhesive tape from a glass plate at an angle of 90°.

3. SPECIFIED ATMOSPHERIC CONDITIONS

The ambient conditions shall be at 23 °C ± 5 °C and 65 ± 15 per cent RH.

4. TEST PIECES

Before the test, the sample roll of adhesive tape shall be conditioned for 24 hours in the specified atmosphere (see para. 3 above).

Five test pieces each 400 mm long shall be tested from each roll. These test pieces shall be taken from the roll after the first three turns were discarded.

5. PROCEDURE

The test shall be under the ambient conditions specified in paragraph 3.

Take the five test pieces while unrolling the tape radially at a speed of approximately 300 mm/s, then apply them within 15 seconds in the following manner:

Apply the tape to the glass plate progressively with a slight length-wise rubbing movement of the finger, without excessive pressure, in such a manner as to leave no air bubble between the tape and the glass plate.

Leave the assembly in the specified atmospheric conditions for 10 minutes.

Unstick about 25 mm of the test piece from the plate in a plane perpendicular to the axis of the test piece. Fix the plate and fold back the free end of the tape at 90°. Apply force in such a manner that the separation line between the tape and the plate is perpendicular to this force and perpendicular to the plate.

Pull to unstick at a speed of 300 mm/s ± 30 mm/s and record the force required.

6. RESULTS

The five values obtained shall be arranged in order and the median value taken as a result of the measurement. This value shall be expressed in Newtons per centimetre of width of the tape.

ANNEX 7

MINIMUM REQUIREMENTS FOR SAMPLING BY AN INSPECTOR

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometrical standpoint in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations. This condition also applies to colour.

1.2. With respect to photometric performances, the conformity of mass-produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random and equipped with a standard filament lamp:

1.2.1. Class A headlamps: no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation.

1.2.2. Class B, C and D headlamps:

1.2.2.1. no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation. For values in zone III for Class B headlamp, zone I for Class C and D headlamp, the maximum unfavourable deviation may be respectively:

0,3 lux equivalent 20 per cent

0,45 lux equivalent 30 per cent

1.2.2.2. and if for the driving beam, HV being situated within the isolux $0,75 E_{\max}$, a tolerance of + 20 per cent for maximum values and – 20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraphs 6.2.3.2 and 6.3.2.2 of this Regulation.

1.2.3. If the results of the tests described above do not meet the requirements, tests shall be repeated using another standard filament lamp.

1.2.4. Headlamps with apparent defects are disregarded.

2. FIRST SAMPLING

In the first sampling four headlamps are selected at random. The first sample of two is marked A, the second sample of two is marked B.

2.1. The conformity is not contested

2.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall not be contested if the deviations of the measured values of the headlamps in the unfavourable directions are:

2.1.1.1. sample A

A1:	one headlamp		0 per cent
	one headlamp	not more than	20 per cent
A2:	both headlamps	more than	0 per cent
	but	not more than	20 per cent
	go to sample B		

2.1.1.2. sample B

B1:	both headlamps	0 per cent
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2.2. The conformity is contested

2.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the headlamps are:

2.2.1.1. sample A

A3:	one headlamp	not more than	20 per cent
	one headlamp	more than	20 per cent
	but	not more than	30 per cent

2.2.1.2. sample B

B2:	in the case of A2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	not more than	20 per cent

B3:	in the case of A2		
	one headlamp		0 per cent
	one headlamp	more than	20 per cent
	but	not more than	30 per cent

2.3. Approval withdrawn

Conformity shall be contested and paragraph 11 applied if, following the sampling procedure shown in Figure 1 of this annex, the deviations of the measured values of the headlamps are:

2.3.1. sample A

A4:	one headlamp	not more than	20 per cent
	one headlamp	more than	30 per cent

A5:	Both headlamps	more than	20 per cent
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2.3.2. sample B

B4:	in the case of A2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	more than	20 per cent

B5:	in the case of A2		
	both headlamps	more than	20 per cent

B6:	in the case of A2		
	one headlamp		0 per cent
	one headlamp	more than	30 per cent

3. REPEATED SAMPLING

In the case of A3, B2, B3 a repeated sampling, third sample C of two headlamps, selected from stock manufactured after alignment, is necessary within two months' time after the notification.

3.1. The conformity is not contested

3.1.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall not be contested if the deviations of the measured values of the headlamps are:

3.1.1.1. sample C

C1:	one headlamp		0 per cent
	one headlamp	not more than	20 per cent
C2:	both headlamps	more than	0 per cent
	but	not more than	20 per cent
	go to sample D		

3.1.1.2. sample D

D1:	in the case of C2		
	both headlamps		0 per cent

3.2. The conformity is contested

3.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the headlamps are:

3.2.1.1. sample D

D2:	in the case of C2		
	one headlamp	more than	0 per cent
	but	not more than	20 per cent
	one headlamp	not more than	20 per cent

3.3. Approval withdrawn

Conformity shall be contested and paragraph 11 applied if, following the sampling procedure shown in Figure 1 of this annex, the deviations of the measured values of the headlamps are:

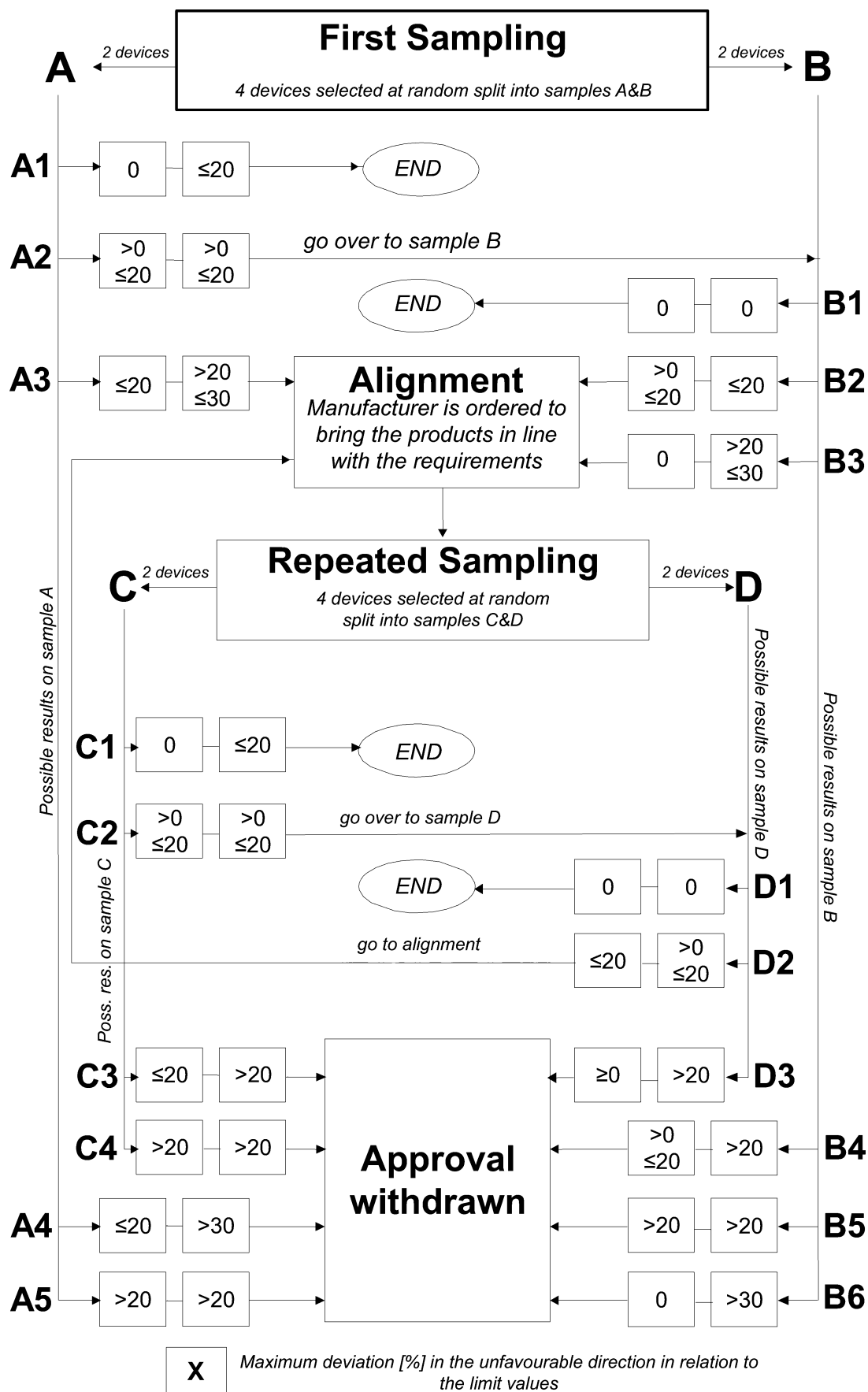
3.3.1. sample C

C3:	one headlamp	not more than	20 per cent
	one headlamp	more than	20 per cent
C4:	both headlamps	more than	20 per cent

3.3.2. sample D

D3:	in the case of C2		
	one headlamp	0 or more than	0 per cent
	one headlamp	more than	20 per cent

Figure 1



ANNEX 8

OVERVIEW OF OPERATIONAL PERIODS CONCERNING TEST FOR STABILITY
OF PHOTOMETRIC PERFORMANCE

- Abbreviations:
- P: passing beam lamp

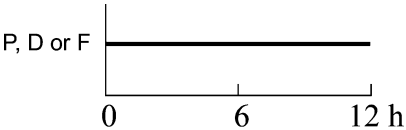
D: driving beam lamp (D₁ + D₂ means two driving beams)

F: front fog lamp

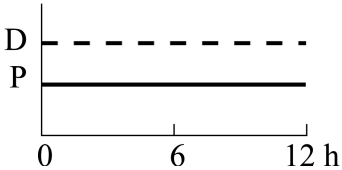
— — — — — : means a cycle of 15 minutes off and 5 minutes lit

All following grouped headlamps and front fog lamps together with the added class B marking symbols are given as examples and are not exhaustive.

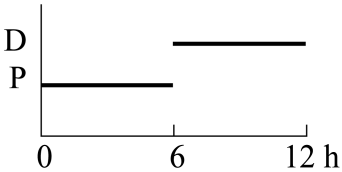
1. P or D or F (C-BS or R-BS or B)



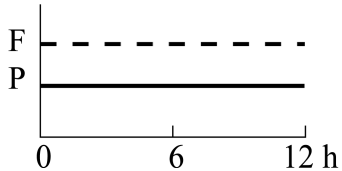
2. P+D (CR-BS) or P+D₁+D₂ (CR-BS R-BS)



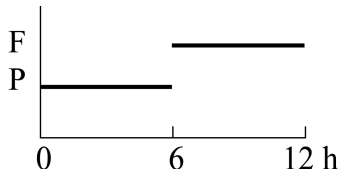
3. P+D (C/R-BS) or P+D₁+D₂ (C/R-BS R-BS)



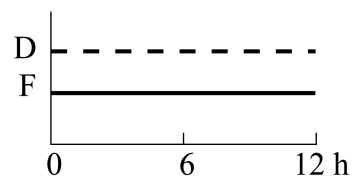
4. P+F (C-BS B)



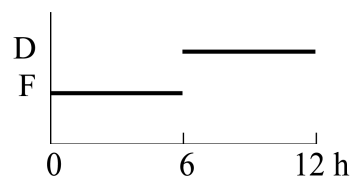
5. P+F (C-BS B/) or C-BS/B



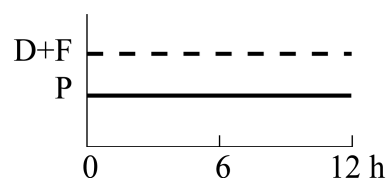
6. $D+F$ (R-BS B) or D_1+D_2+F (R-BS R-BS B)



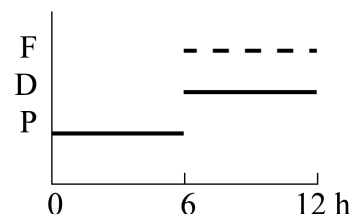
7. $D+F$ (R-BS B/) or D_1+D_2+F (R-BS R-BS B/)



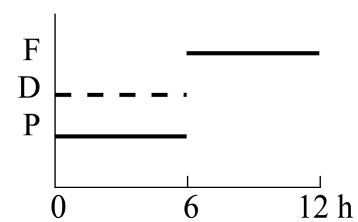
8. $P+D+F$ (CR-BS B) or $P+D_1+D_2+F$ (CR-BS R-BS B)



9. $P+D+F$ (C/R-BS B) or $P+D_1+D_2+F$ (C/R-BS R-BS B)



10. $P+D+F$ (CR-BS B/) or $P+D_1+D_2+F$ (CR-BS R-BS B/)



11. $P+D+F$ (C/R-BS B/) or $P+D_1+D_2+F$ (C/R-BS R-BS/B)

