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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 1 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 and/or a driving beam and equipped with filament lamps of category R2 and/or HS1

SCOPE ⁽¹⁾

This regulation applies to motor vehicles headlamps which may incorporate lenses of glass or plastic material.

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' are 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 of additional components capable of altering the optical effects by reflection, refraction or 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 Ability to provide a passing beam or a driving beam or both;
 - 1.3.6 The materials constituting the lenses and coating, if any.
 - 1.3.7 The holder intended to accommodate the filament lamp (or lamps) of one of the following categories: R2 and/or HS1 ⁽²⁾;

⁽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⁾ Application for approval of a filament lamp: see Regulation No 37. 'Type of filament lamp' should not be confused with 'category of filament lamp'. This regulation concerns headlamps using filament lamps of categories R2 and/or HS1. These categories of filament lamps differ essentially in their design and, more particularly, in the cap. They are not interchangeable, but within one filament lamp category there are normally several types.

2. APPLICATION FOR APPROVAL

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: Whether the headlamp is intended to provide both a passing beam and a driving beam or only one of these beams;

— 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.

— 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.

2.2. The application shall be accompanied, in respect of each type of headlamp, 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; 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 specification;

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.

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

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.

3.3. In the case of headlamps designed to satisfy the requirements both of countries with right-hand traffic and of countries with left-hand traffic, the two settings of the optical unit on the vehicle or of the filament lamp on the reflector shall be marked by the capital letters R and D, and L and G, respectively.

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 lamp of the grouped, combined or reciprocally incorporated lamps satisfies the provisions applicable to it. This requirement shall not apply to headlamps fitted with a two-filament bulb when a single beam is approved.

4.1.3. An approval number shall be assigned to each type approved. The same Contracting Party may not assign the same number to another type of headlamp covered by this Regulation except in the case of an extension of the approval to a device differing only in the colour of the light emitted.

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 shown in annex 1 to this Regulation, with the indications according to paragraph 2.2.1 and if the headlamp is equipped with an adjustable reflector and if the headlamp is to be used only in mounting positions according to the indications in paragraph 2.2.1, the applicant shall be obliged by the 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.

⁽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 opposite side of the road 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 space on the lens shall be sufficient.

4.2. *Composition of the approval mark*

The approval mark shall consist of:

4.2.1. an international approval mark 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.

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 letter 'C';

4.2.2.4. on headlamps meeting the requirements of this Regulation in respect of the driving beam only, the letter 'R';

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';

4.2.2.6. on headlamps incorporating a lens of plastic material, the group of letters 'PL' shall be affixed near the symbols prescribed in paragraphs 4.2.2.3 to 4.2.2.5 above.

4.2.2.7. 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 certificate and on the communication form 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:

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.

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 (X), shall be placed near the filament lamp holder.

⁽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 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30-36 (vacant) and 37 for Turkey. 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.

4.2.2.8. The two digits of the approval number which indicate the series of amendments in force at the time of issue of the approval and, if necessary, the required arrow may be marked close to the above additional symbols.

4.2.2.9. The marks and symbols referred to in paragraphs 4.2.1 and 4.2.2 above shall be clearly legible and be indelible even when the device is fitted in the vehicle.

4.3. *Arrangement of the approval mark*

4.3.1. Independent lamps

Annex 5, figures, 1 to 9 to this Regulation gives examples of arrangements of the approval marks 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 (see four possible examples in annex 5).

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 5, figure 10, 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 is 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 5, figure 11, to this Regulation gives examples of arrangements of approval marks relating to the above case.

5. GENERAL SPECIFICATIONS

- 5.1. Each sample shall conform to the specifications set forth in paragraphs 6 and 7 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.

- 5.3. Headlamps shall be fitted with a device enabling them to be so adjusted on the vehicle as to comply with the rules applicable to them.

Such a device need not be fitted on components in which the reflector and the diffusing lens cannot be separated provided the use of such units is confined to vehicles on which the headlamps setting can be adjusted by other means. Where a headlamp providing a driving beam and a headlamp providing a passing 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. However, this shall not apply to headlamps assemblies whose reflectors are indivisible. For this type of assembly, the requirements of paragraph 6 below shall apply.

- 5.4. The components by which the 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.

The filament lamp-holder shall conform to the dimensional characteristics as given in the following data sheets of IEC Publication 61-2:

Filament lamp	Holder	Data sheet
R2	P45t-41	7005-95-1
HS1	PX43t	7005-34-1

- 5.5. Headlamps designed to satisfy the requirements both of countries in which traffic moves on the right and of those in which it moves on the left may be adapted for traffic on a given side of the road either by an appropriate initial adjustment when the vehicle is fitted out or by selective setting by the driver.

Such initial adjustment or selective setting shall 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 precisely differentiated setting positions, one for right-hand and one for left-hand traffic, shall be possible, and the design shall preclude inadvertent shifting of the headlamp from one position to another or its setting in an intermediate position. Where two different setting positions are provided for the filament lamp, the components attaching the filament lamp to the reflector must be so designed and manufactured that, in each of its two settings, the filament lamp will be held in position with the precision required for headlamps intended for traffic on only one side of the road.

- 5.6. 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.
- 5.7. Conformity with the requirements of paragraphs 5.2 to 5.5 shall be verified visually and, where necessary, by a test fitting.
- 5.8. If the lens of the headlamp is of plastic material, tests shall be done according to the requirements of annex 7.

6. ILLUMINATION

- 6.1. Headlamps shall be so made that the passing-beam filaments of suitable filament lamps give adequate illumination without dazzle, while the driving-beam filaments of suitable filament lamps also give good illumination.

The illumination produced by the headlamp shall be checked on a vertical screen set at a distance of 25 m in front of the headlamp and at right angles to its axis (see annex 6 to this Regulation), and with a standard filament lamp designed for a nominal voltage of 12 V, having a smooth and colourless bulb, and exhibiting the following characteristics at that voltage:

	Consumption in watts	Light flux in lumens
Passing-beam filament	40 ± 5 %	450 ± 10 %
Driving-beam filament	45 + 0 % - 10 %	700 ± 10 %

The dimensions determining the position of the filaments inside the standard filament lamp are shown on the relevant filament lamp data sheet of Regulation No 37.

- 6.1.2 The illumination produced by the headlamp shall be checked on a vertical screen set at a distance of 25 m in front of the headlamp and at right angles to its axis (see annex 6).
- 6.1.3 The headlamp shall be checked by means of (a) standard (etalon) filament lamp(s) designed for a rated voltage of 12 V, any selective-yellow filters ⁽¹⁾ being replaced by geometrically identical uncoloured filters with a transmission factor of at least 80 per cent. During the checking of the headlamp the voltage at the terminals of the filament lamp shall be regulated so as to obtain the following characteristics:

⁽¹⁾ These filters shall consist of all the components, including the lens, which are intended to colour the light.

Filament lamp category	Approximate supply voltage (V) for measurement	Light flux (in lumens)	
		driving-beam filament	passing-beam filament
R2	12	700	450
HS1	12	700	450

6.1.4. The dimensions determining the position of the filament(s) and the shield inside the standard filament lamp are shown on the relevant data sheet of Regulation No. 37.

6.1.5. The bulb of the standard filament lamp shall be of such optical shape and quality that it does not cause any reflection or refraction adversely affecting the light distribution. Compliance with this requirement shall be checked by measuring the light distribution obtained when a standard headlamp is fitted with the standard (etalon) filament lamp.

6.2. The passing beam must produce a sufficiently sharp 'cut-off' to permit 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 should be horizontal or within an angle of 15° above the horizontal. The headlamp shall be so adjusted that:

6.2.1. 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;

6.2.2. this horizontal part of the 'cut-off' is situated on the screen 25 cm below the outline of the horizontal plane passing through the focus of the headlamp (see annex 6 to this Regulation);

6.2.3. the screen is in the position indicated in annex 6 ⁽²⁾.

When so adjusted, the headlamp shall, if it is intended to provide a passing beam and a driving beam, comply with the requirements referred to in paragraphs 6.3 and 6.5 below. If it is intended primarily to provide a passing beam, it need comply only with the requirements referred to in paragraph 6.3 ⁽³⁾.

Where a headlamp so adjusted does not meet the requirements referred to in paragraphs 6.3 and 6.5, its adjustment may be changed, provided that the axis of the beam or the point of intersection HV specified in annex 6 to this Regulation is not laterally displaced by more than 1° (= 44 cm) to the right or left ⁽⁴⁾. To facilitate adjustment by means of the 'cut-off', the headlamp may be partially occluded in order to sharpen the 'cut-off'.

If the headlamp is designed solely to provide a driving beam, it shall be so adjusted that the area of maximum illumination is centred on the point of intersection of the lines hh and vv. Such a headlamp need meet only the requirements referred to in paragraph 6.5.

⁽¹⁾ The adjustment screen should be sufficiently wide to allow examination of the 'cut-off' over a range of at least 5° from the line vv.

⁽²⁾ If, in the case of a headlamp designed to satisfy the requirements of this Regulation with respect to the passing beam only, the focal axis diverges appreciably from the general direction of the beam, lateral adjustment shall be effected to the manner which best satisfies the requirements for illumination at points 75 and 50.

⁽³⁾ A 'Passing beam' headlamp of this kind may incorporate a driving beam for which no specifications are laid down.

⁽⁴⁾ The limit of non-adjustment of 1° to the right or left is not incompatible with vertical non-adjustment. The latter is limited only by the requirements of paragraph 6.5.

- 6.3. The illumination produced on the screen by the passing beam shall meet the requirements of the following table ⁽¹⁾:

Point on measuring screen		Required illumination in lux
Headlamps for right-hand traffic	Headlamps for left-hand traffic	
Point R 50 L	Point H 50 R	< 0,4
Point 75 R	Point 75 L	> 6
Point 50 R	Point 50 L	> 6
Point 25 L	Point 25 R	> 1,5
Point 25 R	Point 25 L	> 1,5
Any point in zone III		< 0,7
Any point in zone IV		> 2
Any point in zone I		> 20

It is understood that, where the flux of the standard filament lamp used for measurement is other than 450 lumens, the measurements as taken will be corrected proportionally to the rates of the fluxes. There shall be no lateral variations detrimental to good visibility in any of the zones I, II, III and IV. 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 traffic system.

- 6.4. The illumination values in zones 'A' and 'B' as shown in figure P1C in annex 6 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:

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

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

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

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

These new values shall not be required for headlamps which have been approved before the application date of Supplement 3 to the 01 series of amendments to this Regulation (2 December 1992) nor to the extensions of such approvals.

- 6.5. In the case of headlamps with an adjustable reflector the requirements of paragraphs 6.2 to 6.4 are applicable for each mounting position indicated according to paragraph 2.1. For verification the following procedure shall be used:

- 6.5.1. each applied position is realised on the test goniometer with respect to a line joining the centre of the light source and point HV on the 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 6.1, 6.2 and/or 6.4;

⁽¹⁾ See annex 2 on the subject of special headlamps for agricultural or forest tractors and other slow-moving vehicles.

6.5.2. with the reflector initially fixed according to paragraph 6.5.1, the headlamp must meet the relevant photometric requirements of paragraphs 6.2, 6.3 and 6.4;

6.5.3. 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 75R (75L respectively);

driving beam: point HV (percentage of E_{max}).

6.5.4. if the applicant has indicated more than one mounting position, the procedure of paragraphs 6.5.1 to 6.5.3 shall be repeated for all the other positions;

6.5.5. if the applicant has not asked for special mounting positions, the headlamp shall be aimed for measurements of paragraphs 6.2 to 6.4 with the headlamps adjusting device in its mean position. The additional tests of paragraph 6.5.3 shall be made with the reflector moved into its extreme positions (instead of $\pm 2^\circ$) by means of the headlamps adjusting device.

6.6. The illumination produced on the screen by the driving beam shall be measured using the same headlamp settings as for the measurements described 6.3 above or, if the headlamp produces a driving beam only, in accordance with the final paragraph of 6.2.3.

If the main beam comes from more than one source, the maximum illumination (E_{max}) shall be determined using all the sources.

The illumination produced on the screen by the driving beam must meet the following requirements: the point HV where the lines hh and vv intersect, must be within the isolux corresponding to 90 % of the maximum illumination. This maximum value must not be less than 32 lux. Illumination must be at least 16 lux up to a horizontal distance of 1,125 m to the right and left of the point of intersection HV, and at least 4 lux up to 2,25 m. (If the flux of the standard filament lamp used for the measurements differs by 700 lumens, the gross measurements must be corrected in proportion to the flux).

6.7. The illumination produced on the screen, as mentioned paragraphes 6.3 and 6.5 above, shall be measured by means of a photoelectric cell with a useful surface in the form of a square with sides 65 mm in length.

7. GAUGING OF DISCOMFORT

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

8. STANDARD HEADLAMP

A headlamp shall be deemed to be a standard headlamp if it:

8.1. Satisfies the above-mentioned requirements for approval;

8.2. Has an effective diameter of not less than 160 mm;

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

- 8.3. Provides with a standard filament lamp, at the various points and in the various areas referred to in paragraph 6.3 above, illumination equal to:
- 8.3.1. not more than 90 % of the maximum limits, and
- 8.3.2. not less than 120 % of the minimum limits prescribed in the table in paragraph 6.3.
9. CONFORMITY OF PRODUCTION
- 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 paragraph 6.
- 9.2. In order to verify that the requirements of paragraph 9.1 are met, suitable controls of the production shall be carried out.
- 9.3. The holder of the approval shall in particular:
- 9.3.1. ensure the existence of procedures for the effective control of the quality of products;
- 9.3.2. have access to the control equipment necessary for checking the conformity to each approved type;
- 9.3.3. 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;
- 9.3.4. 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;
- 9.3.5. ensure that for each type of product at least the tests prescribed in annex 3 to this Regulation are carried out;
- 9.3.6. ensure that any collecting of samples giving evidence of nonconformity 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.
- 9.4. The competent authority which has granted type approval may at any time verify the conformity control methods applicable to each production unit.
- 9.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
- 9.4.2. The inspector may take samples at random to be tested in the manufacturer's laboratory. The minimum number of samples may be determined in the light of the results of the manufacturer's own checks.
- 9.4.3. When the quality lever appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in the application of paragraph 9.4.2. above, the inspector shall select samples, to be sent to the technical service which has conducted the type approval tests, using the criteria of annex 8.

- 9.4.4. The competent authority may carry out any test prescribed in this Regulation. These tests will be on samples selected at random without causing distortion of the manufacturer's delivery commitments and in accordance with the criteria of annex 8.
- 9.4.5. The competent authority shall strive to obtain a frequency of inspection of once every two years. However, this is at the discretion of the competent authority and their confidence in the arrangements for ensuring effective control of the conformity of production. In the case where negative results are recorded, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.
- 9.5. Headlamps with apparent defects are disregarded.
- 9.6. The reference mark is disregarded.
10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 10.1. The approval granted in respect of a headlamp pursuant to this Regulation may be withdrawn if the requirements specified above are not met or if a headlamp bearing the approval mark is not in conformity with 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. MODIFICATION AND EXTENSION OF APPROVAL OF A TYPE OF HEADLAMP
- 11.1. Every modification of the headlamp type shall be notified to the administrative department which approved the type of headlamp. The department may then either:
- 11.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the headlamp still complies with the requirements; or
- 11.1.2. Require a further test report from the technical service responsible for conducting the tests.
- 11.2. 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 applying this Regulation.
- 11.3. 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.
- 11.4. Approvals granted before 18 March 1986 remain valid.

12. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a 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 1

Communication concerning the approval or extension or communication

[Maximum format: A4 (210 × 297 mm)]

issued by ⁽¹⁾: 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 1

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 the manufacturer's representative:

5. Submitted for approval on:

6. Technical service responsible for conducting approval tests:

7. Date of test report:

⁽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.

8. Number of test report:
9. Brief description:
- Category as described by the relevant marking ⁽¹⁾:
- Number and category of filament lamp or lamps:
- Colour of light emitted: white/selective yellow ⁽²⁾:
10. Position of the approval mark:
11. Reason(s) for extension (if applicable):
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⁾ Indicate the appropriate marking selected from the list below:

CR,	CR,	CR,	C/R,	C/R,	C/R,	C,	C,	C,	C/,	C/,	C/,	R CR PL,
CR PL,	CR PL,	CR PL,	C/R PL,	C/R PL,	C/R PL,	C PL,	C PL,	C PL,	C PL,	C PL,	C PL,	
C PL,	C PL,	C PL,	C/PL,	C/PL,	C/PL,	RPL						

⁽²⁾ Strike out what does not apply.

ANNEX 2

Special headlamps for agricultural or forest tractors and other slow-moving vehicles

The provisions of this Regulation shall also apply to the approval of special headlamps for agricultural or forest tractors and other slow-moving vehicles, such headlamps being intended to provide both a driving beam and a passing beam and having a diameter D of less than 160 mm⁽¹⁾, with the following modifications:

- (a) The minimum requirements for illumination laid down in paragraph 6.3 shall be reduced in the ratio
- $$[(D - 45)/(160 - 45)]^2$$
- subject to the following absolute lower limits:
- 3 lux at either point 75 R or point 75 L,
 - 5 lux at either point 50 R or point 50 L,
 - 1,5 lux in zone IV;
- (b) Instead of the symbol CR provided for in paragraph 4.2.2.5 of the Regulation, the headlamp shall be marked with the letter M in a downward-pointing triangle;
- (c) In the communication concerning approval, item 9 in annex 1 shall read: 'Headlamp for slow-moving vehicles only'.
-

⁽¹⁾ If the apparent surface of the reflector is not circular, the diameter shall be that of a circle with the same area as the apparent useful surface of the reflector.

ANNEX 3

Minimum requirements for conformity of production control procedures

1. GENERAL
- 1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation.
- 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 values 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. or 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), 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 6.6 of this Regulation.
 - 1.2.3. If the results of the tests 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 on the headlamps 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:

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.

⁽¹⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ The limit of non-adjustment of 1° to the right of left is not incompatible with vertical non-adjustment. The latter is limited only by the requirements of paragraph 6.5.

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 headlamp 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. The chromaticity coordinates shall be complied with.

The photometric performance of a headlamp emitting selective yellow light shall be the values contained in this Regulation multiplied by 0,84.

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 provisions 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 measurements made by a competent authority.

- 2.2.4. In all cases the reference methods shall be those of this Regulation, particularly 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 headlamp shall be subjected to photometric measurements at the points provided for in the Regulation, the reading being limited to points $E_{\max}$, HV⁽¹⁾, HL, HR⁽²⁾ in the case of the driving beam, and to points B 50 L (or R), HV, 75 R (or L) and 25 L (or R) in the case of the passing beam (see figure in annex 6).

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 the acceptability of his products in order to meet the specifications laid down for verification of conformity of products in paragraph 9.1 of this Regulation.

The criteria governing the 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 8 (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 on hh at a distance of 1,125 m to the left and right of the point HV respectively.

ANNEX 4

Tests for stability of photometric performance of headlamps in operation

Once the photometric values have been measured according to the prescriptions of this Regulation, in points for $E_{\max}$ for driving beam and 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 subparagraph 1.1.1 and checked as prescribed in subparagraph 1.1.2.

1.1.1. Test Procedure**1.1.1.1. The headlamp shall be operated for the specified time so that:**

- (a) in the case where only one lighting function (driving or passing beam) is to be approved, the corresponding filament is lit for the prescribed time⁽¹⁾,
- (b) in the case of a reciprocally incorporated passing lamp and driving lamp (dual filament lamp or two filament lamps):

If the applicant declares that the headlamp is to be used with a single filament lit⁽²⁾ at a time, the test shall be carried out in accordance with this condition, activating⁽¹⁾ each specified function successively for half the time specified in paragraph 1.1;

In all other cases⁽¹⁾⁽²⁾, 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,

- (c) in the case of grouped lighting functions all the individual functions shall be lit simultaneously for the time specified for individual lighting functions
- (d) also taking into account the use of reciprocally incorporated lighting functions
- (e) according to the manufacturer's specifications.

⁽¹⁾ When the tested headlamp is grouped and/or reciprocally incorporated with 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 operation mode with an on/off time ratio of approximately one to one.

⁽²⁾ 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.

1.1.1.2. Test voltage

The voltage shall be adjusted so as to supply a wattage 15 % higher than the rated wattage specified in the Regulation for filament lamps (Regulation No 37) at a rated voltage of 6 V or 12 V, and 26 % higher than the rated wattage for 24 V filament lamps. 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 stabilised 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.

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 % 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 subparagraph 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. Preparation 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 m,

1 part by weight of vegetal carbon dust (beechwood) with a particle size of 0-100 m,

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 % of the values measured for each following point under the conditions described in this annex:

Point of $E_{\max}$ in driving beam photometric distribution for a driving/passing lamp.

Point of $E_{\max}$ in driving beam photometric distribution for a driving lamp 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 (reference) filament lamp shall be used for the photometric verification.

⁽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 % 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⁾ 50 V is situated 375 mm below HV on the vertical line v-v on the screen at 25 m distance.

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 of this annex shall be subjected to the test described in paragraph 2.1 of this annex 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 of this annex). 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 (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 expressed in milliradians (mrad) shall be considered as acceptable when the absolute value $\Delta r_I = |r_3 - r_{60}|$ recorded on the headlamp is not more than 1,0 mrad

$$\Delta r_I \leq 1 \text{ mrad.}$$

2.2.2. However, if this value is more than 1,0 mrad but not more than 1,5 mrad ($1,0 \text{ mrad} < \Delta r_I \leq 1,5 \text{ mrad}$) a second headlamp shall be tested as described in paragraph 2.1 of this annex after being subjected three consecutive times to the cycle as described below, in order to stabilise the position of mechanical parts of the headlamp on a base representative of the correct installation on the vehicle:

Operation of the passing lamp for one hour (the voltage shall be adjusted as specified in paragraph 1.1.1.2 above).

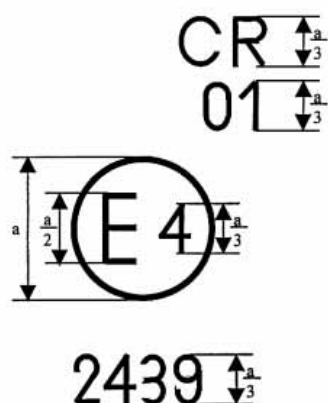
Period of rest for one hour. The headlamp type shall be considered as acceptable if the mean value of the absolute values Δr_I measured on the first sample and Δr_{II} measured on the second sample is not more than 1,0 mrad

$$(\Delta r_I + \Delta r_{II})/2 \leq 1 \text{ mrad}$$

ANNEX 5

Examples of arrangements of approval marks

(See paragraph 4 of this Regulation)



a = 12 mm min.

Figure 1

The headlamp bearing the approval marking shown above is a headlamp meeting the requirements of this Regulation in respect of both the driving beam and the passing beam, and which is designed for right-hand traffic only.

Note: The approval number and the 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 the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

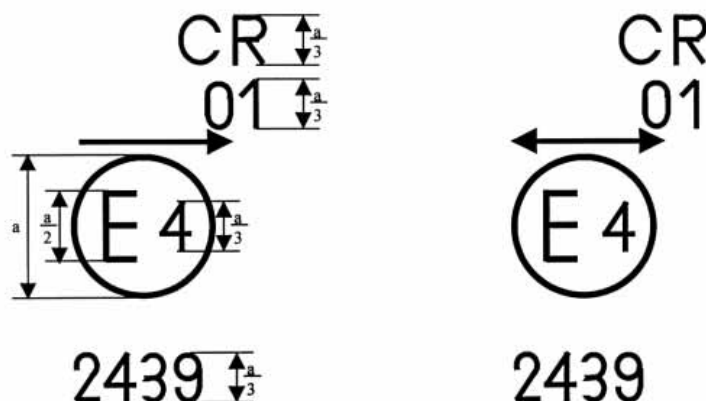


Figure 2 — Figure 3a



Figure 3b

The headlamp bearing the approval mark shown above is a headlamp meeting the requirements of this Regulation with respect to both the passing beam and the driving beam, and designed:

for left-hand traffic only

for both traffic systems, by means of an adjustment as desired of the optical unit or the lamp.

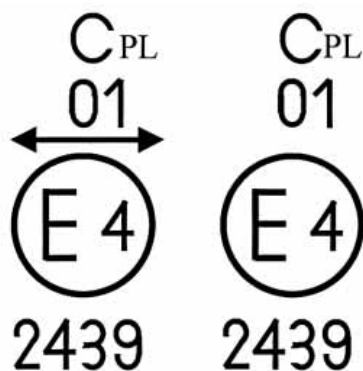


Figure 4 — Figure 5

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

for both traffic systems.

for right-hand traffic only.

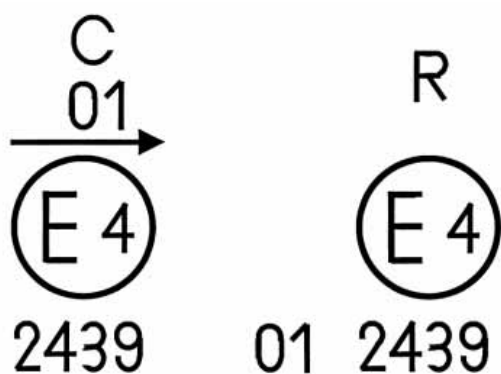


Figure 6 — Figure 7

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

- with respect to the passing beam only, and designed for left-hand traffic only,
- with respect to the driving beam only.

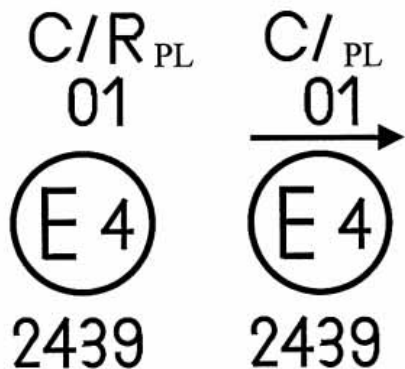


Figure 8 — Figure 9

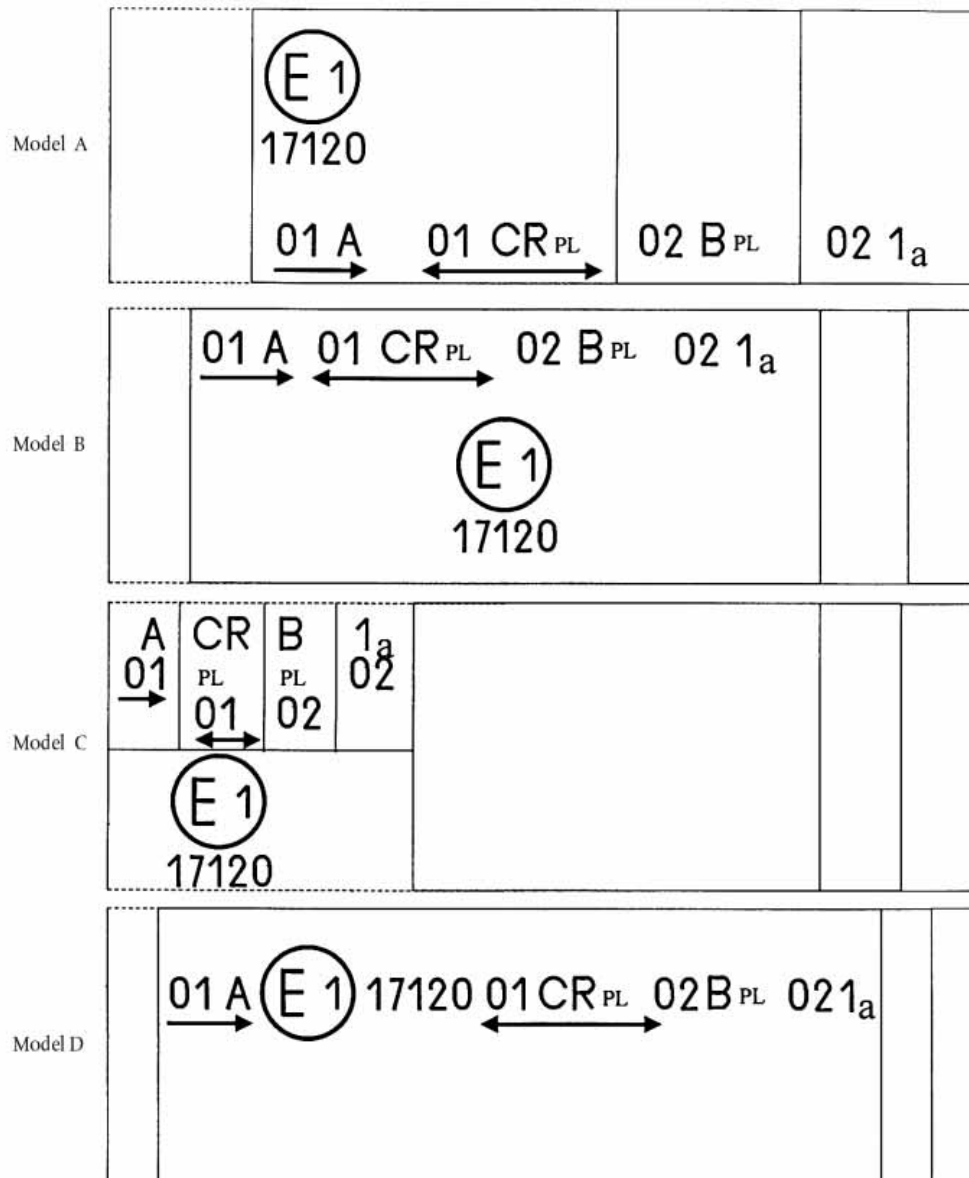
Identification of a headlamp incorporating the lens of plastic material meeting the requirements of Regulation No 1:

- For both the passing beam and the driving beam and designed for right-hand traffic only.
- For the passing beam only and designed for left-hand traffic only.

The passing lamp filament shall not be lit simultaneously with the driving lamp filament and/or any other headlamp with which it is reciprocally incorporated. Simplified marking of grouped, combined or reciprocally incorporated lamps

Figure 10

(The vertical and horizontal lines schematise the shape of the light-signalling device. They are not part of the approval mark)



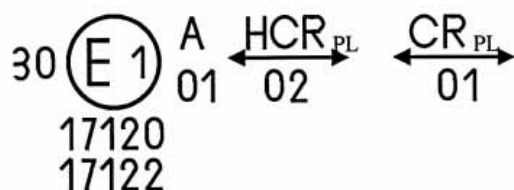
Note: The four examples shown above correspond to a lighting device bearing an approval mark relating to:

- A front Position lamp approved in accordance with the 01 series of amendments to Regulation No 7,
- A headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam, approved in accordance with the 01 series of amendments to Regulation No 1 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 02 series of amendments to Regulation No 6.

Figure 11

Lamp reciprocally incorporated with a headlamp

Example 1



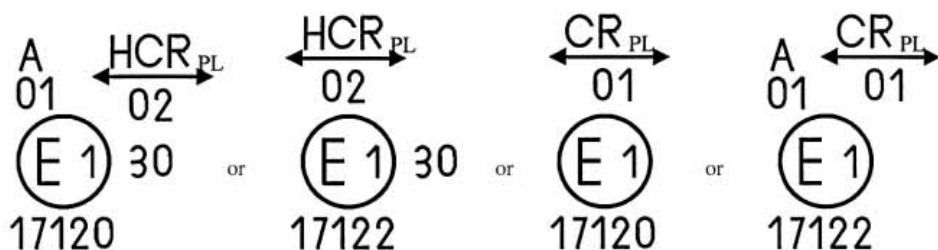
The above example corresponds to the marking of a lens of plastic material intended to be used in different types of headlamps, namely:

either: a headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas, approved in Germany (E1) in accordance with the requirements of Regulation No 20 as amended by the 02 series of amendments, which is reciprocally incorporated with a front position lamp approved in accordance with the 01 series of amendments to Regulation No 7;

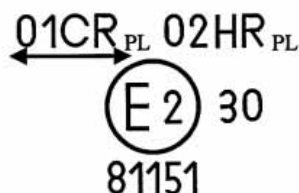
or: a headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam, approved in Germany (E1) in accordance with the requirements of Regulation No 1 as amended by the 01 series of amendments,

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:



Example 2



The above example corresponds to the marking of a lens of plastic material used in an assembly of two headlamps approved in France (E2), consisting of a headlamp emitting a passing beam designed for both traffic systems and of a driving beam with a maximum intensity comprised between x and y candelas, meeting the requirements of Regulation No 1, as amended by the 01 series of amendments and of a headlamp emitting a driving beam with a maximum intensity comprised between w and z candelas, meeting the requirements of Regulation No 20, as amended by the 02 series of amendments the maximum intensity of all the driving beams being comprised between 86 250 and 101 250 candelas.

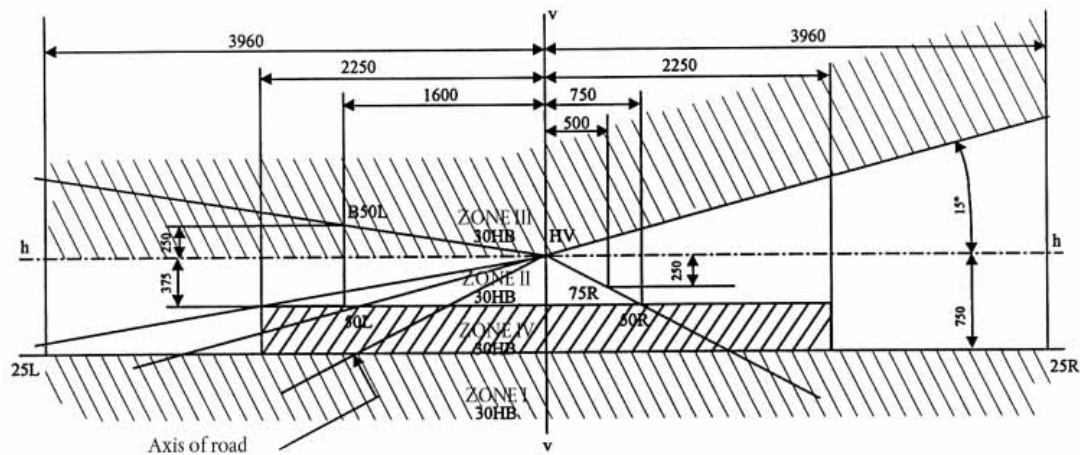
ANNEX 6

Measuring screens

A. Headlamp for right-hand traffic

(Dimensions in mm)

Standard European Beam



h-h: horizontal plane

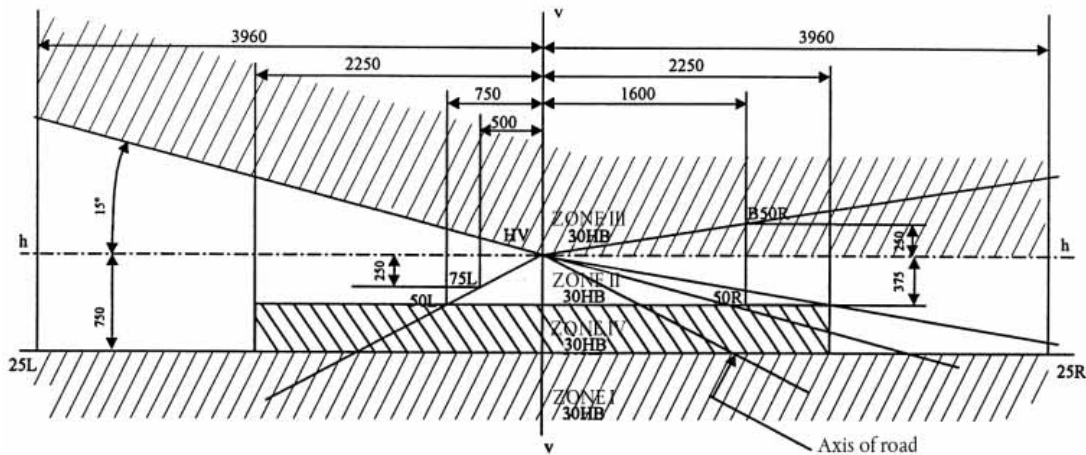
passing through focus of headlamp Standard European Beam

v-v: vertical plane

B. Headlamp for left-hand traffic

(Dimensions in mm)

Standard European Beam

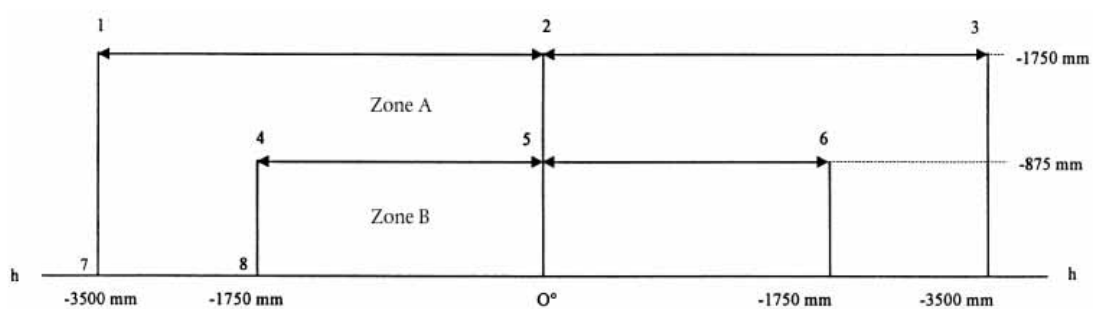


h-h: horizontal plane

passing through focus of headlamp

v-v: vertical plane

C. Measuring points of illumination values



Note: Figure 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 7

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 2.1-2.5 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. *T e s t s*

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 % RH;
- 1 hour at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 % 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 % 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 % RH;

Before this test, the samples shall be kept at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 % 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 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);
- Emax 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 % 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 500K and 6 000K. 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 % n-heptane, 12,5 % toluene, 7,5 % ethyl tetrachloride, 12,5 % trichlorethylene and 6 % xylene (volume %).

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/cm², corresponding to an effort of 100 N applied on a test surface of 14 × 14 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) at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. Afterwards the samples shall be carefully rinsed with distilled water containing not more than 0,2 % 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 $\Delta t = (T_2 - T_3) / T_2$, 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 $\Delta d = (T_5 - T_4) / T_2$, 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 % 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 % n-heptane and 30 % toluene (volume %), 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 $\Delta t = (T_2 - T_3) / T_2$, 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: $\Delta t = (T_2 - T_3) / T_2$

and in diffusion: $\Delta d = (T_5 - T_4) / T_2$ shall be measured according to the procedure described in appendix 2 in the area specified in paragraph 2.2.4 above. The mean value of the three samples shall be such that: $(\Delta t_m \pm 0,100)$; $(\Delta d_m \pm 0,050)$.

2.5. *Test of adherence of coatings, if any*

2.5.1. Preparation of the sample

A surface of 20 mm × 20 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 mm × 2 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 of adhesion of 2 N/(cm of width) ± 20 % measured under the standardised 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 ± 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 % of the gridded surface.

2.6. *Tests of the complete lamp 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 lamp in accordance with this Regulation shall not exceed by more than 30 % the maximum values prescribed at points B 50 L and HV and not be more than 10 % 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 recognised 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. Test on plastic materials (lenses or samples of material supplied pursuant to paragraph 2.2.4 of this Regulation)

Tests	Samples	Lenses or samples of material						Lenses						
		1	2	3	4	5	6	7	8	9	10	11	12	13
1.1.	Limited photometry (paragraph 2.1.2)										X	X	X	
1.1.1.	Temperature change (paragraph 2.1.1)										X	X	X	
1.1.2.	Limited photometry (paragraph 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 (paragraph 2.2.1)	X	X	X										
1.3.1.	Transmission measurement	X	X	X										
1.4.	Chemicals agents (paragraph 2.2.2)	X	X	X										
1.4.1.	Diffusion measurement	X	X	X										
1.5.	Detergents (paragraph 2.3.1)				X	X	X							
1.6.	Hydrocarbons (paragraph 2.3.2)				X	X	X							
1.6.1.	Transmission measurement				X	X	X							
1.7.	Deterioration (paragraph 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 (paragraph 2.5)													X

B. Tests on complete lamps (supplied pursuant to paragraph 2.2.3 of this Regulation)

Tests		Complete lamp	
		Sample No	
		1	2
2.1.	Deterioration (paragraph 2.6.1.1)	X	
2.2.	Photometry (paragraph 2.6.1.2)	X	
2.3.	Adherence (paragraph 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 $\alpha_o/2 = 1^\circ$ and $\alpha_{\max}/2 = 12^\circ$ 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.

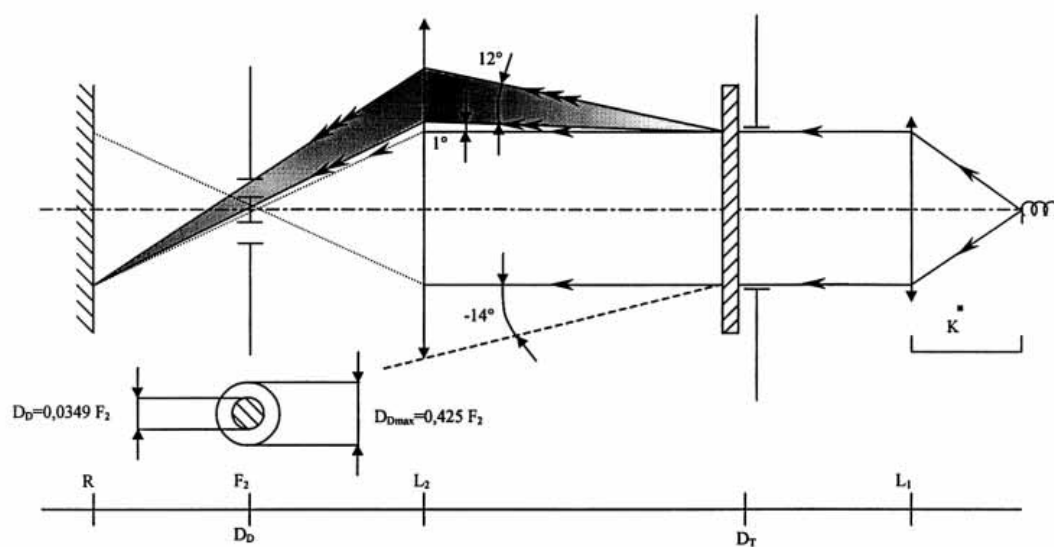
When the initial incident flux is referred to 1 000 units, the absolute precision of each reading shall be better than 1 unit.

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 °C
T_3	yes (after test)	no	Flux transmitted by the tested material in a field of 24 °C
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 $\pm 0,5$ 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:

$$(\Delta d = T5 - T4)/T2 = 0,0250 \pm 0,0025.$$

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 % relative humidity (RH).

4. TEST PIECES

Before the test, the sample roll of adhesive tape shall be conditioned for 24 hours in the specified atmosphere (see paragraph 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 the result of the measurement. This value shall be expressed in Newtons per centimetre of width of the tape.

ANNEX 8

Minimum requirements for sampling by an inspector

1. GENERAL
 - 1.1. The conformity requirements shall be considered satisfied from a mechanical and a geometric standpoint, in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations.
 - 1.2. With respect to photometric performance, 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 values prescribed in this Regulation. For values B 50 L (or R) and Zone III the maximum 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), 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 6.6 of this Regulation. The reference mark is disregarded.
 - 1.2.3. If the results of the tests 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 on the headlamp 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.
 - 1.3. The chromaticity coordinates shall be complied with. The photometric performance of a headlamp emitting selective yellow light shall be the values contained in this Regulation multiplied by 0,84.

⁽¹⁾ The limit of non-adjustment of 1° to the right of left is not incompatible with vertical non-adjustment. The latter is limited only by the requirements of paragraph 6.5.

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 deviation 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

2.1.2. or if the conditions of paragraph 1.2.2. for sample A are fulfilled.

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 headlamps 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 headlamps 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 10 applied if, following the sampling procedure 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 not 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 cases of A3, B2, B3 a repeated sampling, third sample C of two headlamps and fourth sample D 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

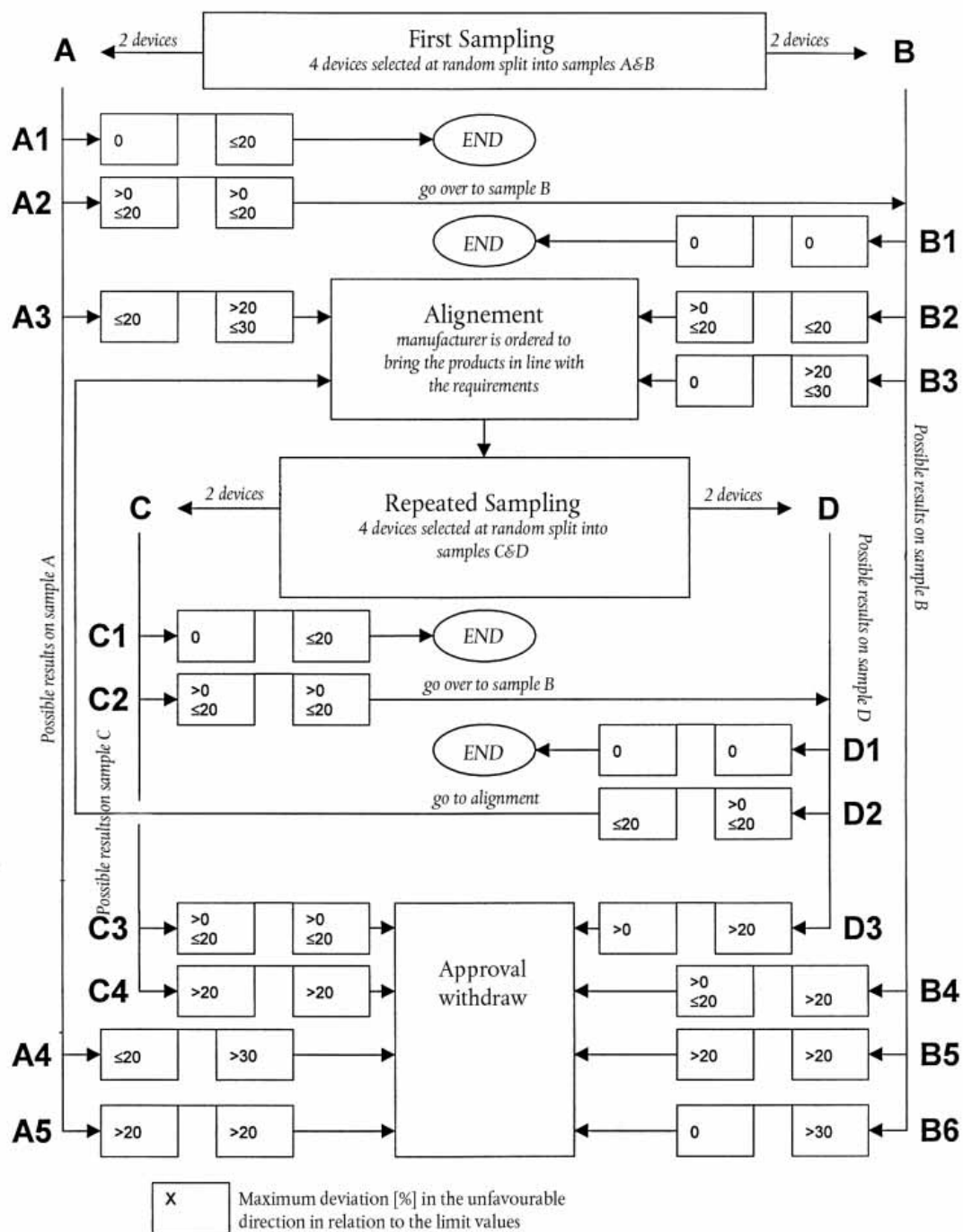
3.1.1.2. sample D

D1: In the case of C2

both headlamps 0 per cent

- 3.1.2. or if the conditions of paragraph 1.2.2 for sample C are fulfilled.
- 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
- 3.2.1.2. 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 10 applied if, following the sampling procedure 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 positions 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 r 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 in 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



Regulation 5 of the Economic Commission for Europe of the United Nations (UN/ECE): Uniform provisions for the approval of motor vehicle 'sealed beam' headlamps (SB) emitting a European asymmetrical passing beam or a driving beam or both

1. SCOPE ⁽¹⁾

This Regulation applies to motor vehicle headlamps which may incorporate lenses of glass or plastic material.

2. DEFINITIONS

For the purpose of this Regulation,

- 2.1. 'Sealed beam' headlamp unit (hereinafter termed 'SB unit'), means a headlamp unit whose components, comprising a reflector system, a lens system and one or more electrical light sources are all parts of an integral whole which has been sealed in the course of manufacture and which cannot be dismantled without rendering the unit completely unusable;
- 2.2. 'Lens' means the outermost component of the headlamp (unit) which transmits light through the illuminating surface;
- 2.3. 'Coating' means any product or products applied in one or more layers to the outer face of a lens;
- 2.4. SB units are considered to be of different types if they differ in one or more of the following essentials of form or characteristics:
 - 2.4.1. Trade name or mark;
 - 2.4.2. Characteristics of the optical system;
 - 2.4.3. Inclusion of additional components capable of altering the optical effects by reflection, refraction, absorption and/or deformation during operation;
 - 2.4.4. The rated voltage (the same approval number may be granted if the only change is of rated voltage);
 - 2.4.5. The rated wattage;
 - 2.4.6. The shape of the filament(s);
 - 2.4.7. The kind the beam produced (passing beam, driving beam or both);
 - 2.4.8. Suitability for right-hand or left-hand traffic or for both traffic systems;
 - 2.4.9. The colour of the light emitted;
 - 2.4.10. The materials constituting the lens and coating, if any.

⁽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).

3. APPLICATION FOR APPROVAL
 - 3.1. 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:
 - 3.1.1. Whether the SB unit is intended to provide both a passing beam and a driving beam, or only one of these beams;
 - 3.1.2. 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;
 - 3.1.3. Where applicable, that it is designed for agricultural or forest tractors and other slow-moving vehicles (see annex 1).
 - 3.2. Every application for approval shall be accompanied by:
 - 3.2.1. Drawings in triplicate, sufficiently detailed to permit identification of the type and giving a front view of the unit (with, if applicable, details of the lens moulding) and a cross-section; also the filament(s) and shield(s) shall be shown on the drawings at a scale of 2 : 1 both in front view and in side view; the drawing must show the position intended for the approval number and the additional symbols in relation to the circle of the approval mark;
 - 3.2.2. Brief technical description;
 - 3.2.3. Samples as follows:
 - 3.2.3.1. For approval of an SB unit to emit white light: five samples;
 - 3.2.3.2. For approval of a unit to emit coloured light: one coloured-light sample, and five white-light samples differing from the type submitted only in that the lens or filter is not coloured.
 - 3.2.3.3. In the case of SB units differing only in that they are designed to emit coloured light from a type designed to emit white light and which has previously satisfied the tests in paragraphs 6, 7 and 8 below, it will be sufficient to submit one sample of the coloured-light type to undergo only the tests given in paragraph 9.
 - 3.2.4. For the test of plastic material of which the lenses are made:
 - 3.2.4.1. thirteen lenses;
 - 3.2.4.1.1. 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;
 - 3.2.4.1.2. every such lens or sample of material shall be produced by the method to be used in mass production;
 - 3.2.4.2. a reflector to which the lenses can be fitted in accordance with the manufacturer's instructions.
 - 3.3. 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.

- 3.4. 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 ⁽¹⁾
- 4.1. SB units submitted for approval shall bear the trade name or mark of the applicant.
- 4.2. They shall comprise on the front lens, a space of sufficient size for the approval mark and the additional symbols provided for in paragraph 5 below; the space must be shown on the drawings referred to in paragraph 3.2.1 above.
- 4.3. They shall carry, either on the front lens or on the body, the values of the rated voltage and of the rated wattage of the driving beam filament, followed by that of the rated wattage of the passing beam filament, as applicable.
- 4.4. In the case of SB units designed to meet the requirements both of countries where the traffic keeps to the right and of those where the traffic keeps to the left, the two settings of the unit on the vehicle shall be marked by the letters 'R/D' for the position for right-hand traffic and the letters 'L/G' for the position for left-hand traffic.
- 4.5. The trade names or marks and markings provided for under this paragraph 4 shall be clearly legible and indelible.
5. APPROVAL
- 5.1. *General*
- 5.1.1. If all the headlamp type samples submitted in accordance with paragraph 3 above satisfy the provisions of this Regulation, approval shall be granted.
- 5.1.2. 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.
- 5.1.3. An approval number shall be assigned to each type approved. The same Contracting Party may not assign the same number to another type of headlamp covered by this Regulation except in the case of an extension of the approval to a device differing only in the colour of the light emitted.
- 5.1.4. 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 2 to this Regulation.
- 5.1.5. In addition to the mark prescribed in paragraph 4.1, an approval mark as described in paragraphs 5.2 and 5.3 below shall be affixed in the spaces referred to in paragraph 4.2 above to every headlamp conforming to a type approved under this Regulation.

⁽¹⁾ In the case of SB units 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 SB unit 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.

5.2. *Composition of the approval mark*

The approval mark shall consist of:

5.2.1. An international approval mark, comprising:

5.2.1.1. A circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval ⁽¹⁾;

5.2.1.2. The approval number prescribed in paragraph 5.1.3 above.

5.2.2.

The following additional symbol (or symbols):

5.2.2.1. On SB headlamps meeting left-hand traffic requirements only, a horizontal arrow pointing to the right of an observer facing the SB headlamp, i.e. to the side of the road on which the traffic moves;

5.2.2.2. On SB headlamps designed to meet the requirements of both traffic systems by means of an appropriate adjustment of the setting of the headlamp, a horizontal arrow with a head on each end, the heads pointing respectively to the left and to the right;

5.2.2.3. On headlamps meeting the requirements of this Regulation in respect of the passing beam only, the letters 'SC';

5.2.2.4. On headlamps meeting the requirements of this Regulation in respect of the driving beam only, the letters 'SR';

5.2.2.5. On headlamps meeting the requirements of this Regulation in respect of both the passing beam and the driving beam, the letters 'SCR';

5.2.2.6. On headlamps incorporating a lens of plastic material, the group of letters 'PL' shall be affixed near the symbols prescribed in paragraphs 5.2.2.3 to 5.2.2.5 above;

5.2.2.7. In every case the relevant operating mode during the next procedure according to paragraph 1.1.1.1 of annex 5 and the allowed voltage(s) according to paragraph 1.1.1.2 of annex 5 shall be stipulated on the approval certificates and on the communication form 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: On units 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.

5.2.2.8. The two digits of the approval number (at present 02) which indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation and at the time of issue of the approval and, if necessary, the required arrow may be marked close to the above additional symbols;

⁽¹⁾ 1 for Germany, 8 for the Czech and Slovak Federal Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal and 22 for the Russian Federation, 23 for Greece, 24 (vacant), 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32-36 (vacant), 37 for Turkey, 38-39 (vacant), and 40 for the former Yugoslav Republic of Macedonia. Subsequent numbers will be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the Adoption of Uniform Technical Conditions for Wheeled Equipments and parts which can be fitted and/ or be used on wheeled vehicle and the conditions for Reciprocal Recognition of Approvals Granted on the basis of these prescriptions, and the numbers thus assigned shall be communicated to the Contracting Parties to the Agreement by the Secretary-General of the United Nations.

- 5.2.2.9. The marks and symbols referred to in paragraphs 5.2.1 and 5.2.2 above shall be clearly legible and indelible even when the headlamp is fitted in the vehicle.

5.3. *Arrangement of the approval mark*

5.3.1. *I n d e p e n d e n t l a m p s*

Annex 4, figures 1 to 9, to this Regulation gives examples of arrangements of the approval mark with the above-mentioned additional symbols.

5.3.2. *G r o u p e d , c o m b i n e d o r r e c i p r o c a l l y i n c o r p o r a t e d l a m p s*

- 5.3.2.1. 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:

- 5.3.2.1.1. It is visible after their installation.

- 5.3.2.1.2. 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.

- 5.3.2.2. 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:

- 5.3.2.2.1. Either on the appropriate light-emitting surface,

- 5.3.2.2.2. 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 4).

- 5.3.2.3. 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.

- 5.3.2.4. 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.

- 5.3.2.5. Annex 4, figure 10, to this Regulation gives examples of arrangements of approval marks for grouped, combined or reciprocally incorporated lamps with all the above-mentioned additional symbols.

- 5.3.3. Lamps, the lens of which is used for different types of headlamps and which may be reciprocally incorporated or grouped with other lamps. The provisions laid down in paragraph 5.3.2 above are applicable.

- 5.3.3.1. 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 4.2 above and bears the approval mark of the actual functions. If different types of headlamps comprise the same main body, the latter may bear the different approval marks.
- 5.3.3.2. Annex 4, figure 11, to this Regulation gives examples of arrangements of approval marks relating to the above case.

6. GENERAL SPECIFICATIONS

- 6.1. Each sample shall conform to the specifications set forth in this paragraph 6 and in paragraphs 7 and 8 below, and, if necessary, paragraph 9.
- 6.2. SB units shall be so made as to retain their prescribed photometric characteristics and to remain in good working order when in normal use, despite the vibrations to which they may be subjected.
- 6.2.1. Headlamps shall be fitted with a device enabling them to be so adjusted on the vehicle as to comply with the rules applicable to them. Such a device need not be fitted on the SB headlamp inserts if the use of such inserts is confined to vehicles on which the headlamp setting can be adjusted by other means. Where an SB headlamp providing a driving beam and an SB headlamp providing a passing beam are assembled as exchangeable subunits to form a composite unit the adjusting device shall enable each SB unit individually to be duly adjusted.
- 6.2.2. However, this will not apply to headlamp assemblies whose reflectors are indivisible. For this type of assembly the requirements of paragraph 8 of this Regulation shall apply. In the case where more than one light source is used to provide the main beam the combined main-beam functions will be used to determine the maximum value of the illumination ($E_{\max}$).
- 6.3. The terminals shall only be in electrical connection with the appropriate filament or filaments and shall be robust and firmly fixed to the unit.
- 6.4. If the units are circular they shall provide all the physical features and electrical connections shown in one of the plates SB2-SB7 in annex 4 and shall be made to the dimensions in that plate.
- 6.5. SB units designed to meet the requirements both of countries where the traffic keeps to the right and of those where the traffic keeps to the left, 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 the angular setting of the unit on the vehicle. In all cases, only two precise setting positions, one for right-hand and one for left-hand traffic, shall be possible, and the design shall preclude inadvertent shifting of the unit from the one position to the other or its setting in an intermediate position. Conformity with the requirements of this paragraph shall be verified visually and, where necessary, by a test fitting.

- 6.6. Complementary tests shall be done according to the requirements of annex 5 to ensure that in use there is no excessive change in photo metric performance.
- 6.7. If the lens of the headlamp is of plastic material, tests shall be done according to the requirements of annex 6.

7. RATED VALUES

7.1. The values of rated voltage are: 6, 12 and 24 volts ⁽¹⁾.

7.2. The power consumed at the test voltage by any submitted SB unit shall not exceed the rated wattage marked on the unit, by more than the percentage specified in table 1. No lower limit is specified for the tolerance on wattage but the minimum illumination values specified in table 2 of paragraph 8.8 must be obtained.

Table 1

		Circular units of 180 mm diameter		Circular units of 145 mm diameter	
Rated voltage		6	12	6	12
Test voltage		6	12	6	12
		Rated wattage and permitted tolerance			
Double filaments	Driving beam	60 + 0 %		37,5 + 0 %	
	Passing beam	50 + 0 %		50 + 0 %	
Driving beam filament only		75 + 0 %		50 + 0 %	
Passing beam filament only		50 + 0 %		50 + 0 %	

8. ILLUMINATION ⁽²⁾

8.1. SB units shall be so made as to give adequate illumination without dazzle for the passing beam, and good illumination for the driving beam.

8.2. The illumination produced by the unit shall be checked on a vertical screen set at a distance of 25 m in front of the unit and at right angles to its axis (see annex 4, plates SB8a, and SB8b).

8.3. The passing beam must produce a sufficiently sharp 'cut-off' to permit satisfactory alignment with its aid. The 'cut-off' must be a horizontal line on the side opposite to the direction of the traffic for which the unit is intended; on the other side it should be horizontal or within an angle of 15° above the horizontal.

8.4. The SB unit shall be aimed so that on passing beam:

8.4.1. In the case of units designed to meet the requirements of right-hand traffic, the 'cut-off' on the left half of the screen ⁽³⁾ is horizontal and, in the case of units designed to meet the requirements of left-hand traffic, the 'cut-off' on the right half of the screen is horizontal;

8.4.2. This horizontal part of the 'cut-off' is situated, on the screen, 25 cm below the level of the horizontal plane passing through the focus of the unit (see annex 4, plates SB8a and SB8b);

⁽¹⁾ 24-volts units are under consideration.

⁽²⁾ All the photometric measurements shall be carried out at the test voltage given in paragraph 7.

⁽³⁾ The test screen must be sufficiently wide to allow examination of the 'cut-off' over a range of at least 5° from the line vv.

- 8.4.3. The screen is in the position indicated in annex 4, plates SB8a and SB8b ⁽¹⁾.
- 8.5. When so aimed, the unit need, if its approval is sought solely for a passing beam ⁽²⁾ meet only the requirements referred to in paragraph 8.8 below; if it is intended to provide both a passing beam and a driving beam it shall meet the requirements referred to in paragraphs 8.8 and 8.9.
- 8.6. Where an SB unit so aimed does not meet the requirements referred to in paragraphs 8.8 and 8.9 below, its alignment may be changed, provided that the axis of the beam is not laterally displaced by more than 1° (= 44 cm) to the right or left ⁽³⁾. To facilitate alignment by means of the 'cut-off', the unit may be partially occulted in order to sharpen the 'cut-off'.
- 8.7. In the case of an SB unit providing a driving beam only, it shall be so aimed that the area of maximum illumination is centred on the point of intersection HV of the lines hh and vv; such a unit need meet only the requirements referred to in paragraph 8.9.
- 8.8. The illumination produced on the screen by the passing beam shall meet the following requirements:

Table 2

Point on measuring screen		Required illumination in lux	
SB units for right-band traffic	SB units for left-band traffic	Minimum	Maximum
B 50 L	B 50 R	—	0,3
75 R	75 L	6	—
50 R	50 L	6	—
25 L	25 R	1,5	—
25 R	25 L	1,5	—
Every point in zone III		—	0,7
Every point in zone IV		2	—
Every point in zone I		—	20

- 8.8.1. There shall be no lateral variations detrimental to good visibility in any of the zones I, II, III and IV;
- 8.8.2. SB units designed to meet the requirements of both right-hand and left-hand traffic must, in each of the two setting positions, meet the requirements set forth above for the corresponding direction of traffic.
- 8.9. In the case of an SB unit 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 unit alignment and voltage as for measurements under paragraph 8.8 above.

⁽¹⁾ If, in the case of a unit designed to meet the requirements of this Regulation with respect to the passing beam only, the focal axis diverges appreciably in from the general direction of the beam, lateral adjustment shall be effected in the manner which best satisfies the requirements for illumination at point 75 R and 50 R for right-hand traffic and at points 75 L and 50 L for left-hand traffic.

⁽²⁾ A unit designed to emit a passing beam may incorporate a driving beam not complying with the specification

⁽³⁾ The limit of realignment of 1° towards the right or left is not incompatible with vertical realignment, which is only limited by the conditions laid down in paragraph 8.9.

- 8.10. The illumination produced on the screen by the driving beam shall meet the following requirements:
- 8.10.1. The point of intersection HV of the line hh and vv shall be situated within the isolux 90 % of maximum illumination. The maximum value shall not be less than 32 lux;
- 8.10.2. Starting from point HV, horizontally to the right and left, illumination shall be not less than 16 lux up to a distance of 1,125 metres, and not less than 4 lux up to a distance of 2,25 metres.
- 8.11. The screen illumination values mentioned in paragraphs 8.8 and 8.9 above shall be measured by means of a photoelectric cell, the effective area of which shall be contained within a square of 65 mm side.

9. COLOUR

The light emitted shall be white or selective yellow. In the latter case the dominant wavelength must be between 5 750 and 5 850 Angstrom units, the purity factor shall be between 0,90 and 0,98 and the illumination produced on the screen by the passing beam must meet the requirements of Table 2 with all the figures multiplied by a factor of 0,84 ⁽¹⁾.

10. REMARK CONCERNING COLOUR

Any approval under this Regulation which is granted by virtue of paragraph 9 above for a type of SB unit emitting white light or selective yellow light, does not prevent the Contracting Parties from prohibiting, on the vehicles which they register, SB units emitting either white or selective yellow light, according to article 3 of the Agreement to which this Regulation is attached.

11. GAUGING OF DISCOMFORT

The discomfort caused by the passing beam of SB units shall be gauged ⁽²⁾.

12. CONFORMITY OF PRODUCTION

- 12.1. Headlamps approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 8 and 9.
- 12.2. In order to verify that the requirements of paragraph 12.1 are met, suitable controls of the production shall be carried out.
- 12.3. The holder of the approval shall in particular:
- 12.3.1. ensure the existence of procedures for the effective control of the quality of products;
- 12.3.2. have access to the control equipment necessary for checking the conformity to each approved type;

⁽¹⁾ These specifications correspond to the following trichromatic coordinates: selective yellow (yellow within the meaning of annex 5, appendix, of the 1968 Convention on Road Traffic). Limit towards red $y \geq 0,138 + 0,580x$. Limit towards green $y \leq 1,29x - 0,100$. Limit towards white $y \geq -x + 0,966$ Limit towards spectrum edge $y \leq -x + 0,992$.

⁽²⁾ This requirement will be the subject of a recommendation for the benefit of administrations.

- 12.3.3. 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;
- 12.3.4. 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;
- 12.3.5. ensure that for each type of product at least the tests prescribed in annex 3 to this Regulation are carried out;
- 12.3.6. ensure that any collecting of samples 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.
- 12.4. The competent authority which has granted type approval may at any time verify the conformity control methods applicable to each production unit.
 - 12.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.
 - 12.4.2. The inspector may take samples at random to be tested in the manufacturer's laboratory. The minimum number of samples may be determined in the light of the results of the manufacturer's own checks.
 - 12.4.3. 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 12.4.2 above, the inspector shall select samples, to be sent to the technical service which has conducted the type approval tests, using the criteria of annex 7.
 - 12.4.4. The competent authority may carry out any test prescribed in this Regulation. These tests will be on samples selected at random without causing distortion of the manufacturer's delivery commitments and in accordance with the criteria of annex 7.
 - 12.4.5. The competent authority shall strive to obtain a frequency of inspection of once every two years. However, this is at the discretion of the competent authority and their confidence in the arrangements for ensuring effective control of the conformity of production. In the case where negative results are recorded, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.
- 12.5. Headlamps with apparent defects are disregarded.
- 12.6. The reference mark is disregarded.
- 13. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
 - 13.1. The approval granted in respect of an SB unit pursuant to this Regulation may be withdrawn if the requirements set forth above are not met, or if a unit bearing the approval mark does not conform to the type approved.
 - 13.2. 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 2 to this Regulation.

14. MODIFICATIONS OF THE TYPE OF SEALED BEAM HEADLAMP UNIT (SB UNIT) AND EXTENSION OF APPROVAL

14.1. Every modification of the type of sealed beam headlamp unit (SB unit) shall be notified to the administrative department which approved the type of sealed beam headlamp unit (SB unit). The department may then either:

14.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the sealed beam headlamp unit (SB unit) still complies with the requirements; or

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

14.2. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 5.1.4 above to the Parties to the Agreement applying this Regulation.

14.3. 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 2 to this Regulation.

15. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a device 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 2 to this Regulation.

16. TRANSITIONAL PROVISIONS

16.1. As from the date of entry into force of the 02 series of amendments to this Regulation no Contracting Party applying it shall refuse to grant approvals under this Regulation as amended by the 02 series of amendments.

16.2. As from 24 months after the date of entry into force mentioned in paragraph 16.1 above, Contracting Parties applying this Regulation shall grant approvals only if the type of headlamp corresponds to the requirements of this Regulation as amended by the 02 series of amendments.

16.3. Existing approvals granted under this Regulation before the date mentioned in paragraph 16.2 above shall remain valid. However, Contracting Parties applying this Regulation may prohibit the fitting of devices which do not meet the requirements of this Regulation as amended by the 02 series of amendments:

16.3.1. On vehicles for which type approval or individual approval is granted more than 24 months after the date of entry into force mentioned in paragraph 16.1 above;

16.3.2. On vehicles first registered more than five years after the date of entry into force mentioned in paragraph 16.1 above.

17. NAMES AND ADDRESSED 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 refusal or, extension or withdrawal of approval, or production definitely discontinued, issued in other countries, are to be sent.

ANNEX 1

SB units for agricultural or forest tractors and other slow-moving vehicles

1. The provisions of this Regulation shall also apply to the approval of special SB units for agricultural or forest tractors and other slow-moving vehicles, such units being intended to provide both a driving beam and a passing beam and having a diameter⁽¹⁾ of less than 160 mm with the following modifications:
 - 1.1. The minimum requirements for illumination laid down in paragraph 8.8 of this Regulation shall be reduced in the ratio
$$(D - 45)^2 / (160 - 45)^2$$
subject to the following absolute lower limits:
 - 3 lux at either point 75R or point 75L;
 - 5 lux at either point 50R or point 50L;
 - 1,5 lux in zone IV;
 - 1.2. Instead of the symbols provided for in paragraph 5.2.2 of this Regulation, the unit shall be marked with the letters 'SM' in an inverted triangle.

⁽¹⁾ If the projected area of the reflector is not circular, the diameter shall be that of a circle having the same area as the projected area of the apparent useful surface of the reflector

ANNEX 2

Communication concerning the approval or extension or communication

[maximum format: A4 (210 × 297 mm)]



(1)

issued by: Name of administration:

.....

.....

.....

concerning (2): APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of a type of sealed beam headlamp unit (SB unit) pursuant to Regulation No. 5

Approval No Extension No

1. SB unit submitted for approval as type (3)

Colour of light emitted: white/selective yellow (2)

Rated voltage

Rated wattage

2. The passing lamp filament may/may not (2) be lit simultaneously with the driving lamp filament and/or another reciprocally incorporated lamp

3. Trade name or mark

4. Manufacturer's name and address

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

6. Submitted for approval on

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

CR₁ → CR₂ → CR₃ C/R₁ → C/R₂ → C/R₃ C₁ → C₂ → C₃ C/ → C/ → C/ R CR PL₁

CR PL₁ → CR PL₂ → C/R PL₁ → C/R PL₂ → C/R PL₃ → C PL₁

C PL₁ → C PL₂ → C/PL₁ → C/PL₂ → RPL

7. Technical service responsible for conducting approval tests
8. Date of report issued by that service
9. Number of report issued by that service
10. Approval granted/refused/extended/withdrawn ⁽¹⁾
11. Reason(s) of extension (if applicable)
12. Maximum intensity (in lux) of the driving beam at 25 m from the unit
13. Extension of approval to headlamps emitting white/selective-yellow light ⁽¹⁾
 - 13.1. Test laboratory
 - 13.2. Date and number of laboratory report
 - 13.3. Date of extension of the approval
14. Place
15. Date
16. Signature
17. The attached drawing, No ..., shows the unit in front view (with, if applicable, details of the lens moulding) and a cross-section.

⁽¹⁾ Strike out what does not apply.

ANNEX 3

Minimum requirements for conformity of production control procedures

1. GENERAL
 - 1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation.
 - 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:
 - 1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values 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 $\pm 0,2$ 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 $\pm 0,1$ lx), 75 R (or L), 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 Emax, 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 8.10 of this Regulation.
 - 1.2.3. If the results of the tests 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⁾.
 - 1.3. 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 5 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 5.

The headlamp shall be considered as acceptable if Dr does not exceed 1,5 mrad.

If this value exceeds 1,5 mrad but is not more than 2,0 mrad, a second headlamp 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⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ See the corresponding footnote in the text of the Regulation.

- 1.4. The chromaticity coordinates shall be complied with.

The photometric performance of a headlamp emitting selective yellow light shall be the values contained in this Regulation multiplied by 0,84.

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 provisions 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 measurements made by a competence authority.

- 2.2.4. In all cases the reference methods shall be those of this Regulation, particularly 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 headlamp shall be subjected to photometric measurements at the points provided for in the Regulation, the reading being limited to points Emax, HV⁽¹⁾, HL, HR⁽²⁾ in the case of the driving beam, and to points B 50 L (or R), HV, 75 R (or L) and 25 L (or R) in the case of the passing beam (see figure in annex 4).

⁽¹⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ See the corresponding footnote in the text of the Regulation.

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 the acceptability of his products in order to meet the specifications laid down for verification of conformity of products in paragraph 12.1 of this Regulation.

The criteria governing the 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.

ANNEX 4

Examples of arrangements of approval marks

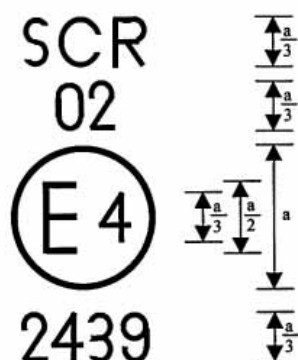


Figure 1

The SB headlamp bearing the approval marking shown above is a headlamp approved in the Netherlands (E4), meeting the requirements of this Regulation as amended by the 02 series of amendments in respect of both the driving beam and the passing beam (SCR), and which is designed for right-hand traffic only.

Note: The approval number and the additional symbol(s) 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 the same direction. The additional symbol(s) must be diametrically opposed to the approval number. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

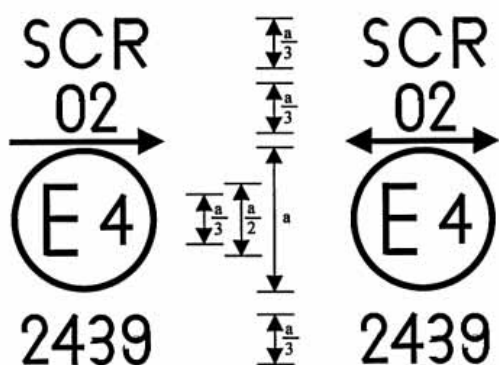


Figure 2 — Figure 3a



Figure 3b

The SB headlamp bearing the approval marking shown above is a headlamp meeting the requirements of this Regulation with respect to both the passing beam and the driving beam and designed:

For left-hand traffic only.

For both traffic systems, by means of an adjustment as desired of the headlamp.

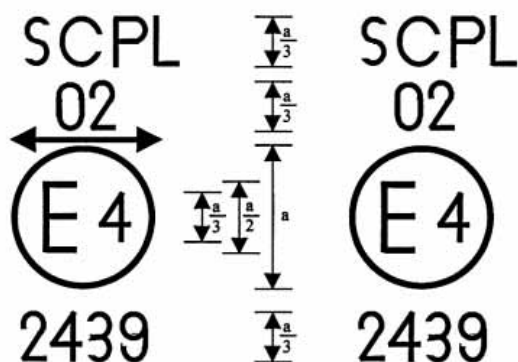


Figure 4 — Figure 5

The SB headlamp bearing the approval mark shown above is a headlamp incorporating the lens of plastic material meeting the requirements of this Regulation with respect to the passing beam only, and designed: For both traffic systems.

For right-hand traffic only.

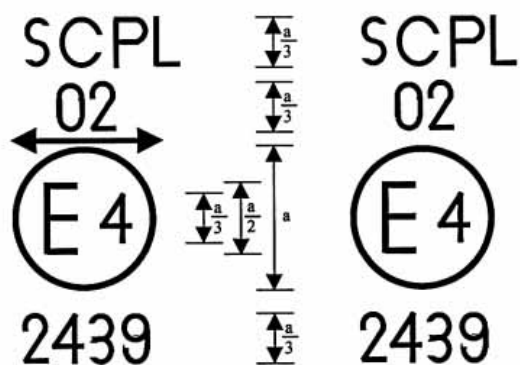


Figure 6 — Figure 7

The SB headlamp bearing the approval mark shown above is a headlamp incorporating the lens of plastic material meeting the requirements of this Regulation:

With respect to the passing beam only, and designed for left-hand traffic only.

With respect to the driving beam only.

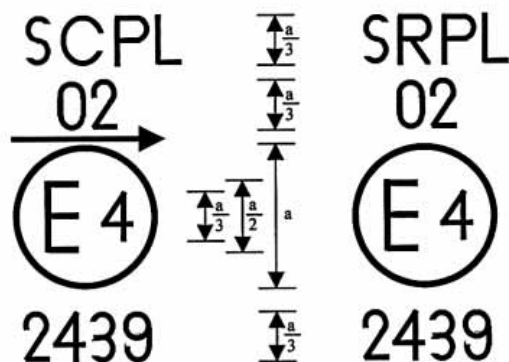
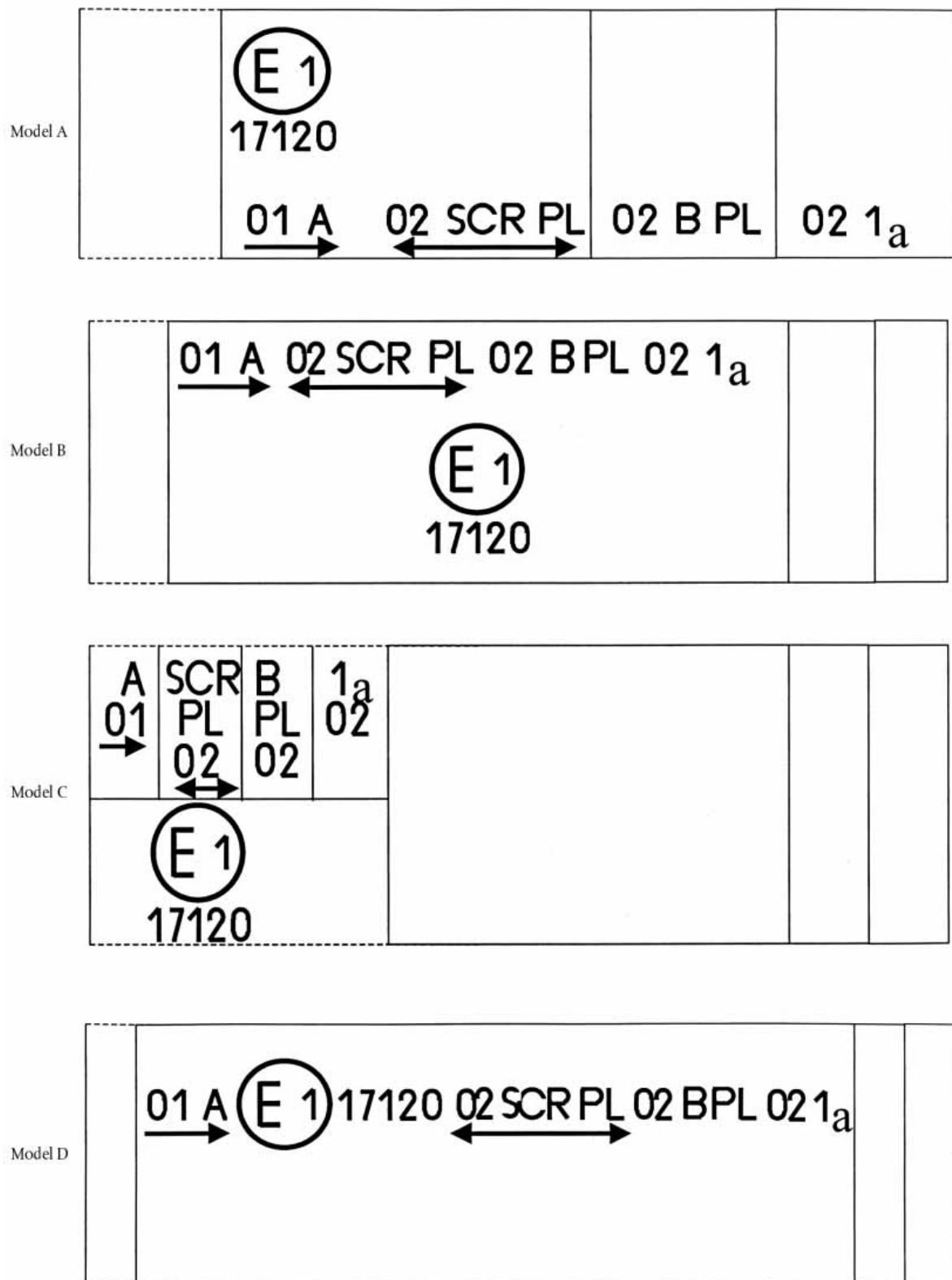


Figure 8 — Figure 9

Identification of a headlamp meeting the requirements of Regulation No 5 with respect to both the passing beam and the driving beam and designed for right-hand traffic only. with respect to the passing beam only and designed for the right-hand traffic only.

The passing lamp filament shall not be lit simultaneously with the driving lamp filament and/or another reciprocally incorporated lamp. Examples of simplified markings for grouped, combined or reciprocally incorporated lamps

Figure 10



(The vertical and horizontal lines schematise the shape of the light-signalling device. They are not part of the approval mark)

Note:

The four examples shown above correspond to a lighting device bearing an approval mark relating to:

A front position lamp approved in accordance with the 01 series of amendments to Regulation No 7;

A headlamp meeting the requirements of this Regulation with respect to the passing beam and to the driving beam, and designed for both traffic systems and incorporating a lens of plastic material;

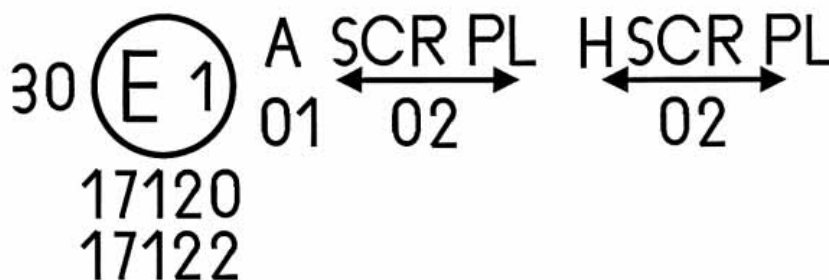
A front fog lamp approved in accordance with the 02 series of amendments to Regulation No 19 and incorporating a lens of plastic material;

A front direction indicator lamp of category 1 a approved in accordance with the 02 series of amendments to Regulation No 6.

Figure 11

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 with a passing beam designed for right-hand and left-hand traffic and a driving beam approved in Germany (E1) in accordance with the requirements of Regulation No 5 as amended by the 02 series of amendments, which is reciprocally incorporated with a front position lamp approved in accordance with the 01 series of amendments to Regulation No 7;

or: a headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas, approved in Germany (E1) in accordance with the requirements of Regulation No 31 as amended by the 02 series of amendments 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:

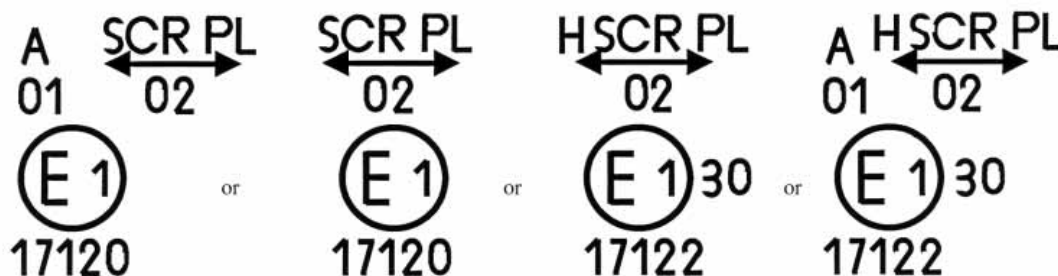
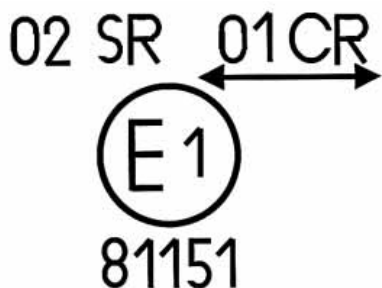


Figure 11

Example 2



The above example corresponds to the marking of a lens used in an assembly of two headlamps approved in Germany (E1), consisting of a headlamp emitting a passing beam designed for both traffic systems and of a driving beam meeting the requirements of Regulation No 1, and of a headlamp emitting a driving beam meeting the requirements of Regulation No 5.

Plate SB2 — Sealed Beam Headlamp Unit, 180 mm (7in) DIA, type 2 double Beam (Passing & Driving)

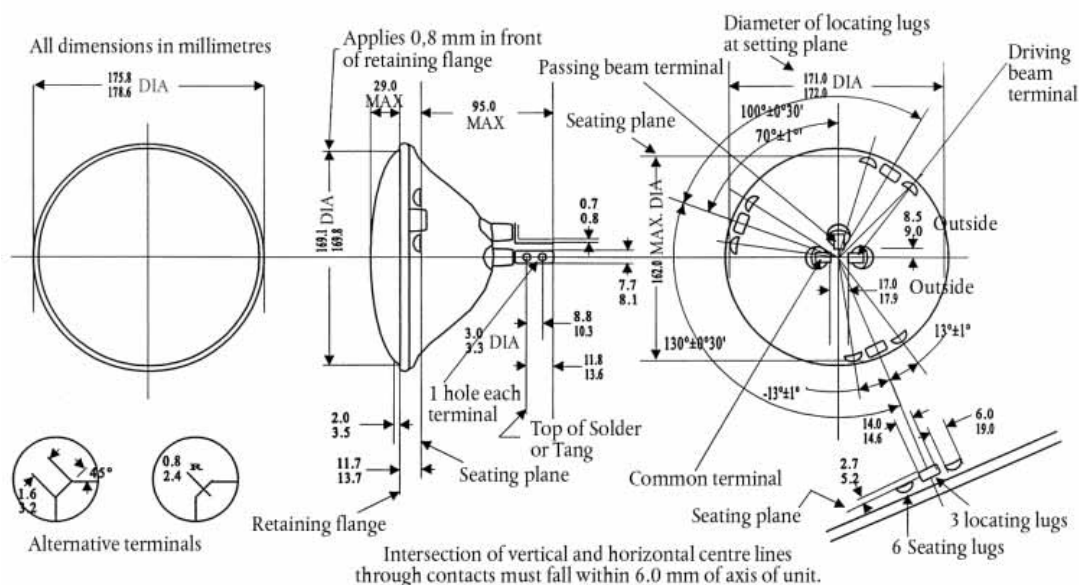
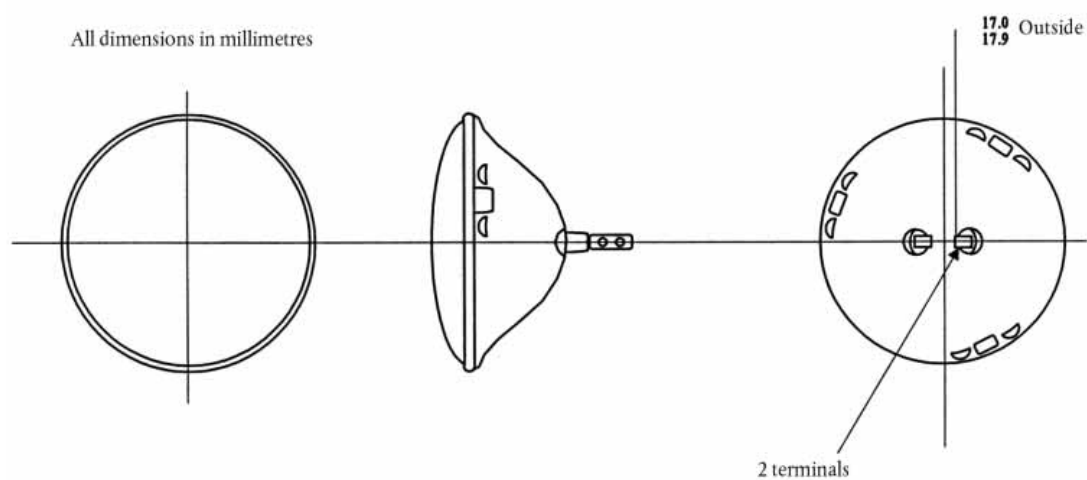
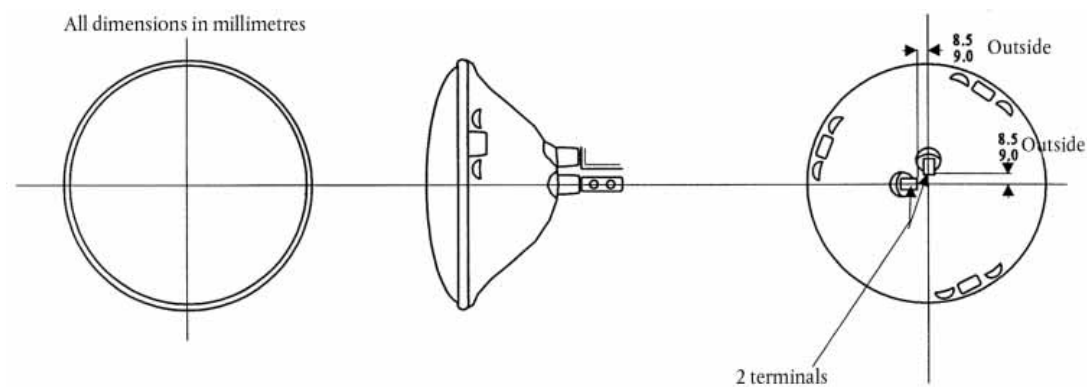


Plate SB3 — Sealed Beam Headlamp Unit, 180 mm (7in) DIA, type 1 single Beam (Driving only)



Note: Same as Plate SB2 Sealed Beam Headlamp Unit, 180 mm DIA, except as shown.

Plate SB4 — Sealed Beam Headlamp Unit, 180 mm (7in) DIA, type 2 single Beam (Passing only)



Note: Same as Plate SB2 Sealed Beam Headlamp Unit, 180 mm DIA, except as shown.

Plate SB5 — Sealed Beam Headlamp Unit, 145 mm (5,75in) DIA, type 1 single Beam (Driving only)

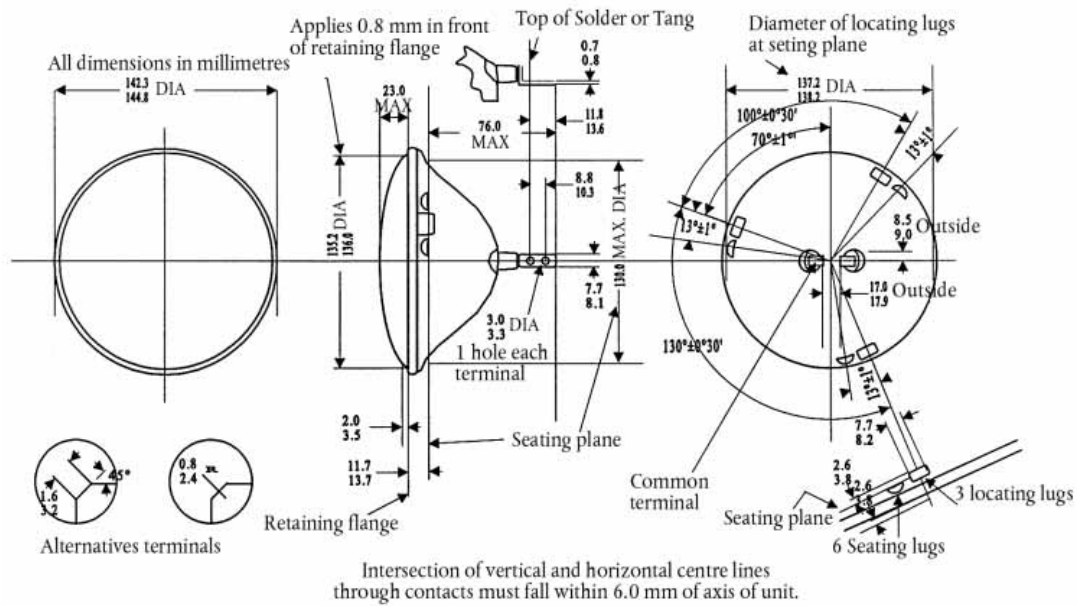
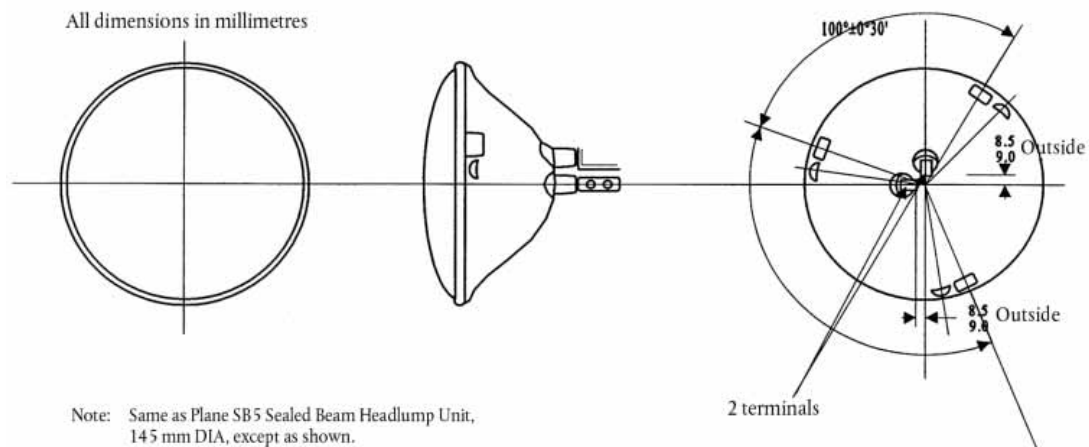
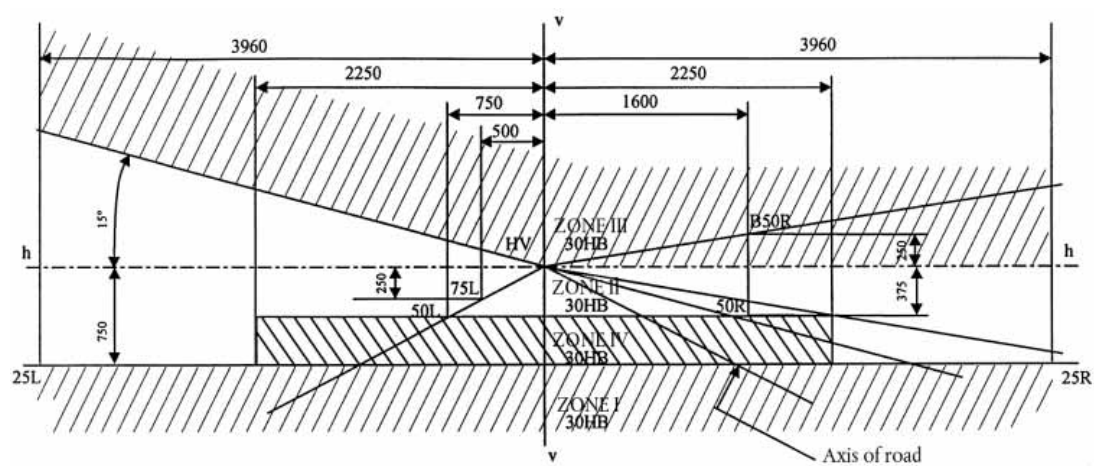
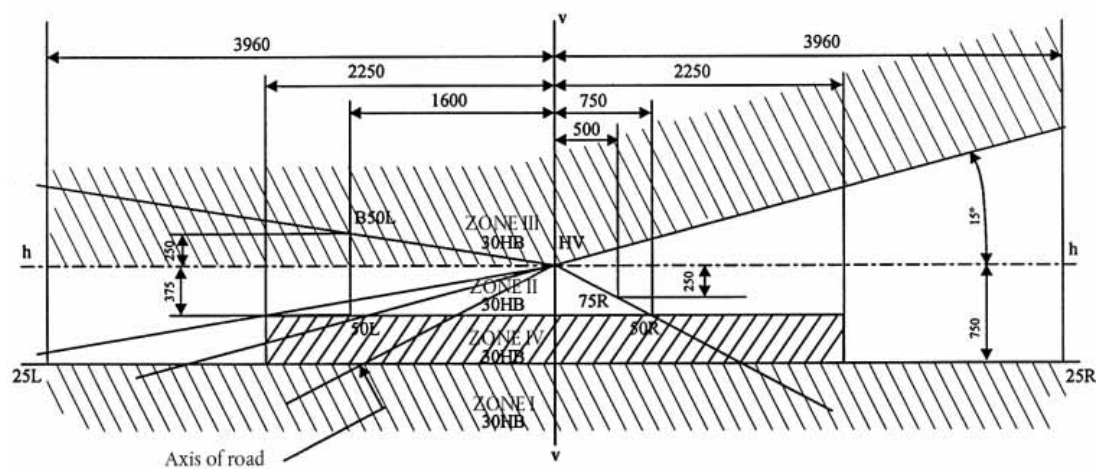


Plate SB7 — Sealed Beam Headlamp Unit, 145 mm (5,75in) DIA, type 1 single Beam (Passing only)





ANNEX 5

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 points for Emax for driving beam and 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 headlamps' shall be understood to mean the complete lamp itself including those surrounding body parts and lamps which could influence its thermal dissipation.

1. TEST OF 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 subparagraph 1.1.1 and checked as prescribed in subparagraph 1.1.2.

1.1.1. **Test Procedure**

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) is to be approved, the corresponding filament is lit for the prescribed time ⁽¹⁾,
- (b) in the case of a reciprocally incorporated passing lamp and driving lamp (dual filament SB headlamp):
 - If the applicant declares that the headlamp is to be used with a single filament lit ⁽²⁾ at a time, the test shall be carried out in accordance with this condition, activating ⁽¹⁾ each specified function successively for half the time specified in paragraph 1.1;
 - In all other cases ⁽¹⁾ ⁽²⁾, 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.
- (c) in the case of grouped lighting functions all the individual functions shall be lit simultaneously for the time specified for individual lighting functions (a) also taking into account the use of reciprocally incorporated lighting functions (b), according to the manufacturer's specifications.

1.1.1.2. **Test voltage**

The voltage shall be adjusted so as to supply a wattage 15 % (26 % for 24 V types) higher than the rated wattage specified in this Regulation for the type(s) of SB headlamp(s) concerned is (are) obtained.

⁽¹⁾ When the tested headlamp is grouped and/or reciprocally incorporated with 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 operation mode with an on/ off time ratio of approximately one to one.

⁽²⁾ Should two filaments be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of both filaments simultaneously.

1.1.2. Test results

1.1.2.1. Visual inspection

Once the headlamp has been stabilised 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

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 % 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 subparagraph 1.1 above, the headlamp shall be operated for one hour as described in subparagraph 1.1.1, after being prepared as prescribed in subparagraph 1.2.1, and checked as prescribed in subparagraph 1.1.2.

1.2.1. Preparation 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 part 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⁾ 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 % solution at 20 °C.

- 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 % of the values measured for each following point under the conditions described in paragraph 1 above:

Point of $E_{\max}$
in driving beam, photometric distribution for a driving/passing lamp,

Point of $E_{\max}$
in driving beam, photometric distribution for a driving lamp 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.

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 1.1, 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 $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$. Using a mass production SB headlamp which has been aged for at least one hour the headlamp shall be operated on passing beam without being dismounted 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 expressed in milliradians (mrad) shall be considered as acceptable when the absolute value

$$\Delta r_1 = |r_3 - r_{60}|$$

recorded on the headlamp is not more than 1,0 mrad ($\Delta r_1 \leq 1,0$ mrad)

⁽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 % 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⁾ 50 V is situated 375 mm below HV on the vertical line v-v on the screen at 25 m distance.

- 2.2.2. However, if this value is more than 1,0 mrad but not more than 1,5 mrad ($1,0 \text{ mrad} \leq \Delta r_I \leq 1,5 \text{ mrad}$) a second headlamp shall be tested as described in 2.1 after being subjected three consecutive times to the cycle as described below, in order to stabilise the position of mechanical parts of the headlamp on a base representative of the correct installation on the vehicle: Operation of the passing lamp 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

$(\Delta r_I + \Delta r_{II}) / 2 \leq 1,0 \text{ mrad}$

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 3.2.4 of this Regulation shall satisfy the specifications indicated in paragraphs 2.1 to 2.5 below.
- 1.2. Two out of the five samples of complete lamps supplied pursuant to paragraph 3.2.3 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 2.1-2.5 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. *T e s t s*

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 % RH;
- 1 hour at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 % 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 % 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 % RH;

Before this test, the samples shall be kept at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and 60-75 % 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 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);
- Emax 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 % 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 l/min. The samples shall be sprayed with distilled water of conductivity lower than 1 mS/m at a temperature of $23\text{ }^\circ\text{C} \pm 50\text{ }^\circ\text{C}$, 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 % n-heptane, 12,5 % toluene, 7,5 % ethyl tetrachloride, 12,5 % trichloroethylene and 6 % 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) $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. Afterwards the samples shall be carefully rinsed with distilled water containing not more than 0,2 % 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 $\Delta t = (T_2 - T_3) / T_2$, 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 $\Delta d = (T_5 - T_4) / T_2$, 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 % 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 % n-heptane and 30 % 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 $\Delta t = (T_2 - T_3) / T_2$, 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: $\Delta t = (T_2 - T_3) / T_2$,

and in diffusion: $\Delta d = (T_5 - T_4) / T_2$,

shall be measured according to the procedure described in appendix 2 in the area specified in paragraph 2.2.4 above. 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 mm × 20 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 mm × 2 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) ± 20 % measured under the standardised 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 ± 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 lamp 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. I 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 lamp in accordance with this Regulation shall not exceed by more than 30 % the maximum values prescribed at points B 50 L and HV and not be more than 10 % 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 recognised 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 3.2.4 of this Regulation)

Samples	Lenses or samples of material	Lenses						Tests						
		1	2	3	4	5	6	7	8	9	10	11	12	13
1.1.	Limited photometry (paragraph 2.1.2)										X	X	X	
1.1.1.	Temperature change (paragraph 2.1.1)										X	X	X	
1.1.2.	Limited photometry (paragraph 2.3.2)										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 (paragraph 2.2.1)	X	X	X										
1.3.1.	Transmission measurement	X	X	X										
1.4.	Chemicals agents (paragraph 2.2.2)	X	X	X										
1.4.1.	Diffusion measurement	X	X	X										
1.5.	Detergents (paragraph 2.3.1)				X	X	X							
1.6.	Hydrocarbons (paragraph 2.3.2)				X	X	X							
1.6.1.	Transmission measurement				X	X	X							
1.7.	Deterioration (paragraph 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 (paragraph 2.5)													X

B. Tests on complete lamps (supplied pursuant to paragraph 3.2.3 of this Regulation)

Tests		Complete lamp	
		Sample No. 1	Sample No. 2
2.1.	Deterioration (paragraph 2.6.1.1)	X	
2.2.	Photometry (paragraph 2.6.1.2)	X	
2.3.	Adherence (paragraph 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 DT with an opening of 6 mm against which the sample stand is placed.

A convergent achromatic lens L2, corrected for spherical aberrations, links the diaphragm DT with the receiver R; the diameter of the lens L2 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 DD with angles $\alpha/2 = 1^\circ$ and $\alpha_{\max}/2 = 12^\circ$ is placed in an image focal plane of the lens L2.

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 L2 DT and the focal length F2 ⁽¹⁾ of the lens L2 shall be so chosen that the image of DT completely covers the receiver R.

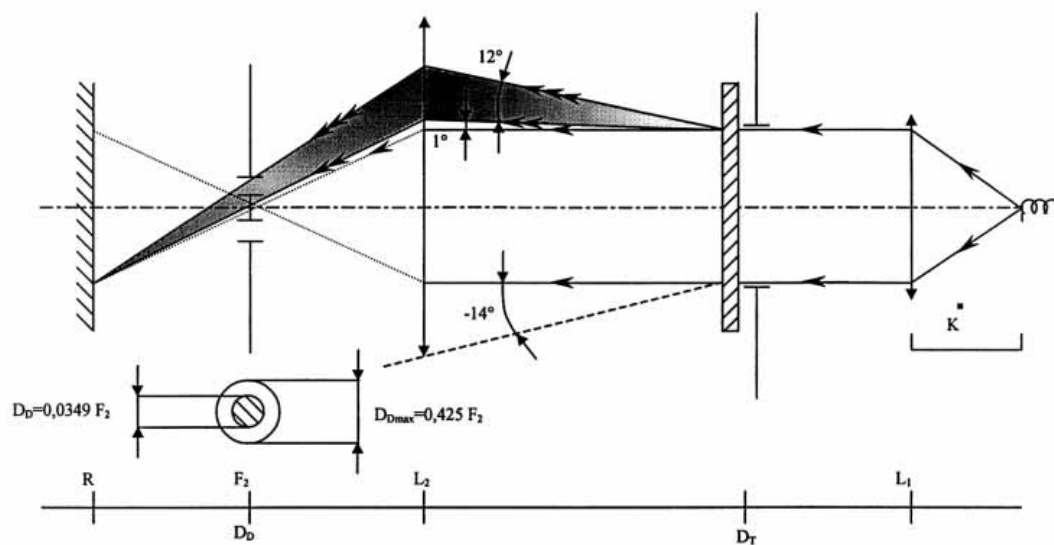
When the initial incident flux is referred to 1 000 units, the absolute precision of each reading shall be better than 1 unit.

2. MEASUREMENTS

The following readings shall be taken:

Reading	With sample	With central par of DD	Quantity represented
T1	no	no	Incident flux in initial reading
T2	yes (before test)	no	Flux transmitted by the new material in a field of 24 °C
T3	yes (latter test)	no	Flux transmitted by the tested material in a field of 24 °C
T4	yes (before test)	yes	Flux diffused by the new material
T5	yes (latter 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 + 0,5 bar. Under these operation conditions the fan pattern obtained shall be $170 \text{ mm} \pm 50 \text{ mm}$ in diameter on the surface exposed to deterioration, at a distance of $380 \text{ mm} \pm 10 \text{ mm}$ 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/m^3 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:

$$\Delta d = (T5 - T4)/T2 = 0,0250 \pm 0,0025$$

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 relative humidity (RH).

4. TEST PIECES

Before the test, the sample roll of adhesive tape shall be conditioned for 24 hours in the specified atmosphere (see paragraph 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 lengthwise 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 the 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 geometric standpoint, in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations.
 - 1.2. With respect to photometric performance, the conformity of mass produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random:
 - 1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this Regulation. For values B 50 L (or R) and Zone III the maximum 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. or the passing beam, the values prescribed in this Regulation are met at 3 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), 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 Emax, 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 8.10 of this Regulation. The reference mark is disregarded.
 - 1.2.3. If the results of the tests 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. Headlamps with apparent defects are disregarded.
 - 1.2.5. The reference mark is disregarded.
 - 1.3. The chromaticity co-ordinates shall be complied with.

The photometric performance of a headlamp emitting selective yellow light shall be the values contained in this Regulation multiplied by 0,84.

⁽¹⁾ See the corresponding footnote in the text of the Regulation.

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 deviation 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 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

2.1.2. or if the conditions of paragraph 1.2.2 for sample A are fulfilled.

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

2.2.2. 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 10 applied if, following the sampling procedure 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 cases of A3, B2, B3 a repeated sampling, third sample C of two headlamps and fourth sample D 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
- 3.1.2. or if the conditions of paragraph 1.2.2 for sample C are fulfilled.
- 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
 - 3.2.1.2. 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 13 applied if, following the sampling procedure 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

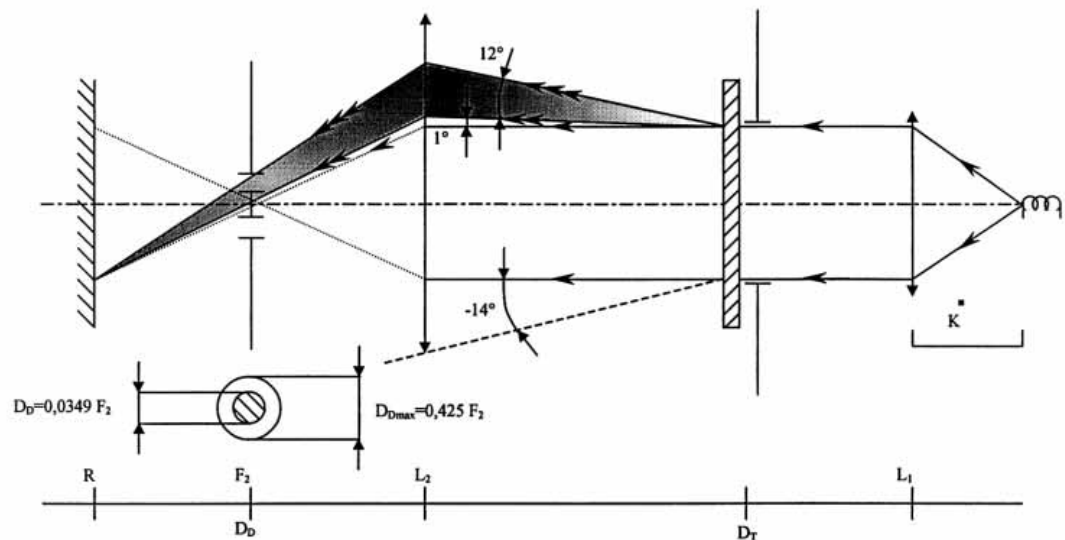
With respect to the verification of the change in vertical positions of the cut-off line under the influence of heat, the following procedure shall be applied:

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 5 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 5.

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 in 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.



Regulation 6 of the Economic Commission for Europe of the United Nations (UN/ECE) uniform provisions concerning the approval of direction indicators for motor vehicles and their trailers

1. DEFINITIONS

For the purposes of this Regulation:

- 1.1. 'Direction indicator' means a device mounted on a motor vehicle or trailer which, when operated by the driver, signals the latter's intention to change the direction in which the vehicle is proceeding. The present Regulation applies solely to fixed-position flashing light devices whose flashing is obtained by the intermittent supply of electric current to the lamp.
- 1.2. 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.
- 1.3. 'Direction indicators of different "types"'
- are different indicators which differ in such essential respects as:
 - The trade name or mark, The characteristics of the optical system (levels of intensity, light distribution angles, etc.),
 - The category of direction indicators,
 - The colour of the filament lamp.

2. APPLICATION FOR APPROVAL

- 2.1. The application for approval of a type of direction indicator shall be submitted by the holder of the trade name or mark or by his duly accredited representative.

It shall specify to which category or to which of the categories 1, 1a, 1b, 2a, 2b, 3, 4, 5 or 6 according to annex 1, the direction indicator belongs and, if it belongs to category 2, whether it has one level of intensity (category 2a) or two levels of intensity (category 2b) and whether the direction indicator may also be used in an assembly of two lamps of the same category.

- 2.2. For each type of direction indicator the application shall be accompanied by the following:

- 2.2.1. Drawings, in triplicate, sufficiently detailed to permit identification of the type and category and showing geometrically in what position the direction indicator is mounted on the vehicle; the axis of observation to be taken as the axis of reference in the tests (horizontal angle $H = 0^\circ$, vertical angle $V = 0^\circ$); and the point to be taken as the centre of reference in the said tests.

The drawings shall show the position intended for the approval number and the additional symbols in relation to the circle of the approval mark;

- 2.2.2. A brief technical description stating in particular the categories of filament lamps prescribed, with the exception of lamps with non-replaceable light sources; each filament lamp category shall be one or other of those contained in Regulation No. 37;
- 2.2.3. For a direction indicator of category 2b, an arrangement diagram and a specification of the characteristics of the system ensuring the two levels of intensity;

- 2.2.4. Two samples; if the approval is applied for devices which are not identical but are symmetrical and suitable for mounting one on the left and one on the right side of the vehicle, the two samples submitted may be identical and be suitable for mounting only on the right or only on the left side of the vehicle; for a direction indicator of category 2b, the application shall also be accompanied by two samples of the parts constituting the system which ensures the two levels of intensity.

3. MARKINGS

Devices submitted for approval shall:

- 3.1. bear the trade name or mark of the applicant; this marking shall be clearly legible and indelible;
- 3.2. bear a clearly legible and indelible marking indicating the category or categories of filament lamps prescribed; this is not valid for lamps with non-replaceable light sources;
- 3.3. comprise a space of sufficient size for the approval marking and the additional symbols prescribed in paragraph 4.2 below; this space shall be shown in the drawings mentioned in paragraph 2.2.1 above;
- 3.4. in the case of lamps with non-replaceable light sources, bear the marking of rated voltage and rated wattage.

4. APPROVAL

4.1. *General*

- 4.1.1. If the two devices submitted for approval in pursuance of paragraph 2.2.4 above meet the requirements of this Regulation, approval shall be granted.
- 4.1.2. Where grouped, combined or reciprocally incorporated lamps have been found to comply with the requirements of several Regulations annexed to the 1958 Agreement, a single international approval mark may be applied provided that such lamps are not grouped, combined or reciprocally incorporated with a lamp or lamps not satisfying any one of these Regulations.
- 4.1.3. An approval number shall be assigned to each type approved. Its first two digits (at present 01, corresponding to the 01 series of amendments which entered into force on 27 June 1987) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another type of device covered by this Regulation. Direction indicators of different categories may be marked with a single approval number when they form one assembly.
- 4.1.4. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a type of device pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation, by means of a form conforming to the model in annex 2 to this Regulation.
- 4.1.5. Every device conforming to a type approved under this Regulation shall bear in the space referred to in paragraph 3.3 above, and in addition to the markings prescribed in paragraphs 3.1 and 3.2 or 3.4 respectively, an approval mark as described in paragraphs 4.2 and 4.3 below.

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 (or symbols):

4.2.2.1. One or more of the numbers: 1, 1a, 1b, 2a, 2b, 3, 4, 5 or 6, according to whether the device belongs to one or more categories 1, 1a, 1b, 2a, 2b, 3, 4, 5 or 6 for which approval is sought in accordance with paragraph 2.1;

4.2.2.2. On devices which cannot be mounted on either side of the vehicle indiscriminately, an arrow showing in which position the device is to be mounted (the arrow shall be directed outwards from the vehicle in the case of devices of categories 1, 1a, 1b, 2a and 2b and towards the front of the vehicle in the case of devices of categories 3, 4, 5 and 6). In addition, for devices of category 6 an indication 'R' or 'L' shall in this case be shown on the device, indicating the right or left side of the vehicle;

4.2.2.3. On devices which may be used as a single lamp and as part of an assembly of two lamps, the additional letter 'D' to the right side of the symbol mentioned in paragraph 4.2.2.1;

4.2.2.4. The two digits of the approval number which indicate the series of amendments in force at the time of issue of the approval and, if necessary, the required arrow may be marked close to the above additional symbols;

4.2.2.5. The marks and symbols referred to in paragraphs 4.2.1 and 4.2.2 above shall be clearly legible and be indelible even when the device is fitted in the vehicle.

4.3. *Arrangement of the approval mark*

4.3.1. Independent lamps

Annex 3, figure 1, to this Regulation gives an example of arrangement of the approval mark with the above-mentioned additional symbols.

⁽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 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30-36 (vacant) and 37 for Turkey. 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.

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 applied 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 the installation of the lamps;

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. an 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 lamp 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 3, figure 2, to this Regulation gives examples of the arrangement of the approval marks for grouped, combined or reciprocally incorporated lamps with all the above-mentioned additional symbols.

4.3.3. Lamps reciprocally incorporated with other lamps, of which the lens may also be used for other types of headlamps

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 3.3 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 3, figure 3, to this Regulation gives examples of approval marks for lamps reciprocally incorporated with a headlamp.

5. GENERAL SPECIFICATIONS

5.1. Each device supplied shall conform to the specifications set forth in paragraphs 6. and 8. below.

- 5.2. The devices must be so designed and constructed that under normal conditions of use and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they retain the characteristics prescribed by this Regulation.

6. INTENSITY OF LIGHT EMITTED

- 6.1. The light emitted by each of the two devices supplied must be in the case of direction indicators of categories 1, 1a, 1b, 2a, 2b, 3 or 4 in the reference axes, in the case of direction indicators of categories 5 or 6 in direction A according to annex 1 of not less than the minimum intensity and of not more than the maximum intensity specified below:

Direction indicator of category ⁽¹⁾	Minimum intensities cd	Maximum values cd when used as		
		single lamp	Lamp (single) marked 'D' (see paragraph 4.2.2.3)	Total for the assembly of two lamps (see paragraph 4.2.2.3)
1	175	700 ⁽²⁾	490 ⁽²⁾	980 ⁽²⁾
1a	250	600 ⁽²⁾	600 ⁽²⁾	1 120 ⁽²⁾
1b	400	860 ⁽²⁾	600 ⁽²⁾	1 200 ⁽²⁾
2a	50	350	350	350
2b by day	175	700 ⁽²⁾	490 ⁽²⁾	980 ⁽²⁾
2b by night	40	120 ⁽²⁾	843 ⁽²⁾	168 ⁽²⁾
3 towards the front	175	700 ⁽²⁾	490 ⁽²⁾	980 ⁽²⁾
3 towards the rear	50	200	140	280
4 towards the front	175	700 ⁽²⁾	490 ⁽²⁾	980 ⁽²⁾
4 towards the rear	0,6	200	140	280
5	0,6	200	140	280
6	50	200	140	280

⁽¹⁾ The installation of front direction indicators of the various categories in power-driven vehicles and their trailers is provided for the Regulations concerning the installation of lighting and light-signalling devices (Regulations Nos. 48 and 53).

⁽²⁾ The total value of maximum intensity for an assembly of two lamps is given by multiplying by 1.4 the value prescribed for a single lamp. When an assembly of two lamps having the same function is deemed to be, for the purpose of installation on a vehicle, a 'single lamp' (following the definition of Regulation N° 48 and its series of amendments in force at the time of application for type approval) each individual lamp constituting the 'single lamp' shall comply with the minimum intensity required and the two lamps together shall not exceed the admissible maximum (last column of the table). In the case of a single lamp each individual lamp shall comply with the minimum intensity required; the admissible maximum intensity shall not be exceeded by both lamps together (last column of the table). In the case of a single lamp containing more than one light source: the lamp shall comply with the minimum intensity required when any one light source has failed, however for front or rear direction indicator lamps 50 % of the minimum intensity in the axis of reference of the lamp shall be considered sufficient provided that a note in the communication form states that the lamp is only for use on a vehicle fitted with an operating tell-tale which indicates when any one or more light source(s) has (have) failed, and when all light sources are illuminated the maximum intensity specified for a single lamp may be exceeded provided that the single lamp is not marked 'D' and the maximum intensity specified for an assembly of two lamps (last column of the table) is not exceeded

- 6.2. Outside the reference axis, within the angular fields specified in the arrangement diagrams in annex 1 to this Regulation, the intensity of the light emitted by each of the two devices supplied must:
- 6.2.1. In each direction corresponding to the points in the relevant table of luminous-intensity distribution reproduced in annex 4 to the Regulation, be not less than the minimum specified in paragraph 6.1 above multiplied by the percentage specified in the said table for the direction in question;
- 6.2.1.1. In divergence from paragraphs 6.2 and 6.2.1, for categories 4 and 5 direction indicators, to the rear, a minimum value of 0.6 cd is required throughout the fields specified in annex 1;
- 6.2.2. In no direction within the area from which the indicator lamp is visible, exceed the maximum specified in paragraph 6.1 above;
- 6.2.3. Moreover,
- 6.2.3.1. Throughout the fields defined in the diagrams in annex 1, the intensity of the light emitted must be not less than 0.7 cd for devices of category 1b, not less than 0.3 cd for devices of categories 1, 1a, 2a, 3, 4 towards the front and for those of category 2b by day; it shall not be less than 0.07 cd for devices of category 2b by night;
- 6.2.3.2. For devices of categories 1 and 2b by night and, to the front, for devices of categories 3 and 4, the intensity of the light emitted outside the zone defined by the measuring points $\pm 10^\circ\text{H}$ and $\pm 10^\circ\text{V}$ (10° -field) must not exceed the following values:

Direction indicator of category	Maximum values in cd outside the 10° -field		
	Single lamp	Lamp (single) marked 'D' (see paragraph 4.2.2.3)	Total for the assembly of two lamps (see paragraph 4.2.2.3)
2b by night	100	70	140
1, 3 and 4	400	280	560

Between the boundaries of the 10° -field ($\pm 10^\circ\text{H}$ and $\pm 10^\circ\text{V}$) and the 5° -field ($\pm 5^\circ\text{H}$ and $\pm 5^\circ\text{V}$), the maximum admissible values of the intensities are linearly increased up to the values as defined in paragraph 6.1;

- 6.2.3.3. For devices of category 1a and 1b, the intensity of the light emitted outside the zone defined by the measuring points $\pm 15^\circ\text{H}$ and $\pm 15^\circ\text{V}$ (15° -field) shall not exceed the following values:

Direction indicator of category	Maximum values in cd outside the 15° -field		
	Single lamp	Lamp (single) marked 'D' (see paragraph 4.2.2.3)	Total for the assembly of two lamps (see paragraph 4.2.2.3)
1a	250	175	350
1b	400	280	560

Between the boundaries of the 15° -field ($\pm 15^\circ\text{H}$ and $\pm 15^\circ\text{V}$) and the 5° -field ($\pm 5^\circ\text{H}$ and $\pm 5^\circ\text{V}$), the maximum values are increased linearly up to the values as defined in paragraph 6.1.

6.2.3.4. The provisions of paragraph 2.2 of annex 4 to this Regulation on local variations of intensity must be observed.

6.3. The intensities shall be measured with the filament lamp(s) continuously alight.

6.4. In the case of devices of category 2b the time that elapses between electrical supply being switched on and the light output measured on the reference axis to reach 90 per cent of the value measured in accordance with paragraph 6.3 above shall be measured for both the day and the night conditions of use.

The time measured for the night condition of use shall not exceed that measured for the day condition of use.

6.5. Annex 4, referred to in paragraph 6.2.1 above, gives particulars of the measurement methods to be used.

7. TEST PROCEDURE

7.1. All measurements shall be made with an uncoloured or amber-coloured standard filament lamp of the category prescribed for the device, the supply voltage being so regulated as to produce the reference luminous flux prescribed for that category of lamp.

7.1.1. All measurements on lamps equipped with non-replaceable light sources (filament lamps and other) shall be made at 6.75 V, 13.5 V or 28.0 V respectively.

In the case of light sources supplied by a special power supply, the above test voltages shall be applied to the input terminals of that power supply.

The test laboratory may require from the manufacturer the special power supply needed to supply the light sources.

7.2. However, in the case of an indicator of category 2b for which an additional system ⁽¹⁾ is used to obtain the night-time intensity, the voltage applied to the system for measuring the night-time intensity shall be that which was applied to the filament lamp for measuring the day-time intensity.

7.3. The vertical and horizontal outlines of the illuminating surface of a light-signalling device (paragraph 1.2.2) shall be determined and measured in relation to the centre of reference (paragraph 1.2.5).

8. COLOUR OF LIGHT EMITTED

The colour of the light emitted shall be within the limits of the co-ordinates prescribed in annex 5 to this Regulation.

9. MODIFICATIONS OF A TYPE OF DIRECTION INDICATOR FOR MOTOR VEHICLES AND THEIR TRAILERS AND EXTENSION OF APPROVAL

9.1. Every modification of a type of direction indicator shall be notified to the administrative department which approved the type. The department may then either:

9.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the device still complies with the requirements; or

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

(1) The functioning and installation conditions of this additional device will be defined by special provisions.

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 applying this Regulation.

9.3. 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 2 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. Direction indicators 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 8 above.

10.2. The minimum requirements for conformity of production control procedures set forth in annex 6 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.

11. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

11.1. The approval granted in respect of a device pursuant to this Regulation may be withdrawn if the foregoing requirements are not met.

11.2. If a Contracting Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in annex 2 to this Regulation.

12. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a device 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 2 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 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.

14. TRANSITIONAL PROVISIONS

14.1. As from the date of entry into force of the 01 series of amendments to this Regulation, no Contracting Party applying it shall refuse to grant approvals under this Regulation as amended by the 01 series of amendments.

14.2. As from 36 months after the date of entry into force referred to in paragraph 14.1 above, Contracting Parties applying this Regulation shall grant approvals only if the type of light-signalling device corresponds to the requirements of this Regulation as amended by the 01 series of amendments.

14.3. Front direction indicators of categories 1a and 1b as described in paragraph 6.1 of this Regulation as amended may not be required until three years after the date of entry into force of this Regulation and then only for new vehicle types for which approval according to Regulation No. 48 is requested for a new design or a change of design and/or of the shape of the bodywork affecting the dimensions of the front direction indicators and their position in relation to the passing lamps or fog lamps.

Approvals granted to direction indicators of categories 4 and 5 under this Regulation in its original form, unamended, shall cease to be valid five years after the entry into force of the 01 series of amendments to this Regulation, unless the Contracting Party which granted approval notifies the other Contracting Parties applying this Regulation to the effect that the type of direction indicator approved also meets the requirements of this Regulation as amended by the 01 series of amendments.

14.4. The Parties to the Agreement applying this Regulation:

14.4.1. Shall continue after the date referred to above to recognise approvals granted in accordance with the original version of this Regulation for the fitting of replacement devices to vehicles in use;

14.4.2. May issue approvals for devices on the basis of the original version of this Regulation, provided that the devices are intended as replacements for fitting to vehicles in use and that it is not technically feasible for the devices in question to satisfy the new requirements contained in the 01 series of amendments.

14.5. Approvals which were granted to direction indicators of categories 1, 2a, 2b and 3 pursuant to this Regulation in its original form (00 series) until the date referred to in paragraph 14.2 shall remain valid after this date.

ANNEX 1

Categories of direction indicators: minimum angles required for light distribution in space of these categories of direction indicators⁽¹⁾

In all cases, the minimum vertical angles of light distribution in space of direction indicators are 15° above and 15° below the horizontal, in the case of direction indicators of category 6 however they are 30° above and 5° below the horizontal.

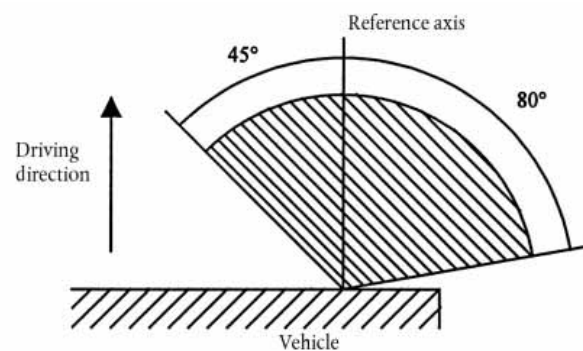
Minimum horizontal angles of light distribution in space:

Categories 1, 1a and 1b: direction indicators for the front of the vehicle:

Category 1: for use at a distance not less than 40 mm from the headlamp;

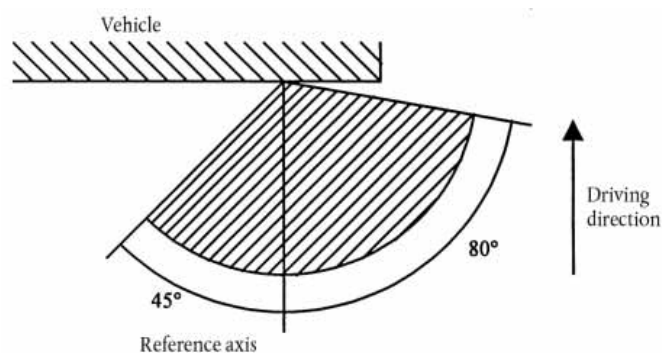
Category 1a: for use at a distance greater than 20 mm but less than 40 mm from the headlamp;

Category 1b: for use at a distance less than 20 mm from the headlamp.



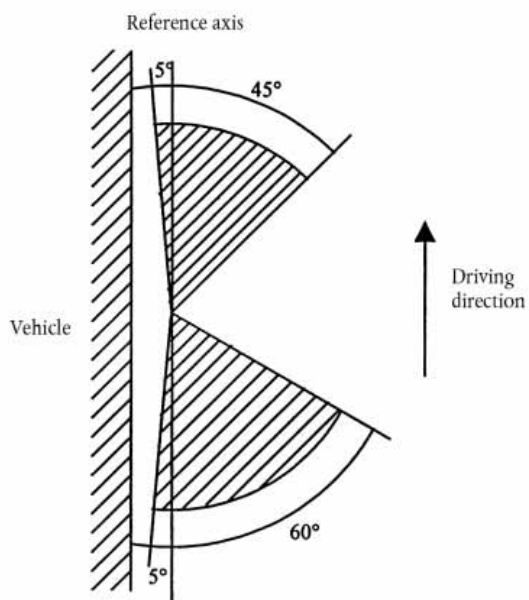
Category 2a: Direction indicators with one level of intensity for the rear of the vehicle.

Category 2b: Direction indicators with two levels of intensity for the rear of the vehicle.

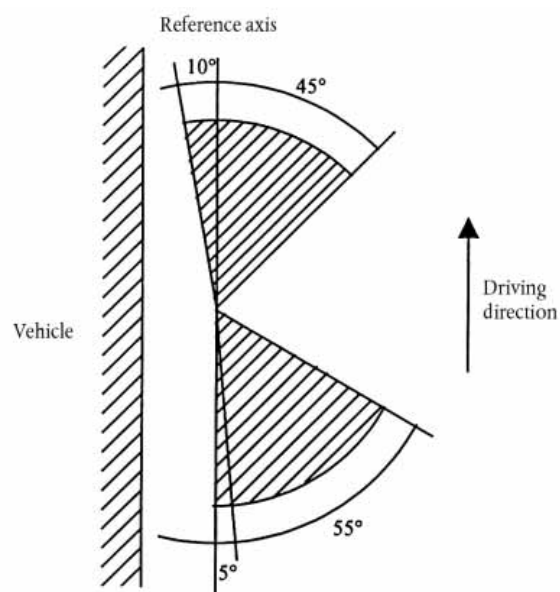


⁽¹⁾ The angles shown in these arrangements are correct for devices to be mounted on the right side of the vehicle. The arrows in these diagrams point towards the front of the vehicle.

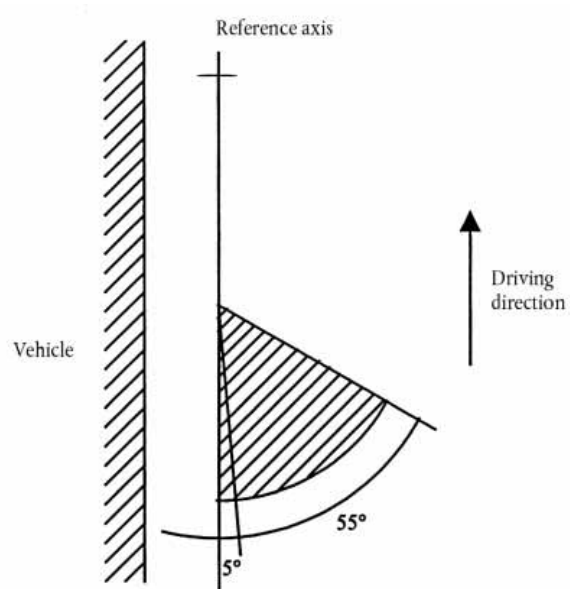
Category 3: Front-side direction indicators for use on a vehicle equipped with this category of direction indicator only.



Category 4: Front-side direction indicators for use on a vehicle also equipped with category 2a or 2b direction indicators.



Categories 5 and 6: Supplementary side direction indicators for use on a vehicle also equipped with categories 1, 1a or 1b and 2a or 2b direction indicators.



ANNEX 2

Communication

[Maximum format: A4 (210 × 297 mm)]



(1)

issued by: Name of administration:

.....

.....

.....

concerning (2): APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITELY DISCONTINUED

of a type of direction indicator pursuant to Regulation No. 6

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 the manufacturer's representative:
5. Submitted for approval on:
6. Technical service responsible for conducting approval tests:
7. Date of test report issued by that service:

(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.

8. Number of test report issued by that service:
9. Concise description ⁽¹⁾:
Category: 1, 1a, 1b, 2a, 2b, 3, 4, 5, 6 ⁽²⁾.
Number and category of filament lamp(s):
10. Position of the approval mark:
11. Reason(s) for extension (if applicable):
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.

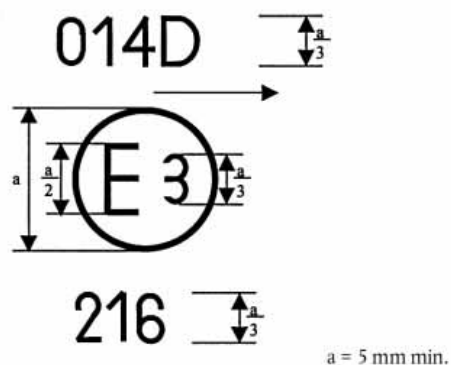
⁽¹⁾ For lamps with non-replaceable light sources indicate the number and the total wattage of the light sources.

⁽²⁾ Strike out what does not apply.

ANNEX 3

Arrangement of the approval mark

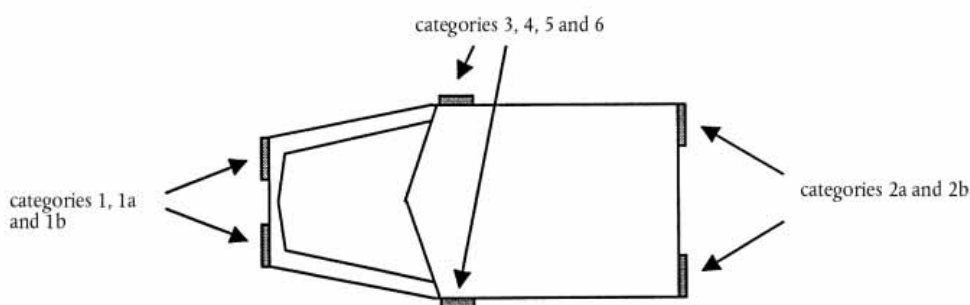
Figure 1



The device bearing the approval marking shown above is a category-4 device (front-side direction indicator) approved in Italy (E3) under No. 216, which may also be used in an assembly of two lamps. The arrow shows in what position this device, which cannot be mounted on either side of the vehicle indiscriminately, is to be mounted. The arrow points towards the front of the vehicle.

The number mentioned close to the symbol '4 D' indicates that the approval was granted according to the requirements of Regulation No. 6 as amended by the 01 series of amendments.

Direction in which the arrows on the approval mark point, according to the category of the device is shown below:



Note: The approval number and the 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 the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

Simplified marking of grouped, combined or reciprocally incorporated lamps when two or more lamps are part of the same assembly.

Figure 2

The vertical and horizontal lines schematise the shape of the light-signalling device. These are not part of the approval mark.

Model A

	3333 ⓔ 4		
	1A 02	2a 01	R 01
	F 00	AR 00	S 01

Model B

		1A 2a R 02 01 01 F AR S 00 00 01 3333 ⓔ 4	

Model C

1A 2a R 02 01 01 F AR S 00 00 01			
3333 ⓔ 4 →			

Note: The three examples of approval marks shown above (models A, B and C) represent three possible variables for the marking of a lighting device when two or more lamps are part of the same assembly of grouped, combined or reciprocally incorporated lamps.

They indicate that the device was approved in the Netherlands (E4) under number 3333 and comprise:

a reflex-reflector of class IA approved in accordance with the 02 series of amendments to Regulation No. 3;

a rear direction indicator of category 2a approved in accordance with the 01 series of amendments to Regulation No. 6;

a red rear position lamp (R) approved in accordance with the 01 series of amendments to Regulation No. 7;

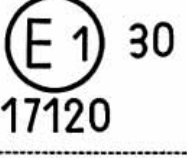
a rear fog lamp (F) approved in accordance with Regulation No. 38 in its original version;

a reversing lamp (AR) approved in accordance with Regulation No. 23 in its original version;

a stop lamp with two levels of illumination (S2) approved in accordance with the 01 series of amendments to Regulation No. 7.

			
	01 A → 02 HCR ↔	02 B	01 1a

	01 A → 01 HCR ↔	02 B	01 1a		
					

A	HCR	B	1a			
01	01	02	01			
→	↔					
						

Note: The three examples shown above correspond to a lighting device bearing an approval mark relating to:

a front position lamp approved in accordance with the 01 series of amendments to Regulation No. 7;

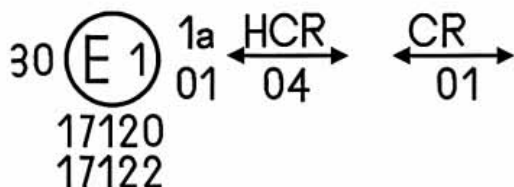
a headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas, approved in accordance with the 02 series of amendments to Regulation No. 20;

a front fog lamp approved in accordance with the 02 series of amendments to Regulation No. 19;

a front direction indicator lamp of category 1a approved in accordance with the 01 series of amendments to Regulation No. 6.

Lamp reciprocally incorporated with a headlamp.

Figure 3

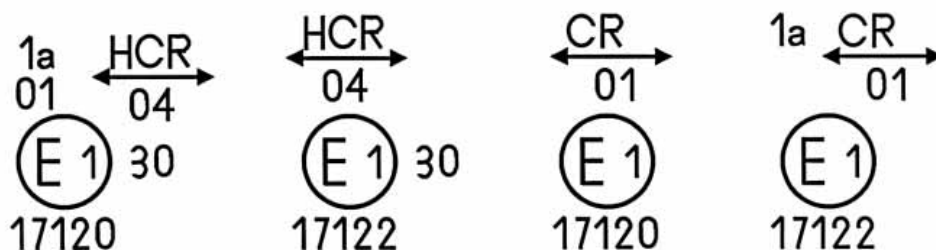


The above example corresponds to the marking of a lens intended to be used in different types of headlamps, namely:

either: a headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 101 250 candelas, approved in Germany (E1) in accordance with the requirements of Regulation No. 8 as amended by the 04 series of amendments; which is reciprocally incorporated with a front direction indicator approved in accordance with the 01 series of amendments to Regulation No. 6;

or: a headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam, approved in Germany (E1) in accordance with the requirements of Regulation No. 1 as amended by the 01 series of amendments, which is reciprocally incorporated with the same front direction indicator 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:



ANNEX 4

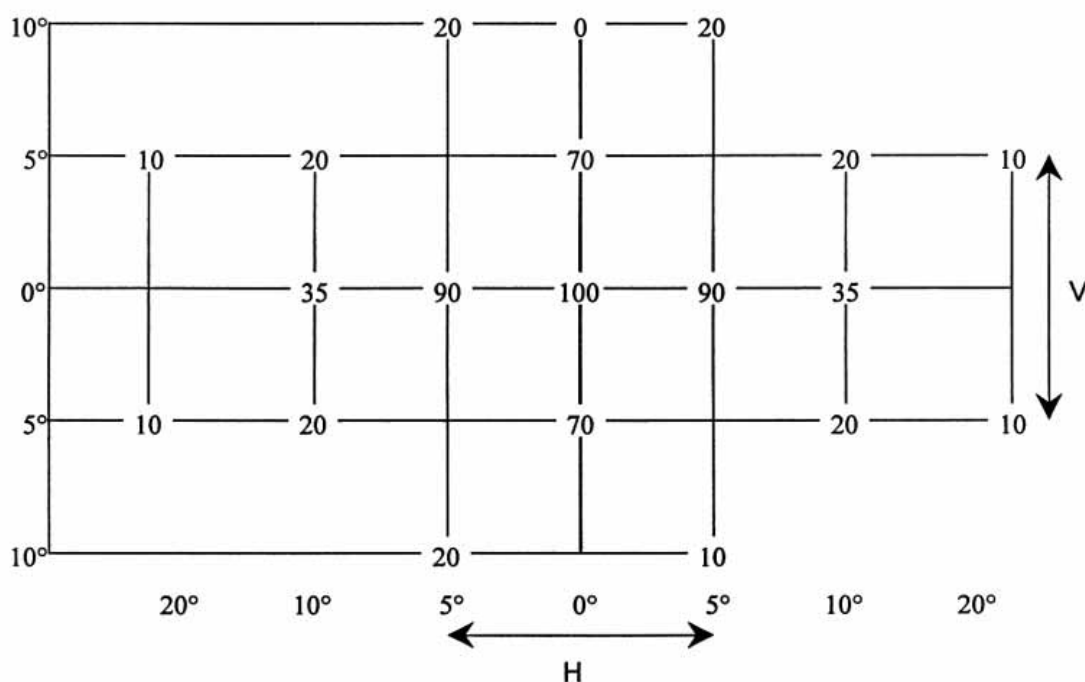
Photometric measurements

1. MEASUREMENT METHODS

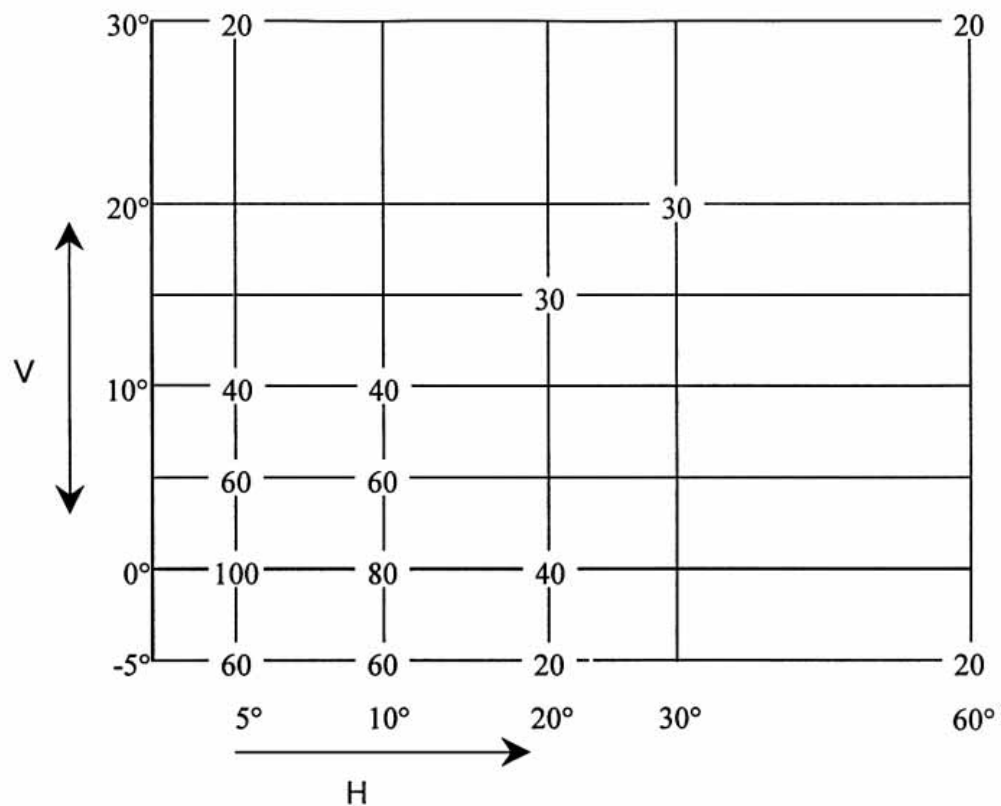
- 1.1. During photometric measurements, stray reflections shall be avoided by appropriate masking.
- 1.2. In case the results of measurements should be challenged, measurements shall be carried out in such a way as to meet the following requirements:
- 1.2.1. The distance of measurement shall be such that the law of the inverse of the square of the distance is applicable;
- 1.2.2. The measuring equipment shall be such that the angular aperture of the receiver viewed from the reference centre of the light is comprised between 10' and 1 degree;
- 1.2.3. The intensity requirement for a particular direction of observation shall be deemed to be satisfied if that requirement is met in a direction deviating by not more than one-quarter of a degree from the direction of observation.

2. TABLE OF STANDARD LIGHT DISTRIBUTION IN SPACE

— for direction indicators of the categories 1, 1a, 1b, 2a, 2b, 3, 4 and 5



— for direction indicators of category 6 (outer side of the vehicle)



2.1. The direction $H = 0^\circ$ and $V = 0^\circ$ corresponds to the reference axis. (On the vehicle, it is horizontal, parallel to the median longitudinal plane of the vehicle and oriented in the required direction of visibility.) It passes through the centre of reference. The values shown in the tables give, for the various directions of measurement, the minimum intensities as a percentage of the minimum intensities required in the table in paragraph 6.1:

2.1.1. in the direction $H = 0^\circ$ and $V = 0^\circ$ for categories 1, 1a, 1b, 2a, 2b, 3 and in the case of category 4 to the front only;

2.1.2. in the direction $H = 5^\circ$ and $V = 0^\circ$ for category 6.

2.2. Within the field of light distribution of paragraph 2, schematically shown as a grid, the light pattern should be substantially uniform, i.e. in so far as the light intensity in each direction of a part of the field formed by the grid lines shall meet at least the lowest minimum value being shown on the grid lines surrounding the questioned direction as a percentage.

3. PHOTOMETRIC MEASUREMENT OF LAMPS EQUIPPED WITH SEVERAL LIGHT SOURCES

The photometric performance shall be checked:

3.1. For non-replaceable light sources (filament lamps and other):

with the light sources present in the lamp, in accordance with paragraph 7.1.1 of this Regulation.

3.2. For replaceable filament lamps:

when equipped with mass production filament lamps at 6,75 V, 13,5 V or 28,0 V, the luminous intensity values produced shall lie between the maximum limit given in this Regulation and the minimum limit of this Regulation increased according to the permissible deviation of the luminous flux permitted for the type of filament lamp chosen, as stated in Regulation No 37 for production of filament lamps; alternatively a standard filament lamp may be used in turn, in each of the individual positions, operated at its reference flux, the individual measurements in each position being added together.

ANNEX 5

Colour of amber lights: trichromatic co-ordinates

Limit towards yellow: $y \leq 0,429$

Limit towards red: $y \geq 0,398$

Limit towards white: $z \leq 0,007$

For checking these colorimetric characteristics, a source of light at a colour temperature of 2 856 K corresponding to illuminant A of the International Commission on Illumination (CIE) shall be used in conformity with the Convention on Road Traffic (E/CONF.56/16/Rev.1). However, for lamps equipped with non-replaceable light sources (filament lamps and other), the calorimetric characteristics should be verified with the light sources present in the lamp, in accordance with paragraph 7.1.1 of this Regulation.

ANNEX 6

Minimum requirements for conformity of production control procedures

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation.

1.2. With respect to photometric performances, the conformity of mass-produced direction indicators shall not be contested if, when testing photometric performances of any direction indicator chosen at random and equipped with a standard filament lamp, or when the direction indicators are equipped with non-replaceable light sources (filament lamps or other), and when all measurements are made at 6,75 V, 13,5 V or 28,0 V respectively:

1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this Regulation.

1.2.2. If, in the case of a direction indicator equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on direction indicators shall be repeated using another standard filament lamp.

1.3. The chromaticity coordinates shall be complied with when the direction indicator is equipped with a standard filament lamp, or for direction indicators equipped with non-replaceable light sources (filament lamps or other), when the colorimetric characteristics are verified with the light source present in the direction indicator.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of direction indicator 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 provisions 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 and colorimetric characteristics.

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 measurements made by a competent authority.
- 2.2.4. In all cases the reference methods shall be those of this Regulation, particularly for the purpose of administrative verification and sampling.
- 2.3. *Nature of sampling*
- Samples of direction indicators shall be selected at random from the production of a uniform batch. A uniform batch means a set of direction indicators 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 direction indicator shall be subjected to photometric measurements for the minimum values at the points listed in annex 4, and the chromaticity coordinates listed in annex 5, provided for in the Regulation.
- 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 the acceptability of his products in order to meet the specifications laid down for verification of conformity of products in paragraph 10.1 of Regulation.
- The criteria governing the 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.
-

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 geometric standpoint, in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations.

1.2. With respect to photometric performance, the conformity of mass-produced direction indicators shall not be contested if, when testing photometric performances of any direction indicator chosen at random and equipped with a standard filament lamp, or when the lamps are equipped with non-replaceable light sources filament lamps or other), and when all measurements are made at 6.75 V, 13.5 V or 28.0 V respectively:

1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this Regulation.

1.2.2. If, in the case of a direction indicator equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on direction indicators shall be repeated using another standard filament lamp.

1.2.3. Direction indicators with apparent defects are disregarded.

1.3. The chromaticity coordinates shall be complied with when the direction indicator is equipped with a standard filament lamp, or for direction indicators equipped with non-replaceable light sources (filament lamps or other), when the colorimetric characteristics are verified with the light source present in the direction indicator.

2. FIRST SAMPLING

In the first sampling four direction indicators 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 direction indicators shall not be contested if the deviation of the measured values of the direction indicators in the unfavourable directions are:

2.1.1.1. sample A

A1: one direction indicator 0 %

one direction indicator not more than 20 %

A2: both direction indicators more than 0 %

but not more than 20 %

go to sample B

2.1.1.2. sample B

B1: both direction indicators 0 %

- 2.1.2. or if the conditions of paragraph 1.2.2 for sample A are fulfilled.
- 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 direction indicators shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the direction indicators are:
- 2.2.1.1. sample A
- A3: one direction indicator not more than 20 %
one direction indicator more than 20 %
but not more than 30 %
- 2.2.1.2. sample B
- B2: in the case of A2
one direction indicator more than 0 %
but not more than 20 %
one direction indicator not more than 20 %
B3: in the case of A2
one direction indicator 0 %
one direction indicator more than 20 %
but not more than 30 %
- 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 in Figure 1 of this annex, the deviations of the measured values of the direction indicators are:
- 2.3.1. sample A
- A4: one direction indicator not more than 20 %
one direction indicator more than 30 %
A5: both direction indicators more than 20 %
- 2.3.2. sample B
- B4: in the case of A2
one direction indicator more than 0 %
but not more than 20 %
one direction indicator more than 20 %
B5: in the case of A2
both direction indicators more than 20 %
B6: in the case of A2
one direction indicator 0 %
one direction indicator more than 30 %
- 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 cases of A3, B2, B3 a repeated sampling, third sample C of two direction indicators and fourth sample D of two direction indicators, 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 direction indicators shall not be contested if the deviations of the measured values of the direction indicators are:

3.1.1.1. sample C

C1: one direction indicator 0 %

one direction indicator not more than 20 %

C2: both direction indicators more than 0 %

But not more than 20 %

go to sample D

3.1.1.2. sample D

D1: in the case of C2

both direction indicators 0 %

3.1.2. or if the conditions of paragraph 1.2.2 for sample C are fulfilled.

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 direction indicators shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the direction indicators are:

3.2.1.1. sample D

D2: in the case of C2

one direction indicator more than 0 %

but not more than 20 %

one direction indicator not more than 20 %

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 in Figure 1 of this annex, the deviations of the measured values of the direction indicators are:

3.3.1. sample C

C3: one direction indicator not more than 20 %

one direction indicator more than 20 %

C4: both direction indicators more than 20 %

3.3.2. sample D

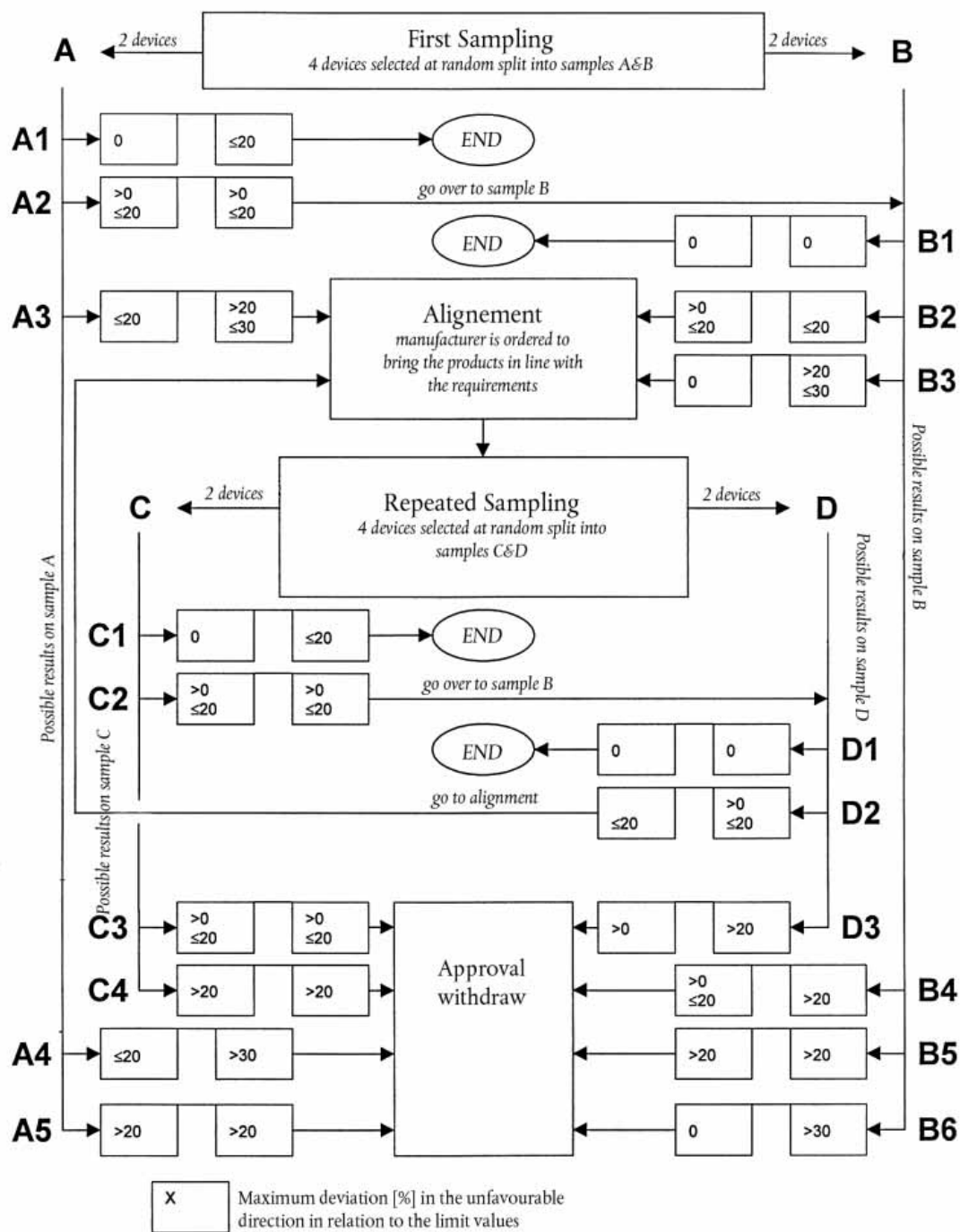
D3: in the case of C2

one direction indicator 0 or more than 0 %

one direction indicator more than 20 %

3.3.3. or if the conditions of paragraph 1.2.2 for samples C and D are not fulfilled.

Figure 1



Regulation 8 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 halogen filament lamps (H1, H2, H3, HB3, HB4, H7, H8, H9, HIR1, HIR2 and/or H11)

A. ADMINISTRATIVE PROVISIONS

SCOPE ⁽¹⁾

This Regulation applies to motor vehicle headlamps which may incorporate lenses of glass or plastic material.

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' are 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. However, the fitting or elimination of filters designed solely to change the colour of the beam and not its light distribution shall not constitute a change in the type;
 - 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 holder intended to accommodate the filament lamp (or lamps) of one of the categories H1, H2, H3, HB3, HB4, H7, H8, H9, HIR1, HIR2 and/or H11 ⁽²⁾ ⁽³⁾.

⁽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⁾ 'Type of lamp' ('lamp type') should not be confused with 'category of lamp' ('lamp category'). This Regulation concerns headlamps using halogen filament lamps of categories H 1, H 2, H 3, HB 3, HB 4, H 7, H 8, H 9, HIR 1, HIR 2 and/or H 11. These categories of filament lamps differ essentially in their design and, more particularly, in the cap. They are not interchangeable, but within one filament lamp category there may normally be several types.

⁽³⁾ HIR 1, and/or H 9 lamp 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 not be applied when these headlamps are installed. This restriction shall apply as long as there was no general agreement on use of levelling devices and headlamps cleaners with respect to the level of the performance of the headlamp.

- 1.3.7. the materials constituting the lenses and coating, if any.
2. APPLICATION FOR APPROVAL OF A HEADLAMP ⁽¹⁾
- 2.1. The application for approval of a headlamp 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 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;
- 2.1.2.1. 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.
- 2.1.3. the colour of the beam emitted by the headlamp;
- 2.2. Every application 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 specification;
- 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.

⁽¹⁾ Application for approval of a filament lamp: see Regulation No 37.

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

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.

3.3. Headlamps designed to satisfy the requirements of both right-hand and left-hand traffic shall bear markings indicating the two settings of the optical unit of 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 in pursuance of paragraph 2 above meet the requirements 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.

This requirement shall not apply to headlamps fitted with a two-filament bulb when a single beam is approved.

4.1.3. An approval number shall be assigned to each type approved. Its first two digits (at present 04) 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 headlamp covered by this Regulation, except if the approval is extended to a device which only differs from the already approved device by the colour of the light emitted.

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 fitted with an adjustable reflector and if it is designed exclusively for use when installed in positions as described in paragraph 2.2.1.1, the applicant must, once approval has been obtained, correctly explain to the user what the proper position(s) for installation is (are).

⁽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 space on the lens shall be sufficient.

- 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 mark, 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 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 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 at 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 'HC';
- 4.2.2.4. on headlamps meeting the requirements of this Regulation in respect of the driving beam only, the letters 'HR';
- 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 'HCR';
- 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 reciprocally incorporated headlamps, indication of the maximum luminous intensity of the driving beams as a whole shall be expressed as 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 and Slovak Federal Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 vacant, 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal and 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 (vacant), 26 for Slovenia and 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33-36 (vacant), 37 for Turkey, 38-39 (vacant), 40 for the former Yugoslav Republic of Macedonia, 41 (vacant), 42 for European Community (Approvals are granted by its Member States using their respective ECE symbol) and 43 for the Japon. Subsequent numbers will be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the Adoption of Uniform Technical Conditions for Wheeled Equipments and parts which can be fitted and/ or be used on wheeled vehicle 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.

- 4.2.3. In every case the relevant operating mode used during the test procedure according to paragraph 1.1.1.1 of annex 5 and the allowed voltage(s) according to paragraph 1.1.1.2 of annex 5 shall be stipulated on the approval certificate and on the communication form 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 5 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 (X) shall be placed near the filament lamp holder.
- 4.2.4. The two digits of the approval number (at present 04) 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 and 4.2.2 shall be clearly legible and indelible even when the headlamp is mounted on the vehicle.

4.3. *Arrangement of the approval mark*

4.3.1. *I n d e p e n d e n t l a m p s*

Annex 3, figures 1-9, gives examples of arrangements of the approval marks with the above-mentioned additional symbols.

4.3.2. *G r o u p e d , c o m b i n e d o r r e c i p r o c a l l y i n c o r p o r a t e d l a m p s*

- 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 Regulations 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 examples shown in annex 3).
- 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 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 3, figure 10, of 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 is 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 3, figure 11, of this Regulation gives examples of arrangements of approval marks corresponding to that 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 vehicle as to comply with the rules applicable to them. Such a device need not be fitted on components in which the reflector and the lens cannot be separated provided the use of such components is confined to vehicles on which the headlamp setting can be adjusted by other means. Where a headlamp providing a driving beam and a headlamp providing a passing 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. However, this shall not apply to headlamp assemblies whose reflectors are indivisible. For this type of assembly, the requirements of paragraph 6 shall apply.

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

- 5.3. The components by which the filament lamp(s) is/are fixed to the reflector shall be so made that, even in darkness, the filament lamp(s) can be fixed in no other position but the correct one ⁽¹⁾. The filament lamp-holder shall conform to the dimensional characteristics as given in the following data sheets of IEC Publication 61-2:

Filament lamps	Holder	Data sheets
H1	P 14.5s	7005-46-3
H2	X 5111	7005-99-2
H3	PK 22s	7005-47-1
HB3	P 20d	7005-31-1
HB4	P 22d	7005-32-1
H7	PX 26d	7005-5-1
H8	PG 17	7005-110-1
HIR1	PX20d	7005-...-1
HIR2	PX22d	7005-...-.
H9	PGJ 19-5	7005-110-1
H11	PGJ 19-2	7005-110-1

- 5.4. Headlamps designed to satisfy the requirements of both right-hand and 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 precise setting positions, one for right-hand and one for left-hand traffic, shall be possible, and the design shall preclude inadvertent shifting of the headlamp from one position to the other or its setting in an intermediate position. Where two different setting positions are provided for the filament lamp, the components 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 intended for traffic on only one side of the road. Conformity with the requirements of this paragraph shall be verified visually and, where necessary, by a test fitting.

- 5.5. On headlamps designed to provide alternately a driving beam and a passing beam, any mechanical, electro-mechanical or other device incorporated in the headlamp for switching from one beam to the other ⁽²⁾ must be so constructed that:

- 5.5.1. the device is strong enough to be worked 50 000 times without suffering damage despite the vibration to which it may be subjected in normal use;
- 5.5.2. in the case of failure it is possible to obtain the passing beam automatically;
- 5.5.3. either the passing beam or the driving beam can always be obtained without any possibility of the mechanism stopping in between the two positions;

⁽¹⁾ A headlamp is regarded as satisfying the requirements of this paragraph if the filament lamp can easily be fitted into the headlamp and the positioning lugs can be correctly fitted into their slots even in darkness.

⁽²⁾ These provisions shall not apply to the control switch.

- 5.5.4. the user cannot, with ordinary tools, change the shape or position of the moving parts.
- 5.6. Complementary tests shall be done according to the requirements of annex 5 to ensure that in use there is no excessive change in photometric performance.
- 5.7. If the lens of the headlamp is of plastic material, tests shall be done according to the requirements of annex 6.

6. ILLUMINATION

6.1. General provisions

- 6.1.1. Headlamps shall be so made that with suitable H1, H2, H3, HB3, HB4, H7, H8, H9, HIR1, HIR2 and/or H11 filament lamps they provide adequate illumination without dazzle in the case of the passing beam and good illumination in the case of the driving beam.
- 6.1.2. The illumination produced by the headlamp shall be checked on a vertical screen set at a distance of 25 m in front of the headlamp and at right angles to its axis (see annex 4).
- 6.1.3. The headlamps shall be checked by means of (a) standard (reference) filament lamp(s) designed for a rated voltage of 12 V, any selective-yellow filters⁽¹⁾ being replaced by geometrically identical uncoloured filters with a transmission factor of at least 80 per cent. During the checking of the headlamp the voltage at the terminals of the filament lamp must be regulated so as to obtain the following characteristics:

Filament lamps	Approximate supply voltage (in V) for measurement	Light flux (in lumens)
H1	12	1 150
H2	12	1 300
H3	12	1 100
HB3	12	1 300
HB4	12	825
H7	12	1 100
H8	12	600
HIR1	12	1 840
HIR2	12	1 355
H9	12	1 500
H11	12	1 000

The headlamp shall be deemed satisfactory if the photometric requirements are met with at least one standard (reference) 12-volt filament lamp which may be supplied with the headlamp.

⁽¹⁾ These filters shall consist of all the components, including the lens, which are intended to colour the light.

- 6.1.4. The dimensions determining the position of the filament inside the standard filament lamp are shown on the relevant data sheet of Regulation No 37.
- 6.1.5. The bulb of the standard filament lamp must be of such optical shape and quality that it does not cause any reflection or refraction adversely affecting the light distribution. Compliance with this requirement must be checked by measuring the light distribution obtained when a standard headlamp is fitted with the standard (reference) filament lamp.
- 6.2. *Provisions regarding passing beams*
- 6.2.1. The passing beam must produce a sufficiently sharp 'cut-off' to permit satisfactory adjustment with its aid. The 'cut-off' must be a horizontal straight line on the side opposite to the direction of traffic for which the headlamp is intended; on the other side it must extend neither beyond the broken line HV H1 H4 formed by a straight line HV H1 standing at an angle of 45° to the horizontal and a straight line H1 H4 lying 25 cm above the straight line hh, nor beyond the straight line HV H3, inclined at an angle of 15° above the horizontal (see annex 4). A 'cut-off' extending beyond both line HV H2 and line H2 H4 and resulting from a combination of the above two 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;
- 6.2.2.2. this horizontal part of the 'cut-off' is situated on the screen 25 cm below the line hh (see annex 4);
- 6.2.2.3. the 'elbow' of the 'cut-off' is on line vv ⁽²⁾.
- 6.2.3. When so aimed, the headlamp need, if its approval is sought solely for a passing beam, ⁽³⁾comply only with the requirements referred to in paragraphs 6.2.5 to 6.2.7 below; if it is intended to provide both a passing beam and a driving beam it shall comply with the requirements referred to 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 referred to 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 laterally displaced by more than 1° (= 44 cm) to the right or left ⁽⁴⁾. To facilitate alignment by means of the 'cut-off', the headlamp may be partially occulted in order to sharpen the 'cut-off'.

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

⁽²⁾ If, in the case of a headlamp designed to satisfy the requirements of this Regulation with respect to the passing beam only, the focal axis diverges appreciably from the general direction of the beam, or if, whatever the type of headlamp (passing only or combined passing and driving), the beam does not have a 'cut-off' with a clear 'elbow', the lateral adjustment shall be affected in the manner which best satisfies the requirements for illumination at points 75 R and 50 R for right-hand traffic and at points 75 L and 50 L for left-hand traffic.

⁽³⁾ A headlamp designed to emit a passing beam may incorporate a driving beam not complying with this specification.

⁽⁴⁾ The limit of re-alignment of 1° towards the right or left is not incompatible with upward or downward vertical re-alignment. 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 for the passing beam only).

- 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		
Point B	50 L	Point B	50 R	≤ 0,4
Point 75	50 R	Point 75	50 L	≥ 12
Point 75	50 L	Point 75	50 R	≤ 12
Point 50	50 L	Point 50	50 R	≤ 15
Point 50	50 R	Point 50	50 L	≥ 12
Point 50	50 V	Point 50	50 V	≥ 5
Point 25	50 L	Point 25	50 R	≥ 2
Point 25	50 R	Point 25	50 L	≥ 2
Any point in zone III				≤ 0,7
Any point in zone IV				≥ 3
Any point in zone I				≤ 2 × (E 50R or E 50 L)(*)

(*) E 50R and E 50L are the illuminations actually measured.

- 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 4 shall be checked by the measurement of the photometric values of points 1 to 8 on this figure; these values ⁽¹⁾ shall lie within the following limits:

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

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

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

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

These new values shall not be required for headlamps which have been approved before the application date of Supplement 4 to the 04 series of amendments to this Regulation (13 January 1993) nor to the extensions of such approvals.

- 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.

6.3. Provisions regarding driving beams

- 6.3.1. In 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 the lines hh and vv; such a headlamp need meet only the requirements referred to in paragraph 6.3.

⁽¹⁾ Illumination values in any point of zones A and B, which also lies within zone III, shall not exceed 0,7 lux.

- 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 the lines hh and vv shall be situated within the isolux representing 80 per cent of maximum illumination. This maximum value (EM) shall be not less than 48 lux. The maximum value shall in no case exceed 240 lux; moreover, 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 luminous intensity (IM) of the driving beam expressed in thousands of candelas shall be calculated by means of the formula: $IM = 0,625 EM$
- 6.3.2.1.2. the reference mark (IM) indicating this maximum intensity and referred to in paragraph 4.2.2.7 above shall be obtained by means of the formula: $IM = IM/3 = 0,208 EM$
- this value shall be rounded to whichever is the nearest of the following: 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 24 lux up to a distance of 1,125 m and not less than 6 lux up to a distance of 2,25 m.
- 6.4. In the case of headlamps with an 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 realised on the test goniometer with respect to a line joining the centre of the light source and point HV on the 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 ± 2 degrees 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 75R (75L respectively);
- driving beam: IM and point HV (percentage of IM).
- 6.4.4. if the applicant has indicated more than one mounting positions, the procedure of paragraphs 6.4.1 to 6.4.3 shall be repeated for all the 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 tests 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 referred to 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. REQUIREMENTS CONCERNING COLOURED LENSES AND FILTERS

- 7.1. Approval may be obtained for headlamps emitting either white or selective-yellow light with a filament lamp. Expressed in CIE trichromatic coordinates, the corresponding colorimetric characteristics are as follows:

Selective-yellow filter (screen or lens)

Limit towards red $y \geq 0,138 + 0,580 x$

Limit towards green $y \leq 1,29 x - 0,100$

Limit towards white $y \geq -x + 0,966$

Limit towards spectral value $y \leq -x + 0,992$

which can also be expressed as follows:

dominant wave-length: 575-585 nm purity factor: 0,90-0,98. The transmission factor must be $\geq 0,78$ when determined by means of a source of light with a colour temperature of 2 856 K ⁽¹⁾.

- 7.2. The filter must be part of the headlamp, and must be attached to it in such a way that the user cannot remove it either inadvertently or, with ordinary tools, intentionally.

8. GAUGING DISCOMFORT

The discomfort caused by the passing beam of headlamps shall be gauged ⁽²⁾.

9. STANDARD HEADLAMP ⁽³⁾

A headlamp shall be deemed to be a standard (reference) headlamp if it

- 9.1. satisfies the above-mentioned requirements for approval;
- 9.2. has an effective diameter of not less than 160 mm;
- 9.3. provides with a standard filament lamp, at the various points and in the various zones referred to in paragraph 6.2.5, illumination equal to:
- 9.3.1. not more than 90 per cent of the maximum limits and
- 9.3.2. not less than 120 per cent of the minimum limits prescribed in the table in paragraph 6.2.5.

10. OBSERVATION CONCERNING COLOUR

Since any approval under this Regulation is granted, pursuant to paragraph 7.1 above, to a type of headlamp emitting either white light or selective-yellow light, article 3 of the Agreement to which the Regulation is annexed shall not prevent the Contracting Parties from prohibiting headlamps emitting a beam of white or selective-yellow light on vehicles registered by them.

⁽¹⁾ Corresponding to illuminant A of the international Commission on illumination (CIE).

⁽²⁾ This requirement will be the subject of a recommendation for the benefit of administrations.

⁽³⁾ Different values may be accepted provisionally. In the absence of final specifications, the use of an approved headlamp is recommended.

C. FURTHER ADMINISTRATIVE PROVISIONS

- 11. MODIFICATION AND EXTENSION OF APPROVAL OF A TYPE OF HEADLAMP
 - 11.1. Every modification of the headlamp type shall be notified to the administrative department which approved the type of headlamp. The department may then either:
 - 11.1.1. consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the headlamp still complies with the requirements; or
 - 11.1.2. require a further test report from the technical service responsible for conducting the tests.
 - 11.2. 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 applying this Regulation.
 - 11.3. 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.
- 12. CONFORMITY OF PRODUCTION
 - 12.1. 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.
 - 12.2. In order to verify that the requirements of paragraph 12.1 are met, suitable controls of the production shall be carried out.
 - 12.3. The holder of the approval shall in particular:
 - 12.3.1. ensure the existence of procedures for the effective control of the quality of products;
 - 12.3.2. have access to the control equipment necessary for checking the conformity to each approved type;
 - 12.3.3. 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;
 - 12.3.4. 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;
 - 12.3.5. ensure that for each type of product at least the tests prescribed in annex 2 to this Regulation are carried out;
 - 12.3.6. Ensure that any collecting of samples 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.

12.4. The competent authority which has granted type approval may at any time verify the conformity control methods applicable to each production unit.

12.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.

12.4.2. The inspector may take samples at random to be tested in the manufacturer's laboratory.

The minimum number of samples may be determined in the light of the results of the manufacturer's own checks.

12.4.3. 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 12.4.2 above, the inspector shall select samples, to be sent to the technical service which has conducted the type approval tests, using the criteria of annex 7.

12.4.4. The competent authority may carry out any test prescribed in this Regulation. These tests will be on samples selected at random without causing distortion of the manufacturer's delivery commitments and in accordance with the criteria of annex 7.

12.4.5. The competent authority shall strive to obtain a frequency of inspection of once every two years. However, this is at the discretion of the competent authority and their confidence in arrangements for ensuring effective control of the conformity production. In the case where negative results are recorded, competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly possible.

12.5. Headlamps with apparent defects are disregarded.

12.6. The reference mark is disregarded.

13. PENALTIES FOR NON-CONFORMITY OF PRODUCTION MODELS

13.1. Approval issued under this Regulation for a type of headlamp may be withdrawn if the instructions are not observed or if a headlamp bearing the mark of approval does not conform to the type approved.

13.2. If contracting parties to the Agreement applying this Regulation withdraw authorisation they had previously granted, they must immediately inform the other contracting parties applying this Regulation, using a communication sheet as shown in Annex 1 to this Regulation.

14. DEFINITIVE DISCONTINUATION OF PRODUCTION

If holders of a type-approval definitely stop producing headlamps of a type approved in accordance with this Regulation, they must inform the authority that granted the approval, which must in turn notify the other parties to the 1958 Agreement applying this Regulation, using a communication sheet as shown in Annex 1 to this Regulation.

15. NAMES AND ADDRESSES OF THE TECHNICAL DEPARTMENTS RESPONSIBLE FOR APPROVAL TESTING AND OF THE ADMINISTRATIVE DEPARTMENTS

The parties to the 1958 Agreement applying this Regulation must supply the Secretariat of the United Nations Organisation with the names and addresses of the technical departments responsible for approval testing and of the administrative departments that grant approval and that must be sent documents concerning the granting, extension, rejection or withdrawal of approval and definitive discontinuation of production issued in other countries.

ANNEX 1

Communication concerning the approval (or extension or communication)

[maximum format: A4 (210 × 297)]



(1)

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 8

Approval No: Extension No:

1. Trade name or mark of headlamp:
2. Manufacturer's name for the type of headlamp:
3. Manufacturer's name and address:
4. If applicable, name and address of the 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:

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

(2) Strike out what does not apply.

ANNEX 2

Verification of conformity of production of headlamps equipped with H1, H2, H3, HB3, HB4, H7, H8, H9, HIR1, HIR2 and/or H11 filament lamps

1. GENERAL

1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation.

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 values 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 $\pm 0,2$ 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 $\pm 0,1$ 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 tests 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 on the headlamps 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:

One of the sampled headlamps shall be tested according to the procedure described in paragraph 2.1 of annex 5 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 5.

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, second headlamp 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⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ See the corresponding footnote in the text of the Regulation.

- 1.4. The chromaticity coordinates shall be complied with when the headlamp is equipped with a filament lamp set to Standard A colour temperature.

The photometric performance of a headlamp emitting selective yellow light when equipped with a colourless filament lamp shall be the values contained in this Regulation multiplied by 0,84.

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 provisions 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 measurements made by a competent authority.

- 2.2.4. In all cases the reference methods shall be those of this Regulation, particularly 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 to get her 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 headlamp shall be subjected to photometric measurements at the points provided for in the Regulation, there adding being limited to points EmaX HV⁽¹⁾, HL, HR⁽²⁾ in the case of the 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 4).

⁽¹⁾ Letters in brackets refer to headlamps intended for left-hand traffic.

⁽²⁾ See the corresponding footnote in the text of the Regulation.

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 the acceptability of his products in order to meet the specifications laid down for verification of conformity of products in paragraph 12.1 of this Regulation.

The criteria governing the 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.

ANNEX 3

Examples of arrangements of approval marks

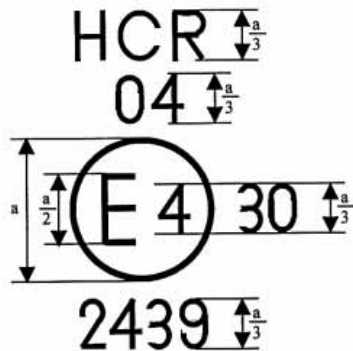


Figure 1

The device bearing the approval mark shown above is a headlamp approved in the Netherlands (E4), under approval number 2439, meeting the requirements of this Regulation, as amended by the 04 series of amendments (04), in respect of both the passing beam and the driving beam (HCR) and is designed for right-hand traffic only.

The number 30 indicates that the maximum luminous intensity of the driving beam is between 86 250 and 111 250 candelas.

Note: The approval number and additional symbols must be placed close to the circle and 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 '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.

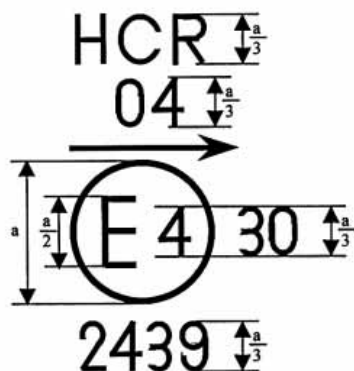


Figure 2

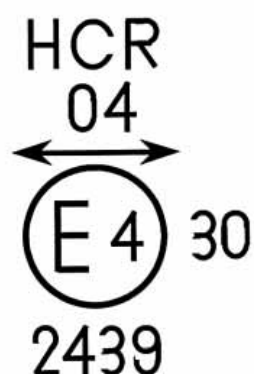


Figure 3 a



Figure 3 b

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:

- For left-hand traffic only.
- For both traffic systems by means of an appropriate adjustment of the setting of the optical unit or the filament lamp on the vehicle.

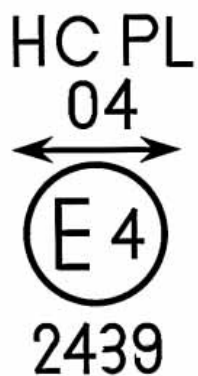
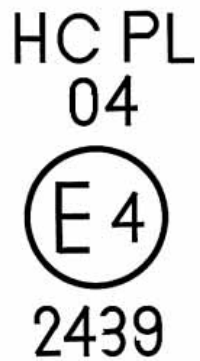
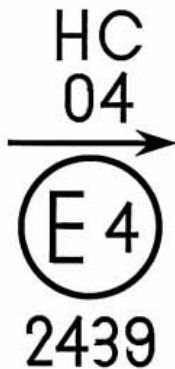


Figure 4

*Figure 5*

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

- For both traffic systems.
- For right-hand traffic only.

*Figure 6**Figure 7*

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

- In respect of the passing beam only and is designed for left-hand traffic only.
- In respect of the driving beam only.

HC/R PL
04
Ⓔ 4
2439

Figure 8

HC/ PL
04
Ⓔ 4
2439

Figure 9

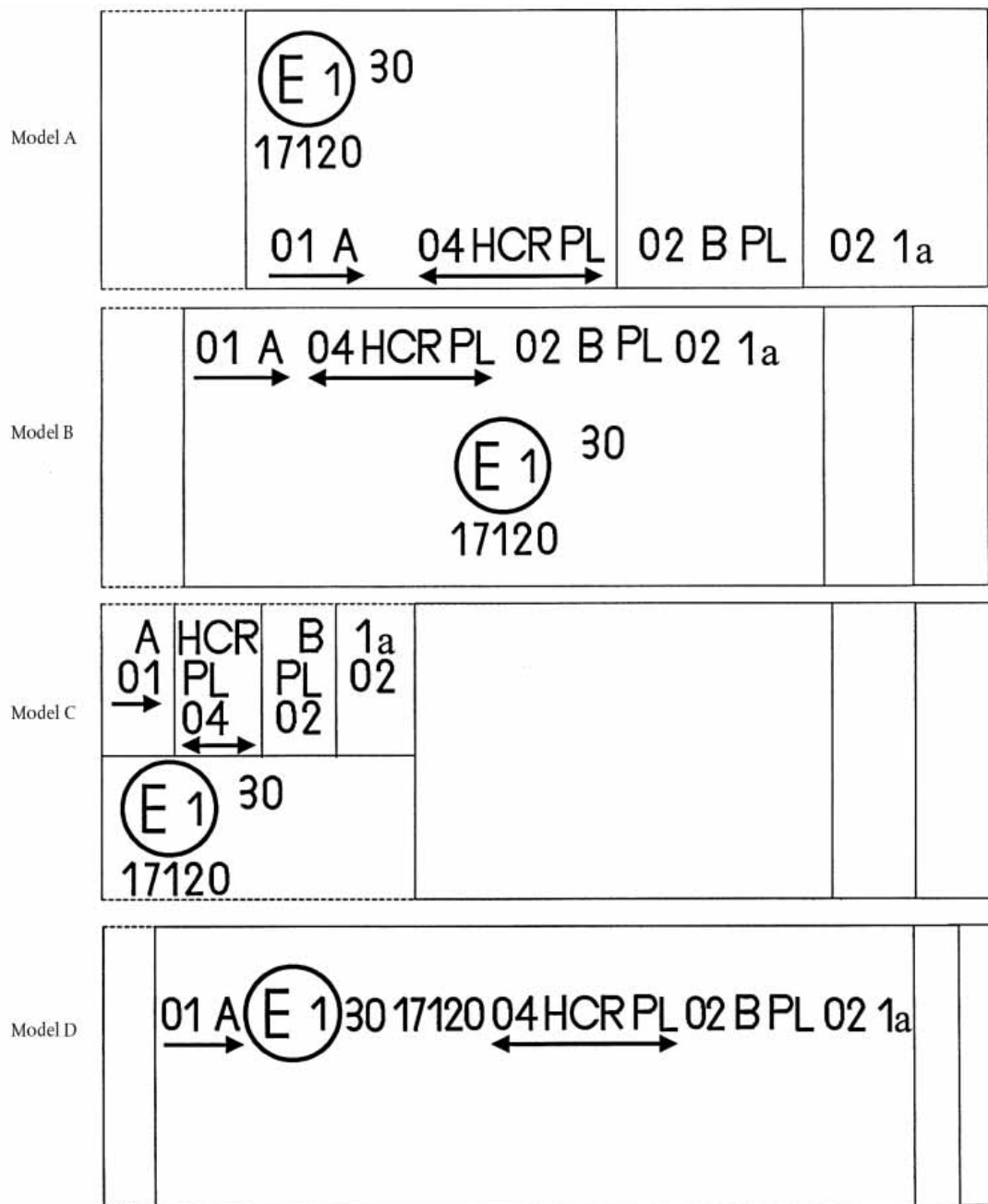
Identification of a headlamp incorporating the lens of plastic material meeting the requirements of Regulation No. 8.

- With respect to both the passing beam and the driving beam designed for the right-hand traffic only.
- With respect to the passing beam only and designed for right-hand traffic only.

The passing lamp filament shall not be lit simultaneously with the driving lamp filament and/or another reciprocally incorporated headlamp. Simplified marking for grouped, combined or reciprocally incorporated lamps.

Figure 10

(The vertical and horizontal lines schematise the shape of the light-signalling device. They are part of the approval mark.)



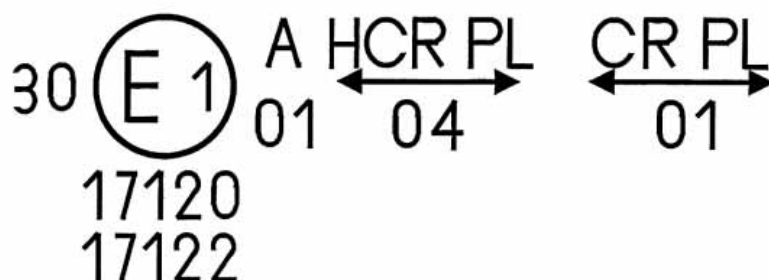
Note: The four examples above correspond to a lighting device bearing an approval mark comprising:

- A front position lamp approved in accordance with the 01 series of amendments to Regulation No 7,
- A headlamp with a passing beam designed for right- and left-hand traffic and a driving beam with a maximum intensity comprised between 86 250 and 111 250 candelas (as indicated by the number 30), approved in accordance with the 04 series of amendments to Regulation No 8 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 02 series of amendments to Regulation No 6.

Figure 11

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 with a passing beam designed for both traffic systems and a driving beam with a maximum luminous intensity comprised between 86 250 and 111 250 candelas (as indicated by the number 30), approved in Germany (E1) in accordance with the requirements of Regulation No 8 as amended by the 04 series of amendments,

which is reciprocally incorporated with

A front position lamp approved in accordance with the 01 series of amendments to Regulation No 7;

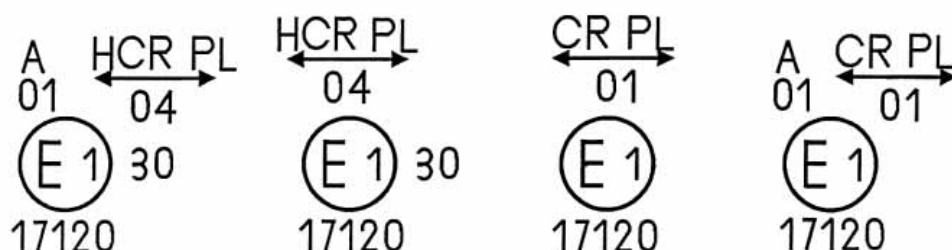
Or A headlamp with a passing beam designed for both traffic systems and a driving beam, approved in Germany (E1) in accordance with the requirements of Regulation No 1 as amended by the 01 series of amendments,

which is reciprocally incorporated with

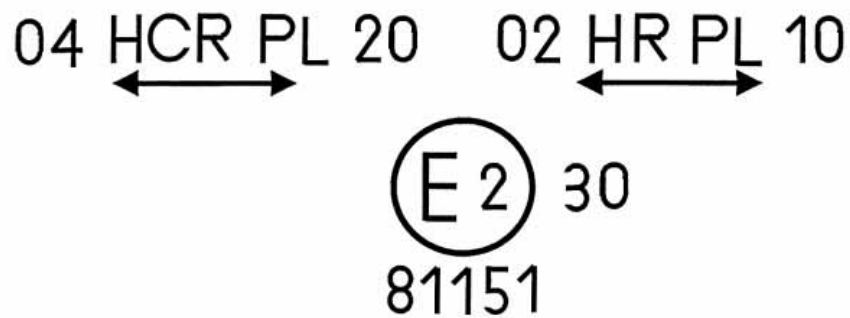
The same front position lamp as above;

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:



Example 2



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 81151, consisting of:

A headlamp emitting a passing beam designed for both traffic systems and a driving beam with a maximum luminous intensity between x and y candelas, meeting the requirements of Regulation No 8, and

A headlamp emitting a driving beam for both traffic systems with a maximum luminous intensity comprised between w and z candelas, meeting the requirements of Regulation No 20, the maximum luminous intensity of the driving beams as a whole being comprised between 86 250 and 111 250 candelas.

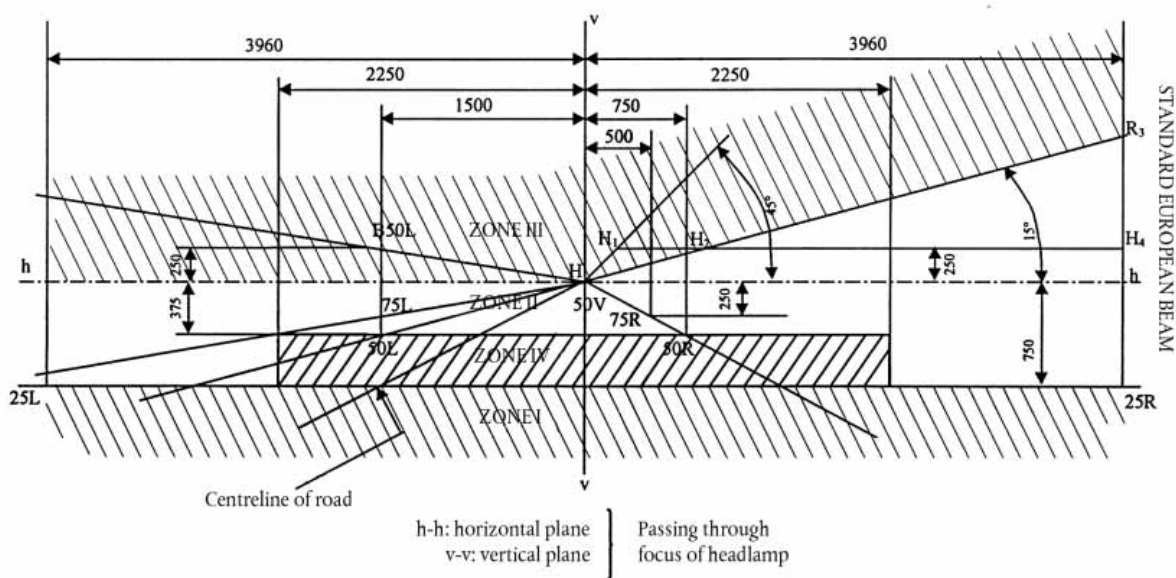
ANNEX 4

Measuring screen

A. Headlamp for right-hand traffic

(dimensions in mm)

Standard European Beam



B. Headlamp for left-hand traffic

(dimensions in mm)

Standard European Beam

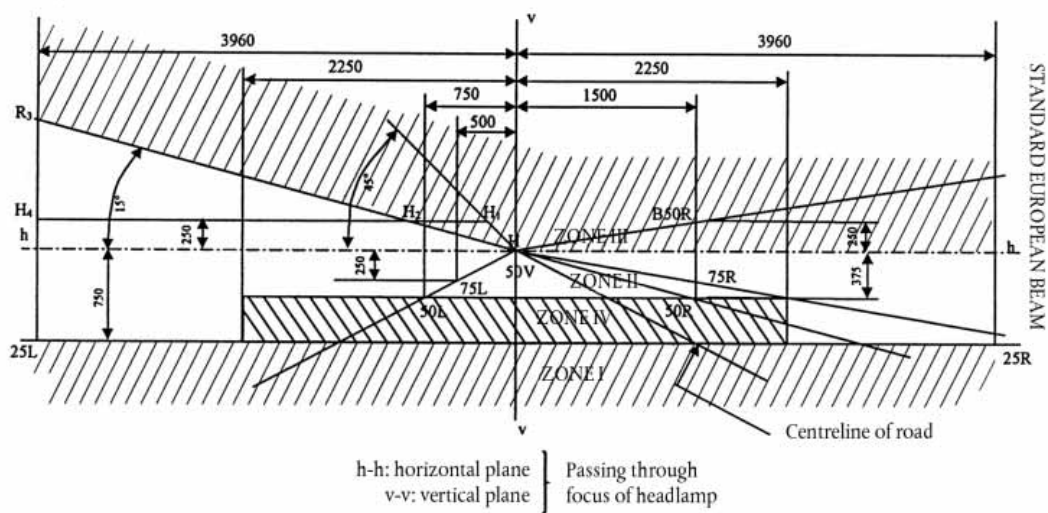
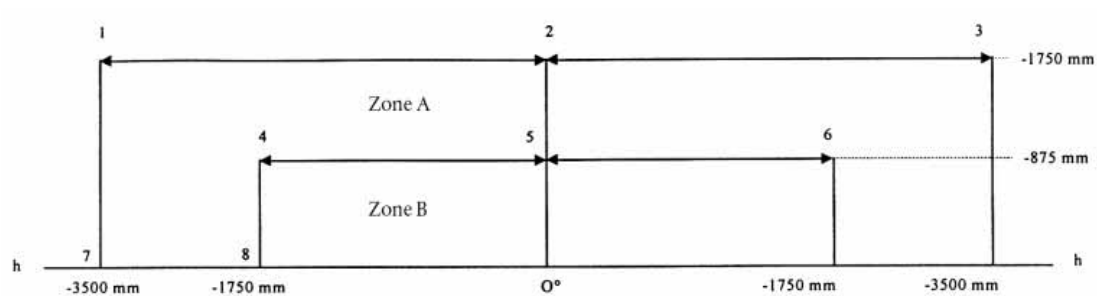


Figure C



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 5

Tests for stability of photometric performance of headlamps in operation

TESTS ON COMPLETE HEADLAMPS

Once the photometric values have been measured according to the requirements of this Regulation, in points for E max for driving beam and 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 OF 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 subparagraph 1.1.1 and checked as prescribed in subparagraph 1.1.2

1.1.1. *Test procedure*

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) is to be approved, the corresponding filament is lit for the prescribed time ⁽¹⁾,
- (b) in the case of a reciprocally incorporated passing lamp and driving lamp (dual filament lamp or two filament lamps): If the applicant declares that the headlamp is to be used with a single filament lit ⁽²⁾, the test shall be carried out in accordance with this condition, activating ⁽¹⁾ each specified function successively for half the time specified in paragraph 1.1. In all other cases ⁽¹⁾ ⁽²⁾ 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
- (c) in the case of grouped lighting functions all the individual functions shall be lit simultaneously for the time specified for individual lighting functions (a) also taking into account the use of reciprocally incorporated lighting functions (b), according to the manufacturer's specifications.

1.1.1.2. **Test voltage**

The voltage shall be adjusted so as to supply 90 per cent of the maximum wattage specified in the Regulation for filament lamps. (Regulation No 37). The applied wattage shall in all cases comply with the corresponding value of a filament lamp 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⁾ When the tested headlamp is grouped and/ or reciprocally incorporated with 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 operation mode with an on/off time ratio of approximately one to one.

⁽²⁾ 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.

1.1.2. Test results**1.1.2.1. Visual inspection**

Once the headlamp has been stabilised 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.

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 subparagraph 1.1 above, the headlamp shall be operated for one hour as described in subparagraph 1.1.1, after being prepared as prescribed in subparagraph 1.2.1, and checked as prescribed in subparagraph 1.1.2.

1.2.1. Preparation 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 particle size of 0-100 µm,

0,2 part by weight of NaCMC ⁽¹⁾

⁽¹⁾ When the tested headlamp is grouped and/ or reciprocally incorporated with 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 operation mode with an on/ off time ratio of approximately one to one.

13 parts by weight of distilled water with a conductivity of ≤ 1 mS/m, and

2 ± 1 parts by weight of surface-actant ⁽¹⁾

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 illuminating value has dropped to 15-20 per cent of the values measured for each following point under the conditions described in paragraph 1 above:

E_{max} in driving beam for a driving/passing lamp,

E_{max} in driving beam for a driving lamp only,

50 R and 50 V ⁽²⁾ for a passing lamp only, designed for right-hand traffic,

50 L and 50 V ⁽²⁾ 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 (reference) 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 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 dismounted 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 R for left-hand traffic or B 50 L for right-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 expressed in milliradians (mrad) shall be considered as acceptable when the absolute value $\Delta r_l = |r_3 - r_{60}|$ recorded on the headlamp is not more than 1,0 mrad ($\Delta r_l \leq 1,0$ mrad).

⁽¹⁾ The tolerance on quantity is due to the necessity of obtaining a dirt that correctly spreads out on all the plastic lens.

⁽²⁾ 50 V is situated 375 mm below HV on the vertical line v-v on the screen at 25 m distance.

- 2.2.2. However, if this value is more than 1,0 mrad but not more than 1,5 mrad ($1,0 \text{ mrad} < \Delta r1 \leq 1,5 \text{ mrad}$) 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 stabilise the position of mechanical parts of the headlamp on a base representative of the correct installation on the vehicle:

Operation of the passing lamp 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 ΔrI measured on the first sample and ΔrII measured on the second sample is not more than 1,0 mrad.

$$(\Delta rI + \Delta rII)/2 \leq 1 \text{ mrad}$$

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 2.1-2.5 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 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 500K 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 tetrachloride, 12,5 per cent trichlorethylene 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) at $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$. 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 $\Delta t = (T_2 - T_3) / T_2$, 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 $\Delta d = (T_5 - T_4) / T_2$, 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 $\Delta t = (T_2 - T_3) / T_2$, 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: $\Delta t = (T_2 - T_3) / T_2$

and in diffusion: $\Delta d = (T_5 - T_4) / T_2$

shall be measured according to the procedure described in appendix 2 in the area specified in paragraph 2.2.4 above. 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 of adhesion of $2 \text{ N}/(\text{cm of width}) \pm 20$ per cent measured under the standardised 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 $1,5 \text{ m/s} \pm 0,2 \text{ m/s}$.

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 recognised 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)

Tests	Samples	Lenses or samples of material						Lenses						
		1	2	3	4	5	6	7	8	9	10	11	12	13
1.1.	Limited photometry (paragraph 2.1.2)										X	X	X	
1.1.1.	Temperature change (paragraph 2.1.1)										X	X	X	
1.1.2.	Limited photometry (paragraph 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 (paragraph 2.2.1)	X	X	X										
1.3.1.	Transmission measurement	X	X	X										
1.4.	Chemical agents (paragraph 2.2.2)	X	X	X										
1.4.1.	Diffusion measurement	X	X	X										
1.5.	Detergents (paragraph 2.2.1)				X	X	X							
1.6.	Hydrocarbons (paragraph 2.3.2)				X	X	X							
1.6.1.	Transmission measurement				X	X	X							
1.7.	Deterioration (paragraph 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 (paragraph 2.5)													X

B. Tests on complete lamps (supplied pursuant to paragraph 2.2.3 of this Regulation)

Table B

Tests		Complete headlamp	
		Sample No.	
		1	2
2.1.	Deterioration (paragraph 2.6.1.1)	X	
2.2.	Photometry (paragraph 2.6.1.2)	X	
2.3.	Adherence (paragraph 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 DT with an opening of 6 mm against which the sample stand is placed.

A convergent achromatic lens L2, corrected for spherical aberrations, links the diaphragm DT with the receiver R; the diameter of the lens L2 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 DD with angles $\alpha/2 = 1^\circ$ and $\alpha_{\max}/2 = 12^\circ$ is placed in an image focal plane of the lens L2.

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 L2 DT and the focal length F2 ⁽¹⁾ of the lens L2 shall be so chosen that the image of DT completely covers the receiver R.

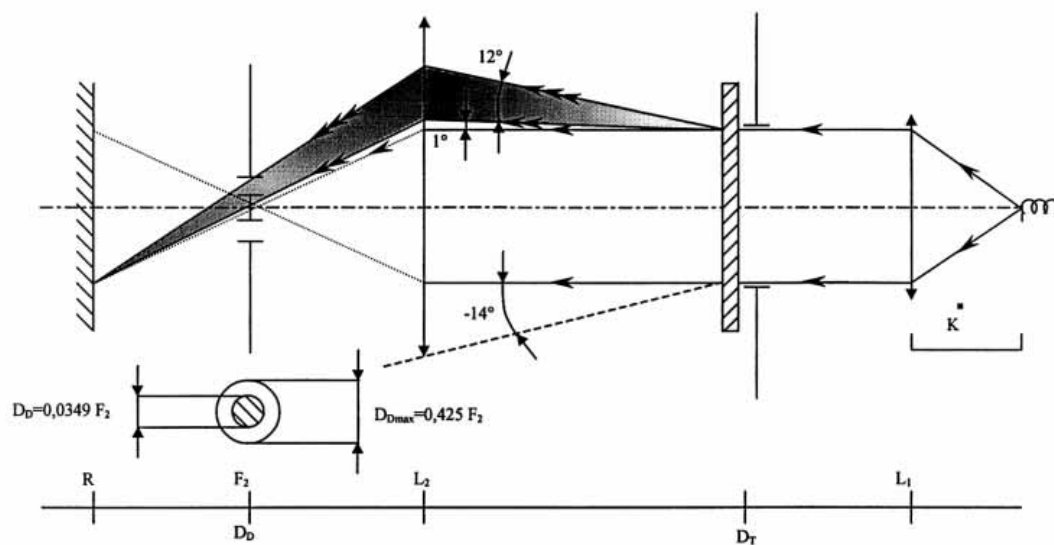
When the initial incident flux is referred to 1 000 units, the absolute precision of each reading shall be better than 1 unit.

2. MEASUREMENTS

The following readings shall be taken:

Reading	With sample	With central part of DD	Quantity represented
T1	no	no	Incident flux in initial reading
T2	yes (before test)	no	Flux transmitted by the new material in a field of 24 °C
T3	yes (after test)	no	Flux transmitted by the tested material in a field of 24 °C
T4	yes (before test)	yes	Flux diffused by the new material
T5	yes (after test)	yes	Flux diffused by the tested material

⁽¹⁾ For L2 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 $\pm$ 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:

$$\Delta d = (T5 - T4)/T2 = 0,0250 \pm 0,0025$$

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 ± 5 per cent relative humidity (RH).

4. TEST PIECES

Before the test, the sample roll of adhesive tape shall be conditioned for 24 hours in the specified atmosphere (see paragraph 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 radically 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 the 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 geometric standpoint, in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations.

1.2. With respect to photometric performance, 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 values prescribed in this Regulation. For values B 50 L (or R) and Zone III the maximum 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. The reference mark is disregarded.

1.2.3. If the results of the tests 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.

1.2.4. If the results of the tests described above do not meet the requirements, tests on the headlamps 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.

1.3. The chromaticity coordinates shall be complied with when the headlamp is equipped with a filament lamp set to Standard A colour temperature.

The photometric performance of a headlamp emitting selective yellow light when equipped with a colourless filament lamp shall be the values contained in this Regulation multiplied by 0,84.

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.
- 2.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced headlamps shall not be contested if the deviation of the measured values of the headlamps in the unfavourable directions are:
- 2.2.1.1. sample A
- A1: one head lamp 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
- 2.2.1.2. sample B
- B1: both headlamps 0 per cent
- 2.2.2. or if the conditions of paragraph 1.2.2 for sample A are fulfilled.
- 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 head lamp 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 13 applied if, following the sampling procedure 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 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 cases of A3, B2, B3 a repeated sampling, third sample C of two headlamps and fourth sample D 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 head lamp 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
- 3.1.2. or if the conditions of paragraph 1.2.2 for sample C are fulfilled.
- 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

3.2.1.2. 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 13 applied if, following the sampling procedure 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 positions 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 5 after being subjected three consecutive times to the cycle described in paragraph 2.2.2 of annex 5.

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 in 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.

Regulation 77 of the Economic Commission for Europe of the United Nations (UN/ECE) uniform provisions concerning the approval of parking lamps for power-driven vehicles

1. SCOPE

This Regulation applies to the approval of parking lamps which are provided for the equipment of power-driven vehicles.

2. DEFINITIONS

For the purposes of this Regulation:

2.1. 'Parking lamp' means the lamp used to draw attention to the presence of a stationary vehicle;

2.2. 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.

2.3. 'Parking lamps of different types' are parking lamps which differ in such essential respects as:

2.3.1. the trade name or mark,

2.3.2. the characteristics of the optical system,

2.3.3. the category of filament lamp.

3. APPLICATION FOR APPROVAL

3.1. The application for approval shall be submitted by the holder of the trade name or mark or by his duly accredited representative.

3.2. For each type of parking lamp the application shall be accompanied by:

3.2.1. A brief technical description stating, in particular, with the exception of lamps with non-replaceable light sources, the categories of filament lamps prescribed; each filament lamp category shall be one or other of those contained in Regulation No. 37;

3.2.2. Drawings (three copies), in sufficient detail to permit identification of the type of the parking lamp and showing geometrically the position in which the lamp is to be mounted on the vehicle, the axis of observation to be taken as the axis of reference in the tests (horizontal angle $H = 0^\circ$, vertical angle $V = 0^\circ$), and the point to be taken as the center of reference in the said tests;

3.2.3. Two samples; if the parking lamps are such that they can be mounted only on one side of the vehicle, the two samples submitted may be identical and be suitable for mounting only on the right or only on the left side of the vehicle.

4. MARKINGS

4.1. Parking lamps submitted for approval shall clearly, legibly and indelibly bear:

- 4.1.1. The trade name or mark of the applicant,
- 4.1.2. A clearly legible and indelible marking indicating the category or categories of filament lamps prescribed; this is not valid for parking lamps with non-replaceable light sources.
- 4.1.3. In the case of parking lamps with non-replaceable light sources bear the marking of rated voltage and rated wattage.
- 4.2. Each lamp shall have a space of adequate dimensions for the approval mark and for the additional symbol prescribed in paragraph 5.5 below; this space shall be indicated in the drawings referred to in paragraph 3.2.2 above.
- 5. APPROVAL
- 5.1. If the two samples of a parking lamp type submitted in accordance with paragraph 3.2.3 above meet the requirements of this Regulation, approval 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 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 parking lamp.
- 5.3. Where approval is requested for a type of lighting and light-signaling device comprising a parking lamp and other lamps a single approval mark may be issued provided that the lamp in question complies with the requirements of this Regulation and that each of the other lamps forming part of the lighting and light-signaling device for which approval is requested, comply with the specific Regulation applying to them.
- 5.4. Notice of approval or refusal or extension or withdrawal of approval or production definitely discontinued 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.
- 5.5. Every parking lamp conforming to a type approved under this Regulation shall bear in the spaces referred to in paragraph 4.2 above, in addition to the marking prescribed in paragraph 4.1 an international approval mark consisting of:
 - 5.5.1 A circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval⁽¹⁾;
 - 5.5.2 The number of this Regulation followed by the letter 'R', a dash and the approval number;
 - 5.5.3 When a lamp emits a light of amber colour towards the front and rear, the lamp must be marked with an arrow indicating its orientation, the arrow showing the front of the vehicle;

⁽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 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 and 22 for the Russian Federation, 23 for Greece, 24 (vacant), 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30-36 (vacant) and 37 for Turkey. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

- 5.5.4. Where a single approval number is issued, as under paragraph 5.3, for a type of lighting and light-signaling device comprising a parking lamp, and other lamps, a single approval mark may be affixed, consisting of the additional symbols prescribed by the various Regulations under which approval has been granted.
- 5.6. The marking according to paragraphs 4.1.1 and 5.5 shall be clearly legible and be indelible even when the parking lamps are fitted on the vehicles.
- 5.7. Annex 2 to this Regulation gives an example of an arrangement of the approval mark.
6. GENERAL SPECIFICATIONS
- 6.1. Each sample shall conform to the specifications of paragraphs 7 and 9 of this Regulation.
- 6.2. Parking lamps shall be so designed and constructed that in normal use, despite the vibrations to which they may be subjected, their satisfactory operation continues to be ensured and they retain the characteristics prescribed by this Regulation.
7. PHOTOMETRIC CHARACTERISTICS
- 7.1. In the reference axis, the light emitted by each of the two samples shall be of not less than the minimum intensity and of not more than the maximum intensity specified below:
- 7.1.1. Intensity of forward facing parking lamps, minimum (cd): 2 — maximum (cd): 60.
- 7.1.2. Intensity of rearward facing parking lamps, minimum (cd): 2 — maximum (cd): 30.
- 7.1.3. In the case of a single lamp containing more than one light source, the lamp shall comply with the minimum intensity required when any one light source has failed and when all light sources are illuminated the maximum intensities shall not be exceeded.
- 7.2. Outside the reference axis and within the angular fields defined in the diagrams in annex 3 to this Regulation, the intensity of the light emitted by each of the two samples shall:
- 7.2.1. in each direction corresponding to the points in the luminous intensity distribution table reproduced in annex 4 to this Regulation be not less than the value shown in the said table for the direction in question, expressed as a percentage of the minimum specified in paragraph 7.1;
- 7.2.2. in any direction within the space from which the light in question is visible, not exceed the maximum specified in paragraph 7.1;
- 7.2.3. however, a luminous intensity of 60 cd shall be permitted for parking lamps directed to the rear incorporated with stop lamps (see paragraph 7.1.2) below a plane forming an angle of 5° with and downward from the horizontal plane;
- 7.2.4. Moreover,
- 7.2.4.1. throughout the fields defined in annex 3 the intensity of the light emitted shall be not less than 0.05 cd,
- 7.2.4.2. the requirements of paragraph 2.2 of annex 4 on local variations of intensity shall be observed.
- 7.3. Annex 4 of this Regulation to which reference is made in paragraph 7.2.1, gives particulars of the methods of measurement to be used.

8. TEST PROCEDURE

All measurements shall be carried out with uncoloured standard filament lamps of the types prescribed for the device, adjusted to produce the normal luminous flux prescribed for those types of lamps.

8.1. All measurements on lamps equipped with non-replaceable light sources (filament lamps and other) shall be made at 6.75 V, 13.5 V or 28.0 V respectively.

In the case of light sources supplied by a special power supply, the above test voltages shall be applied to the input terminals of that power supply.

The test laboratory may require from the manufacturer the special power supply needed to supply the light sources.

9. COLOUR OF LIGHT EMITTED

The colour of the light emitted measured by using a source of light with a colour temperature of 2 854 K, corresponding to illuminant A of the International Commission on Illumination (CIE), shall be within the limits of the co-ordinates prescribed for the colour in question in annex 5.

However, for lamps equipped with non-replaceable light sources (filament lamps and other), the colorimetric characteristics should be verified with the light sources present in the lamp, in accordance with paragraph 8.1 of this Regulation.

10. REMARKS CONCERNING COLOURS

Every approval under this Regulation is, by virtue of paragraph 5. above, granted for a type of device emitting light of a particular colour or uncoloured light; the Contracting Parties to the Agreement to which this Regulation is annexed are accordingly not precluded by article 3 of that Agreement from prohibiting, for devices fitted on the vehicles registered by them certain colours provided for in this Regulation.

11. MODIFICATIONS OF A TYPE OF PARKING LAMP AND EXTENSION OF APPROVAL

11.1. Every modification of the type of parking lamp shall be notified to the administrative department which approved the type of parking lamp. The department may then either:

11.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the parking lamp still complies with the requirements; or

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

11.2. Confirmation or refusal of approval, specifying the modification shall be communicated by the procedure specified in paragraph 5.4 above.

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

12. 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:

- 12.1. Lamps approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 7 and 9 above.
- 12.2. The minimum requirements for conformity of production control procedures set forth in annex 6 to this Regulation shall be complied with.
- 12.3. The minimum requirements for sampling by an inspector set forth in annex 7 to this Regulation shall be complied with.
- 12.4. 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.

13. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 13.1. The approval granted in respect of a type of parking lamp pursuant to this Regulation may be withdrawn if the requirements set forth above are not complied with or if a parking lamp bearing the approval mark does not conform to the type approved.
- 13.2. If a Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by means of a copy of the approval form bearing at the end, in large letters, the signed and dated annotation 'APPROVAL WITHDRAWN'.

14. PRODUCTION DEFINITELY DISCONTINUED

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

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

The Contracting 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

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



(1)

.....

.....

Communication concerning:

- approval
- refusal of approval
- extension of approval
- withdrawal of approval
- production definitely discontinued ⁽²⁾

of a type of parking lamp pursuant to No. 77

Approval No. Extension No.

1. Designation of the type of parking lamp
2. Category of filament lamps ⁽³⁾
3. Colour of light emitted
4. Trade name or mark
5. Manufacturer's name and address
6. If applicable, name and address of manufacturer's representative
7. Submitted for approval on
8. Technical service responsible for conducting approval tests
9. Date of report issued by that service
10. Number of report issued by that service
11. Approval granted/refused/extended/withdrawn ⁽²⁾
12. Place
13. Date
14. Signature
15. The attached drawing No ... shows the geometrical position in which the device is to be mounted on the vehicle and the axis of reference and centre of reference of the device.

⁽¹⁾ Name of administration.

⁽²⁾ Strike out what does not apply.

⁽³⁾ For parking lamps with non-replaceable light sources indicate the number and the total wattage of the light sources.

ANNEX 2

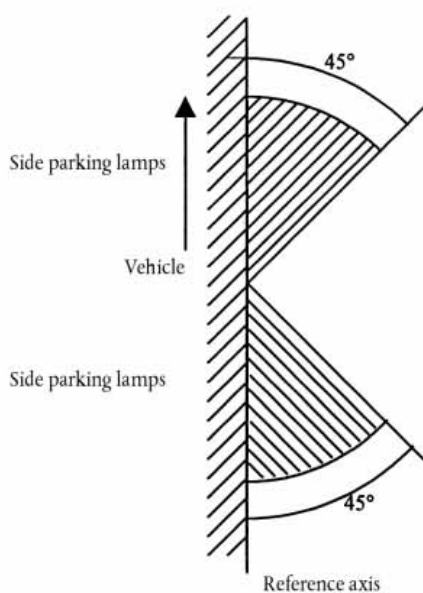
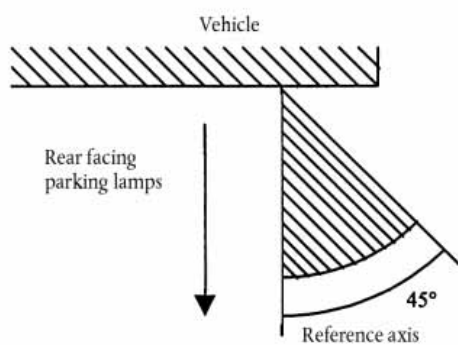
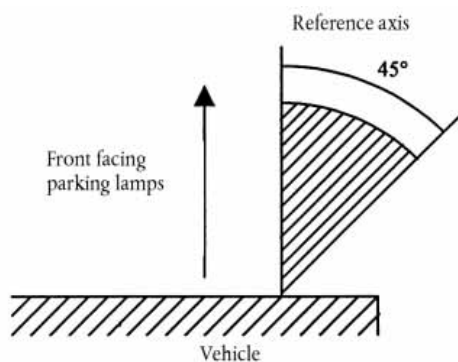
Arrangement of approval mark

The lamp bearing the above approval mark has been approved in the Netherlands (E4) pursuant to Regulation No. 77 under the approval number 002439. The first two digits of the approval number indicates that the approval was granted according to the requirements of Regulation No. 77 in its original form.

ANNEX 3

Minimum angles required for the light distribution in space ⁽¹⁾

In all cases, the minimum vertical angles of light distribution in space are 15° above and 15° below the horizontal.



⁽¹⁾ The angles shown in these diagrams are correct for devices to be mounted on the right side of the vehicle. The arrows point to the front of the vehicles.

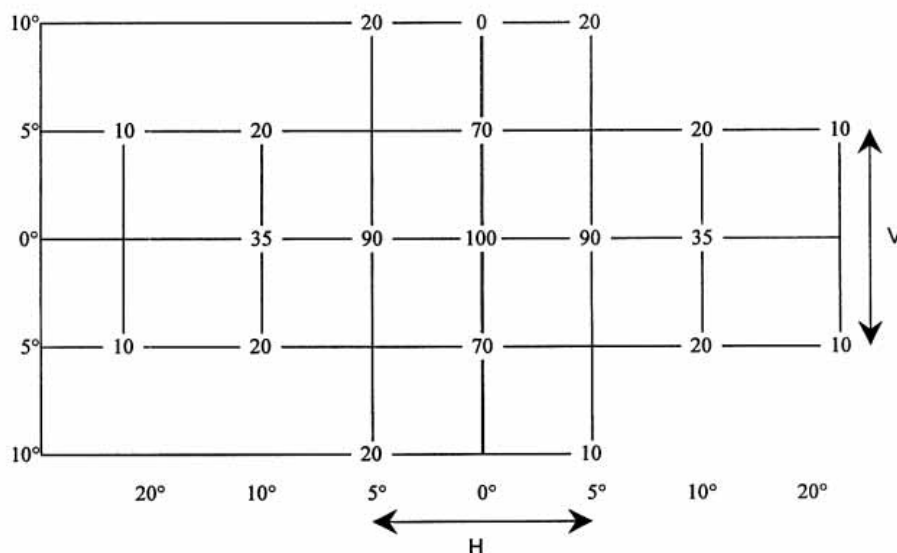
ANNEX 4

Photometric measurements

1. MEASUREMENT METHODS

- 1.1. During photometric measurements, stray reflections shall be prevented by appropriate masking.
- 1.2. Should the results of measurements be challenged, measurements shall be carried out in such a way as to meet the following requirements:
- 1.2.1. the distance of measurements shall be such that the law of the inverse of the square of the distance is applicable;
- 1.2.2. the measuring equipment shall be such that the angular aperture of the receiver viewed from the reference centre of the light is between 10° and 1° ;
- 1.2.3. the intensity requirement for a particular direction of observation shall be deemed to be satisfied if that requirement is met in a direction deviating by not more than 15° from the direction of observation.

2. STANDARD LUMINOUS INTENSITY DISTRIBUTION TABLE



- 2.1. The direction $H = 0^\circ$ and $V = 0^\circ$ corresponds to the reference axis. (On the vehicle it is horizontal, parallel to the median longitudinal plane of the vehicle and oriented in the required direction of visibility). It passes through the centre of reference. The values shown in the table give, for the various directions of measurements, the minimum intensities as a percentage of the minimum required in the axis for each lamp (in the direction $H = 0^\circ$ and $V = 0^\circ$).
- 2.2. Within the field of light distribution of paragraph 2, schematically shown as a grid, the light pattern should be substantially uniform in so far as the light intensity in each direction of a part of the field formed by the grid lines meets at least the lowest minimum percentage value being shown (available) on the grid lines surrounding the questioned direction.

3. PHOTOMETRIC MEASUREMENT OF LAMPS EQUIPPED WITH SEVERAL LIGHT SOURCES

The photometric performance shall be checked:

3.1. for non-replaceable light sources (filament lamps and other):

with the light sources present in the lamp, in accordance with paragraph 8.1 of this Regulation.

3.2. for replaceable filament lamps:

when equipped with mass production filament lamps at 6,75 V, 13,5 V or 28,0 V the luminous intensity values produced shall lie between the maximum limit given in this Regulation and the minimum limit of this Regulation increased according to the permissible deviation of the luminous flux permitted for the type of filament lamp chosen, as stated in Regulation No 37 for production filament lamps; alternatively a standard filament lamp may be used in turn, in each of the individual positions, operated at its reference flux, the individual measurements in each position being added together.

ANNEX 5

Colour of light emitted

RED: TRICHROMATIC CO-ORDINATES

limit towards yellow: $Y \leq 0,335$

limit towards purple: $Z \leq 0,008$

WHITE

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: $Y \geq 0,382$

AMBER

limit towards yellow: $Y \leq 0,429$

limit towards red: $Y \geq 0,398$

limit towards white: $Z \leq 0,007$

For checking those colorimetric characteristics, a source of light at a colour temperature of 2 854 K corresponding to illuminant A of the International Commission on Illumination (CIE) shall be used. However, for lamps equipped with non-replaceable light sources (filament lamps and other), the colorimetric characteristics should be verified with the light sources present in the lamp, in accordance with paragraph 8.1 of this Regulation.

ANNEX 6

Minimum requirements for conformity of production control procedures

1. GENERAL

- 1.1. The conformity requirements shall be considered satisfied from a mechanical and geometric standpoint, if the differences do not exceed inevitable manufacturing deviations within the requirements of this Regulation.
- 1.2. With respect to photometric performances, the conformity of mass-produced lamps shall not be contested if, when testing photometric performances of any lamp chosen at random and equipped with a standard filament lamp, or when the lamps are equipped with non-replaceable light sources (filament lamps or other), and when all measurements are made at 6,75 V, 13,5 V or 28,0 V respectively:
- 1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this Regulation.
- 1.2.2. If, in the case of a lamp equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on lamps shall be repeated using another standard filament lamp.
- 1.3. The chromaticity coordinates shall be complied with when the lamp is equipped with a standard filament lamp, or for lamps equipped with non-replaceable light sources (filament lamps or other), when the colorimetric characteristics are verified with the light source present in the lamp.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of lamp 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 provisions 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 and colorimetric characteristics.

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 measurements made by a competent authority.
- 2.2.4. In all cases the reference methods shall be those of this Regulation, particularly for the purpose of administrative verification and sampling.

2.3. *Nature of sampling*

Samples of lamps shall be selected at random from the production of a uniform batch. A uniform batch means a set of lamps 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 lamp shall be subjected to photometric measurements for the minimum values at the points listed in annex 4 and the chromaticity coordinates listed in annex 5, provided for in the Regulation.

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 the acceptability of his products in order to meet the specifications laid down for verification of conformity of products in paragraph 12.1 of this Regulation.

The criteria governing the acceptability shall be such that, with a confidence level of 95 per cent, the minimum probability of passing spot check in accordance with annex 7 (first sampling) would be 0,95.

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 geometric standpoint, in accordance with the requirements of this Regulation, if any, if the differences do not exceed inevitable manufacturing deviations.
- 1.2. With respect to photometric performance, the conformity of mass-produced lamps shall not be contested if, when testing photometric performances of any lamp chosen at random and equipped with a standard filament lamp, or when the lamps are equipped with non-replaceable light sources (filament lamps or other), and when all measurements are made at 6,75 V, 13,5 V or 28,0 V respectively:
- 1.2.1. no measured value deviates unfavourably by more than 20 per cent from the values prescribed in this Regulation.
- 1.2.2. If, in the case of a lamp equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on lamps shall be repeated using another standard filament lamp.
- 1.2.3. Lamps with apparent defects are disregarded.
- 1.3. The chromaticity coordinates shall be complied with when the lamp is equipped with a standard filament lamp, or for lamps equipped with non-replaceable light sources (filament lamps or other), when the colorimetric characteristics are verified with the light source present in the lamp.

2. FIRST SAMPLING

In the first sampling four lamps 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 lamps shall not be contested if the deviation of the measured values of the lamps in the unfavourable directions are:
- 2.1.1.1. sample A
A1: one lamp 0 %
one lamp not more than 20 %
A2: both lamps more than 0 %
but not more than 20 %
go to sample B
- 2.1.1.2. sample B
B1: both lamps 0 %
- 2.1.2. or, if the conditions of paragraph 1.2.2 for sample A are fulfilled.

- 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 lamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the lamps are:
- 2.2.1.1. sample A
A3: one lamp not more than 20 %
one lamp more than 20 %
but not more than 30 %
- 2.2.1.2. sample B
B2: in the case of A2
one lamp more than 0 %
but not more than one 20 %
lamp not more than 20 %
B3: in the case of A2
one lamp 0 %
one lamp more than 20 %
but not more than 30 %
- 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 13 applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the lamps are:
- 2.3.1. sample A
A4: one lamp not more than 20 %
one lamp more than 30 %
A5: both lamps more than 20 %
- 2.3.2. sample B
B4: in the case of A2
one lamp more than 0 %
but not more than 20 %
one lamp more than 20 %
B5: in the case of A2
both lamps more than 20 %
B6: in the case of A2
one lamp 0 %
one lamp more than 30 %
- 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 cases of A3, B2, B3 a repeated sampling, third sample C of two lamps and fourth sample D of two lamps, 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 lamps shall not be contested if the deviations of the measured values of the lamps are:

3.1.1.1. sample C

C1: one lamp 0 %

one lamp not more than 20 %

C2: both lamps more than 0 %

but not more than 20 %

go to sample D

3.1.1.2. sample D

D1: in the case of C2

both lamps 0 %

3.1.2. or, if the conditions of paragraph 1.2.2 for sample C are fulfilled.

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 lamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the lamps are:

3.2.1.1. sample D

D2: in the case of C2

one lamp more than 0 %

but not more than 20 %

one lamp not more than 20 %

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 13 applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the lamps are:

3.3.1. sample C

C3: one lamp not more than 20 %

one lamp more than 20 %

C4: both lamps more than 20 %

3.3.2. sample D

D3: in the case of C2

one lamp 0 or more than 0 %

one lamp more than 20 %

3.3.3. or, if the conditions of paragraph 1.2.2 for samples C and D are not fulfilled.

Figure 1

