

19 September 2008

AGREEMENT

CONCERNING THE ADOPTION OF UNIFORM TECHNICAL PRESCRIPTIONS FOR WHEELED VEHICLES, EQUIPMENT AND PARTS WHICH CAN BE FITTED AND/OR BE USED ON WHEELED VEHICLES AND THE CONDITIONS FOR RECIPROCAL RECOGNITION OF APPROVALS GRANTED ON THE BASIS OF THESE PRESCRIPTIONS */

(Revision 2, including the amendments which entered into force on 16 October 1995)

Addendum 22: Regulation No. 23

Revision 3

Incorporating all valid text up to:

Supplement 10 to the original version of the Regulation- Date of entry into force: 26 February 2004
Corrigendum 1 to Supplement 10 to the original version of the Regulation, subject of Depositary
Notification C.N.166.2004.TREATIES-1 dated 4 March 2004

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UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REVERSING LAMPS FOR POWER-DRIVEN VEHICLES AND THEIR TRAILERS



UNITED NATIONS

*/ Former title of the Agreement:

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

GE.08-25701

Regulation No. 23

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REVERSING LAMPS FOR
POWER-DRIVEN VEHICLES AND THEIR TRAILERS

CONTENTS

REGULATION	<u>Page</u>
0. Scope	5
1. Definitions	5
2. Application for approval	5
3. Markings	6
4. Approval	7
5. General specifications	10
6. Intensity of light emitted	11
7. Test procedure	12
8. Colour of light emitted	13
9. Conformity of production	13
10. Penalties for non-conformity of production	13
11. Production definitely discontinued	14
12. Names and addresses of Technical Services responsible for conducting approval tests, and of Administrative Departments	14
ANNEXES	
<u>Annex 1</u> - Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a type of reversing lamp pursuant to Regulation No. 23	
<u>Annex 2</u> - Examples of arrangements of approval marks	

CONTENTS (continued)

- Annex 3 - Photometric measurements
- Annex 4 - Colour of white light (trichromatic coordinates)
- Annex 5 - Minimum requirements for conformity of production control procedures
- Annex 6 - Minimum requirements for sampling by an inspector

0. SCOPE

This Regulation applies to reversing lamps for vehicles of categories M, N, O, and T ^{1/}

1. DEFINITIONS

For the purposes of this Regulation,

1.1. "Reversing lamp" means the lamp of the vehicle designed to illuminate the road to the rear of the vehicle and to warn other road users that the vehicle is reversing or about to reverse;

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. "Reversing lamps of different types" means lamps which differ in such essential respects as:

- (a) the trade name or mark;
- (b) the characteristics of the optical system, (levels of intensity, light distribution angles, category of filament lamp, light source module, etc.);

A change of the colour of the filament lamp or the colour of any filter does not constitute a change of type.

1.4. References made in this Regulation to standard (étalon) filament lamp(s) and to Regulation No. 37 shall refer to Regulation No. 37 and its series of amendments in force at the time of application for type approval.

2. APPLICATION FOR APPROVAL

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

At the choice of the applicant, it will specify that the device may be installed on the vehicle with different inclinations of the reference axis in respect to the vehicle reference planes and to the ground or rotate around its reference axis; these different conditions of installation shall be indicated in the communication form.

^{1/} As defined in Annex 7 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), (document TRANS/WP.29/78/Rev.1/Amend.2 as last amended by Amend.4).

- 2.2. For each type of reversing lamp, the application shall be accompanied by:
- 2.2.1. drawings, in triplicate, in sufficient detail to permit identification of the type of the reversing lamp and showing in what geometrical position(s) the reversing lamp may be mounted on the vehicle; the axis of observation to be taken as the axis of reference in the tests (horizontal angle $H = 0$, vertical angle $V = 0$); and the point to be taken as the centre of reference in the said tests. The drawings must show the position intended for the approval number and the additional symbol in relation to the circle of the approval mark;
- 2.2.2. a brief technical description stating in particular, with the exception of lamps with non-replaceable light sources:
- (a) the category or categories of filament lamp(s) prescribed; this filament lamp category shall be one of those contained in Regulation No. 37 and its series of amendments in force at the time of application for type approval; and/or
 - (b) the light source module specific identification code.
- 2.2.3. two samples. If the devices 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.

3. MARKINGS

The samples of a type of reversing lamp submitted for approval shall:

- 3.1. bear the trade name or mark of the applicant; this marking shall be clearly legible and be indelible;
- 3.2. with the exception of lamps with non-replaceable light sources bear a clearly legible and indelible marking indicating:
- (a) the category or categories of filament lamp(s) prescribed; and/or
 - (b) the light source module specific identification code.
- 3.3. if necessary in order to prevent any mistake in mounting the reversing lamp on the vehicle, bear the word "TOP" marked horizontally on the uppermost part of the illuminating surface;
- 3.4. provide adequate space for the approval mark and for the additional symbols prescribed in paragraph 4.3. below; the said space shall be shown in the drawing referred to in paragraph 2.2.1. above;

- 3.5. in the case of lamps with non-replaceable light sources or light source module(s), bear the marking of rated voltage or the range of voltage, and the rated wattage.
- 3.6. in the case of lamps with light source module(s), the light source module(s) shall bear:
- 3.6.1. the trade name or mark of the applicant; this marking must be clearly legible and indelible;
- 3.6.2. the specific identification code of the module; this marking must be clearly legible and indelible.
This specific identification code shall comprise the starting letters "MD" for "MODULE" followed by the approval marking without the circle as prescribed in paragraph 4.3.1.1. below; this specific identification code shall be shown in the drawings mentioned in paragraph 2.2.1. above. The approval marking does not have to be the same as the one on the lamp in which the module is used, but both markings shall be from the same applicant.
- 3.6.3. the marking of the rated voltage and rated wattage.
4. APPROVAL
- 4.1. If the two samples of a type of reversing lamp meet the requirements of this Regulation, approval shall be granted.
- 4.2. An approval number shall be assigned to each type approved. The same Contracting Party shall not assign the same number to another type of reversing lamp covered by this Regulation. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a type of reversing lamp pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation by means of a form conforming to the model in Annex 1 to this Regulation.
- 4.3. Every reversing lamp conforming to a type approved under this Regulation shall bear in the space referred to in paragraph 3.4. above, in addition the mark and the particulars prescribed above in paragraphs 3.1., 3.2. and 3.3. or 3.5. respectively:

- 4.3.1. an international approval mark consisting of:
- 4.3.1.1. a circle surrounding the letter "E" followed by the distinguishing number of the country which has granted the approval; 2/ and
- 4.3.1.2. an approval number;
- 4.3.2. an additional symbol consisting of letters A and R, mingled as shown in Annex 2 to this Regulation.
- 4.3.3. The first two digits of the approval number which indicate the most recent series of amendments to this Regulation may be placed in the vicinity of the additional symbol "AR."
- 4.3.4. On lamps of which the visibility angles are symmetrical with regard to the reference axis in a horizontal direction, an arrow pointing towards the side on which the photometric specifications are met up to an angle of 45° H.
- 4.4. Independent lamps

If different types of lamps complying with the requirements of several Regulations, use the same outer lens having the same or different colour, 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

2/ 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech Republic, 9 for Spain, 10 for Serbia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal, 22 for the Russian Federation, 23 for Greece, 24 for Ireland, 25 for Croatia, 26 for Slovenia, 27 for Slovakia, 28 for Belarus, 29 for Estonia, 30 (vacant), 31 for Bosnia and Herzegovina, 32 for Latvia, 33 (vacant), 34 for Bulgaria, 35 (vacant), 36 for Lithuania, 37 for Turkey, 38 (vacant), 39 for Azerbaijan, 40 for The former Yugoslav Republic of Macedonia, 41 (vacant), 42 for the European Community (Approvals are granted by its Member States using their respective ECE symbol), 43 for Japan, 44 (vacant), 45 for Australia, 46 for Ukraine, 47 for South Africa, 48 for New Zealand, 49 for Cyprus, 50 for Malta, 51 for the Republic of Korea, 52 for Malaysia, 53 for Thailand, 54 and 55 (vacant), 56 for Montenegro, 57 (vacant) and 58 for Tunisia. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement.

approval, and an approval number. This approval mark may be located anywhere on the lamp, provided that :

- 4.4.1. It is visible after their installation.
- 4.4.2. 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.
- 4.4.3. 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.
- 4.4.4. The main body of the lamp shall include the space described in paragraph 3.4. above and shall bear the approval mark of the actual function(s).
- 4.4.5. Model E in Annex 2 to this Regulation gives examples of an approval mark with the above-mentioned additional symbols.
- 4.5. When two or more lamps are part of the same assembly of grouped, combined or reciprocally incorporated lamps, approval is granted only if each of these lamps satisfies the requirements of this Regulation or of another Regulation. Lamps not satisfying any one of those Regulations shall not be part of such an assembly of grouped, combined or reciprocally incorporated lamps.
 - 4.5.1. Where grouped, combined or reciprocally incorporated lamps 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, an approval number and, if necessary, the required arrow. This approval mark may be placed anywhere on the grouped, combined or reciprocally incorporated lamps provided that:
 - 4.5.1.1. It is visible after their installation;
 - 4.5.1.2. 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.
 - 4.5.2. 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, shall be marked:
 - 4.5.2.1. Either on the appropriate light-emitting surface,

- 4.5.2.2. Or in a group, in such a way that each lamp of the grouped, combined or reciprocally incorporated lamps may be clearly identified (see three possible examples in Annex 2).
- 4.5.3. 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 a Regulation under which approval has been granted.
- 4.5.4. 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.
- 4.6. The mark and symbol referred to in paragraphs 4.3.1. and 4.3.2. shall be indelible and shall be clearly legible even when the reversing lamp is mounted on the vehicle.
- 4.7. Annex 2 gives examples of approval marks for a single lamp (Figure 1) and for grouped, combined or reciprocally incorporated lamps (Figure 2) with all the additional symbols referred to above, in which the letters A and R are mingled.

5. GENERAL SPECIFICATIONS

- 5.1. Each sample shall conform to the specifications set forth in the paragraphs below.
- 5.2. Reversing lamps shall be so designed and constructed that in normal use, despite the vibration to which they may then be subjected, they continue to function satisfactorily and retain the characteristics prescribed by this Regulation.
- 5.3. Light source module
- 5.3.1. The design of the light source module(s) shall be such that even in darkness the light source module(s) can be fitted in no other position, but the correct one.
- 5.3.2. The light source module(s) shall be tamperproof.
- 5.4. In the case of replaceable filament lamp(s):
- 5.4.1. Any category or categories of filament lamp(s) approved according to Regulation No. 37 may be used, provided that no restriction on the use is made in Regulation No. 37 and its series of amendments in force at the time of application for type approval.
- 5.4.2. The design of the device shall be such that the filament lamp can be fixed in no other position but the correct one.

- 5.4.3. The filament lamp holder shall conform to the characteristics given in IEC Publication 60061. The holder data sheet relevant to the category of filament lamp used, applies.

6. INTENSITY OF LIGHT EMITTED

- 6.1. The intensity of the light emitted by each of the two samples shall be not less than the minima and not greater than the maxima specified below and shall be measured in relation to the axis of reference in the directions shown below (expressed in degrees of angle with the axis of reference).

- 6.2. The intensity along the axis of reference shall be not less than 80 candelas.

- 6.3. The intensity of the light emitted in all directions in which the light can be observed shall not exceed:

300 candelas in directions in or above the horizontal plane;

and, in directions below the horizontal plane:

600 candelas between h-h and 5° D and
8,000 candelas below 5° D.

- 6.4. In every other direction of measurement shown in Annex 3 to this Regulation, the luminous intensity shall be not less than the minima specified in that annex.

However, in the case where the reversing lamp is intended to be installed on a vehicle exclusively in a pair of devices, the photometric intensity may be verified only up to an angle of 30° inwards where a photometric value of at least 25 cd shall be satisfied.

This condition shall be clearly explained in the application for approval and relating documents (see paragraph 2. of this Regulation).

Moreover, in the case where the type approval will be granted applying the condition above, a statement in paragraph 11. "Comments" of the communication form (see Annex 1 to this Regulation), will inform that the device shall only be installed in a pair.

- 6.5. 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. A group of light sources, wired so that the failure of any one of them causes all of them to stop emitting light, shall be considered to be one light source.

7. TEST PROCEDURES

- 7.1. All measurements, photometric and colorimetric, shall be made:
- 7.1.1. In the case of a lamp with replaceable light source, if not supplied by an electronic light source control gear, with an uncolored standard filament lamp of the category prescribed for the device, supplied with the voltage necessary to produce the reference luminous flux required for that category of filament lamp.
- 7.1.2. In the case of a lamp equipped with non-replaceable light sources (filament lamps and other), at 6.75 V, 13.5 V or 28.0 V respectively.
- 7.1.3. In the case of a system that uses an electronic light source control gear, being part of the lamp ^{3/} applying at the input terminals of the lamp the voltage declared by the manufacturer or, if not indicated, 6.75 V, 13.5 V or 28.0 V respectively.
- 7.1.4. In the case of a system that uses an electronic light source control gear not being part of the lamp the voltage declared by the manufacturer shall be applied to the input terminals of the lamp.
- 7.2. The Technical Service shall require from the manufacturer the light source control gear needed to supply the light source and the applicable functions.
- 7.3. The voltage to be applied to the lamp shall be indicated in the communication form, specified in Annex 1 of this Regulation.
- 7.4. For any lamp, except those equipped with filament lamps, the luminous intensities measured after one minute and after 30 minutes of operation, shall comply with the minimum and maximum requirements. The luminous intensity distribution after one minute of operation can be calculated from the luminous intensity distribution after 30 minutes of operation by applying at each test point the ratio of luminous intensities measured at HV after one minute and after 30 minutes of operation.
- 7.5. The limits of the apparent surface in the direction of the reference axis of a light-signalling device shall be determined.

^{3/} For the purpose of this Regulation "being part of the lamp" means to be physically included in the lamp body or to be external, separated or not, from the lamp body but supplied by the lamp manufacturer as part of the lamp system.

8. COLOUR OF LIGHT EMITTED

The colour of the light emitted inside the field of the light distribution grid defined at paragraph 2. of Annex 3 shall be white and, in case of doubt, may be checked on the basis of the definition of the colour of white light given in Annex 4 to this Regulation. Outside this field no sharp variation of colour shall be observed.

9. CONFORMITY OF PRODUCTION

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

- 9.1. Lamps 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.
- 9.2. The minimum requirements for conformity of production control procedures set forth in Annex 5 to this Regulation shall be complied with.
- 9.3. The minimum requirements for sampling by an inspector set forth in Annex 6 to this Regulation shall be complied with.
- 9.4. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.

10. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

- 10.1. The approval granted in respect of a type of reversing lamp pursuant to this Regulation may be withdrawn if the foregoing requirements are not complied with or if the reversing lamp bearing the mark referred to in paragraphs 4.3.1. and 4.3.2. does not conform to the type approved.
- 10.2. If a Contracting Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in Annex 1 to this Regulation.

11. PRODUCTION DEFINITELY DISCONTINUED

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

12. NAMES AND ADDRESSES OF THE 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, or production definitely discontinued issued in other countries, are to be sent.

Annex 1

COMMUNICATION

(Maximum format: A4 (210 x 297 mm))



issued by :

Name of administration:

.....
.....
.....

concerning: 2/

- APPROVAL GRANTED
- APPROVAL EXTENDED
- APPROVAL REFUSED
- APPROVAL WITHDRAWN
- PRODUCTION DEFINITELY DISCONTINUED

of a type of reversing lamp pursuant to Regulation No. 23

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 report issued by that service:
8. Number of report issued by that service:
9. Concise description:
Number, category and kind of light source(s):

Voltage and wattage:

Application of an electronic light source control gear:

- (a) being part of the lamp: yes/no 2/
- (b) being not part of the lamp: yes/no 2/

Input voltage(s) supplied by an electronic light source control gear:

Electronic light source control gear manufacturer and identification number (when the light source control gear is part of the lamp but is not included into the lamp body):

Light source module:..... yes/no 2/

Light source module specific identification code:

Geometrical conditions of installation and relating variations; if any:

10. Position of the approval mark:

11. Comments:

This device shall be installed on a vehicle only as part of a pair of devices: yes/no 2/

12. Reason(s) for extension (if applicable):

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

14. Place:

15. Date:

16. Signature:

17. The list of documents deposited with the Administrative Service which has granted approval is annexed to this communication and may be obtained on request.

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

2/ Strike out what does not apply.

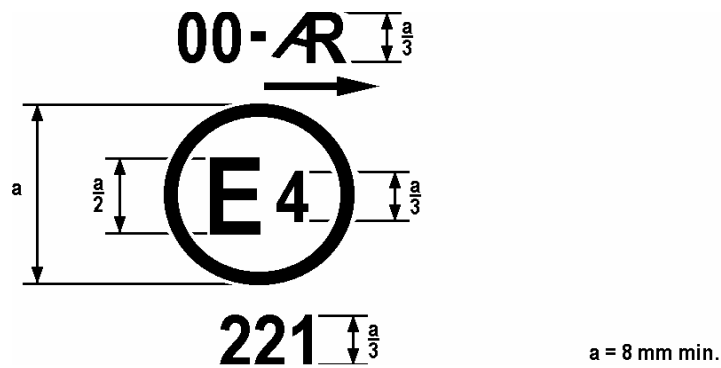
Annex 2

EXAMPLES OF ARRANGEMENTS OF APPROVAL MARKS

Figure 1

Marking for single lamps

Model A



The device bearing the approval mark shown above is a reversing lamp approved in the Netherlands (E4) pursuant to Regulation No. 23 under approval number 221. The approval number indicates that the approval was granted in accordance with the requirements of Regulation No. 23 in its original form or as amended by Supplements 1 and/or 2, as the case may be. The arrow indicates the side on which the required photometric specifications are met up to an angle of 45° H.

Note: The approval number and additional symbol shall be placed close to the circle and either above or below the letter "E" or to the left or right of that letter. The digits of the approval number and of the production serial 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

Simplified marking for grouped, combined or reciprocally incorporated lamps

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


Model B

	3333 Ⓔ 4	IA 02	$\frac{2a}{01}$ →	$\frac{R}{01}$ →
		F 00	AR 00	S2 01

Model C

		IA $\frac{2a}{01}$ $\frac{R}{01}$ 02	
		F AR S2 00 00 01 3333 Ⓔ 4	

Model D

<table style="border-collapse: collapse; width: 100%;"> <tr> <td style="padding: 2px 5px;">IA</td> <td style="padding: 2px 5px;">$\frac{2a}{01}$</td> <td style="padding: 2px 5px;">$\frac{R}{01}$</td> </tr> <tr> <td style="padding: 2px 5px;">02</td> <td style="padding: 2px 5px;">01</td> <td style="padding: 2px 5px;">01</td> </tr> <tr> <td style="padding: 2px 5px;">F</td> <td style="padding: 2px 5px;">AR</td> <td style="padding: 2px 5px;">S2</td> </tr> <tr> <td style="padding: 2px 5px;">00</td> <td style="padding: 2px 5px;">00</td> <td style="padding: 2px 5px;">01</td> </tr> </table> <p style="text-align: center;">3333</p> <div style="text-align: center;">  </div>	IA	$\frac{2a}{01}$	$\frac{R}{01}$	02	01	01	F	AR	S2	00	00	01			
IA	$\frac{2a}{01}$	$\frac{R}{01}$													
02	01	01													
F	AR	S2													
00	00	01													

Note: The three examples of approval marks, models B, C and D 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. This approval mark shows that the device was approved in the Netherlands (E4) under approval number 3333 and comprising:

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

A rear direction indicator lamp 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 02 series of amendments to Regulation No. 7;

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

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

A stop lamp with two levels of illumination (S2) approved in accordance with the 02 series of amendments to Regulation No. 7.

Model E

Marking of independent lamps

F 2a AR R S1
00 01 00 02 02



1432

The above example corresponds to the marking of a lens intended to be used in different types of lamps. The approval marks indicate that the device was approved in Spain (E9) under approval number 1432 and comprises:

A rear fog lamp (F) approved in accordance with the Regulation No. 38 in its original version,

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

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

A red rear position (side) lamp (R) approved in accordance with the 02 series of amendments to Regulation No. 7,

A stop-lamp with one level of illumination (S1) approved in accordance with the 02 series of amendments to Regulation No. 7.

Figure 3

Light source modules

MD E3 17325

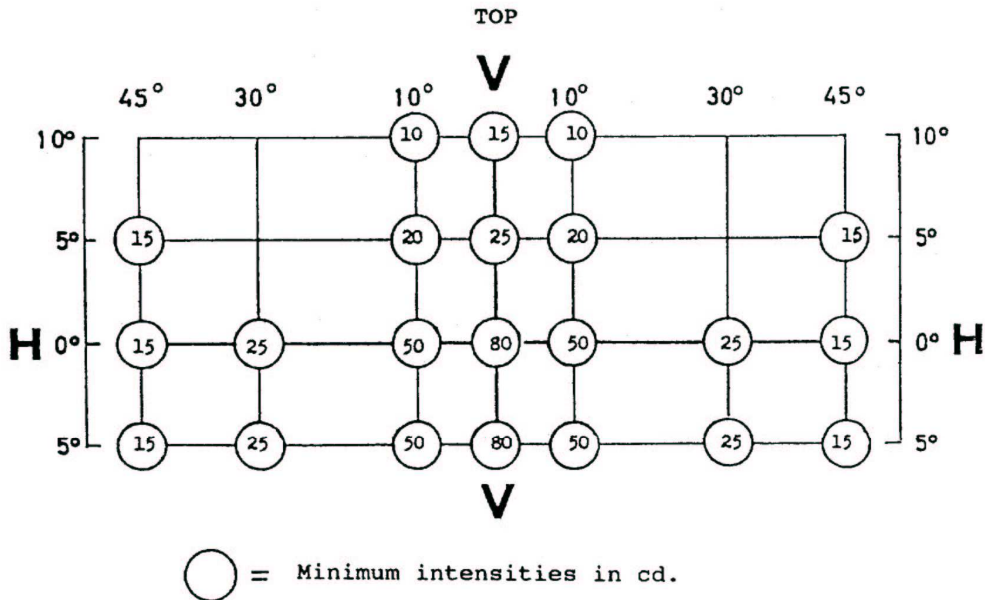
The light source module bearing the identification code shown above has been approved together with a lamp approved in Italy (E3) under approval number 17325.

Annex 3

PHOTOMETRIC MEASUREMENTS

1. Measurement methods
 - 1.1. When photometric measurements are taken, stray reflections shall be avoided by appropriate masking.
 - 1.2. In the event that the results of measurements are challenged, measurements shall be taken 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 angle subtended by the receiver 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 satisfied if the required intensity is obtained in a direction deviating by not more than one quarter of a degree from the direction of observation.
 - 1.3. In the case where the device may be installed on the vehicle in more than one or in a field of different positions the photometric measurements shall be repeated for each position or for the extreme positions in the field of reference axis specified by the manufacturer.

2. Measuring points expressed in degrees of angle with the axis of reference and values of the minimum intensities of the light emitted



2.1. The directions $H = 0^\circ$ and $V = 0^\circ$ correspond to the axis of reference. On the vehicle they are horizontal, parallel to the median longitudinal plane of the vehicle and oriented in the required direction of visibility. They pass through the centre of reference. The values shown in the table give, for the various directions of measurement, the minimum intensities in cd.

2.2. If visual examination of a lamp appears to reveal substantial local variations of intensity, a check shall be made to ensure that no intensity measured between two of the directions of measurement referred to above is below 50 per cent of the lower minimum intensity of the two prescribed for these directions of measurement.

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 relevant subparagraphs of paragraph 7.1. of this Regulation.

3.2. For replaceable filament lamps:

when equipped with filament lamps at 6.75 V, 13.5 V or 28.0 V, the luminous intensity values produced shall be corrected. The correction factor is the ratio between the reference luminous flux and the mean value of the luminous flux found at the voltage applied (6.75 V, 13.5 V or 28.0 V). The actual luminous fluxes of each filament lamp used shall not deviate more than ∇ 5 per cent from the mean value. 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 4

COLOUR OF WHITE LIGHT

(Trichromatic coordinates)

Limit towards blue:	:	$x \geq 0.310$
Limit towards yellow	:	$x \leq 0.500$
Limit towards green	:	$y \leq 0.150 + 0.640x$
Limit towards green	:	$y \leq 0.440$
Limit towards purple	:	$y \geq 0.050 + 0.750x$
Limit towards red	:	$y \geq 0.382$

For checking these colorimetric characteristics, a source of light at a colour temperature of 2,854° K corresponding to illuminant A of the International Commission on Illumination (ICI) shall be used.

These colorimetric characteristics, shall be measured under conditions described in paragraph 7. of this Regulation.

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 relevant subparagraphs of paragraph 7.1. of this Regulation.

Annex 5

MINIMUM REQUIREMENTS FOR CONFORMITY
OF PRODUCTION CONTROL PROCEDURES

1. GENERAL

- 1.1. The conformity requirements shall be considered satisfied from a mechanical and 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 according to paragraph 7. of this Regulation, 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 when tested under conditions of paragraph 7. of this Regulation.

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 3 and the chromaticity coordinates listed in Annex 4, 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 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 6 (first sampling) would be 0.95.

Annex 6

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 performances, the conformity of mass-produced lamps shall not be contested if, when testing photometric performances of any lamp chosen at random according to paragraph 7. of this Regulation, 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 when tested under conditions of paragraph 7. of this Regulation.

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 per cent
one lamp not more than	20 per cent
A2: both lamps more than	0 per cent
but not more than	20 per cent
go to sample B	

2.1.1.2. sample B

B1: both lamps 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 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 per cent
one lamp 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 lamp more than 0 per cent
but not more than 20 per cent
one lamp not more than 20 per cent

B3: in the case of A2
one lamp 0 per cent
one lamp 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 lamps are:

2.3.1. sample A

A4: one lamp not more than 20 per cent
one lamp more than 30 per cent

A5: both lamps more than 20 per cent

2.3.2.	sample B	
	B4: in the case of A2	
	one lamp more than	0 per cent
	but not more than	20 per cent
	one lamp more than	20 per cent
	B5: in the case of A2	
	both lamps more than	20 per cent
	B6: in the case of A2	
	one lamp	0 per cent
	one lamp 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 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 per cent
	one lamp not more than	20 per cent
	C2: both lamps 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 lamps	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 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 per cent
but not more than	20 per cent
one lamp 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 lamps are:

3.3.1. sample C

C3: one lamp not more than	20 per cent
one lamp more than	20 per cent
C4: both lamps more than	20 per cent

3.3.2. sample D

D3: in the case of C2	
one lamp 0 or more than	0 per cent
one lamp 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.

Figure 1

