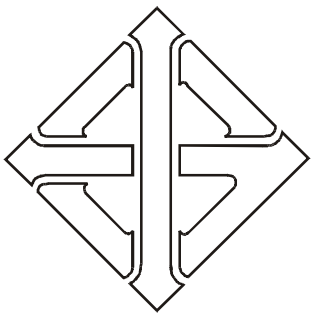

มาตรฐานผลิตภัณฑ์อุตสาหกรรม

THAI INDUSTRIAL STANDARD

มอก. 2290–2549

ECE Regulation No.38

00 series of amendments

โคมไฟตัดหมอกด้านท้ายยานยนต์และส่วนพ่วง

REAR FOG LAMPS FOR POWER–DRIVEN VEHICLES AND THEIR TRAILERS

สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

กระทรวงอุตสาหกรรม

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กระทรวงอุตสาหกรรม ถนนพระรามที่ 6 กรุงเทพฯ 10400
โทรศัพท์ 0 2202 3300

ประกาศในราชกิจจานุเบกษา ฉบับประกาศและงานทั่วไป เล่ม 124 ตอนพิเศษ 16ง
วันที่ 8 กุมภาพันธ์ พุทธศักราช 2550

โคมไฟส่องสว่างและโคมไฟสัญญาณเป็นอุปกรณ์จำเป็นสำหรับส่องสว่างและแสดงแสงสัญญาณสำหรับยานยนต์ที่มีเจตนาใช้งานบนทางสาธารณะ เพื่อให้เกิดความปลอดภัยจึงต้องมีมาตรฐานที่เหมาะสม และเพื่อเป็นการส่งเสริมอุตสาหกรรม จึงกำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรมโคมไฟตัดหมอกด้านท้ายยานยนต์และส่วนพ่วง ขึ้น

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้กำหนดขึ้นโดยรับ Economic Commission for Europe (ECE) Regulation No. 38 UNIFORM PROVISIONS CONCERNING THE APPROVAL OF REAR FOG LAMPS FOR POWER-DRIVEN VEHICLES AND THEIR TRAILERS ดังต่อไปนี้

1. Regulation No. 38 Revision 2

   Incorporating all valid text up to:

   Supplement 6 - Supplement 10 to the original version of the Regulation

   Corrigendum 1 to Supplement 9 to the original version of the Regulation

มาใช้ในระดับเหมือนกันทุกประการ (identical) เฉพาะสาระสำคัญทางวิชาการซึ่งแสดงถึงข้อกำหนดคุณลักษณะทั่วไป ความเข้มของแสง วิธีการทดสอบ การทดสอบความทนความร้อน สีของแสง สำหรับข้อกำหนดด้านการรับรองหรือการดำเนินการต่าง ๆ ที่เกี่ยวข้อง ให้เป็นไปตามพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม โดยสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม จะประกาศกำหนดหลักเกณฑ์การรับรองต่อไป

คณะกรรมการมาตรฐานผลิตภัณฑ์อุตสาหกรรมได้พิจารณามาตรฐานนี้แล้ว เห็นสมควรเสนอรัฐมนตรีประกาศตามมาตรา 15 แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. 2511

ประกาศกระทรวงอุตสาหกรรม

ฉบับที่ 3527 (พ.ศ. 2549)

ออกตามความในพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม

พ.ศ. 2511

เรื่อง กำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม

โคมไฟตัดหมอกด้านท้ายยานยนต์และส่วนพ่วง

อาศัยอำนาจตามความในมาตรา 15 แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. 2511 รัฐมนตรีว่าการกระทรวงอุตสาหกรรมออกประกาศกำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม โคมไฟตัดหมอกด้านท้ายยานยนต์และส่วนพ่วง มาตรฐานเลขที่ มอก. 2290-2549 ไว้ ดังมีรายละเอียดต่อท้ายประกาศนี้

ประกาศ ณ วันที่ 5 กรกฎาคม พ.ศ. 2549

สุริยะ จึงรุ่งเรืองกิจ

รัฐมนตรีว่าการกระทรวงอุตสาหกรรม

มาตรฐานผลิตภัณฑ์อุตสาหกรรม

โคมไฟตัดหมอกด้านท้ายยานยนต์และส่วนพ่วง

ขอบข่าย

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ครอบคลุมข้อกำหนดคุณลักษณะทั่วไป ความเข้มของแสง วิธีการทดสอบ การทดสอบความทนความร้อน สีของแสง ของโคมไฟตัดหมอกด้านท้ายของยานยนต์มีต้นกำลังขับเคลื่อนในตัว (power-driven vehicle) และส่วนพ่วง

บทนิยาม

ความหมายของคำที่ใช้ในมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ ให้เป็นไปตาม ECE Regulation No. 38

ข้อกำหนด

ข้อกำหนดคุณลักษณะทั่วไป ความเข้มของแสง วิธีการทดสอบ การทดสอบความทนความร้อน สีของแสง ในมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ ให้เป็นไปตาม ECE Regulation No. 38 ข้อ 5. ถึง ข้อ 9.

การทดสอบ

การทดสอบและการหาค่าต่าง ๆ ในมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ ให้เป็นไปตาม ECE Regulation No. 38 ANNEX ที่เกี่ยวข้อง

Regulation No. 38

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

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ANNEXES

Annex 1 - Communication concerning the approval or extension or refusal or withdrawal of approval or production definitely discontinued of a type of rear fog lamps for power-driven vehicles and their trailers pursuant to Regulation No. 38

Annex 2 - Arrangements of approval marks

CONTENTS (continued)

Annex 3 - Photometric measurements

Annex 4 - Minimum requirements for conformity of production control procedures

Annex 5 - Minimum requirements for sampling by an inspector

1. DEFINITIONS

For the purposes of this Regulation,

1.1. "Rear fog lamp" means a lamp used to make the vehicle more easily visible from the rear by giving a red signal of greater intensity than the rear position (side) lamps;

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

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

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

1.3.1. the trade name or mark;

1.3.2. the characteristics of the optical system;

1.3.3. the category of lamp.

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.

2.2. For each type of rear fog lamp, the application shall be accompanied by:

2.2.1. drawings (three copies) in sufficient detail to permit identification of the type of the rear fog lamp and showing geometrically the position(s) in which the rear fog lamp may be fitted to the vehicle; the axis of observation to be taken as the axis of reference in the tests (horizontal angle H = 0º; vertical angle V = 0º; and the point to be taken as the centre of reference in the said tests;

2.2.2. a brief technical description stating, in particular, with the exception of lamps with non-replaceable light sources:

- the category or categories of filament lamp(s) prescribed; this filament lamp category shall be one of those contained in Regulation No. 37; and/or
- the light source module specific identification code.

2.2.3. two samples; if the rear fog lamp cannot be mounted indiscriminately on either side of the vehicle, the two samples submitted may be identical and may 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 rear fog lamp submitted for approval shall:

3.1. bear the trade name or mark of the applicant; this marking must 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:

- the category or categories of filament lamp prescribed; and/or
- the light source module specific identification code.

3.3. 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 drawings referred to in paragraph 2.2.1. above.

3.4. in the case of lamps with non-replaceable light sources or light source module(s), bear the marking of the rated voltage and rated wattage.

3.5. in the case of lamps with light source module(s), the light source module(s) shall bear:

3.5.1. the trade name or mark of the applicant; this marking must be clearly legible and indelible;

3.5.2. 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.

3.5.3. the marking of the rated voltage and rated wattage.

4. APPROVAL

4.1. If the two samples of a type of rear fog lamp meet the requirements of this Regulation, approval shall be granted.

4.2. An approval number shall be assigned to each type approved; the number so assigned may not subsequently be assigned by the same Contracting Party to another type of rear fog lamp covered by this Regulation. The first two digits of the approval number shall indicate the most recent series of amendments incorporated in the Regulation at the time of issue of the approval. Notice of approval or of refusal of approval of a type of rear fog lamp 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 and of an attached drawing, supplied by the applicant for approval, in a format not exceeding A 4 (210 x 297 mm) and, if possible, on a scale of 1:1.

4.3. Every rear fog lamp conforming to a type approved under this Regulation shall bear in the space referred to in paragraph 3.3. above, in addition to the mark and the particulars prescribed in paragraphs 3.1. and 3.2. above:

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 approval; 1/

4.3.1.2. an approval number;

4.3.2. the additional symbol "F".

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 Serbia and Montenegro, 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 and 51 for the Republic of Korea. Subsequent numbers shall be assigned to other countries in the chronological order in which they ratify or accede to the Agreement Concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, and the numbers thus assigned shall be communicated by the Secretary-General of the United Nations to the Contracting Parties to the Agreement

4.3.3. 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 "F".

4.4. The mark and the symbol referred to in paragraphs 4.3.1. and 4.3.2. shall be indelible and shall be clearly legible even when the rear fog lamp is fitted to the vehicle.

4.5. Independent lamps

If different types of lamps complying with the requirements of several Regulations, uses 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 approval, and an approval number. This approval mark may be located anywhere on the lamp, provided that:

4.5.1. It is visible after their installation.

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 and if necessary, the required arrow shall be marked.

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 under which approval has been granted.

4.5.4. The main body of the lamp shall include the space described in paragraph 3.3. above and shall bear the approval mark of the actual function(s).

4.5.5. Model E in Annex 2 to this Regulation gives examples of an approval mark with the above-mentioned additional symbols.

4.6. When two or more lamps are part of the same unit 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 a unit of grouped, combined or reciprocally incorporated lamps.

4.6.1. 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:

4.6.1.1. it is visible after their installation;

4.6.1.2. 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.

4.6.2. 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:

4.6.2.1. either on the appropriate light-emitting surface;

4.6.2.2. 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).

4.6.3. 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.

4.6.4. 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.

4.7. Annex 2 gives examples of arrangements 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.

5. GENERAL SPECIFICATIONS

5.1. Each sample shall conform to the specifications set forth in the paragraphs below.

5.2. Rear fog 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.

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 references in the directions shown below (expressed in degrees of angle with the axis of reference).

6.2. The intensity along the H and V axes, between 10° to the left and 10° to the right and between 5° up and 5° down, shall not be less than 150 cd.

6.3. The intensity of the light emitted in all directions in which the light(s) can be observed shall not exceed 300 cd per light.

6.4. 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.

6.5. The apparent surface in the direction of the reference axis shall not exceed 140 cm^2.

6.6. Annex 3 gives particulars of the measurement method to be used in case of doubt.

7. TEST PROCEDURE

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

7.1. 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. The limits of the apparent surface in the direction of the reference axis of a light-signalling device shall be determined.

8. HEAT RESISTANCE TEST

8.1. The lamp must be subjected to a one-hour test of continuous operation following a warm-up period of 20 minutes. The ambient temperature shall be 23º C ± 5º C. The lamp used shall be a lamp of the category prescribed for the lamp, and shall be supplied with a current at a voltage such that it gives the specified average power at the corresponding test voltage.

8.2. Where only the maximum power is specified, the test shall be carried out by regulating the voltage to obtain a power equal to 90 per cent of the specified power. The specified average or maximum power referred to above shall in all cases be chosen from the voltage range of 6, 12 or 24 V at which it reaches the highest value.

8.3. After the lamp has been stabilized at the ambient temperature, no distortion, deformation, cracking or colour modification shall be perceptible.

9. COLOUR OF LIGHT EMITTED

The colour of the light emitted inside the field of the light distribution grid defined at paragraph 3 of annex 3, which shall be measured by using a source of light at a colour temperature of 2856 K, */ must lie within the limits of the following trichromatic co-ordinates:

limit towards yellow: $y \leq 0.335$
limit towards purple: $y \geq 0.980 - x$

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 7.1. of this Regulation.

10. CONFORMITY OF PRODUCTION

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

10.1. 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 9. above.

10.2. The minimum requirements for conformity of production control procedures set forth in Annex 4 to this Regulation shall be complied with.

10.3. The minimum requirements for sampling by an inspector set forth in Annex 5 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 for a type of rear fog lamp may be withdrawn if the foregoing requirements are not complied with or if a rear fog lamp bearing the mark referred to in paragraphs 4.3.1. and 4.3.2. does not conform to the type approved.

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

12. PRODUCTION DEFINITELY DISCONTINUED

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

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

The Contracting Parties to the Agreement which apply this Regulation shall communicate to the secretariat of the United Nations the names and addresses of the technical services conducting approval tests and of the administrative departments which grant approval and to which the forms certifying approval or refusal or withdrawal of approval, 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 rear fog lamp for power-driven vehicles and their trailers pursuant to Regulation No. 38

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 reports issued by that service .....

9. Concise description: 3/
Number and category(ies) of filament lamp(s): .....
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. 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/ 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/ For rear fog lamps with non-replaceable light sources indicate the number and the total wattage of the sealed-in light sources.

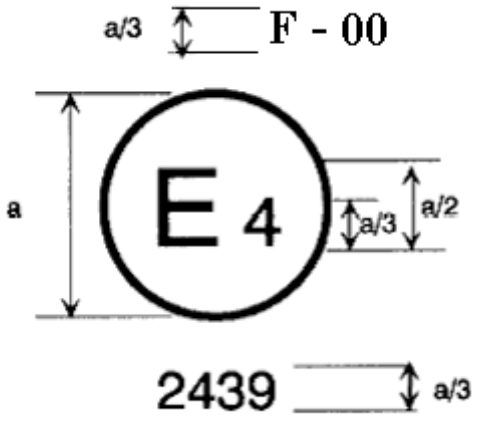
Annex 2

ARRANGEMENT OF APPROVAL MARKS

Figure 1

(Marking for single lamps)

Model A



a = 5 mm min

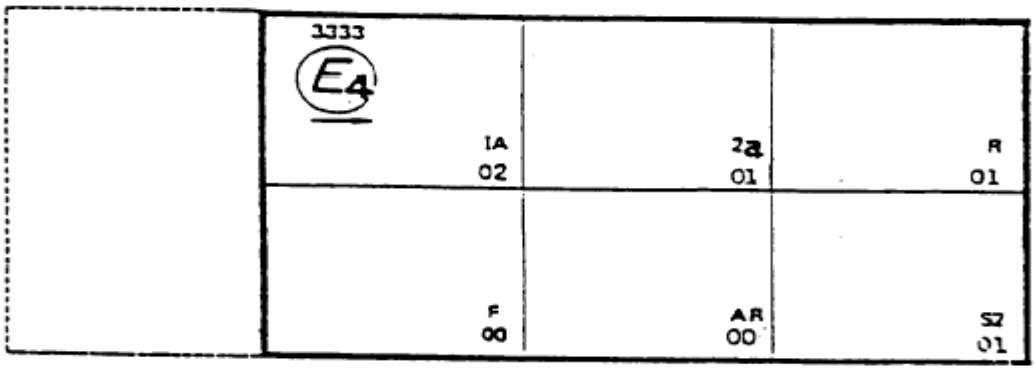
The device bearing the approval mark shown above is a rear fog lamp approved in the Netherlands (E 4) pursuant to Regulation No. 38 under approval number 2439. The approval number indicates that the approval was granted in accordance with the requirements of Regulation No. 38 in its original version.

Figure 2

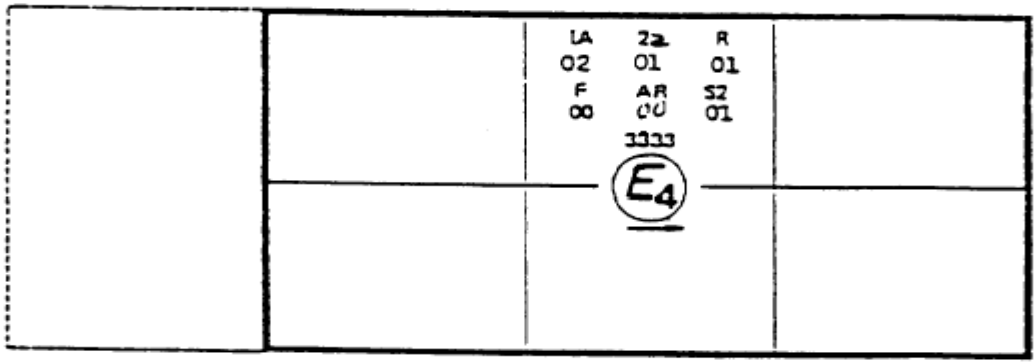
(Simplified marking for grouped, combined or reciprocally incorporated lamps)

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

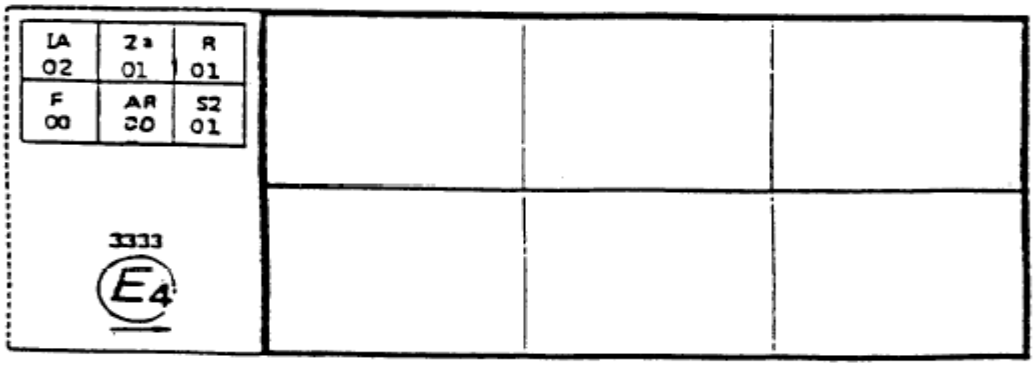
Model B



Model C



Model D



Note: The three examples of approval marks, models B, C and D, represent three possible variants of the marking of a lighting device when two or more lamps are part of the same unit of grouped, combined or reciprocally incorporated lamps. This approval mark shows that the device was approved in the Netherlands (E 4) under approval number 3333 and comprising:

A retro 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;

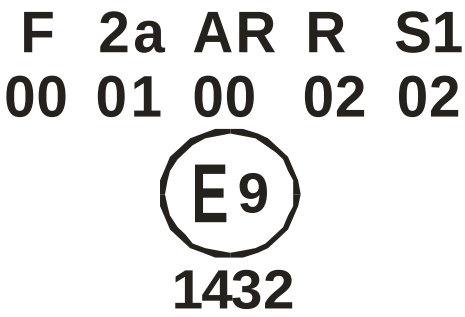
A rear fog lamp (F) approved in accordance with Regulation No. 38 in its original form;

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 01 series of amendments to Regulation No. 7.

Model E

Marking of independent lamps



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. When photometric measurements are taken, stray reflexions shall be avoided by appropriate masking.

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:

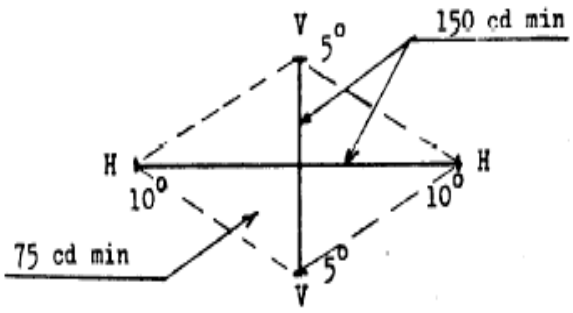
2.1. the distance of measurement shall be such that the law of the inverse of the square of the distance is applicable;

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°;

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.

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 of the field of the reference axis specified by the manufacturer.

4. If visual examination of a light appears to reveal substantial local variations of intensity, a check shall be made to ensure that, outside the axes, no intensity measured within the rhombus defined by the extreme directions of measurement is below 75 cd (see diagram below).



5. Photometric measurement of lamps equipped with several light sources

The photometric performance shall be checked:

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

With the light sources present in the lamp, in accordance with paragraph 7.1. of this Regulation.

5.2. 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

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 3 and for the chromaticity coordinates provided for in paragraph 9. 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 10.1. 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 5 (first sampling) would be 0.95.

Annex 5

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 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 Figure1 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 11. 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 11 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

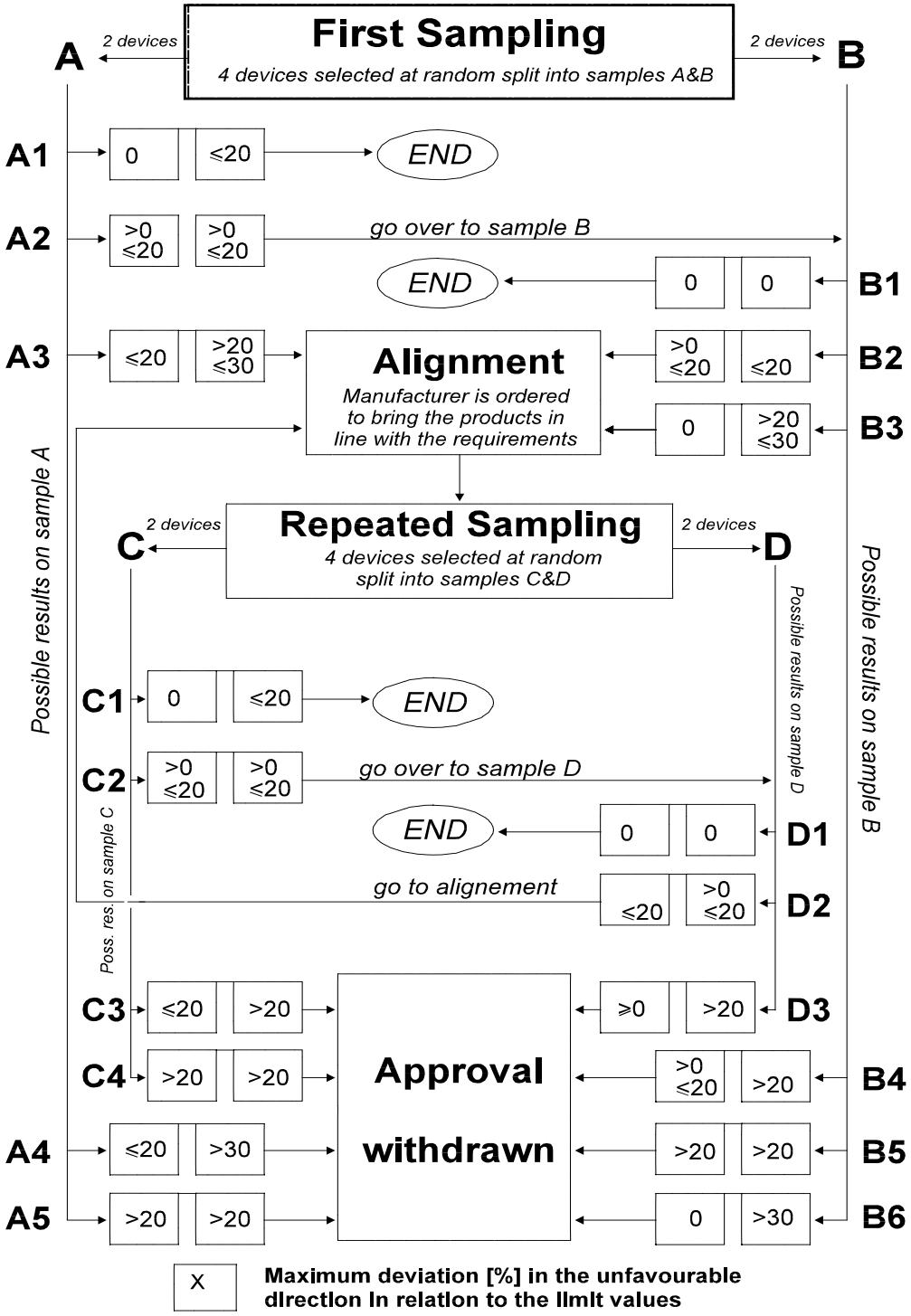
C3:	one lamp not more than	20 per cent
	one lamp more than	20 per cent
C4:	both lamps more than	20 per cent

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


First Sampling
4 devices selected at random split into samples A&B
A
B
2 devices
2 devices
A1
A2
A3
A4
A5
B1
B2
B3
B4
B5
B6
0
≤20
END
>0 ≤20
go over to sample B
Alignment
Manufacturer is ordered to bring the products in line with the requirements
>20 ≤30
Repeated Sampling
4 devices selected at random split into samples C&D
C
D
C1
C2
C3
C4
D1
D2
D3
go over to sample D
go to alignement
Approval withdrawn
Possible results on sample A
Possible results on sample B
Possible results on sample D
Poss. res. on sample C
X
Maximum deviation [%] in the unfavourable direction In relation to the limit values

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