
GHANA STANDARD

DGS 4004:2019
ECE 04R00:2013

**UNIFORM PROVISIONS CONCERNING THE
APPROVAL OF DEVICES FOR THE
ILLUMINATION OF REAR REGISTRATION
PLATES OF POWER-DRIVEN VEHICLES
AND THEIR TRAILERS**
(UNECE 04R00 Rev. 3 – 19 August 2013, IDT)

This document is a Draft Ghana Standard. This document shall not be used or referred to as a Ghana Standard

ICS

Ref. No. DGS 4004:2019

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National Foreword

The Ghana Standards Authority is the National Statutory Body responsible for the development and promulgation of Ghana Standards.

The Ghana Standards Authority is a member of the African Organization for Standardization (ARSO), the International Organization for Standardization (ISO) and an affiliate member of the International Electrotechnical Commission (IEC).

This Ghana Standard is an identical adoption of the *UNECE 04R00 Rev. 3 – 19 August 2013 - Uniform provisions concerning the approval of devices for the illumination of rear registration plates of power-driven vehicles and their trailers* and lays down the essential requirements to which such illumination devices must conform.

Throughout the text of this standard, read “...this UNECE Regulation...” to mean “...this Ghana Standard...”

The National Committee responsible for this standard (DGS 4004:2019) is the Technical Committee on Automobile Standards (GSA/TC 05).

This is the 1st edition.

Users of this standard should note that the standard undergoes revision from time to time and any references to it statutorily imply its latest edition.

DRAFT GHANA STANDARD

19 August 2013

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 3: Regulation No. 4

Revision 3

Incorporating all valid text up to:

Supplement 12 to the original version of the Regulation - Date of entry into force: 2 February 2007

Corrigendum 2 to Supplement 10 to the original version of the Regulation - Date of entry into force:
14 November 2007

Supplement 13 to the original version of the Regulation - Date of entry into force: 11 July 2008

Supplement 14 to the original version of the Regulation - Date of entry into force: 15 October 2008

Supplement 15 to the original version of the Regulation - Date of entry into force: 9 December 2010

Supplement 16 to the original version of the Regulation - Date of entry into force: 15 July 2013

Uniform provisions concerning the approval of devices for the illumination of rear registration plates of 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.

DRAFT GHANA STANDARD

Regulation No. 4

Uniform provisions concerning the approval of devices for the illumination of rear registration plates of power-driven vehicles and their trailers

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Scope

This Regulation applies to rear registration plate lamps for vehicles of categories M, N, O, and T¹.

1. Definitions

For the purpose of this Regulation:

- 1.1. "*Rear registration plate lamp*" means the device for the illumination of rear registration plates, hereinafter called "illuminating device", which illuminates the rear registration plate by reflection. For the approval of this device, the illumination of the space to be occupied by the plate is determined.
- 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 registration plate 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 light source, light source module, etc.).
- 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.

References made in this Regulation to standard (étalon) LED light source(s) and to Regulation No. 128 shall refer to Regulation No. 128 and its series of amendments in force at the time of application for type approval.

2. Application for approval

The application for approval shall be submitted by the holder of the trade name or mark or by his duly accredited representative. It shall specify whether the device is intended to illuminate a wide plate (520 x 120 mm), tall plate (340 x 240 mm), plate for agricultural or forestry tractors (120 x 165 mm) or any combination of those plates. At the choice of the applicant, it will also specify that the device may be fitted in more than one or a field of positions in relation to the space to be occupied by this registration plate; these different positions shall be indicated by the applicant in the communication form. It shall be accompanied by the following, in respect of each type:

- (a) Drawings (three copies) in sufficient detail to permit identification of the type and showing geometrically the position in which the

¹ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.2, para. 2. - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

illuminating device is to be fitted in relation to the space to be occupied by the registration plate, and the outlines of the area adequately illuminated. The drawings must show the position intended for the approval number in relation to the circle of the approval mark;

- (b) A brief technical description stating in particular, with the exception of lamps with non-replaceable light sources:
 - (i) The category or categories of filament lamp 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
 - (ii) The category or categories of LED light source(s) prescribed; this LED light source category shall be one of those contained in Regulation No. 128 and its series of amendments in force at the time of application for type approval.; and/or
 - (iii) The light source module specific identification code²;
- (c) Two samples, equipped with the lamp or lamps recommended.

3. Markings

Illuminating devices submitted for approval must bear:

- 3.1. The trade name or mark of the maker or manufacturer of the illuminating device;
- 3.2. A space of sufficient size for the approval mark; this space shall be shown in the drawings mentioned in paragraph 2. (a) above.
- 3.3. In the case of lamps with non-replaceable light sources or light source module(s), the marking of rated voltage of the range of voltage, and the rated wattage;
- 3.4. With the exception of lamps with non-replaceable light sources it must bear a clearly legible and indelible marking indicating:
 - (a) The category or categories of light source(s) prescribed; and/or
 - (b) The light source module specific identification code.
- 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 4.4.1. below and, in the case of several non-identical light source modules are used, followed by additional

² A light source is defined in ISO 7227:1987 "Road vehicles - Lighting and light-signalling devices - Vocabulary" as an emitter of visible and radiant energy.

symbols or characters; this specific identification code shall be shown in the drawings mentioned in paragraph 2. (a) 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 illuminating device submitted in accordance with paragraph 2. above satisfy the provisions of this Regulation, approval shall be granted.
- 4.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00 for the Regulation in its original form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign this number to another type of device 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.
- 4.3. Notice of approval or of extension or refusal of approval of a type of illuminating device 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.
- 4.4. Every illuminating device conforming to a type approved under this Regulation shall, in addition to the markings referred to in paragraphs 3. (a) and (c) above, bear an international approval mark in conformity with Annex 1, consisting of:
- 4.4.1. A circle surrounding the letter "E" followed by a number identifying the country which has granted approval³;
- 4.4.2. An approval number, in the vicinity of the circle;
- 4.4.3. The following additional symbol: the letter "L";
- 4.4.4. 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 L.
- 4.5. The mark and symbols referred to in paragraphs 4.4.1., 4.4.2. and 4.4.3. shall be indelible and shall be clearly legible even when the illuminating device is mounted on the vehicle.
- 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.

³ The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.2/Amend.3 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

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 1).
- 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.
- 4.6.5. The approval marking shall be clearly legible and indelible. It may be placed on an inner or outer part (transparent or not) of the device which cannot be separated from the transparent part of the device emitting the light. In any case the marking shall be visible when the device is fitted on the vehicle or when a movable part such as the hood or boot lid or a door is opened.
- 4.7. Annex 1 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

Each device shall satisfy the provisions of paragraph 9⁴.

- 5.1. The devices for the illumination of rear registration plates shall be so constructed that the whole surface of the plate will be visible within the angles given in Annex 4.

⁴ These specifications are such as to ensure good visibility if the inclination of the registration plate does not exceed 30° on either side of the vertical.

- 5.2. All measurements shall be made with the standard uncoloured or coloured light source of the category prescribed by the manufacturer, supplied with the voltage:
- (a) In the case of filament lamp(s), that is necessary to produce the reference luminous flux required for that category of filament lamp;
 - (b) In the case of LED light source(s) of 6.75 V, 13.5 V or 28.0 V, the luminous flux value produced shall be corrected. The correction factor is the ratio between the objective luminous flux and the value of the luminous flux found at the voltage applied.
- All measurements on the devices with non-replaceable light sources shall be made at 6.75 V, 13.5 V or 28.0 V respectively.
- 5.3. 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 manufacturer the special power supply needed to supply the light sources.
- 5.4. For any rear registration plate illuminating device, except those equipped with filament lamp(s), the luminance values measured after one minute and after 30 minutes of operation shall comply with the minimum requirements.
- The luminance distribution after one minute of operation can be calculated by applying at each test point the ratio of luminance values measured in one point after one minute and after 30 minutes of operation.
- 5.5. In the case of light source modules, it shall be checked that:
- 5.5.1. The design of the light source module(s) shall be such as:
- (a) That each light source module can only be fitted in no other position than the designated and correct one and can only be removed with the use of tool(s);
 - (b) If there are more than one light source module used in the housing for a device, light source modules having different characteristics cannot be interchanged within the same lamp housing.
- 5.5.2. The light source module(s) shall be tamperproof.
- 5.5.3. A light source module shall be so designed that regardless of the use of tool(s), it shall not be mechanically interchangeable with any replaceable approved light source.
- 5.6. In the case of replaceable light source(s):
- 5.6.1. Any category or categories of light source(s) approved according to Regulation No. 37 and/or Regulation No. 128 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 or in Regulation No. 128 and its series of amendments in force at the time of application for type approval.
- 5.6.2. The design of the device shall be such that the light source cannot be fixed in any other position but the correct one.
- 5.6.3. The light source holder shall conform to the characteristics given in IEC Publication 60061. The holder data sheet relevant to the category of light source used, applies.

6. Colour of light

The light of the lamp used in the illuminating device must be sufficiently colourless not to cause any appreciable change in the colour of the registration plate.

7. Incidence of the light

The manufacturer of the illuminating device shall specify one or more or a field of positions in which the device is to be fitted in relation to the space for the registration plate; when the lamp is placed in the position (s) specified by the manufacturer the angle of incidence of the light on the surface of the plate shall not exceed 82° at any point of the surface to be illuminated, this angle being measured from the extremity of the device's illuminating area which is furthest from the surface of the plate. If there is more than one illuminating device, the foregoing requirement shall apply only to that part of the plate intended to be illuminated by the device concerned.

When the device has one outer edge of the illuminating surface that is parallel to the surface of the registration plate, the extremity of the illuminating surface of the device which is furthest from the surface of the plate is the middle point of the edge of the illuminating surface, which is parallel to the plate and is furthest from the surface of the plate.

The device must be so designed that no light is emitted directly towards the rear, with the exception of red light if the device is combined or grouped with a rear lamp.

8. Measuring procedure

Luminance measurements shall be made on a diffuse colourless surface with known diffuse reflection factor⁵. The diffuse colourless surface shall have the dimensions of the registration plate or the dimension exceeding one measuring point. Its centre shall be placed in the centre of the positions of the measuring points.

This diffuse colourless surface(s) shall be placed in the position normally occupied by the registration plate and 2 mm in front of its holder.

Luminance measurements shall be made perpendicularly to the surface of the diffuse colourless surface with the tolerance of 5° in each direction at the points shown in Annex 3 to this Regulation, each point representing a circular area of 25 mm in diameter. The measured luminance shall be corrected for the diffuse reflection factor 1.0.

9. Photometric characteristics

At each of the points of measurement shown in Annex 3, the luminance B shall be at least equal to 2.5 cd/m².

⁵ CIE Publication No.17 –1970, paragraph 45-20-040

The gradient of the luminance between the values B_1 and B_2 , measured at any two points 1 and 2 selected from among those mentioned above, shall not exceed $2 \times B_0/\text{cm}$, B_0 being the minimum luminance measured at the various points, that is to say:

$$\frac{B_2 - B_1}{\text{distance 1 - 2 in cm}} \leq 2 \times B_0/\text{cm}$$

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. Devices for the illumination of rear registration plates (henceforth called devices), approved under this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements set forth in paragraphs 5., 6. and 9. above. If there is more than one device necessary, then in the following text a device means a set of devices.
- 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 an illuminating device pursuant to this Regulation may be withdrawn if the requirements laid down above are not complied with.
- 11.2. If a Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith notify the other Contracting Parties applying this Regulation thereof by means of a communication form conforming to the model in Annex 2 to this Regulation.

12. Production definitively discontinued

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

13. Transitional provisions

- 13.1. Rear registration plate illuminating devices not equipped with filament lamps.
- 13.1.1. As from the date of entry into force of Supplement 8, no Contracting Party applying this Regulation shall refuse to grant approvals under this Regulation as amended by Supplement 8.
- 13.1.2. As from 36 months after the date of entry into force of Supplement 8, Contracting Parties applying this Regulation shall grant approvals only if the type of devices as described in paragraph 13.1. above meets the requirements of this Regulation as amended by Supplement 8.
- 13.1.3. Contracting Parties applying this Regulation shall not refuse to grant extensions of approvals to the preceding series of amendments to this Regulation.
- 13.1.4. Contracting Parties applying this Regulation shall continue to grant approvals to hose types of devices as described in paragraph 13.1. above which comply with the requirements of this Regulation as amended by the preceding series of amendments during the 36 months' period which follows the date of entry into force of Supplement 8.
- 13.2. Fitting of rear registration plate illuminating devices described in paragraph 13.1. above on a vehicle.
- 13.2.1. As from the date of entry into force of Supplement 8, no Contracting Party applying this Regulation shall prohibit the fitting on a vehicle of devices described in paragraph 13.1. above approved under this Regulation as amended by Supplement 8.
- 13.2.2. Contracting Parties applying this Regulation shall continue to allow the fitting on a vehicle of devices described in paragraph 13.1. above approved to this Regulation as amended by the preceding series of amendments during the 48 months' period which follows the date of entry into force of Supplement 8.
- 13.2.3. Upon the expiration of a period of 48 months after the date of entry into force of Supplement 8, Contracting Parties applying this Regulation may prohibit the fitting of devices described in paragraph 13.1. above which do not meet the requirements of this Regulation as amended by Supplement 8 on a new vehicle for which type approval or individual approval was granted more than 24 months after the entry into force of Supplement 8 to this Regulation.
- 13.2.4. Upon expiration of a period of 60 months after the date of entry into force of Supplement 8, Contracting Parties applying this Regulation may prohibit the fitting of devices as described in paragraph 13.1. above which do not meet the requirements of this Regulation as amended by Supplement 8 on a new vehicle first registered more than 60 months after the date of entry into force of Supplement 8 to this Regulation.

14. Names and addresses of Technical Services conducting approval tests, and of Type Approval Authorities

The 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 Type Approval Authorities which grant approval and to which forms certifying approval or refusal or withdrawal or approval, issued in other countries, are to be sent.

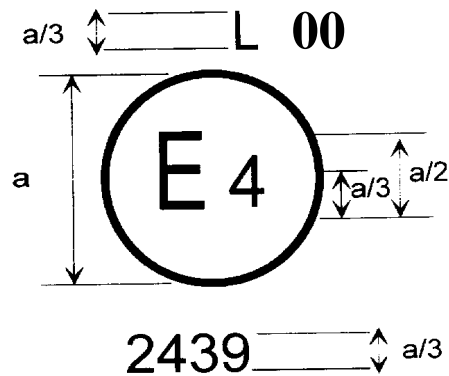
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Annex 1

Arrangement of approval marks

Figure 1
(Marking for single lamps)

Model A



$a = 5 \text{ mm min}$

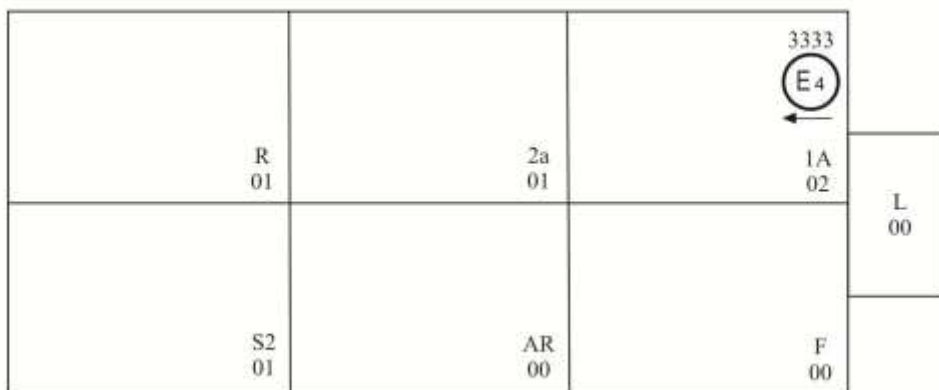
The device bearing the approval mark shown above is a device for the illumination of a vehicle's rear registration plate (L) approved in the Netherlands (E4) pursuant to Regulation No. 4 under approval number 2439. The approval number indicates that the approval was granted in accordance with the requirements of Regulation No. 4 in its original form or as amended by the respective supplements to the Regulation in its original form, as the case may be.

Figure 2

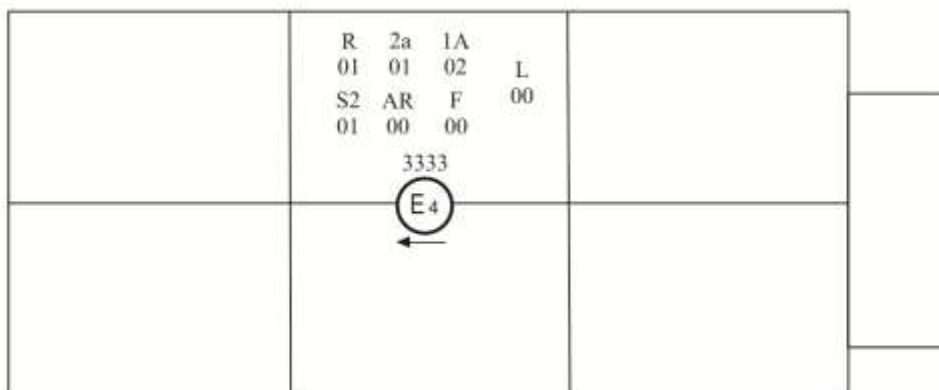
Simplified marking for grouped, combined or reciprocally incorporated lamps

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

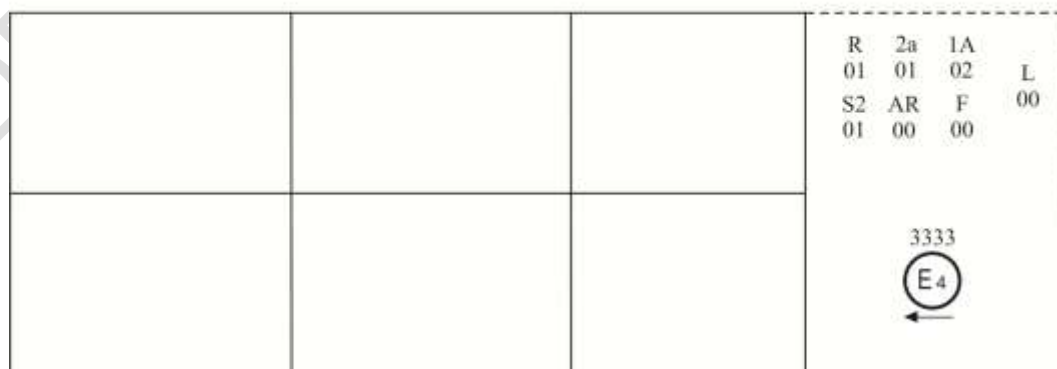
Model B



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 (E4) 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 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;

A rear registration plate illuminating device (L) approved in accordance with Regulation No. 4 in its original form.

Figure 3

Light source modules

Model E

Model D

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 2

Communication

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



issued by: Name of administration:

.....

- concerning²:
- Approval granted
 - Approval extended
 - Approval refused
 - Approval withdrawn
 - Production definitively discontinued

of a type of device for the illumination of rear registration plates of motor vehicles (except motor cycles) and their trailers pursuant to Regulation No. 4

Approval No..... Extension No.....

1. Trade name or mark of the device:
2. Manufacturer's name for the type of device:
3. Manufacturer's name and address:
4. If applicable, name and address of manufacturer's representative
5. Submitted for approval on:
6. Technical Service responsible for conducting approval tests:
7. Date of report issued by that Service:
8. Number of report issued by that Service:
9. Concise description³:

- | | |
|--------------------------|---|
| Device for illuminating: | a tall plate |
| | a wide plate |
| | a plate for agricultural or forestry tractor ² |

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

² Strike out which does not apply.

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

Number and category (ies) of light source(s):

Light source module: Yes/No²

Light source module specific identification code:

Geometrical conditions of installation (position(s) and inclination(s) of the device in relation to the space to be occupied by the registration plate and/or different inclinations of this space):

10. Position of the approval mark:

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

12. Approval granted/extended/refused/withdrawn²:

13. Place:.....

14. Date:.....

15. Signature:

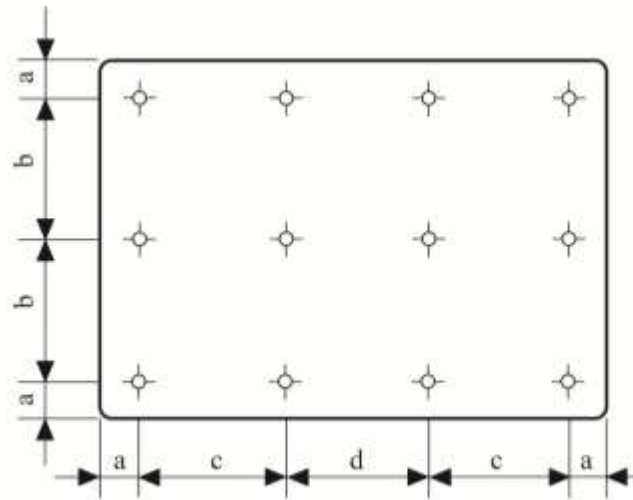
16. The list of documents deposited with the Type Approval Authority which has granted approval is annexed to this communication and may be obtained on request.

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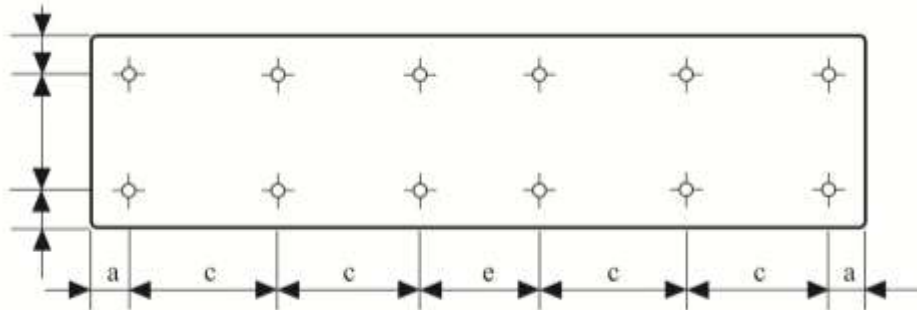
Annex 3

Measurement points for test purposes

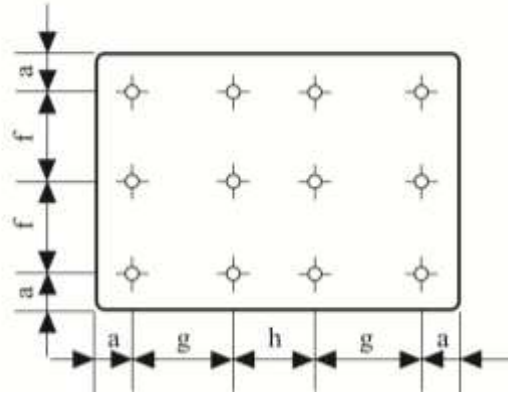
- (a) Devices for illuminating a tall plate (340 x 240 mm)



- (b) Devices for illuminating a wide plate (520 x 120 mm)



(c) Devices for illuminating a plate for agricultural or forestry tractors (240 x 165 mm)



a = 25 mm

b = 95 mm

c = 100 mm

d = 90 mm

e = 70 mm

f = 57.5 mm

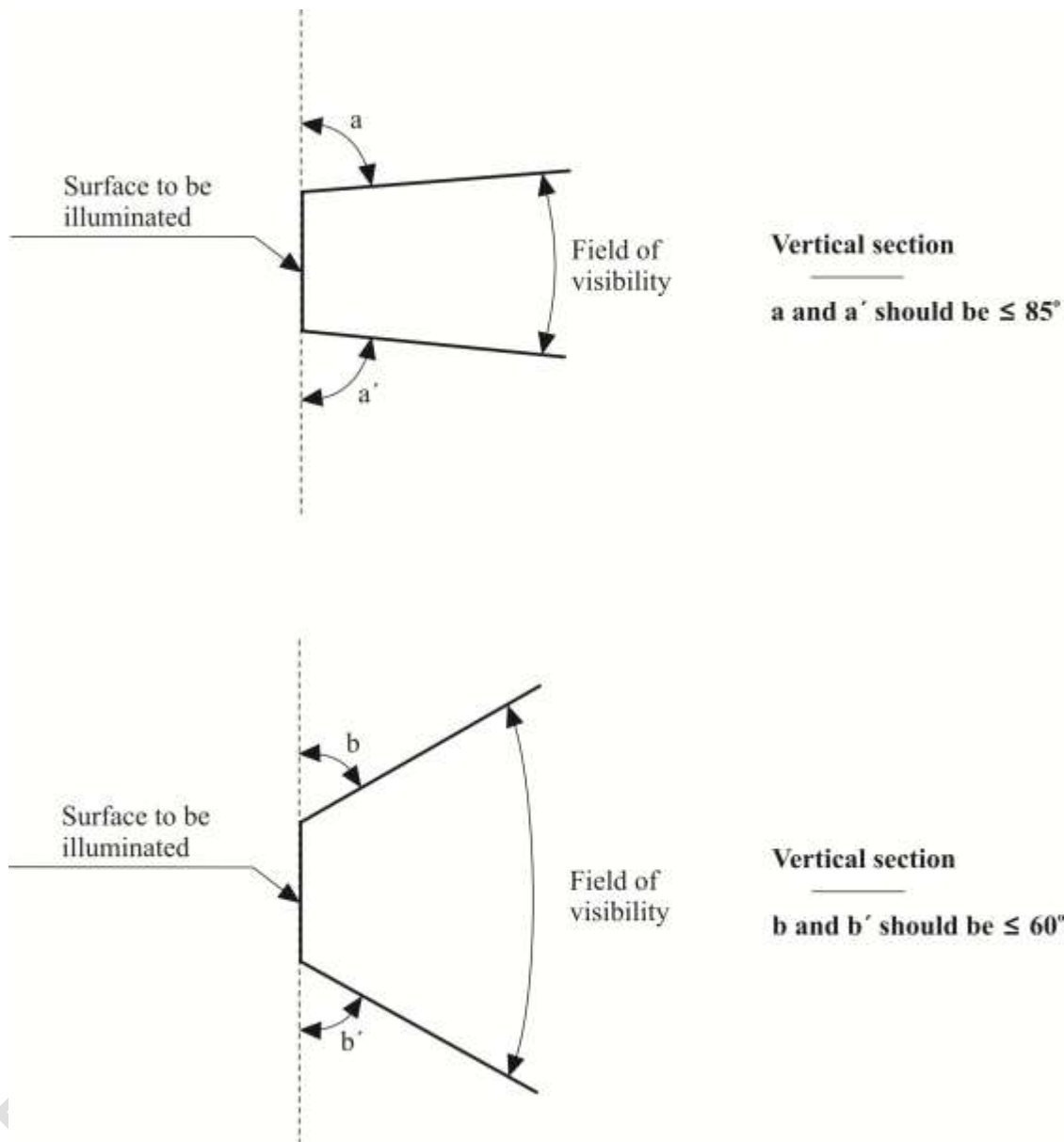
g = 65 mm

h = 60 mm

Note: In the case of devices for illuminating two or all of the plates, the measurement points used are obtained by combining the corresponding drawings above in accordance with the outline indicated by the make or manufacturer; however, if two measurement points are less than 30 mm apart, only one shall be used.

Annex 4

Minimum field of visibility of the surface to be illuminated



1. The field-of-visibility angles shown above relate only to the relative positions of the illuminating device and the space for the registration plate.
2. The field of visibility of the registration plate when mounted on the vehicle remains subject to the relevant national regulations.
3. The angles shown take account of the partial occultation caused by the illuminating device. They must be adhered to in the directions in which there is most occultation. The illuminating devices must be such as to reduce the areas partly occulted to the minimum strictly necessary.

Annex 5

Photometric measurement of lamps equipped with several light sources

1. The photometric performance shall be checked:
 - 1.1. For non-replaceable light sources (filament lamps and other):

With the light sources present in the lamp, in accordance with paragraph 5.2.1. of this Regulation.
 - 1.2. For replaceable light sources:

When equipped with light sources at 6.75 V, 13.5 V or 28.0 V, the luminance values produced shall be corrected. For filament lamps 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).

For LED light sources the correction factor is the ratio between the objective 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 light source used shall not deviate more than ± 5 per cent from the mean value. Alternatively and in case of filament lamps only 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 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 devices shall not be contested if, when testing photometric performances of any device chosen at random and equipped with a standard light source, 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. With respect to the gradient of luminance the unfavourable deviation may be:

| | | |
|----------------------------|---------------|-------------|
| $2.5 \times B_0/\text{cm}$ | comparable to | 20 per cent |
| $3.0 \times B_0/\text{cm}$ | comparable to | 30 per cent |
 - 1.2.3. If, in the case of a device equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on devices shall be repeated using another standard light source.
2. Minimum requirements for verification of conformity by the manufacturer

For each type of device 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.
 - 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 Type Approval 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 Type Approval 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 devices shall be selected at random from the production of a uniform batch. A uniform batch means a set of devices 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 device shall be subjected to photometric measurements 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 Type Approval 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 7 (first sampling) would be 0.95.

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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 devices shall not be contested if, when testing photometric performances of any device chosen at random and equipped with a standard light source, 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. With respect to the gradient of luminance the unfavourable deviation may be:

| | | |
|-------------|---------------|-------------|
| 2.5 x Bo/cm | comparable to | 20 per cent |
| 3.0 x Bo/cm | comparable to | 30 per cent |
 - 1.2.3. If, in the case of a device equipped with a replaceable light source and if results of the test described above do not meet the requirements, tests on devices shall be repeated using another standard light source.
 - 1.2.4. Devices with apparent defects are disregarded.
2. First sampling

In the first sampling four devices 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 devices shall not be contested if the deviation of the measured values of the devices in the unfavourable directions are:
 - 2.1.1.1. Sample A

| | |
|----------------------------|-------------|
| A1: one device | 0 per cent |
| one device not more than | 20 per cent |
| A2: both devices more than | 0 per cent |
| but not more than | 20 per cent |
| go to sample B | |
 - 2.1.1.2. Sample B

| | |
|------------------|------------|
| B1: both devices | 0 per cent |
|------------------|------------|

- 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 devices shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the devices are:
- 2.2.1.1. Sample A
- | | |
|------------------------------|-------------|
| A3: one device not more than | 20 per cent |
| one device 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 device more than | 0 per cent |
| but not more than | 20 per cent |
| one device not more than | 20 per cent |
| B3: in the case of A2 | |
| one device | 0 per cent |
| one device more than | 20 per cent |
| but not more than | 30 per cent |
- 2.3. Approval withdrawn
- Conformity shall be contested and paragraph 11. of this Regulation applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the devices are:
- 2.3.1. Sample A
- | | |
|------------------------------|-------------|
| A4: one device not more than | 20 per cent |
| one device more than | 30 per cent |
| A5: both devices more than | 20 per cent |
- 2.3.2. Sample B
- | | |
|------------------------|-------------|
| B4: in the case of A2 | |
| one device more than | 0 per cent |
| but not more than | 20 per cent |
| one device more than | 20 per cent |
| B5: in the case of A2 | |
| both devices more than | 20 per cent |
| B6: in the case of A2 | |
| one device | 0 per cent |
| one device more than | 30 per cent |

3. Repeated sampling
- In the cases of A3, B2, B3 a repeated sampling, third sample C of two devices and fourth sample D of two devices, 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 devices shall not be contested if the deviations of the measured values of the devices are:
- 3.1.1.1. Sample C
- | | |
|----------------------------|-------------|
| C1: one device | 0 per cent |
| one device not more than | 20 per cent |
| C2: both devices 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 devices | 0 per cent |
- 3.2. The conformity is contested
- 3.2.1. Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced devices shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the devices are:
- 3.2.1.1. Sample D
- | | |
|--------------------------|-------------|
| D2: in the case of C2 | |
| one device more than | 0 per cent |
| but not more than | 20 per cent |
| one device not more than | 20 per cent |
- 3.3. Approval withdrawn
- Conformity shall be contested and paragraph 11. of this Regulation applied if, following the sampling procedure in Figure 1 of this annex, the deviations of the measured values of the devices are:
- 3.3.1. Sample C
- | | |
|------------------------------|-------------|
| C3: one device not more than | 20 per cent |
| one device more than | 20 per cent |
| C4: both devices more than | 20 per cent |
- 3.3.2. Sample D
- | | |
|---------------------------|-------------|
| D3: in the case of C2 | |
| one device 0 or more than | 0 per cent |
| one device more than | 20 per cent |

Figure 1

