

Submitted by the expert from Canada

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agenda item 6)

PROPOSAL FOR HORIZONTAL REFERENCE DOCUMENT
(signalling lamps for motor vehicles and trailers)

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1. SCOPE

This Horizontal Reference Document contains definitions, requirements, methods of measurement and other characteristics common to signalling lamps for motor vehicle (and trailer). Unique requirements specific to individual signalling devices are indicated in Regulations regarding respective individual devices.

2. DEFINITIONS

2.1. 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 Horizontal reference Document.

2.2. “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.);
- (c) The category of the lamp, if any;
- (d) The variable intensity control, if any.

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

2.3. References made in this Horizontal reference Document 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.

2.4. References made in this Horizontal reference Document to LED lamp(s) and to Regulation No. X shall refer to Regulation No. X and its series of amendments in force at the time of application for type approval.

3. APPLICATION FOR APPROVAL

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

If applicable, the application shall specify the category of the device, and some of its characteristics.

At the discretion of the applicant, it may specify if 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.

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

3.2.1. Drawings, in triplicate, sufficiently detailed to permit identification of the type and if applicable the category of the lamp, and showing geometrically in

what position(s) it may be mounted on the vehicle; the axis of observation to be taken as the axis of reference in the tests (horizontal angle $H = 0^\circ$, vertical angle $V = 0^\circ$); and the point to be taken as the centre of reference during the tests. The drawings shall show the position intended for the approval number and the additional symbols in relation to the circle of the approval mark;

3.2.2. 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/or
- (c) The category or categories of LED lamp(s) prescribed; this LED lamp category shall be one of those contained in Regulation No. X; and/or
- (b) The light source module specific identification code.

3.2.3. For a lamp with variable intensity, a concise description of the variable intensity control. For a double-intensity lamp, an arrangement diagram and a specification of the characteristics of the system ensuring the two levels of intensity;

3.2.4. Two complete samples of the device; if application is made for the approval for devices which are not identical but are symmetrical and suitable for mounting one on the left and one on the right side of the vehicle, the two samples submitted may be identical and be suitable for mounting only on the right or only on the left side of the vehicle. For a variable-intensity lamp, the application shall also be accompanied by variable intensity control or a generator providing the same signal(s).

4. MARKINGS

Devices submitted for approval shall:

4.1. Bear on the lens the trade name or mark of the applicant; this marking shall be clearly legible and indelible;

4.2. 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;

4.3. Comprise a space of sufficient size for the approval marking and the additional symbols prescribed in paragraph 5.2 below; this space shall be shown in the drawings mentioned in paragraph 3.2.1 above;

4.4. In case of lamps with:

- (a) An electronic light source control gear; or
- (b) A variable intensity control; and/or
- (c) Non-replaceable light sources; and/or

(d) Light source module(s);

bear the marking of the rated voltage or range of voltage and rated maximum wattage;

- 4.5 In the case of lamps with light source module(s), the light source module(s) shall bear:
- 4.5.1. The trade name or mark of the applicant; this marking must be clearly legible and indelible;
- 4.5.2. 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 5.2.1.1 below; this identification code shall be shown in the drawings mentioned in paragraph 3.2.1 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;
- 4.5.3. The marking of the rated voltage or range of voltage and rated maximum wattage.
- 4.6. An electronic light source control gear or a variable intensity control being part of the lamp but not included into the lamp body shall bear the name of the manufacturer and its identification number.

5. APPROVAL

5.1. General

- 5.1.1. If the two devices submitted for approval in pursuance of paragraph 3.2.4 above meet the requirements of the Regulation corresponding to their function, approval shall be granted.
- 5.1.2. Where grouped, combined or reciprocally incorporated lamps have been found to comply with the requirements of several Regulations annexed to the 1958 Agreement, a single international approval mark may be applied. The approval may only be granted if such lamps are not grouped, combined or reciprocally incorporated with a lamp or lamps not satisfying any one of these Regulations.
- 5.1.3. An approval number shall be assigned to each type approved. Its first two digits shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation under which approval has been granted; at the time of issue of the approval (00 identifies a Regulation in its original form). The same Contracting Party shall not assign the same number to another type of device covered by the same device Regulation.
- 5.1.4. Notice of approval or of extension or refusal or withdrawal of approval of a type of a device pursuant to the Regulation, under which the device has been approved, shall be communicated to the Parties to the 1958 Agreement which

apply this device's Regulation, by means of a form conforming to the model in **Annex x** to the Regulation under which the device has been approved.

- 5.1.5 Every device conforming to a type approved under this device's Regulation shall bear in the space referred to in paragraph 4.3, above, and in addition to the markings prescribed in paragraphs 4.1 and 4.2 or 4.4 respectively, an approval mark as described in paragraphs 5.2 and 5.3, below.
- 5.2 Composition of the approval mark
- The approval mark shall consist of:
- 5.2.1 An international approval marking, comprising:
- 5.2.1.1 A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;¹
- 5.2.1.2 The approval number prescribed in paragraph 5.1.3, above.
- 5.2.2 The additional symbol (or symbols) indicated in the Regulation under which the approval has been granted.
- 5.2.3 The two digits of the approval number which indicate the series of amendments in force at the time of issue of the approval and, if necessary, the required arrow, may be marked close to the above additional symbols.
- 5.2.4 The marks and symbols referred to in paragraphs 5.2.1 and 5.2.2, above, shall be clearly legible and be indelible even when the device is fitted in the vehicle (see paragraph 5.4).

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, 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.**

5.2.5. Additional marking required by pertinent Regulation under which the device is being approved.

5.3 Arrangement of the approval mark

5.3.1 Independent lamps

Annex 1 gives an example of arrangement of the approval mark with the above-mentioned additional symbols. For exact marking to be inserted into the generic scheme of Annex 1 of this document see **Annex y**, Figure 1, of each Regulation pertaining to individual devices

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

5.3.1.1 It is visible after their installation (see paragraph 5.4);

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

5.3.1.3 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;

5.3.1.4 The main body of the lamp shall include the space described in paragraph 4.3, above, and shall bear the approval mark of the actual function(s);

5.3.1.5 Point 4 in Annex 3 to this Horizontal Reference Document gives examples of an approval mark with the above-mentioned additional symbols.

5.3.2 Grouped, combined or reciprocally incorporated lamps

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

5.3.2.1.1 It is visible after the installation of the lamps (see paragraph 5.4);

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

5.3.2.2 An identification symbol for each lamp appropriate to each Regulation under

which approval has been granted, together with the corresponding series of amendments incorporating the most recent major technical amendments to the Regulation at the time of issue of the approval and, if necessary, the required arrow, shall be marked:

- 5.3.2.2.1 Either on the appropriate light-emitting surface;
- 5.3.2.2.2 Or in a group, in such a way that each lamp of the grouped, combined or reciprocally incorporated lamps may be clearly identified.
- 5.3.2.3 The size of the components of a single approval mark shall not be less than the minimum size required for the smallest of the individual marks by the Regulation under which approval has been granted.
- 5.3.2.4 An approval number shall be assigned to each type approved. The same Contracting Party may not assign the same number to another type of grouped, combined or reciprocally incorporated lamps covered by a Regulation.
- 5.3.2.5 Annex 1, point 2, to this Horizontal Reference Document gives examples of the arrangement of the approval marks for grouped, combined or reciprocally incorporated lamps with all the above-mentioned additional symbols.
- 5.3.3 Lamps reciprocally incorporated with other lamps, of which the lens may also be used for other types of headlamps. The provisions laid down in paragraph 5.3.2, above, are applicable.
- 5.3.3.1 In addition, where the same lens is used, the latter may bear the different approval marks relating to the different types of headlamps or units of lamps, provided that the main body of the headlamp, even if it cannot be separated from the lens, also comprises the space described in paragraph 4.3, above, and bears the approval marks of the actual functions. If different types of headlamps comprise the same main body, the latter may bear the different approval marks.
- 5.3.3.2 Annex 1, point 3, to this Horizontal Reference Document gives examples of approval marks for lamps reciprocally incorporated with a headlamp.

5.4 Position of the approval marking

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.

6. GENERAL SPECIFICATIONS

- 6.1 Each device supplied shall conform to the specifications set forth in the Regulation pertained to this device.
- 6.2 The devices must be so designed and constructed that under normal conditions of use and notwithstanding the vibrations to which they may be subjected in such use, their satisfactory operation remains assured and they

retain the characteristics prescribed by this Horizontal Reference Document and the Regulation under which they have been approved.

- 6.3 For a device equipped with a light source module:
 - 6.3.1 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 position but the correct one;
 - 6.3.2 The light source module(s) shall be tamperproof.
- 6.4. Devices, which are reciprocally incorporated with another function, using a common light source, and designed to operate permanently with an electronic light source control gear to regulate the intensity of the light emitted, are permitted.
- 6.5. In the case of replaceable filament lamp(s):
 - 6.5.1. 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.
 - 6.5.2. The design of the device shall be such that the filament lamp can be fixed in no other position but the correct one.
 - 6.5.3. 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.
- 6.6 The limits of the apparent surface in the direction of the reference axis of a light-signalling device shall be determined.
- 6.7. The conditions of point 5.7 of Regulation No. 48 shall be verified.**
- 6.8. The heat resistance test, if applicable (see each Regulation), shall be carried out.
- 6.9. COLOUR OF LIGHT EMITTED

The colour of the light emitted inside the field of the light distribution grid defined in **paragraph xx of Annex xx** of each Regulation shall be within the limits of the coordinates prescribed in Annex 5 to this Horizontal Reference Document. Outside this field, no sharp variation of colour shall be observed. These requirements shall also apply within the range of variable luminous intensity produced by variable intensity lamps.
- 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 or a variable intensity control,

** Point should be added to the existing text.

with a colourless or coloured 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 or a variable intensity control, being part of the lamp² 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 or a variable intensity control, not being part of the lamp with the voltage declared by the manufacturer applied to the input terminals of the lamp.
- 7.2 However, in the case of a lamp operated by a variable intensity control to obtain variable luminous intensity, photometric measurements shall be performed according to the applicant's description.
- 7.3 The test laboratory shall require from the manufacturer the light source control gear or a variable intensity control needed to supply the light source and the applicable functions.
- 7.4 The voltage to be applied to the lamp shall be noted in the communication form in **Annex y** of the Regulation under which the device has been approved.
- 7.5. 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.

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 $23^{\circ}\text{C} \pm 5^{\circ}$. The filament lamp used shall be a filament lamp of the category specified 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. However, for lamps equipped with non-replaceable light sources (filament lamps and other), the test shall be made with the light sources present in the lamp, in accordance with paragraph 10.2. of the Regulation pertaining to the device.

² 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, but supplied by the lamp manufacturer as part of the lamp system.

- 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; for lamps equipped with non-replaceable light sources (filament lamps and other) the test conditions set in the Regulation pertaining to the device shall be applied.
- 8.3. After the lamp has been stabilized at the ambient temperature, no distortion, deformation, cracking or colour modification shall be perceptible. In case of doubt the intensity of light according to the requirements of the Regulation pertaining to the device shall be measured. At that measurement the values shall reach at least 90 per cent of the values obtained before the heat resistance test on the same device.
9. MODIFICATIONS OF A TYPE OF LAMP FOR MOTOR VEHICLES AND THEIR TRAILERS AND EXTENSION OF APPROVAL
- 9.1 Every modification of a type of lamp shall be notified to the administrative department which approved the type. The department may then either:
- 9.1.1 Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the device still complies with the requirements; or
- 9.1.2 Require a further test report from the technical service responsible for conducting the tests.
- 9.2 Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 5.1.4, above, to the Parties to the Agreement applying individual device Regulations.
- 9.3 The Competent Authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying the Regulation under which the approval has been granted by means of a communication form conforming to the model in **Annex y** to each Regulation.
10. CONFORMITY OF PRODUCTION
- The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2), with the following requirements:
- 10.1 The minimum requirements for conformity of production control procedures set forth in Annex 6 to this HRD shall be complied with;
- 11.2 The minimum requirements for sampling by an inspector set forth in Annex 7 to this Horizontal Reference Document shall be complied with;

- 11.3 The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be once every two years.
11. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 11.1 The approval granted in respect of a device pursuant to a Regulation may be withdrawn if the foregoing requirements are not met;
- 11.2 If a Contracting Party to the Agreement which applies a Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying individual device Regulations, by means of a communication form conforming to the model in **Annex y** to each Regulation.
12. PRODUCTION DEFINITELY DISCONTINUED
- If the holder of the approval completely ceases to manufacture a device approved in accordance with the individual device Regulations, he shall so inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the 1958 Agreement applying individual device Regulations by means of a communication form conforming to the model in **Annex xy** to each Regulation.
13. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS
- The Parties to the 1958 Agreement which apply a 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 the definitive discontinuation of production issued in other countries, are to be sent.

Annexes 1 and 2

Not applicable

Annex 3

ARRANGEMENT OF APPROVAL MARKS

1. MARKING OF INDEPENDENT LAMPS

See **Annex xxx, point xxx**, of each Regulation.

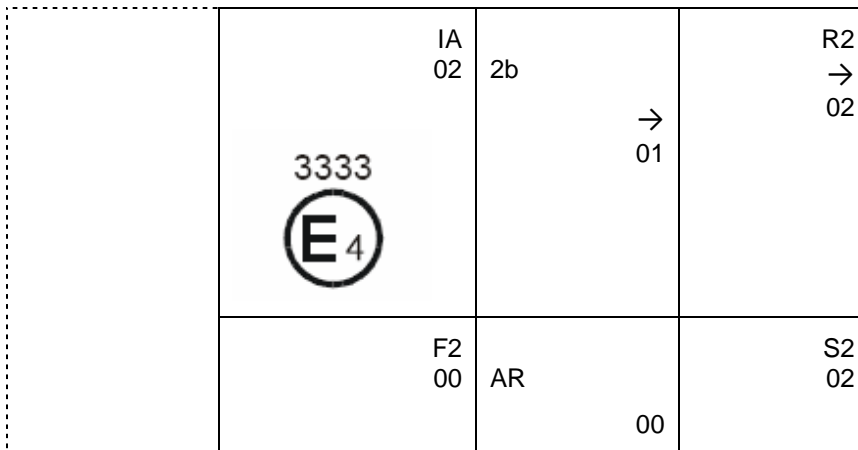
Note: The approval number and the additional symbols shall be placed close to the circle and either above or below the letter “E”, or to the right or left of that letter. The digits of the approval number shall be on the same side of the letter “E” and face the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

2. SIMPLIFIED MARKING OF GROUPED, COMBINED OR RECIPROCALLY INCORPORATED LAMPS WHEN TWO OR MORE LAMPS ARE PART OF THE SAME ASSEMBLY

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

2.1 Devices in rear

Model A

	IA 02	2b	→ 01	R2 → 02
	F2 00	AR	00	S2 02

Model B

		IA 2b R2 02 → → 01 02 F2 AR S2 00 00 02	
		3333 E ₄	

Model C

IA 2b R2 02 → → 01 02 F2 AR S2 00 00 02 3333 E ₄ →			

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

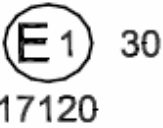
They indicate that the device was approved in the Netherlands (E4) under approval number 3333 and comprises:

- (a) A reflex-reflector of class 1A approved in accordance with the 02 series of amendments to Regulation No. 3;

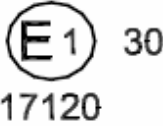
- (b) A rear direction indicator lamp with variable luminous intensity (category 2b) approved in accordance with the 01 series of amendments to Regulation No. 6;
- (c) A ~~red~~ rear position lamp with variable luminous intensity (R2) approved in accordance with the 02 series of amendments to Regulation No. 7;
- (d) A rear fog lamp with variable luminous intensity (F2) approved in accordance with Regulation No. 38 in its original version;
- (e) A reversing lamp (AR) approved in accordance with Regulation No. 23 in its original version;
- (f) A stop-lamp with variable luminous intensity (S2) approved in accordance with the 02 series of amendments to Regulation No. 7.

2.2 Devices in front

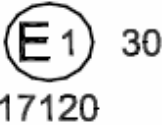
Model D

				
	02 A 02 HCR → ↔	02 B →	00 RL	01 1a

Model E

	02 A 02 HCR 02 B 00 RL 01 1a → ↔			
				


Model F

A 02 →	HCR 02 ←→	K 00	R L 00	1a 01				
								

Note: These three examples of approval marks above, models D, E and F, correspond to a lighting device approved in Germany (E1) under approval number 17120, and incorporating:

- (a) A front position lamp (A) approved in accordance with the 02 series of amendments to Regulation No. 7;
- (b) A headlamp (HCR) with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86,250 and 101,250 candelas (indicated by the figure 30), approved in accordance with the 02 series of amendments to Regulation No. 20;
- (c) A front direction indicator lamp (of category 1a) approved in accordance with the 01 series of amendments to Regulation No. 6;
- (d) Daytime running lights (RL) approved in accordance with the 00 series of amendments to Regulation No. 87;
- (e) A front fog lamp (B) approved in accordance with the 02 series of amendments to Regulation No. 19 in models D and E;
- (f) A cornering lamp (K) approved in accordance with the 00 series of amendments to Regulation No. 119 in model F.

3. MARKING OF A LAMP RECIPROCALLY INCORPORATED WITH A HEADLAMP

30  1a HCR CR
01 ←→ 04 ←→ 01

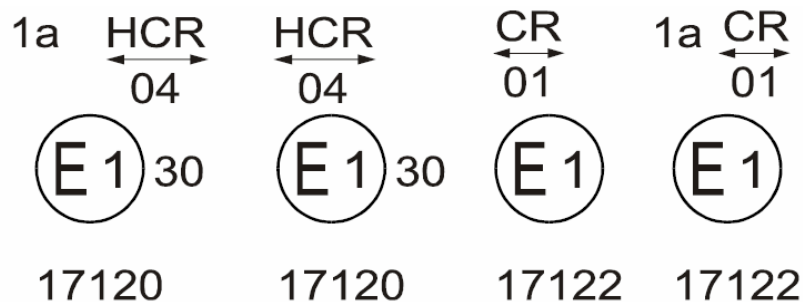
17120

17122

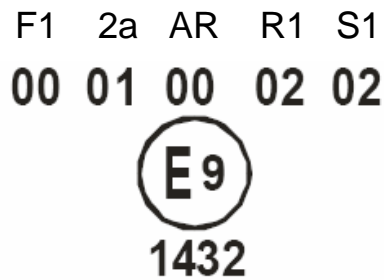
The above example corresponds to the marking of a lens intended to be used in different types of headlamps, namely either:

- (a) A headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam with a maximum intensity comprised between 86,250 and 101,250 candelas (indicated by the number 30), approved in Germany (E1) in accordance with the requirements of Regulation No. 8 as amended by the 04 series of amendments; which is reciprocally incorporated with a front direction indicator (category 1a) approved in accordance with the 01 series of amendments to Regulation No. 6; or
- (b) A headlamp with a passing beam designed for right-hand and left-hand traffic and a driving beam, approved in Germany (E1) in accordance with the requirements of Regulation No. 1 as amended by the 01 series of amendments, which is reciprocally incorporated with the same front direction indicator as above; or even
- (c) Either of the above-mentioned headlamps approved as a single lamp.

The main body of the headlamp shall bear the only valid approval number, for instance:



4. MARKING OF INDEPENDENT LAMPS USING THE SAME LENS



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) A rear fog lamp (F) of category F1 (steady luminous intensity) approved in accordance with Regulation No. 38 in its original version;
- (b) A rear direction indicator lamp of category 2a (steady luminous intensity) approved in accordance with the 01 series of amendments to Regulation No. 6;
- (c) A reversing lamp (AR) approved in accordance with Regulation No. 23 in its original version;
- (d) A red rear position lamp of category R1 (steady luminous intensity) approved in accordance with the 02 series of amendments to Regulation No. 7;
- (e) A stop-lamp with one level of illumination of category S1 (steady luminous intensity) approved in accordance with the 02 series of amendments to Regulation No. 7.

5. MARKING OF 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 4

PHOTOMETRIC MEASUREMENTS

1. MEASUREMENT METHODS
 - 1.1 During photometric measurements, stray reflections shall be avoided by appropriate masking.
 - 1.2 In case the results of measurements should be challenged, measurements shall be carried out in such a way as to meet the following requirements:
 - 1.2.1 The distance of measurement shall be such that the law of the inverse of the square of the distance is applicable;
 - 1.2.2 The measuring equipment shall be such that the angular aperture of the receiver viewed from the reference centre of the light is comprised between 10' and 1 degree;
 - 1.2.3 The intensity requirement for a particular direction of observation shall be deemed to be satisfied if that requirement is met in a direction deviating by not more than one-quarter of a degree from the direction of observation.
 - 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 of the field of the reference axes specified by the manufacturer.
2. PHOTOMETRIC MEASUREMENT OF LAMPS
 - 2.1 For any lamp except those equipped with filament lamp(s), the luminous intensities measured after one minute and after 30 minutes of operation:
 - (a) In flashing mode ($f = 1.5$ Hz, duty factor 50%) for direction indicator lamps;
 - (b) In steady mode for other lamps;shall comply with the minimum and maximum requirements. The luminous intensity distribution after one minute of operation can be calculated by applying at each test point the ratio of luminous intensity measured in HV after one minute and after 30 minutes of operation, as described above.
 - 2.2 The photometric performance of lamps incorporating several light sources shall be checked:

2.2.1 For lamps equipped with non-replaceable light sources (filament lamps and other):

with the light sources present in the lamp, in accordance with the relevant subparagraph of paragraph 8 of this Horizontal Reference Document;

2.2.2 For lamps equipped with replaceable filament lamps:

with lamps supplied with 6.75 V, 13.5 V or 28.0 V.

The luminous intensity values produced shall then 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 $\pm 5\%$ 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.

2.3 In any event, all light sources connected in series shall be considered as a single light source.

Annex 5

COLOUR OF LIGHTS

1. Colour of the light emitted from a device

1.1 "White" means the chromaticity coordinates (x,y) ^{3/} of the light emitted that lie inside the chromaticity areas defined by the boundaries:

W ₁₂	green boundary:	$y = 0.150 + 0.640 x$
W ₂₃	yellowish green boundary:	$y = 0.440$
W ₃₄	yellow boundary:	$x = 0.500$
W ₄₅	reddish purple boundary:	$y = 0.382$
W ₅₆	purple boundary:	$y = 0.050 + 0.750 x$
W ₆₁	blue boundary:	$x = 0.310$

With intersection points:

	x	y
W ₁ :	0.310	0.348
W ₂ :	0.453	0.440
W ₃ :	0.500	0.440
W ₄ :	0.500	0.382
W ₅ :	0.443	0.382
W ₆ :	0.310	0.283

1.2. "Selective-yellow" means the chromaticity coordinates (x,y) ^{3/} of the light emitted that lie inside the chromaticity areas defined by the boundaries:

SY ₁₂	green boundary:	$y = 1.290 x - 0.100$
SY ₂₃	the spectral locus	
SY ₃₄	red boundary:	$y = 0.138 + 0.580 x$
SY ₄₅	yellowish white boundary:	$y = 0.440$
SY ₅₁	white boundary:	$y = 0.940 - x$

With intersection points:

	x	y
SY ₁ :	0.454	0.486
SY ₂ :	0.480	0.519
SY ₃ :	0.545	0.454
SY ₄ :	0.521	0.440
SY ₅ :	0.500	0.440

^{3/} CIE Publication 15.2, 1986, Colorimetry, the CIE 1931 standard colorimetric observer.

1.3. "Amber" means the chromaticity coordinates (x,y) \bar{z} of the light emitted that lie inside the chromaticity areas defined by the boundaries:

A ₁₂	green boundary:	$y = x - 0.120$
A ₂₃	the spectral locus	
A ₃₄	red boundary:	$y = 0.390$
A ₄₁	white boundary:	$y = 0.790 - 0.670 x$

With intersection points:

	x	y
A ₁ :	0.545	0.425
A ₂ :	0.560	0.440
A ₃ :	0.609	0.390
A ₄ :	0.597	0.390

1.4. "Red" means the chromaticity coordinates (x,y) \bar{z} of the light emitted that lie inside the chromaticity areas defined by the boundaries:

R ₁₂	yellow boundary:	$y = 0.335$
R ₂₃	the spectral locus	
R ₃₄	the purple line:	(its linear extension across the purple range of colours between the red and the blue extremities of the spectral locus).
R ₄₁	purple boundary:	$y = 0.980 - x$

With intersection points:

	x	y
R ₁ :	0.645	0.335
R ₂ :	0.665	0.335
R ₃ :	0.735	0.265
R ₄ :	0.721	0.259

2. Night-time Colour of the light retro-reflected from a device excluding retro-reflective tires according to Regulation No. 88

2.1. "White" means the chromaticity coordinates (x,y) \bar{z} of the light reflected that lie inside the chromaticity areas defined by the boundaries:

W ₁₂	blue boundary:	$y = 0.843 - 1.182 x$
W ₂₃	violet boundary:	$y = 0.489 x + 0.146$
W ₃₄	yellow boundary:	$y = 0.968 - 1.010 x$
W ₄₁	green boundary:	$y = 1.442 x - 0.136$

With intersection points:

	x	y
W ₁	0.373	0.402
W ₂	0.417	0.350
W ₃	0.548	0.414
W ₄	0.450	0.513

- 2.2. "Yellow" means the chromaticity coordinates (x,y) 3/ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

Y ₁₂	green boundary:	$y = x - 0.040$
Y ₂₃	the spectral locus	
Y ₃₄	red boundary:	$y = 0.200 x + 0.268$
Y ₄₁	white boundary:	$y = 0.970 - x$

With intersection points:

	x	y
Y ₁	0.505	0.465
Y ₂	0.520	0.480
Y ₃	0.610	0.390
Y ₄	0.585	0.385

- 2.3. "Amber" means the chromaticity coordinates (x,y) 3/ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

A ₁₂	green boundary:	$y = 1.417 x - 0.347$
A ₂₃	the spectral locus	
A ₃₄	red boundary:	$y = 0.390$
A ₄₁	white boundary:	$y = 0.790 - 0.670 x$

With intersection points:

	x	y
A ₁	0.545	0.425
A ₂	0.557	0.442
A ₃	0.609	0.390
A ₄	0.597	0.390

- 2.4. "Red" means the chromaticity coordinates (x,y) 3/ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

R ₁₂	yellow boundary:	$y = 0.335$
R ₂₃	the spectral locus	
R ₃₄	the purple line	
R ₄₁	purple boundary:	$y = 0.978 - x$

With intersection points:

x	y
---	---

R ₁	0.643	0.335
R ₂	0.665	0.335
R ₃	0.735	0.265
R ₄	0.720	0.258

3. Day-time Colour of the light reflected from a device

3.1. "White" means the chromaticity coordinates (x,y) $\underline{3/}$ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

W ₁₂	violet boundary	$y = x - 0.030$
W ₂₃	yellow boundary	$y = 0.740 - x$
W ₃₄	green boundary	$y = x + 0,050$
W ₄₁	blue boundary	$y = 0.570 - x$

With intersection points:

	x	y
W ₁	0.300	0.270
W ₂	0.385	0.355
W ₃	0.345	0.395
W ₄	0.260	0.310"

3.2. "Yellow" means the chromaticity coordinates (x,y) $\underline{3/}$ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

Y ₁₂	red boundary	$y = 0.534 x + 0.163$
Y ₂₃	white boundary	$y = 0.910 - x$
Y ₃₄	green boundary	$y = 1.342 x - 0.090$
Y ₄₁	the spectral locus	

With intersection points:

	x	y
Y ₁	0.545	0.454
Y ₂	0.487	0.423
Y ₃	0.427	0.483
Y ₄	0.465	0.534

3.3. "Red" means the chromaticity coordinates (x,y) $\underline{3/}$ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

R ₁₂	red boundary	$y = 0.346 - 0.053 x$
R ₂₃	purple boundary	$y = 0.910 - x$
R ₃₄	yellow boundary	$y = 0.350$
R ₄₁	the spectral locus	

With intersection points:

x	y
---	---

R ₁	0.690	0.310
R ₂	0.595	0.315
R ₃	0.560	0.350
R ₄	0.650	0.350"

4. Day-time Colour of the fluorescent a device

4.1. "Red" means the chromaticity coordinates (x,y) 3/ of the light reflected that lie inside the chromaticity areas defined by the boundaries:

FR ₁₂	red boundary	$y = 0.346 - 0.053 x$
FR ₂₃	purple boundary	$y = 0.910 - x$
FR ₃₄	yellow boundary	$y = 0.315 + 0.047 x$
FR ₄₁	the spectral locus	

With intersection points:

	x	y
FR ₁	0,690	0,310
FR ₂	0,595	0,315
FR ₃	0,569	0,341
FR ₄	0,655	0,345

For checking these colorimetric characteristics, the test procedure described in paragraph 8.1 of this Horizontal Reference Document shall be applied.

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 the relevant subparagraph of paragraph 8.1. of this Horizontal Reference Document.

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 Horizontal Reference Document and the Regulation under which the lamp has been approved.
- 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 8 of this Horizontal Reference Document:
- 1.2.1 No measured value deviates unfavourably by more than 20% from the values prescribed in the Regulation under which the lamp has been approved;
- 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 tested under conditions of paragraph 8 of this Horizontal Reference Document.

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 Horizontal Reference Document and the Regulation under which the lamp has been approved.

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 Horizontal Reference Document 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 Horizontal Reference Document and in Regulation pertaining to the specific device.
- 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 Horizontal Reference Document.

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 Horizontal Reference Document and in Regulation pertaining to the specific device, particularly for the purpose of administrative verification and sampling.

2.3 Nature of sampling

Samples of lamps shall be selected at random from the production of a uniform batch. A uniform batch means a set of lamps of the same type, defined according to the production methods of the manufacturer.

The assessment shall in general cover series production from individual factories. However, a manufacturer may group together records concerning the same type from several factories, provided these operate under the same quality system and quality management.

2.4 Measured and recorded photometric characteristics

The sampled lamp shall be subjected to photometric measurements for the minimum values at the points listed in Annex 4, and the chromaticity coordinates listed in Annex 5, provided for in this Horizontal Reference Document and the Regulation under which it has been approved.

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 11.1 of this Horizontal Reference Document.

The criteria governing the acceptability shall be such that, with a confidence level of 95%, the minimum probability of passing a spot check in accordance with Annex 7 (first sampling) would be 0.95.

Annex 7

MINIMUM REQUIREMENTS FOR SAMPLING BY AN INSPECTOR

1. GENERAL

1.1 The conformity requirements shall be considered satisfied from a mechanical and a geometric standpoint, in accordance with the requirements of this Horizontal Reference Document and the Regulation under which the lamp has been approved, 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 8 of this Horizontal Reference Document:

1.2.1 No measured value deviates unfavourably by more than 20% from the values prescribed in the Regulation under which it has been approved;

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 tested under conditions of paragraph 8 of this Horizontal Reference Document.

2. FIRST SAMPLING

In the first sampling four lamps are selected at random. The first sample of two (the first and third lamps) is marked A, the second sample of two (the second and fourth lamps) 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 deviations of the measured values of the lamps in the unfavourable directions are:

2.1.1.1 Sample A

A1:	one lamp	0%
	for the other lamp not more than	20%
A2:	both lamps more than	0%
	but not more than	20%
	go to sample B	

2.1.1.2 Sample B

B1: both lamps 0%

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

2.2 The conformity is contested

2.2.1 Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced lamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the lamps are:

2.2.1.1 Sample A

A3: one lamp not more than 20%
the other lamp more than 20%
but not more than 30%

2.2.1.2 Sample B

B2: in the case of A2
one lamp more than 0%
but not more than 20%
the other lamp not more than 20%

B3: in the case of A2
one lamp 0%
the other lamp more than 20%
but not more than 30%

2.2.2 or if the conditions of paragraph 1.2.2 for sample A are not fulfilled.

2.3 Approval withdrawn

Conformity shall be contested and point 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%
the other lamp more than 30%

A5: both lamps more than 20%

2.3.2

Sample B

B4:	in the case of A2	
	one lamp more than	0%
	but not more than	20%
	the other lamp more than	20%
B5:	in the case of A2	
	both lamps more than	20%
B6:	in the case of A2	
	one lamp	0%
	the other lamp more than	30%

2.3.3 or if the conditions of paragraph 1.2.2 for samples A and B are not fulfilled.

3.

REPEATED SAMPLING

In the cases of A3, B2, B3 a repeated sampling, third sample C of two lamps and fourth sample D of two lamps, selected from stock manufactured after alignment, is necessary within two months' time after the notification.

3.1

The conformity is not contested

3.1.1

Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced lamps shall not be contested if the deviations of the measured values of the lamps are:

3.1.1.1 Sample C

C1:	one lamp	0%
	the other lamp not more than	20%
C2:	both lamps more than	0%
	but not more than	20%
	go to sample D	

3.1.1.2 Sample D

D1:	in the case of C2	
	both lamps	0%

3.1.2

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

3.2 The conformity is contested

3.2.1 Following the sampling procedure shown in Figure 1 of this annex the conformity of mass-produced lamps shall be contested and the manufacturer requested to make his production meet the requirements (alignment) if the deviations of the measured values of the lamps are:

3.2.1.1 Sample D

D2:	in the case of C2	
	for both lamps	0%
	but not more than	20%
	the other lamp not more than	20%

3.2.1.2 or if the conditions of paragraph 1.2.2 for sample C are not fulfilled.

3.3 Approval withdrawn

Conformity shall be contested and point 12 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%
	the other lamp more than	20%
C4:	both lamps more than	20%

3.3.2 Sample D

D3:	in the case of C2	
	one lamp 0 %, or more than	0%
	the other lamp more than	20%

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

Figure 1

