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1958 AGREEMENT

Consideration of draft amendments to existing Regulations

Proposal for Supplement 8 to Regulation No. 112

(Headlamps emitting an asymmetrical passing beam)

Submitted by the Working Party on Lighting and Light-signalling

The text reproduced below was adopted by the Working Party on Lighting and Light-signalling (GRE) at its fifty-seventh session. It is based on ECE/TRANS/WP.29/GRE/2006/10, as amended by para. 50 of the report, ECE/TRANS/WP.29/GRE/2007/8, as amended by para. 53 of the report, ECE/TRANS/WP.29/GRE/2007/19, as amended by para. 55 of the report, ECE/TRANS/WP.29/GRE/2007/12 and ECE/TRANS/WP.29/GRE/2007/16, as amended by Annex IV to the report. It is submitted to WP.29 and AC.1 for consideration (ECE/TRANS/WP.29/GRE/57, paragraphs 45, 50, 53, 55 and 62).

Title of the Regulation, amend to read:

"UNIFORM PROVISIONS CONCERNING THE APPROVAL OF MOTOR VEHICLE HEADLAMPS EMITTING AN ASYMMETRICAL PASSING BEAM OR A DRIVING BEAM OR BOTH AND EQUIPPED WITH FILAMENT LAMPS AND/OR LED MODULES"

List of contents, the annexes, amend to read:

" ….

Annex 8 - Overview of operational periods concerning tests for stability of photometric performance

Annex 9 - Instrumental verification of the "cut-off" for passing beam headlamps

Annex 10 - Requirement for LED modules and headlamps including LED modules

Annex 11 - A general illustration for principal passing beam and beam contributors and correlated light source options"

Text of the Regulation

Paragraph 1.3.7., amend to read:

"1.3.7. the category of filament lamp used and/or the LED module specific identification code(s)."

Insert a new paragraph 1.6., to read:

"1.6. 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."

Paragraph 2.1.5., amend to read:

"2.1.5. the category of the filament lamp(s) used, as listed in Regulation No. 37 and its series of amendments in force at the time of application for type approval, and/or the light source module specific identification code(s) for LED modules, if available."

Paragraph 2.2.1., amend to read:

"2.2.1. drawings in triplicate in sufficient detail to permit identification of the type and representing a frontal view of the headlamp, with details of lens ribbing if any, and the cross-section. The drawings shall indicate the space**(s)** reserved for the approval mark and in case of LED module(s) also the space reserved for the specific identification code(s) of the module(s);"

Paragraph 2.2.2., amend to read:

"2.2.2. a brief technical description including, in the case where headlamps are used to produce bend lighting, the extreme positions according to paragraph 6.2.9. below. In the case of LED module(s) this shall include:
(a) a brief technical specification of the LED module(s);
(b) a drawing with dimensions and the basic electrical and photometric values and the objective luminous flux;
(c) in case of electronic light source control gear, information on the electrical interface necessary for approval testing;"

Paragraph 2.2.4.1., amend to read:

"2.2.4.1. fourteen lenses;"

Paragraph 2.2.4.1.1., amend to read:

"2.2.4.1.1. ten of these lenses may be replaced by ten samples of material at least 60 x 80 mm in size, having a flat or convex outer surface and a substantially flat area (radius of curvature not less than 300 mm) in the middle measuring at least 15 x 15 mm;"

Insert new paragraphs 2.2.5. and 2.2.6., to read:

"2.2.5. For testing the ultraviolet (UV)-resistance of light transmitting components made of plastic material against UV radiation of LED modules inside the headlamp:

2.2.5.1. one sample of each of the relevant material as being used in the headlamp or one headlamp sample containing these. Each material sample shall have the same appearance and surface treatment, if any, as intended for use in the headlamp to be approved;

2.2.5.2. the UV-resistance testing of internal materials to light source radiation is not necessary if no LED modules other than low-UV-types as specified in Annex 10 of this Regulation are being applied or if provisions are taken, to shield the relevant headlamp components from UV radiation, e.g. by glass filters.

2.2.6. One electronic light source control gear, if applicable."

Paragraph 3., the reference to footnote 2/ and footnote 2/, should be deleted.

Paragraph 3.3., amend to read:

"3.3. Headlamps designed to satisfy the requirements both of right-hand and of left-hand traffic shall bear markings indicating the two settings of the optical unit or LED module on the vehicle or …. position for left-hand traffic."

Insert new paragraphs 3.4. to 3.6., to read:

"3.4. In the case of lamps with LED module(s), the lamp shall bear the marking of the rated voltage and rated wattage and the light source module specific identification code.

3.5. LED module(s) submitted along with the approval of the lamp:

3.5.1. shall bear the trade name or mark of the applicant. This marking shall be clearly legible and indelible;

3.5.2. shall bear the specific identification code of the module. This marking shall 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 4.2.1. below and in the case several non identical light source modules are used, followed by additional symbols or characters. This specific identification code shall be shown in the drawings mentioned in paragraph 2.2.1. above. The approval marking does not have to be the same as the one on the lamp in which the module is used, but both markings shall be from the same applicant.

3.6. If an electronic light source control gear which is not part of a LED module is used to operate a LED module(s), it shall be marked with its specific identification code(s), the rated input voltage and wattage."

Paragraph 4.2.2.2., amend to read:

"4.2.2.2. on headlamps designed to meet the requirements of both traffic systems by means of an appropriate adjustment of the setting of the optical unit or the filament lamp or LED module(s), a horizontal arrow with a head on each end, the heads pointing respectively to the left and to the right;"

Paragraph 4.2.3.1., amend to read:

"4.2.3.1. on headlamps meeting the requirements of this Regulation which are so designed that the filament or LED module(s) producing the principal passing beam shall not be lit simultaneously with that of any other lighting function with which it may be reciprocally incorporated: an oblique stroke (/) shall be placed behind the passing lamp symbol in the approval mark."

Paragraph 4.2.3.2., amend to read:

"4.2.3.2. on headlamps equipped with filament lamps and meeting the requirements of Annex 4 to this Regulation only when supplied with a voltage of 6 V or 12 V, a symbol consisting of the number 24 crossed out by an oblique cross (x), shall be placed near the filament lamp holder."

Paragraph 5.2.1., amend to read:

"5.2.1. Headlamps shall be fitted with …. by other means.

Where a headlamp providing a principal passing beam and a headlamp providing a driving beam, each equipped with its own filament lamp or LED module(s), are assembled to form a composite unit the adjusting device shall enable each optical system individually to be duly adjusted."

Paragraph 5.3., amend to read (including the deletion of the reference to footnote 6/ and footnote 6/):

"5.3. The headlamp shall be equipped with*:*

5.3.1. filament lamp(s) approved according to Regulation No. 37. Any filament lamp covered by 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**.**"

Paragraph 5.4., renumber as paragraph 5.3.1.1. and amend to read (the reference to footnote 7 and footnote 7/ renumber as footnote 6/):

"5.3.1.1. The design of the device shall be such that the filament lamp can be fixed in no other position but the correct one. 6/"

Paragraph 5.5., renumber as paragraph 5.3.1.2. and amend to read:

"5.3.1.2. 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."

Insert new paragraphs 5.3.2. to 5.3.2.3., to read:

"5.3.2. and/or LED module(s):

5.3.2.1. electronic light source control gear(s), if applicable, shall be considered to be part of the headlamp; they may be part of the LED module(s);

5.3.2.2. the headlamp, if equipped with LED modules, and the LED module(s) themselves shall comply with the relevant requirements specified in Annex 10 of this Regulation. The compliance with the requirements shall be tested.

5.3.2.3. The total objective luminous flux of all LED modules producing the principal passing beam and measured as described in paragraph 5. of Annex 10 shall be equal or greater than 1,000 lumens."

Paragraph 5.6., renumber as paragraph 5.4. and amend to read:

"5.4. Headlamps designed to satisfy the requirements both of right-hand and of left-hand traffic may be adapted for traffic on a given side of the road either by an appropriate initial setting when fitted on the vehicle or by selective setting by the user. Such initial or selective setting may consist, for example, of fixing either the optical unit at a given angle on the vehicle or the filament lamp or LED module(s) producing the principal passing beam at a given angle/position in relation to the optical unit. In all cases, only two different and clearly distinct settings, one for right-hand and one for left-hand traffic, shall be possible, and the design shall preclude inadvertent shifting from one setting to the other or setting in an intermediate position. Where two different setting positions are provided for the filament lamp or LED module(s) producing the principal passing beam, the components for attaching the filament lamp or LED module(s) producing the principal passing beam to the reflector must be so designed and made that, in each of its two settings, this filament lamp or LED module(s) will be held in position with the precision required for headlamps designed for traffic on only one side of the road. Conformity with the requirements of this paragraph shall be verified by visual inspection and, where necessary, by a test fitting."

Paragraph 5.7. (former), renumber as paragraph 5.5.

Paragraph 5.8. (former), renumber as paragraph 5.6. and amend to read:

"5.6. Light transmitting components made of plastic material shall be tested according to the requirements of Annex 6."

Paragraph 5.9.(former), renumber as paragraph 5.7.

Paragraphs 5.9.1. and 5.9.2. (former), renumber as paragraphs 5.7.1. and 5.7.2. and amend to read:

"5.7.1. the device is robust enough to withstand 50,000 operations under normal conditions of use. In order to verify compliance with this requirement, the Technical Service responsible for approval tests may:

(a) require the applicant to supply the equipment necessary to perform the test;

(b) forego the test if the headlamp presented by the applicant is accompanied by a test report, issued by a Technical Service responsible for approval tests for headlamps of the same construction (assembly), confirming compliance with this requirement.

5.7.2. in the case of failure, the illumination above the line H-H shall not exceed the values of a passing beam according to paragraph 6.2.5.; in addition, on headlamps designed to provide a passing and/or a driving beam to become a bend lighting, a minimum illumination of at least 3 lux shall be fulfilled in test point 25 V (VV line, D 75 cm).

When performing the tests to verify compliance with these requirements, the Technical Service responsible for approval tests shall refer to the instructions supplied by the applicant."

Paragraphs 5.9.3. and 5.9.4. (former), renumber as paragraphs 5.7.3. and 5.7.4.

Insert new paragraphs 5.8. to 5.8.2., to read:

"5.8. Illumination configuration for different traffic conditions

5.8.1. In the case of headlamps designed to meet the requirements of traffic moving on one side of the road (either right or left) only, appropriate measures shall be taken to prevent discomfort to users in a country where traffic moves on the side of the road opposite to that of the country for which the headlamp was designed. Such measures may be:

(a) occulting a part of the outer headlamp lens area;

(b) downward adjustment of the beam. In this case, the adjustment shall be at least 0.5 degree vertically. Horizontal adjustment is allowed;

(c) any other measure to remove the asymmetrical part of the beam.

5.8.2. Following the application of this(these) measure(s) the following requirements regarding illumination shall be met:

(a) points 50 L (for right-hand traffic) or 50 R (for left-hand traffic) at least **three** lux;

(b) point B 50 R (for right-hand traffic) or B 50 L (for left-hand traffic) not more than one lux."

Insert a new paragraph 5.9., to read:

"5.9. In case of a passing beam headlamp incorporating a light source or LED module(s) producing the principal passing beam and having a total objective luminous flux which exceeds 2,000 lumen a reference shall be made in item 9. of the communication form in Annex 1. The objective luminous flux of LED modules shall be measured as described in paragraph 5. of Annex 10."

Paragraph 6.1.1., and 6.1.2.,amend to read:

"6.1.1. Headlamps shall be so made that they give adequate illumination without dazzle when emitting the passing beam, and good illumination when emitting the driving beam. Bend lighting may be produced by activating one additional filament light source or one or more LED module(s) being part of the passing beam headlamp.

6.1.2. The illumination produced by the headlamp shall be determined by means of a flat vertical screen set up 25 m forward of the headlamp, at right angles to its axes as shown in Annex 3 to this Regulation; the test screen shall be sufficiently wide to allow examination and adjustment of the "cut-off" of the passing beam over at least 5° on either side of the V-V line."

Paragraphs 6.1.3. and 6.1.4., amend to read:

"6.1.3. Apart from LED module(s), the headlamps shall be checked by means of an uncoloured standard (étalon) filament lamp designed for a rated voltage of 12 V. During the checking of the headlamp, the voltage at the terminals of the filament lamp shall be regulated so as to obtain the reference luminous flux as indicated for each filament lamp at the relevant data sheet of Regulation No. 37. The headlamp shall be considered acceptable if it meets the requirements of paragraph 6. with at least one standard (étalon) filament lamp, which may be submitted with the headlamp.

6.1.4. LED module(s) shall be measured at 6.3 V, 13.2 V or 28.0 V respectively, if not otherwise specified within this Regulation. LED module(s) operated by an electronic light source control gear, shall be measured as specified by the applicant.

The values obtained by the LED module(s) shall be multiplied by a factor of 0.7 prior to check for compliance."

Insert a new paragraph 6.1.5., to read:

"6.1.5. In the case of headlamps equipped with LED module(s) and filament lamps, the part of the headlamp with filament lamp(s) shall be tested according to paragraph 6.1.3. and the part of the headlamp with LED module(s) shall be evaluated according to the provisions of paragraph 6.1.4. and then added to the previous result obtained from the filament lamp(s) tested."

Paragraphs 6.2.1. to 6.2.2.4., amend to read:

"6.2.1. The luminous intensity distribution of the passing beam headlamp shall incorporate a "cut-off" (see figure 1), which enables the headlamp to be adjusted correctly for the photometric measurements and for the aiming on the vehicle.

The "cut-off" shall provide:

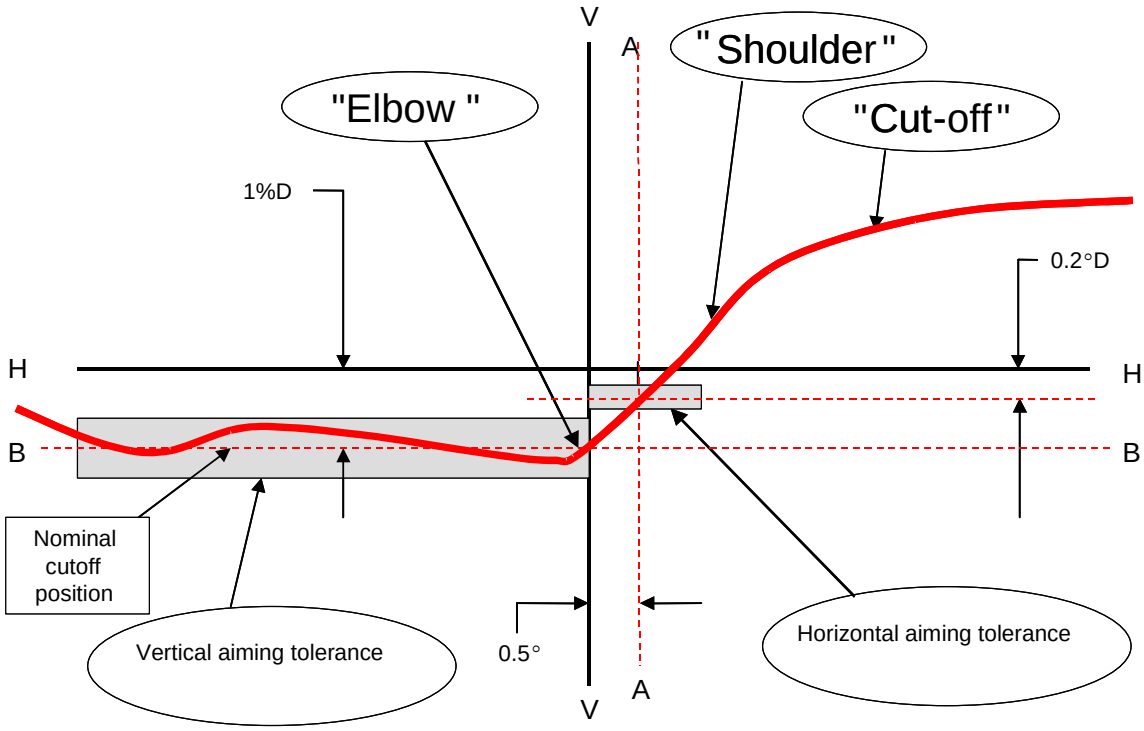
(a) For right hand traffic beams:
  (i) a straight "horizontal part" towards the left;
  (ii) a raised "elbow - shoulder" part towards the right.

(b) For left hand traffic beams:
  (i) a straight "horizontal part" towards the right;
  (ii) a raised "elbow - shoulder" part towards the left.

In each case the "elbow-shoulder" part shall have a sharp edge.

6.2.2. The headlamp shall be visually aimed by means of the "cut-off" (see figure 1) as follows:

6.2.2.1. for vertical adjustment: the horizontal part of the "cut-off" is moved upward from below line B and adjusted to its nominal position one per cent (25 cm) below the H-H line;



Note: The scales are different for vertical and horizontal lines.

Figure 1

6.2.2.2. for horizontal adjustment: the "elbow - shoulder" part of the "cut-off" shall be moved:

for right hand traffic from right to left and shall be horizontally positioned after its movement so that:

(a) above the line 0.2° D its "shoulder" shall not exceed the line A to the left;
(b) the the line 0.2° D or below its "shoulder" should cross the line A; and
(c) the kink of the "elbow" should be primarily on the V-V line;

or

for left hand traffic from left to right and shall be horizontally positioned after its movement so that:

(a) above the line 0.2 D its "shoulder" shall not exceed the line A to the right;
(b) on the line 0.2° or below its "shoulder" cross the line A; and
(c) the kink of the "elbow" should be primarily on the V-V line;

6.2.2.3. Where a headlamp so aimed does not meet the requirements set out in paragraphs 6.2.5. to 6.2.7. and 6.3., its alignment may be changed, provided that the axis of the beam is not displaced:

Horizontally from line A by more than:
(a) 0.5° to the left or 0.75° to the right, for right hand traffic; or
(b) 0.5° to the right or 0.75° to the left, for left hand traffic; and

vertically not more than 0.25° up or down from line B.

6.2.2.4. If, however, vertical adjustment cannot be performed repeatedly to the required position within the tolerances described in paragraph 6.2.2.3. above, the instrumental method of Annex 9, paragraphs 2. and 3. shall be applied to test compliance with the required minimum quality of the "cut-off" and to perform the vertical and horizontal adjustment of the beam."

Paragraphs 6.2.2.1. and 6.2.2.3., (former), references to footnotes 8/ and 9/ and the corresponding footnotes, should be deleted.

Paragraph 6.2.3. (former), the reference to footnote 10/, should be deleted.

Paragraph 6.2.3., amend to read (including a reference to footnote 8/, and footnote 10/, renumber as footnote 8/:

"6.2.3. When so aimed, the headlamp, if its approval is sought solely for provision of a passing beam, 8/ need comply only with the requirements set out in paragraphs 6.2.4. to 6.2.6. below; if it is intended to provide both a passing beam and a driving beam, it shall comply with the requirements set out in paragraphs 6.2.4. to 6.2.6. and 6.3."

Paragraph 6.2.4. should be deleted (including the reference to footnote 11/ and footnote 11/.

Paragraphs 6.2.5. and 6.2.6., re-number as paragraphs 6.2.4. and 6.2.5. accordingly.

Paragraph 6.2.7., re-number as paragraph 6.2.6. (the reference to footnote 12/and footnote 12/ renumber as footnote 9/).

Paragraphs 6.2.8. and 6.2.9., renumber as paragraphs 6.2.7. and 6.2.8., to read:

"6.2.**7**. Headlamps designed to meet the requirements of both right-hand and left-hand traffic must, in each of the two setting positions of the optical unit or LED module(s) producing the principal passing beam or of the filament lamp, meet the requirements set forth above for the corresponding direction of traffic.

6.2.8. The requirements in paragraph 6.2.4. above shall also apply to headlamps designed to provide bend lighting and/or that include the additional light source or LED module(s) referred to in paragraph 6.2.9.2. In the case …. by more than 0.2º."

Paragraphs 6.2.9.1. to 6.2.9.1.3., renumber as paragraphs 6.2.8.1. to 6.2.8.1.3.

Renumbered paragraph 6.2.8.1.3., amend to read:

"6.2.8.1.3. means of one additional filament light source or one or more LED module(s) without moving horizontally the kink of the elbow of the cut-off, measurements shall be carried out with this light source or LED module(s) activated."

Paragraphs 6.2.10. to 6.2.10.3., renumber as paragraphs 6.2.9. to 6.2.9.3. and amend to read:

"6.2.9. Only one filament light source or one or more LED module(s) are permitted for the principal passing beam. Additional light sources or LED modules are permitted only as follows (see Annex 10):

6.2.9.1. one additional light source according to Regulation No. 37 or one or more additional LED module(s) may be used inside the passing beam headlamp to contribute to bend lighting;

6.2.9.2. one additional light source according to Regulation No. 37 or one or more LED module(s), inside the passing beam headlamp, may be used for the purposes of generating infrared radiation. It/they shall only be activated at the same time as the principal light source or LED module(s). In the event that the principal light source or (one of) the principal LED module(s) fails, this additional light source or LED module(s) shall be automatically switched off;

6.2.9.3. in the event of failure of an additional filament light source or one or more additional LED module(s), the headlamp shall continue to fulfil the requirements of the passing beam."

Paragraph 6.3.1., amend to read:

"6.3.1. In the case of a headlamp designed to provide a driving beam and a passing beam, measurements of the illumination produced on the screen by the driving beam shall be taken with the same headlamp alignment as for measurements under paragraphs 6.2.4. to 6.2.6. above; in the case of a headlamp providing a driving beam only, it shall be so adjusted that the area of maximum illumination is centred on the point of intersection of lines H-H and V-V; such a headlamp need meet only the requirements referred to in paragraph 6.3. Where more than one light source is used to provide the driving beam, the combined functions shall be used to determine the maximum value of the illumination (EM)."

Paragraph 6.3.2., amend to read:

"6.3.2. Irrespective of the type of light source (LED module(s) or filament light source(s)) used to produce the principal passing beam, several light sources:

(a) either filament light sources listed in Regulation No. 37; or

(b) LED module(s) may be used for each individual driving beam."

Paragraph 6.5., amend to read:

"6.5. The screen illumination values mentioned in paragraphs 6.2.4. to 6.2.7. and 6.3. above shall be measured by means of a photo receptor, the effective area of which shall be contained within a square of 65 mm side"

Paragraph 8, the reference to footnote 13/ and footnote 13, renumber as footnote 10.

Insert a new paragraph 14., to read:

"14. TRANSITIONAL PROVISIONS

14.1. As from the official 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 to the original version of the Regulation.

14.2. As from 24 months from the entry into force of Supplement 8, Contracting Parties applying this Regulation shall grant approvals only if the headlamp type to be approved meets the requirements of this Regulation as amended by Supplement 8 to the original version of the Regulation.

14.3. Approvals granted under the preceding supplements to this Regulation shall remain valid.

14.4. Contracting Parties applying this Regulation shall continue to grant approvals on the basis of the preceding supplements to this Regulation, provided that the headlamps are intended as replacements for fitting to vehicles in use.

14.5. Contracting Parties applying this Regulation shall not refuse to grant extensions of approvals to the preceding supplements to this Regulation."

Annex 1, item 9., amend to read:

"9. Brief description:

Category as described by the relevant marking: 3/.....
.....

Number and category(s) of filament lamp(s): .....
.....
Measures according to paragraph 5.8. of this Regulation:

Number and specific identification code(s) of LED module(s) .....

Number and specific identification code(s) of electronic light source control gear(s)
.....

Total objective luminous flux as described in paragraph 5.8. exceeds 2,000 lumen: yes/no 2/
.....

The adjustment of the cut-off has been determined at: 10 m/25 m 2/.

.....

The determination of the minimum sharpness of the "cut-off" has been carried out at: 10 m/25 m 2/."

Annex 2, insert a new figure 13, to read:

"Figure 13

LED modules

MD E3 17325

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

Annex 4,

Paragraph 1.1.1.1., amend to read:

"1.1.1.1. (a) In the case where only one lighting function (driving or passing beam or front fog lamp) is to be approved, the corresponding filament and/or LED module(s) is (are) lit for the prescribed time, 2/

(b) In the case of a headlamp with a passing beam and one or more driving beams or in the case of a headlamp with a passing beam and a front fog lamp:

(i) the headlamp shall be subjected to the following cycle until the time specified is reached:
15 minutes, principal passing-beam filament or principal passing beam LED module(s) lit;
5 minutes, all filaments and/or LED module(s) lit.

(ii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) lit 3/ at a time, the test shall be carried out in accordance with this condition, activating 2/ successively the passing beam half of the time and the driving beam(s) (simultaneously) for half the time specified in paragraph 1.1. above.

(c) In the case of a headlamp with a front fog lamp and one or more driving beams:

(i) the headlamp shall be subjected to the following cycle until the time specified is reached:
15 minutes, front fog lamp lit;
5 minutes, all filaments and/or all LED modules lit.

(ii) if the applicant declares that the headlamp is to be used with only the front fog lamp lit or only the driving beam(s) lit 3/ at a time, the test shall be carried out in accordance with this condition, activating 2/ successively the front fog lamp half of the time and the driving beam(s) (simultaneously) for half the time specified in paragraph 1.1. above.

(d) In the case of a headlamp with a passing beam, one or more driving beams and a front fog lamp:

(i) the headlamp shall be subjected to the following cycle until the time specified is reached:
15 minutes, principal passing-beam filament or principal passing beam LED module(s) lit;
5 minutes, all filaments and/or all LED modules lit.

(ii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) 3/ lit at a time, the test shall be carried out in accordance with this condition, activating 2/ successively the passing beam half of the time and the driving beam(s) for half the time specified in paragraph 1.1. above, while the front fog lamp is subjected to a cycle of 15 minutes off and 5 minutes lit for half of the time and during the operation of the driving beam;

(iii) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the front fog lamp 3/ lit at a time, the test shall be carried out in accordance with this condition, activating 2/ successively the passing beam half of the time and the front fog lamp for half of the time specified in paragraph 1.1. above, while the driving beam(s) is(are) subjected to a cycle of 15 minutes off and 5 minutes lit for half of the time and during the operation of the passing beam;

(iv) if the applicant declares that the headlamp is to be used with only the passing beam lit or only the driving beam(s) 3/ lit or only the front fog lamp 3/ lit at a time, the test shall be carried out in accordance with this condition, activating 2/ successively the passing beam one third of the time, the driving beam(s) one third of the time and the front fog lamp for one third of the time specified in paragraph 1.1. above.

(e) In the case of a passing beam designed to provide bend lighting with the addition of a filament light source and/or one or more LED module(s), this light source and/or LED module(s) shall be switched on for one minute, and switched off for nine minutes during the activation of the passing beam only (see Annex 4 – Appendix 1)."

Paragraph 1.1.1.1., footnote 3/, amend to read:

"3/ Should two or more lamp filaments and/or LED module(s) be simultaneously lit when headlamp flashing is used, this shall not be considered as being normal use of the filaments and/or LED module(s)."

Paragraph 1.1.1.2., amend to read:

"1.1.1.2. Test voltage

For LED module(s) the test conditions set out in paragraph 6.1.4. of this Regulation shall apply.

For filament lamps according to Regulation No. 37 the voltage shall be adjusted so as to supply 90 per cent of the maximum wattage specified in Regulation No. 37 for the filament lamp(s) used.

The applied wattage shall in all cases comply with the corresponding value of a filament lamp of 12 V rated voltage, except if the applicant for approval specifies that the headlamp may be used at a different voltage. In the latter case the test shall be carried out with the filament lamp whose wattage is the highest that can be used."

Paragraph 1.2.1.3., amend to read:

"1.2.1.3. Measuring equipment

The measuring equipment shall be equivalent to that used during headlamp approval tests. A standard (étalon) filament lamp and/or the LED module(s) as submitted with the headlamp shall be used for the photometric verification."

Paragraph 2.1., amend to read:

"2.1. Test

The test shall be carried out in a dry and still atmosphere at an ambient temperature of 23 °C ± 5 °C.

Using a mass production filament lamp or the LED module(s) as submitted with the headlamp, which has (have) been aged for at least one hour, the headlamp shall be operated on the principal passing beam …. "

Annex 4 - Appendix 1, amend to read:

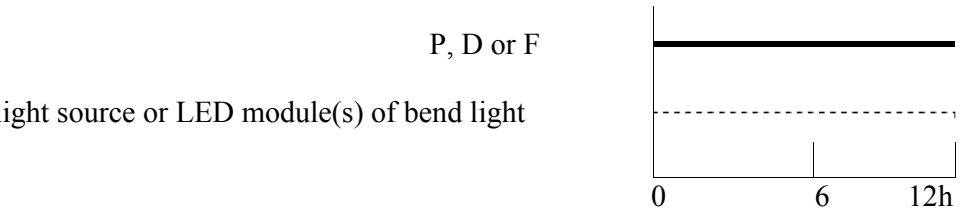
"Annex 4 - Appendix 1

OVERVIEW OF OPERATIONAL PERIODS
CONCERNING TEST FOR STABILITY OF PHOTOMETRIC PERFORMANCE

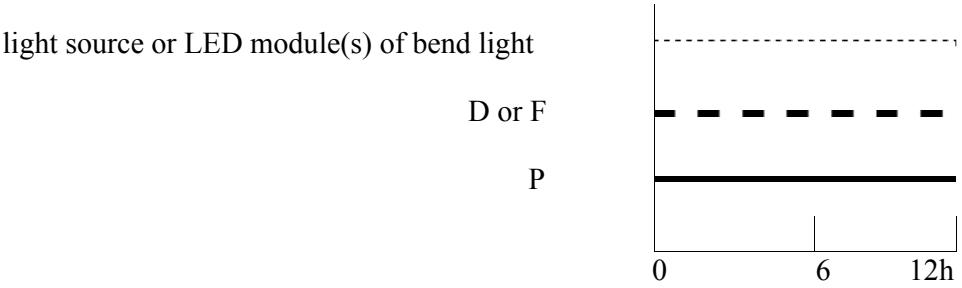
Abbreviations:
P: passing beam lamp
D: driving beam lamp (D_1 + D_2 means two driving beams)
F: front fog lamp
– – – – means a cycle of 15 minutes off and 5 minutes lit
..... means a cycle of 9 minutes off and 1 minute lit

All following grouped headlamps and front fog lamps together with the added marking symbols are given as examples and are not exhaustive.

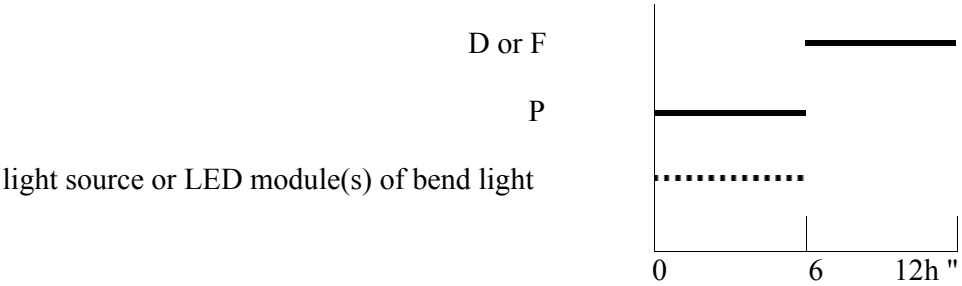
1. P or D or F (HC or HR or B)



2. P+F (HC B) or P+D (HCR)



3. P+F (HC/B) or HC/B or P+D (HC/R)



Annex 5,

Paragraph 1.2., amend to read:

"1.2. With respect to photometric performances, the conformity of mass-produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random and equipped with a standard (étalon) filament lamp and/or LED module(s), as present in the lamp:"

Paragraph 1.2.4., amend to read:

"1.2.4. If in the case of a lamp equipped with a replaceable filament light source the results of the tests described above do not meet the requirements, tests shall be repeated using another standard (étalon) filament lamp."

Insert new paragraph 1.4., to read:

"1.4. If, however, vertical adjustment cannot be performed repeatedly to the required position within the tolerances described in paragraph 6.2.2.3. of this Regulation, one sample shall be tested according to the procedure described in paragraphs 2. and 3. of Annex 9."

Annex 6,

Paragraph 2.1.2.1., amend to read:

"2.1.2.1. Method

Photometric measurements shall be carried out on the samples before and after the test.

These measurements shall be made using a standard (étalon) lamp and/or LED module(s), as present in the headlamp, at the following points:

B 50 L and 50 R for …. "

Insert a new paragraph 2.2.4., to read:

"2.2.4. Resistance to light source radiations

The following test shall be done:

Flat samples of each light transmitting plastic component of the headlamp are exposed to the light of the LED module(s). The parameters such as angles and distances of these samples shall be the same as in the headlamp. These samples shall have the same colour and surface treatment, if any, as the parts of the headlamp.

After 1,500 hours of continuous operation, the colorimetric specifications of the transmitted light must be met, and the surfaces of the samples shall be free of cracks, scratches, scalings or deformation."

Annex 6 - Appendix 1, Part A, amend to read:

"Annex 6 - Appendix 1

CHRONOLOGICAL ORDER OF APPROVAL TESTS

A. Tests on plastic materials (lenses or samples of material supplied pursuant to paragraph 2.2.4. of this Regulation).

Samples	Lenses or samples of material	Lenses

Tests	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.1. Limited photometry (A.6, para. 2.1.2.)											X	X	X	
1.1.1. Temperature change (A.6, para. 2.1.1.)											X	X	X	
1.2. Limited photometry (A.6, para. 2.1.2.)											X	X	X	
1.2.1. Transmission measurement	X	X	X	X	X	X	X	X	X					
1.2.2. Diffusion measurement	X	X	X				X	X	X					
1.3. Atmospheric agents (A.6, para. 2.2.1.)	X	X	X											
1.3.1. Transmission measurement	X	X	X											
1.4. Chemical agents (A.6, para.2.2.2.)	X	X	X											
1.4.1. Diffusion measurements	X	X	X											
1.5. Detergents (A.6, para. 2.3.1.)				X	X	X								
1.6. Hydrocarbons (A.6, para. 2.3.2.)				X	X	X								
1.6.1. Transmission measurement				X	X	X								
1.7. Deterioration (A.6, para. 2.4.1.)							X	X	X					
1.7.1. Transmission measurement							X	X	X					
1.7.2. Diffusion measurement							X	X	X					
1.8. Adherence (A.6, para. 2.5.)														X
1.9. Resistance to light source radiations (A.6, para. 2.2.4.)										X				

Annex 7,

Paragraph 1.2., amend to read:

"1.2. With respect to photometric performances, the conformity of mass-produced headlamps shall not be contested if, when testing photometric performances of any headlamp chosen at random and equipped with a standard filament lamp and/or LED module(s) present in the headlamp:"

Paragraph 1.2.4., amend to read:

"1.2.4. If the results of the tests described above do not meet the requirements, tests shall be repeated using another standard filament lamp and/or LED module(s) present in the headlamp."

Insert new paragraph 1.3., to read:

"1.3. If, however, vertical adjustment cannot be performed repeatedly to the required position within the tolerances described in paragraph 6.2.2.3. of this Regulation, one sample shall be tested according to the procedure described in paragraphs 2. and 3. of Annex 9."

Insert new Annexes 9 to 11, to read:

"Annex 9

INSTRUMENTAL VERIFICATION OF THE "CUT-OFF" FOR PASSING BEAM HEADLAMPS

1. GENERAL

In the case where paragraph 6.2.2.4. of this Regulation applies, the quality of the "cut-off" shall be tested according to the requirements set out in paragraph 2. below and the instrumental vertical and horizontal adjustment of the beam shall be performed according to the requirements set out in paragraph 3. below.

Before carrying out the measurement of the quality of "cut-off" and the instrumental aiming procedure, a visual pre-aim in accordance with paragraphs 6.2.2.1. and 6.2.2.2. of this Regulation is required.

2. MEASUREMENT OF THE QUALITY OF THE "CUT-OFF"

To determine the minimum sharpness, measurements shall be performed by vertically scanning through the horizontal part of the "cut-off" in angular steps of 0.05° at either a measurement distance of:

(a) 10 m with a detector having a diameter of approximately 10 mm or
(b) 25 m with a detector having a diameter of approximately 30 mm.

The measuring distance at which the test was carried out shall be recorded in item 9. of the communication form (see Annex 1 of this Regulation).

To determine the maximum sharpness, measurements shall be performed by vertically scanning through the horizontal part of the "cut-off" in angular steps of 0.05° exclusively at a measurement distance of 25 m and with a detector having a diameter of approximately 30 mm.

The "cut-off" quality shall be considered acceptable if the requirements of paragraph 2.1. to 2.3. below comply with at least one set of measurements.

2.1. Not more than one "cut-off" shall be visible. 1/

2.2. Sharpness of "cut-off"

The sharpness factor G is determined by scanning vertically through the horizontal part of the "cut-off" at 2.5° from the V-V where:

$G = (\log E_{\beta} - \log E_{(\beta + 0.1°)})$ where β = the vertical position in degrees.

The value of G shall not be less than 0.13 (minimum sharpness) and not greater than 0.40 (maximum sharpness).

2.3. Linearity

The part of the horizontal "cut-off" that serves for vertical adjustment shall be horizontal between 1.5° and 3.5° from the V-V line (see figure 1).

The inflection points of the "cut-off" gradient at the vertical lines at 1.5°, 2.5° and 3.5° shall be determined by the equation:

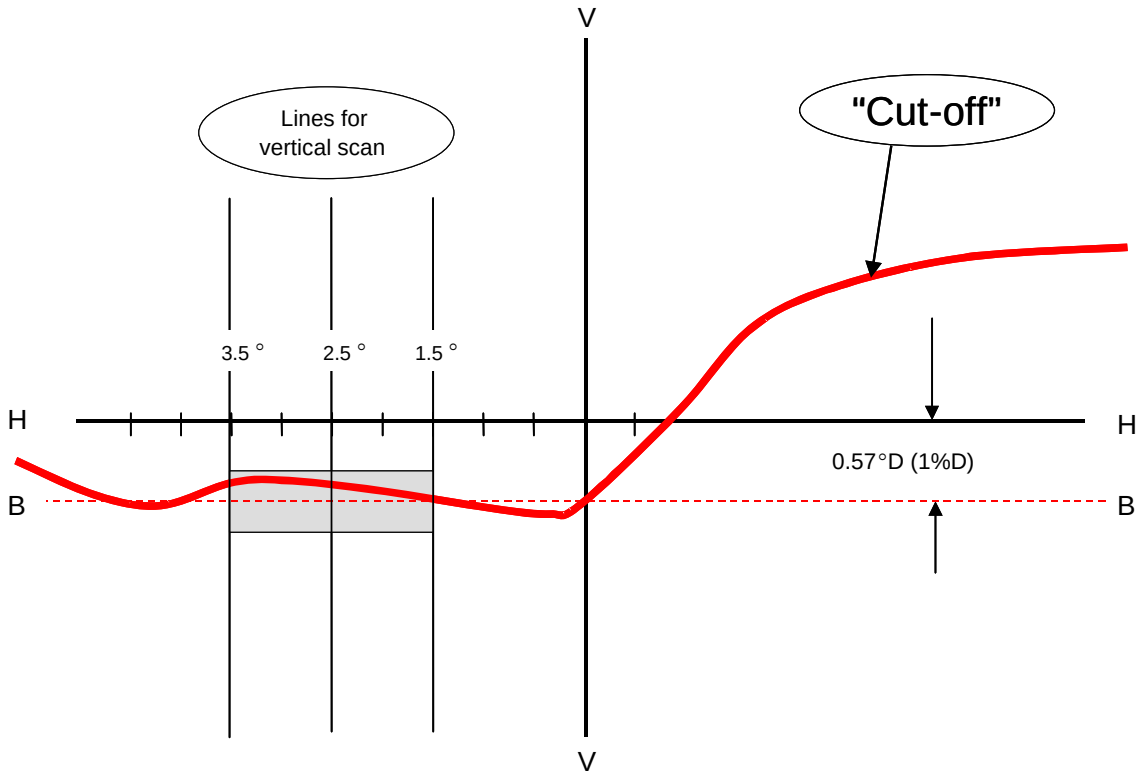
The maximum vertical distance between the inflection points determined shall not exceed 0.2 °.

$$(d^2 (\log E) / d\beta^2 = 0).$$

1/ This paragraph should be amended when an objective test method is available.

3. VERTICAL AND HORIZONTAL ADJUSTMENT

If the "cut-off" complies with the quality requirements of paragraph 2. of this annex, the beam adjustment may be performed instrumentally.



Note: The scales are different for vertical and horizontal lines.

Figure 1 Measurement of "cut-off" quality

3.1. Vertical adjustment

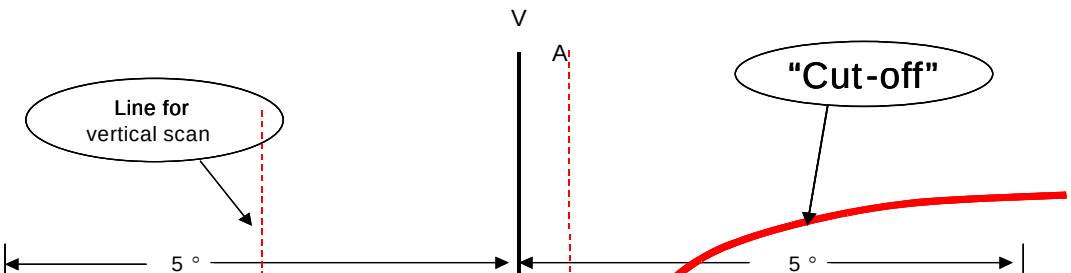
Moving upward from below the line B (see figure 2 below), a vertical scan is carried out through the horizontal part of the "cut-off" at 2.5° from V-V. The inflection point (where d^2 (log E) / dv^2 = 0) is determined and positioned on the line B situated one per cent below H-H.

3.2. Horizontal adjustment

The applicant shall specify one of the following horizontal aim methods:

(a) The "0.2 D line" method (see figure 2 below).
A single horizontal line at 0.2° D shall be scanned from 5° left to 5° right after the lamp has been aimed vertically. The maximum gradient "G" determined using the formula $G = (\log E_{\beta} - \log E_{(\beta+0.1°)})$ where β is the horizontal position in degrees, shall not be less than 0.08.

The inflection point found on the 0.2 D line shall be positioned on the line A.



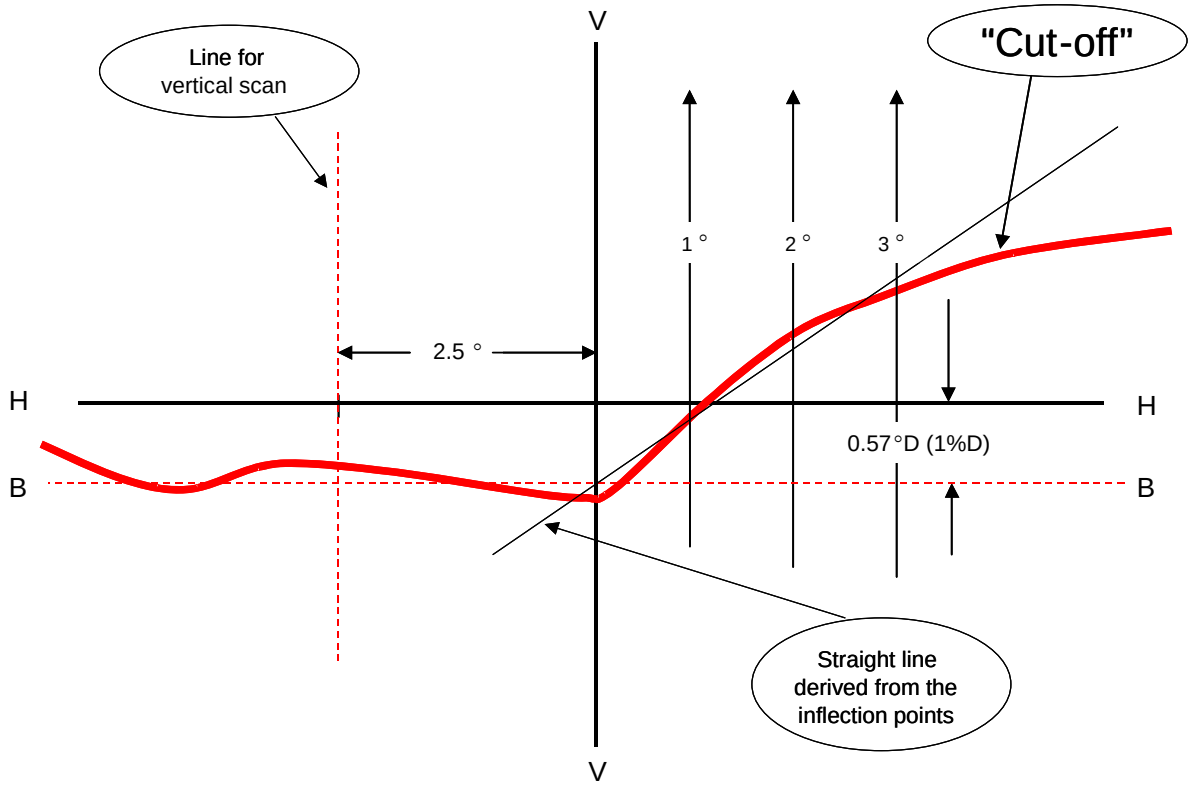
Note: The scales are different for vertical and horizontal lines.

Figure 2 Instrumental vertical and horizontal adjustment- horizontal line scan method

(b) The "3 line" method (see figure 3)
Three vertical lines shall be scanned from 2° D to 2° U at 1°R, 2°R, and 3°R after the lamp has been aimed vertically. The respective maximum gradients "G" determined using the formula:

$$G = (\log E_{\beta} - \log E_{(\beta + 0.1°)})$$

where β is the vertical position in degrees, shall not be less than 0.08. The inflection points found on the three lines shall be used to derive a straight line. The intersection of this line and the line B found while performing vertical aim shall be placed on the V line.



Note: The scales are different for vertical and horizontal lines.

Figure 3 Instrumental vertical and horizontal adjustment-three line scan method

Annex 10

REQUIREMENTS FOR LED MODULES AND HEADLAMPS INCLUDING LED MODULES

1. GENERAL SPECIFICATIONS

1.1. Each LED module sample submitted shall conform to the relevant specifications of this Regulation when tested with the supplied electronic light source control-gear(s), if any.

1.2. LED module(s) shall be so designed as to be and to remain in good working order when in normal use. They shall moreover exhibit no fault in design or manufacture. A LED module shall be considered to have failed if any one of its LEDs has failed.

1.3. LED module(s) shall be tamperproof.

1.4. The design of removable LED module(s) shall be such that:

1.4.1. when the LED module is removed and replaced by another module provided by the applicant and bearing the same light source module identification code, the photometric specifications of the headlamp shall be met;

1.4.2. LED modules with different light source module identification codes within the same lamp housing, shall not be interchangeable.

2. MANUFACTURE

2.1. The LED(s) on the LED module shall be equipped with suitable fixation elements.

2.2. The fixation elements shall be strong and firmly secured to the LED(s) and the LED module.

3. TEST CONDITIONS

3.1. Application

3.1.1. All samples shall be tested as specified in paragraph 4. below.

3.1.2. The kind of light sources on a LED module shall be light-emitting diodes (LED) as defined in Regulation No. 48 paragraph 2.7.1. in particular with regard to the element of visible radiation. Other kinds of light sources are not permitted.

3.2. Operating conditions

3.2.1. LED module operating conditions

All samples shall be tested under the conditions as specified in paragraphs 6.1.4. and 6.1.5. of this Regulation. If not specified differently in this annex LED modules shall be tested inside the headlamp as submitted by the manufacturer.

3.2.2. Ambient temperature

For the measurement of electrical and photometric characteristics, the headlamp shall be operated in a dry and still atmosphere at an ambient temperature of 23 °C ± 5 °C.

3.3. Ageing

Upon the request of the applicant the LED module shall be operated for 15 h and cooled down to ambient temperature before starting the tests as specified in this Regulation.

4. SPECIFIC REQUIREMENTS AND TESTS

4.1. Colour rendering

4.1.1. Red content

In addition to measurements as described in paragraph 7. of this Regulation:

The minimum red content of the light of a LED module or headlamp incorporating LED module(s) tested at 50 V shall be such that:

$$k_{red} = \frac{\int_{\lambda=610\,nm}^{780\,nm} E_e(\lambda)\, V(\lambda)\, d\lambda}{\int_{\lambda=380\,nm}^{780\,nm} E_e(\lambda)\, V(\lambda)\, d\lambda} \geq 0.05$$

where:

$E_e(\lambda)$ (unit: W) is the spectral distribution of the irradiance;
$V(\lambda)$ (unit: 1) is the spectral luminous efficiency;
(λ) (unit: nm) is the wavelength.

This value shall be calculated using intervals of one nanometre.

4.2. UV-radiation

The UV-radiation of a low-UV-type LED module shall be such that:

$$k_{UV} = \frac{\int_{\lambda=250\,nm}^{400\,nm} E_e(\lambda)\, S(\lambda)\, d\lambda}{k_m \int_{\lambda=380\,nm}^{780\,nm} E_e(\lambda)\, V(\lambda)\, d\lambda} \leq 10^{-5}\ W/lm$$

where:

$S(\lambda)$(unit: 1) is the spectral weighting function;
k_m = 683 lm/W is the maximum value of the luminous efficacy of radiation.

(For definitions of the other symbols see paragraph 4.1.1. above).

This value shall be calculated using intervals of one nanometer. The UV-radiation shall be weighted according to the values as indicated in the Table UV below:

λ	S(λ)	λ	S(λ)	λ	S(λ)
250	0.430	305	0.060	355	0.000 16
255	0.520	310	0.015	360	0.000 13
260	0.650	315	0.003	365	0.000 11
265	0.810	320	0.001	370	0.000 09
270	1.000	325	0.000 50	375	0.000 077
275	0.960	330	0.000 41	380	0.000 064
280	0.880	335	0.000 34	385	0.000 530
285	0.770	340	0.000 28	390	0.000 044
290	0.640	345	0.000 24	395	0.000 036
295	0.540	350	0.000 20	400	0.000 030
300	0.300				

Table UV: Values according to "IRPA/INIRC Guidelines on limits of exposure to ultraviolet radiation". Wavelengths (in nanometres) chosen are representative; other values should be interpolated.

4.3. Temperature stability

4.3.1. Illuminance

4.3.1.1. A photometric measurement of the headlamp shall be made after 1 minute of operation for the specific function at the test point specified below. For these measurements, the aim can be approximate but must be maintained for before and after ratio measurements.

Test points to be measured:

Passing beam 50 V

Driving beam H – V

4.3.1.2. The lamp shall continue operation until photometric stability has occurred. The moment at which the photometry is stable is defined as the point in time at which the variation of the photometric value is less than 3 per cent within any 15 minute period. After stability has occurred, aim for complete photometry shall be performed in accordance with the requirements of the specific device. Photometer the lamp at all test points required for the specific device.

4.3.1.3. Calculate the ratio between the photometric test point value determined in paragraph 4.3.1.1. and the point value determined in paragraph 4.3.1.2.

4.3.1.4. Once stability of photometry has been achieved, apply the ratio calculated above to each of the remainder of the test points to create a new photometric table that describes the complete photometry based on one minute of operation.

4.3.1.5. The illuminance values, measured after one minute and after photometric stability has occurred, shall comply with the minimum and maximum requirements.

4.3.2. Colour

The colour of the light emitted measured after one minute and measured after photometric stability has been obtained, as described in paragraph 4.3.1.2. of this annex, shall both be within the required colour boundaries.

5. The measurement of the objective luminous flux of LED module(s) producing the principal passing beam shall be carried out as follows:

5.1. The LED module(s) shall be in the configuration as described in the technical specification as defined in paragraph 2.2.2. of this Regulation. Optical elements (secondary optics) shall be removed by the Technical Service at the request of the applicant by the use of tools. This procedure and the conditions during the measurements as described below shall be described in the test report.

5.2. Three LED modules of each type shall be submitted by the applicant with the light source control gear, if applicable, and sufficient instructions.

Suitable thermal management (e.g. heat sink) may be provided, to simulate similar thermal conditions as in the corresponding headlamp application.

Before the test each LED module shall be aged at least for seventy-two hours under the same conditions as in the corresponding headlamp application.

In the case of use of an integrating sphere, the sphere shall have a minimum diameter of one meter, and at least ten times the maximum dimension of the LED module, whichever is the largest. The flux measurements can also be performed by integration using a goniophotometer. The prescriptions in CIE - Publication 84 - 1989, regarding the room temperature, positioning, etc., shall be taken into consideration.

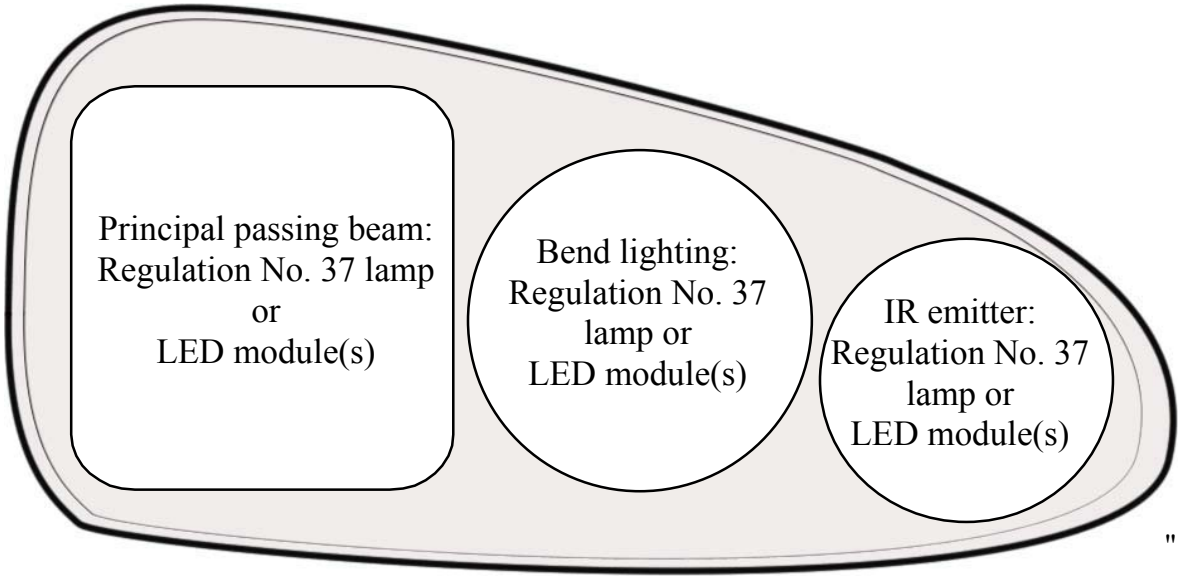
The LED module shall be burned in for approximately one hour in the closed sphere or goniophotometer.

The flux shall be measured after stability has occurred, as explained in paragraph 4.3.1.2. of Annex 10 to this Regulation.

The average of the measurements of the three samples of each type of LED module shall be deemed to be its objective luminous flux.

Annex 11

A GENERAL ILLUSTRATION FOR PRINCIPAL PASSING BEAM AND BEAM CONTRIBUTORS AND CORRELATED LIGHT SOURCE OPTIONS



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