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World Forum for Harmonization of Vehicle Regulations

Working Party on Lighting and Light-Signalling

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Item 5(f) of the provisional agenda

COLLECTIVE AMENDMENTS

Regulations Nos. 19, 48, 98, 112 and 123

Proposal for draft 01 series of amendments to Regulation No. 112 (Headlamps emitting an asymmetrical passing beam)

Submitted by the expert from the Working Party "Brussels 1952" */

The text reproduced below was prepared by the expert from the Working Party "Brussels 1952" (GTB) in order to change the basis for the photometric requirements from 12.0 V to 13.2 V. The modifications to the current text of the Regulation, including draft Supplement 11 and draft Corrigendum 2 to Supplement 8 to Regulation No. 112, are marked in bold or strikethrough characters.

*/ In accordance with the programme of work of the Inland Transport Committee for 2006-2010 (ECE/TRANS/166/Add.1, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance performance of vehicles. The present document is submitted in conformity with that mandate.

A. PROPOSAL

The list of contents, amend to read:

"14. Transitional provisions…….. "

The list of Annexes, amend to read:

"Annex 3: ~~Measuring screens~~ **The Spherical Coordinate Measuring System and Test Point Locations**"

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 **indicating the headlamp producing the passing beam** in the approval mark."

Paragraph 5.7.2., amend to read:

"5.7.2. in the case of failure, the ~~illumination~~ **luminous intensity** 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~~ **luminous intensity** of at least ~~3 lux~~ **2500 cd.** 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."

Paragraph 5.8.2., amend to read:

"5.8.2. Following the application of this (these) measure(s) the following requirements regarding ~~illumination~~ **the luminous intensity of the headlamp** shall be met~~:~~ with the adjustment left unchanged compared to that for the original traffic direction:

5.8.2.1. Passing beam designed for right-hand traffic and adapted to left-hand traffic:

at 0.86D-1.72L at least ~~3 lux~~ **2500 cd**
at 0.57U-3.43R not more than ~~1.0 lux.~~ **845 cd**

5.8.2.2. Passing beam designed for left-hand traffic and adapted to right-hand traffic:

at 0.86D-1.72R at least ~~3 lux~~ **2500 cd**
at 0.57U-3.43L not more than ~~1.0 lux.~~ **845 cd**"

Paragraph 6.1.2., amend to read:

"**6.1.2. The luminous intensity produced by the headlamp shall be measured at 25 m distance by means of a photoelectric cell having a useful area comprised within a square of 65 mm side. The point HV is the centre-point of the coordinate system with a vertical polar axis. Line h is the horizontal through HV (see Annex 3 to this Regulation).**"

Paragraph 6.1.3., 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~~. **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 at 13.2V as indicated at the relevant data sheet of Regulation No. 37.**

For the measurements, the flux of this filament lamp may differ from the reference luminous flux at 13.2V specified in Regulation No. 37. In this case, the luminous intensity shall be corrected accordingly by the individual factor of the standard (étalon) filament lamp ($F = \Phi_{obj.} / \Phi(Voltage)$)."

Paragraph 6.1.4., amend to read:

"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."~~

Paragraph 6.2.2, amend to read:

"6.2.2. **The headlamp shall be visually aimed by means of the "cut-off" (see figure 1) as follows. The aiming shall be carried out using a flat vertical screen set up at a distance of 10 m or 25 m (as indicated in section 9 of Annex 1) forward of the headlamp and at right angles to the H-V axis as shown in Annex 3 to this Regulation. The 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.**"

Paragraph 6.2.2.1., amend to read:

"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~~ **0.57 degrees)** below the H-H line;
……."

Paragraph 6.2.2.2., amend to read:

"6.2.2.2. …
(c) the kink of "elbow" should be ~~primarily on~~ **located in the vicinity of** the V-V line.
…"

Paragraph 6.2.4, replace text and tables as follows:

"**6.2.4. The passing beam shall meet the luminous intensities at the test points referred to in the table below and in annex 3 figure B (or mirrored about the VV line for left-hand traffic) shall meet the following requirements:**

<table>
<tr><th colspan="2">Headlamps for Right-hand traffic</th><th colspan="2">Headlamps for Left-hand traffic</th><th colspan="2">Class A Headlamp</th><th colspan="2">Class B Headlamp</th></tr>
<tr><th rowspan="2">Test Point</th><th rowspan="2">Angular Coordinates Degrees</th><th rowspan="2">Test Point</th><th rowspan="2">Angular Coordinates Degrees</th><th colspan="2">Required luminous intensity cd</th><th colspan="2">Required luminous intensity cd</th></tr>
<tr><th>Max</th><th>Min</th><th>Max</th><th>Min</th></tr>
<tr><td>B 50 L</td><td>0.57U, 3.43L</td><td>B 50 R</td><td>0.57U, 3.43R</td><td>357</td><td></td><td>357</td><td></td></tr>
<tr><td>BR</td><td>1.0 U, 2.5R</td><td>BR</td><td>1.0 U, 2.5L</td><td>1685</td><td></td><td>1685</td><td></td></tr>
<tr><td>75 R</td><td>0.57D, 1.15R</td><td>75 L</td><td>0.57D, 1.15L</td><td></td><td>5000</td><td></td><td>10000</td></tr>
<tr><td>75 L</td><td>0.57D, 3.43L</td><td>75 R</td><td>0.57D, 3.43R</td><td>10700</td><td></td><td>10700</td><td></td></tr>
<tr><td>50 L</td><td>0.86D, 3.43L</td><td>50 R</td><td>0.86D, 3.43L</td><td>13400</td><td></td><td>13400</td><td></td></tr>
<tr><td>50 R</td><td>0.86D, 1.15R</td><td>50 L</td><td>0.86D, 1.15L</td><td></td><td>5000</td><td></td><td>10000</td></tr>
<tr><td>50 V</td><td>0.86D,
0</td><td>50 V</td><td>0.86D, 0</td><td></td><td></td><td></td><td>5000</td></tr>
<tr><td>25 L</td><td>1.72D, 9.0L</td><td>25 R</td><td>1.72D, 9.0R</td><td></td><td>1250</td><td></td><td>1687</td></tr>
<tr><td>25 R</td><td>1.72D, 9.0R</td><td>25 L</td><td>1.72D, 9.0L</td><td></td><td>1250</td><td></td><td>1687</td></tr>
<tr><td colspan="4">Any point in zone III
(bounded by the following coordinates in degrees)
<table>
<tr><td>8 L</td><td>8 L</td><td>8 R</td><td>8 R</td><td>6 R</td><td>1.5 R</td><td>V-V</td><td>4 L</td></tr>
<tr><td>1 U</td><td>4 U</td><td>4 U</td><td>2 U</td><td>1.5 U</td><td>1.5 U</td><td>H-H</td><td>H-H</td></tr>
</table></td><td>625</td><td></td><td>625</td><td></td></tr>
<tr><td colspan="4">Any point in zone IV
(0.86D to 1.72D, 5.15 L to 5.15 R)</td><td></td><td>1875</td><td></td><td>2500</td></tr>
<tr><td colspan="4">Any point in zone I
(1.72D to 4D, 9 L to 9 R)</td><td>16875</td><td></td><td>< 2I */</td><td></td></tr>
<tr><td colspan="8">*/ Actual measured value at points 50R / 50L respectively</td></tr>
</table>

Headlamps for Right-hand traffic		**Headlamps for Left-hand traffic**		**Required luminous intensity cd**	
Test Point	**Angular Coordinates Degrees**	**Test Point**	**Angular Coordinates Degrees**	**Max**	**Min**
1	**4U, 8L**	**1**	**4U, 8R**		**Points 1+2+3 188**
2	**4U, 0**	**2**	**4U, 0**		
3	**4U, 8R**	**3**	**4U, 8L**		
4	**2U, 4L**	**4**	**2U, 4R**		**Points 4+5+6 375**
5	**2U, 0**	**5**	**2U, 0**		
6	**2U, 4R**	**6**	**2U, 4L**		
7	**0, 8L**	**7**	**0, 8R**	**625**	**63**
8	**0, 4L**	**8**	**0, 4R**	**625**	**125**

"

Paragraph 6.2.6., to be deleted

Paragraphs 6.2.7. to 6.2.10.3.(former), renumber as paragraphs 6.2.6 to 6.2.9.3 respectively.

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~~ **luminous intensity of 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~~ **luminous intensity** 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 **luminous intensity (I m).**"

Paragraph 6.3.3. to 6.3.3.2., amend to read:

"6.3.3. **Referring to Annex 3 Figure C and the table below, the luminous intensity distribution of the driving beam shall meet the following requirements:**

		Class A Headlamp		**Class B Headlamp**	
Test Point	**Angular Coordinates Degrees**	**Required luminous intensity cd**		**Required luminous intensity cd**	
		Max	**Min**	**Max**	**Min**
Emax / Imax			**27000**		**40500**
H-5L	**0.0 , 5.0 L**		**3125**		**5000**
H-2.5L	**0.0 , 2.5 L**		**12500**		**20000**
H-2.5R	**0.0 , 2.5 R**		**12500**		**20000**
H-5R	**0.0 , 5.0 R**		**3125**		**5000**

6.3.3.1. The point of intersection (HV) of lines h h and v v shall be situated within the isolux 80 per cent of maximum luminous intensity. This maximum value (I M) shall not be less than 27000 cd for Class A headlamps and 40,500 cd for Class B headlamps.

6.3.3.2. The maximum value (I_M) shall in no circumstances exceed 215,000 cd; in addition, in the case of a combined passing and driving headlamp, this maximum value shall not be more than 16 times the luminous intensity measured for the passing beam at point 75 R (or 75 L)."

6.3.4. The reference mark (I'_M) of the maximum luminous intensity, referred to in paragraph 6.3.3.2. above, shall be obtained by the ratio:

$$I'_M = I_M / 4300$$

This value shall be rounded off to the value 7.5 - 10 - 12.5 - 17.5 - 20 - 25 - 27.5 - 30 - 37.5 - 40 - 45 - 50."

Paragraph6.4.3., amend to read:

"6.4.3. additional tests are made after the reflector has been moved vertically ± 2° or at least into the maximum position, if less than 2°, from its initial position by means of the headlamps adjusting device. Having re-aimed the headlamp as a whole (by means of the goniometer for example) in the corresponding opposite direction the

light output in the following directions shall be controlled and lie within the required limits:

passing beam : points HV and 75 R (75 L respectively);
driving beam : ~~E~~ **I_M** and point HV (percentage of ~~E~~ **I_M).**"

Paragraph 6.3.5., to be deleted:

Insert new paragraph 14, to read:

"**14. TRANSITIONAL PROVISIONS**

14.1. From the date of entry into force of the 01 series of amendments to this Regulation no Contracting Party applying it shall refuse to grant approvals under this Regulation as amended by the 01 series of amendments.

14.2. As from 36 months after the date of entry into force of the 01 series of amendments, Contracting Parties applying this Regulation shall grant approvals only if the headlamp meets the requirements of this Regulation as amended by the 01 series of amendments.

14.3. Existing approvals for headlamps lamps already granted under this Regulation before the date of entry into force of the 01 series of amendments shall remain valid indefinitely."

Annex 2,

The first paragraph, amend to read:

"The headlamp bearing one of the above approval marks has been approved in the Netherlands (E 4) pursuant to Regulation No. 112 under approval number 243, meeting the requirements of this Regulation in its original form (00). The passing beam is designed for right-hand traffic only. The letters CR (Figure 1) indicate that it concerns a Class A passing and driving beam and the letters HCR (Figure 2) indicate that it concerns a Class B passing and driving beam.

The figure 30 indicates that the maximum luminous intensity of the driving beam is between **116437** and **136687** candelas.

Note: The approval number and 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 in the same direction.

The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols."

Annex 2,

"Figure 11, the note, amend to read:

"Note: The four examples above correspond to a lighting device bearing an approval mark comprising:

A front position lamp approved in accordance with the 02 series of amendments to Regulation No. 7,

A headlamp, Class B, with a passing beam designed for right- and left-hand traffic and a driving beam with a maximum intensity comprised between **86 250 and 101 250** candelas (as indicated by the number 30), approved in accordance with the requirements of this Regulation in its original form (00) and incorporating a lens of plastic material,

A front fog lamp approved in accordance with the 02 series of amendments to Regulation No. 19 and incorporating a lens of plastic material,

A front direction indicator lamp of category 1a approved in accordance with the 01 series of amendments to Regulation No. 6."

Figure 12, the note, amend to read:

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

Either A headlamp, Class B, with a passing beam designed for both traffic systems and a driving beam with a maximum luminous intensity comprised between **116437 and 136687** candelas (as indicated by the number 30), approved in Germany (E1) in accordance wit the requirements of this Regulation in its original form (00),

which is reciprocally incorporated with

A front position lamp approved in accordance with the 02 series of amendments to Regulation No. 7;

Or A headlamp, Class A, with a passing beam designed for both traffic systems and a driving beam with a maximum luminous intensity comprised between **45562 cd and 60750 cd** (as indicated by the number 12.5), approved in Germany (E1) in accordance with the requirements of this Regulation in its original form (00),

which is reciprocally incorporated with

The same front position lamp as above;

Or even 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:…"

Figure 12, the text of Example 2, amend to read:

"The above example corresponds to the marking of a lens of plastic material used in a unit of two headlamps approved in France (E2) under approval number 81151, consisting of:

A headlamp, Class B, emitting a passing beam and a driving beam with a maximum luminous intensity between x and y candelas, meeting the requirements of this Regulation, and

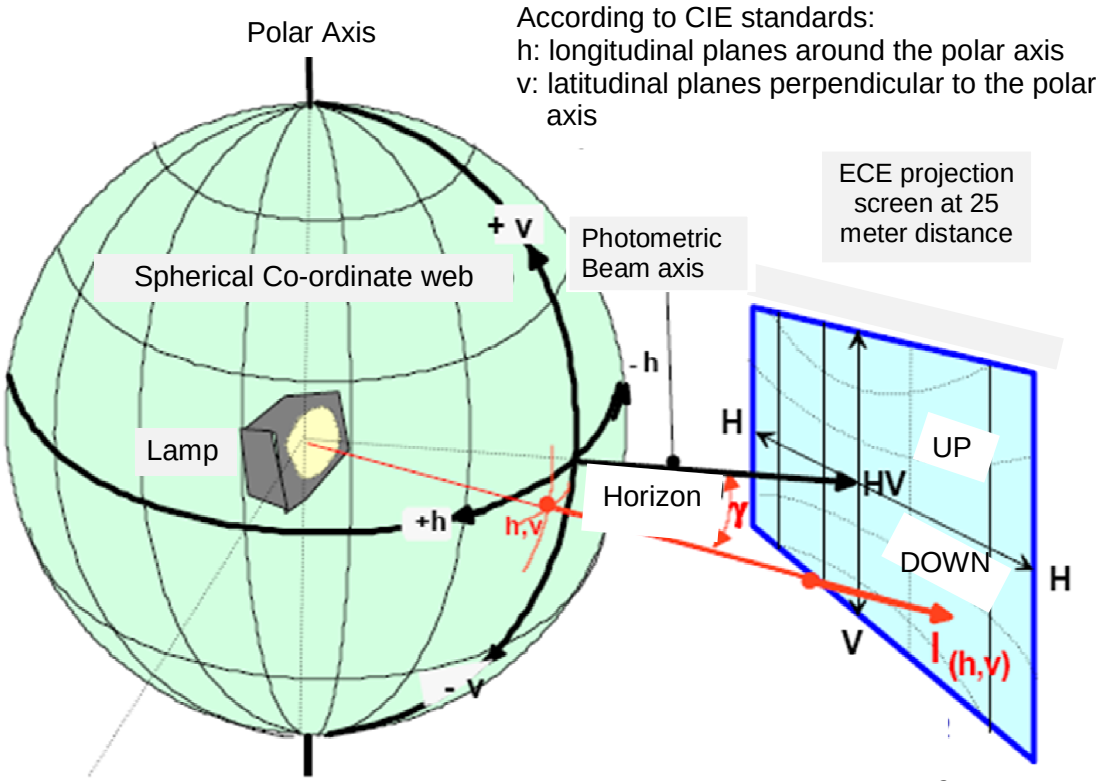
A headlamp, Class B, emitting a driving beam designed for both traffic systems with a maximum luminous intensity between w and z candelas, meeting the requirements of this Regulation, the maximum luminous intensities of the driving beams as a whole being comprised between **116437 and 136687** candelas."

Annex 3, amend to read:

"Annex 3

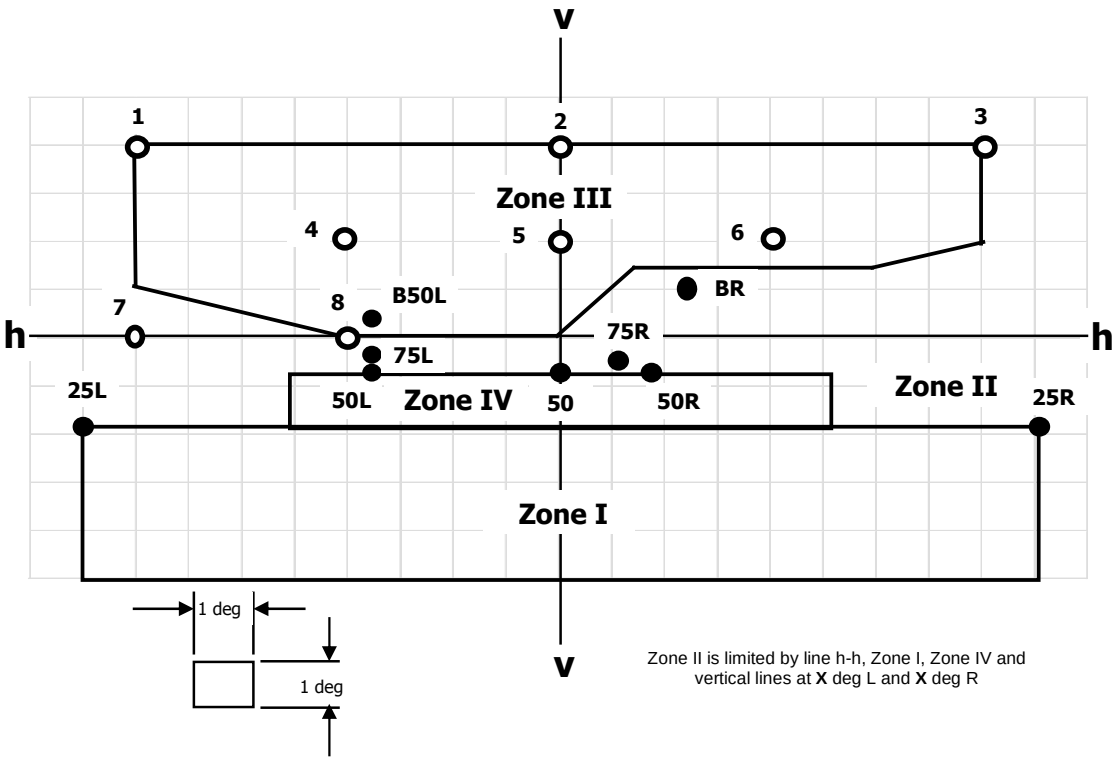
**SPHERICAL COORDINATE MEASURING SYSTEM
AND TEST POINT LOCATIONS**

Figure A: Spherical Coordinate Measuring System



$E_{25m} = I_{(h,v)} \times \cos \gamma / r^2$

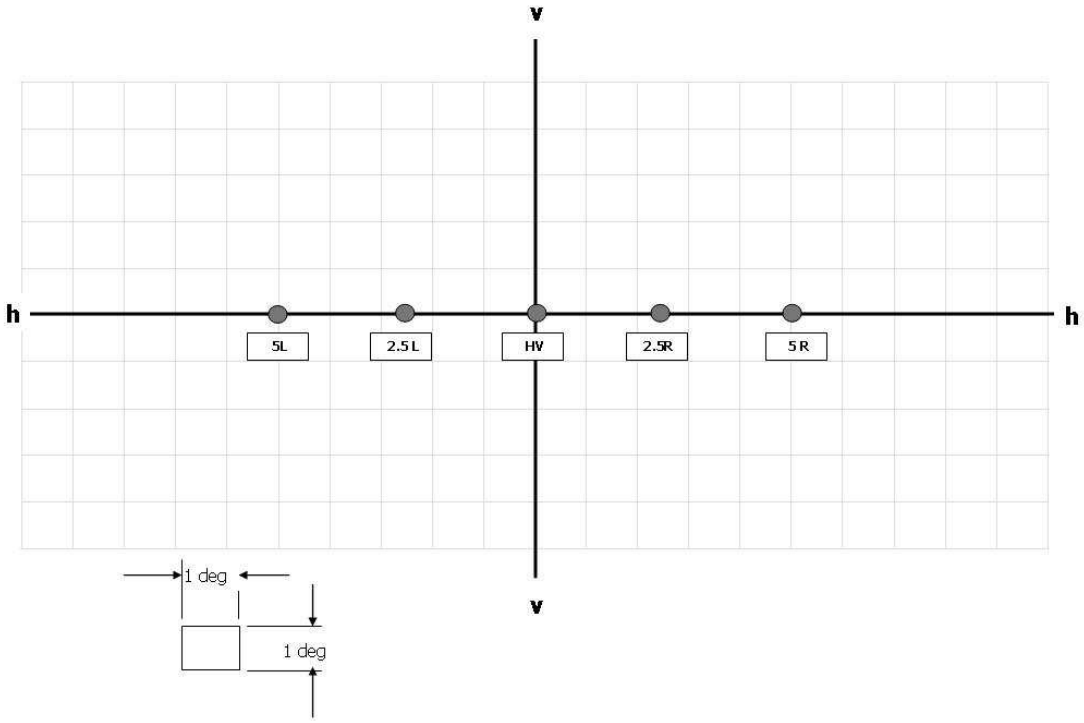
Figure B: Passing Beam for right-hand traffic



h-h : horizontal plane) passing through
v-v : vertical plane) focus of headlamp

The test point locations for left-hand traffic are mirrored about the VV line

Figure C: Driving Beam



"

Annex 4,

The first paragraph, amend to read:

"TEST FOR STABILITY OF…IN OPERATION

TESTS ON COMPLETE HEADLAMPS

Once the photometric values have been measured according to the prescriptions of this Regulation, in the point for ~~E~~$_{max}$ $\mathbf{I_{max}}$ for driving beam and in points HV, 50 R, B 50 L for passing beam (or HV, 50 L, B 50 R for headlamps designed for left-hand traffic) a complete headlamp sample shall be tested for stability of photometric performance in operation. "Complete headlamp" shall be understood to mean the complete lamp itself including those surrounding body parts and lamps which could influence its thermal dissipation."

Paragraph 1.1.2.2., amend to read:

"1.1.2.2. Photometric test

To comply with the requirements of this Regulation, the photometric values shall be verified in the following points:

Passing beam:

50 R - B 50 L - HV for headlamps designed for right-hand traffic,
50 L - B 50 R - HV for headlamps designed for left-hand traffic.

Driving beam: Point ~~of E_{max}~~ **I_{max}**

Another aiming may be carried out to allow for any deformation of the headlamp base due to heat (the change of the position of the cut-off line is covered in paragraph 2 of this annex).

A 10 per cent discrepancy between the photometric characteristics and the values measured prior to the test is permissible including the tolerances of the photometric procedure."

Paragraph 1.2.1.2., amend to read:

"1.2.1.2. Application of the test mixture to the headlamp

The test mixture shall be uniformly applied to the entire light-emitting surface of the headlamp and then left to dry. This procedure shall be repeated until the illumination value has dropped to 15-20 per cent of the values measured for each following point under the conditions described in this annex:

Point of E_{max} in passing beam/driving beam and in driving beam only,

50 R and 50 V 1/ for a ~~passing lamp~~ **headlamp producing only a passing beam**, designed for right-hand traffic,

50 L and 50 V 6/ for a ~~passing lamp~~ **headlamp producing only a passing beam**, designed for left-hand traffic"

Paragraph 2, amend to read:

"2. TEST FOR CHANGE IN VERTICAL POSITION OF THE CUT-OFF LINE UNDER THE INFLUENCE OF HEAT

This test consists of verifying that the vertical drift of the cut-off line under the influence of heat does not exceed a specified value for an operating ~~passing lamp~~ **headlamp producing a passing beam**

The headlamp tested in accordance with paragraph 1, shall be subjected to the test described in paragraph 2.1., without being removed from or readjusted in relation to its test fixture."

Paragraph 2.2.1., amend to read:

"2.2.1. The result in milliradians (mrad) shall be considered as acceptable for a ~~passing lamp~~ **headlamp producing a passing beam**, only when the absolute value $\Delta r_I = | r_3 - r_{60} |$ recorded on the headlamp is not more than 1.0 mrad ($\Delta r_I \leq 1.0$ mrad)."

Annex 5,

Paragraph 1.2.1., amend to read:

"1.2.1. no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation. For values B 50 L (or R) and zone III, the maximum unfavourable deviation may be respectively:

B 50 L (or R):	~~0.2 lx~~ **170cd** equivalent 20 per cent
	~~0.3 lx~~ **255cd** equivalent 30 per cent
Zone III	~~0.3 lx~~ **255cd** equivalent 20 per cent
	~~0.45 lx~~ **380cd** equivalent 30 per cent"

Paragraph 1.2.2., amend to read:

"1.2.2. or if

1.2.2.1. for the passing beam, the values prescribed in this Regulation are met at HV (with a tolerance of + ~~0.2 lx~~ **170cd** and related to that aiming at least one point ~~of each area delimited on the measuring screen (at 25 m) by a circle 15 cm in radius~~ **within a circle of 0.35 degrees** around points B 50 L (or R) 1/ (with a tolerance of ~~0.1 lx~~ **85cd**), 75 R (or L), 50 V, 25 R, 25 L, and in the entire area of zone IV which is not more than ~~22.5 cm~~ **0.52 degrees** above line 25 R and 25 L;

1.2.2.2. and if, for the driving beam, HV being situated within the isolux 0.75 ~~E_{max}~~ $\mathbf{I_{max}}$ a tolerance of + 20 per cent for maximum values and -20 per cent for minimum values is observed for the photometric values at any measuring point specified in paragraph 6.3.2. of this Regulation."

Paragraph 2.4. and footnote 4/, amend to read:

"2.4. Measured and recorded photometric characteristics

The sampled headlamps shall be subjected to photometric measurements at the points provided for in the Regulation, the reading being limited at the points ~~E_{max}~~ $\mathbf{I_{max}}$, HV 3/, HL, HR 4/ in the case of a driving beam, and to points B 50 L (or R),

HV, 50 V, 75 R (or L) and 25 L (or R) in the case of the passing beam (see figure in Annex 3)

4/ HL and HR: points "hh" located at ~~1.125 m~~ **2.5 degrees** to the left and to the right of point HV respectively

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 the passing beam ~~of a passing lamp or a passing/driving lamp~~ (B 50 R and 50 L in the case of headlamps intended for left-hand traffic);

~~E_{max}~~ **Imax** ~~route~~ for the driving beam ~~of a driving lamp or a passing/driving lamp.~~"

Annex 7,

Paragraph 1.2.1., amend to read:

"1.2.1. no measured value deviates unfavourably by more than 20 per cent from the value prescribed in this Regulation. For values B 50 L (or R) and zone III, the maximum unfavourable deviation may be respectively:

B 50 L (or R):	~~0.2 lx~~ **170cd** equivalent 20 per cent
	~~0.3 lx~~ **255cd** equivalent 30 per cent
Zone III	~~0.3 lx~~ **255cd** equivalent 20 per cent
	~~0.45 lx~~ **380cd** equivalent 30 per cent"

Paragraph1.2.2., amend to read:

"1.2.2. or if

1.2.2.1. for the passing beam, the values prescribed in this Regulation are met at HV (with a tolerance of + ~~0.2 lx~~ **170cd** and related to that aiming at least one point of each area delimited on the measuring screen (at 25 m) by a circle 15 cm in radius around points B 50 L (or R) 1/ (with a tolerance of ~~0.1 lx~~ **85cd**), 75 R (or L), 50 V, 25 R, 25 L, and in the entire area of zone IV which is not more than 22.5 cm above line 25 R and 25 L;

1.2.2.2. and if, for the driving beam, HV being situated within the isolux 0.75 ~~E_{max}~~ $\mathbf{I_{max}}$, a tolerance of + 20 per cent for maximum values and -20 per cent for minimum values

is observed for the photometric values at any measuring point specified in paragraph 6.3.2. of this Regulation."

Annex 10, paragraph 4.3.1.5., amend to read:

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

B. JUSTIFICATION

At its fifty-seventh session, the Working Party on Lighting and Light-Signalling (GRE) accepted a proposal tabled by the expert from GTB (ECE/TRANS/WP.29/GRE/2006/36) to specify the luminous flux of Regulation No. 37 light sources at approximately 13.2 volts instead of 12 volts. Having introduced these changes into Regulation No. 37, it is now appropriate to amend the Regulation No. 112 photometric requirements to this 13.2 V basis. These changes have the effect of aligning the performance at type approval with that actually achieved in operation on the vehicle.

Additionally, the opportunity has been taken to update the regulation by changing specification of the photometric requirements based upon luminous intensity and the spherical coordinate system and to incorporate the following changes:

(a) Revision of the photometric tables to specify luminous intensity requirements based upon the spherical coordinate system. There is also the introduction of the BR passing beam test point adopted in conjunction with the new zone III taken from Regulation No. 123 to avoid glare in the preceding driver's mirrors;

(b) Revision of Annex 3 detailing the locations of the test points and zones using the spherical coordinate system;

(c) Revision of Annex 3 to align the passing beam cut-off shape to the new provisions introduced into the Regulation by supplement 8. This cut-off shape is identical to that adopted by Regulation No. 123.

The result of this work, along with similar amendments also being proposed to Regulations Nos. 98 and 123, is an alignment of the passing beam cut-off shape and photometric requirements of all the current headlamp regulations. Additionally, it is no longer necessary to use modifying factors to account for the various light source technologies such as Gas Discharge and light-emitting diode (LED).

These proposed amendments to the photometric requirements do not affect the validity of lamps type approved to earlier versions of this regulation. However, it is necessary to introduce transitional provisions to allow for the changes to be made to the procedures in the photometric laboratories to accommodate the revised photometric tables and measurement protocols.

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