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**ECONOMIC COMMISSION FOR EUROPE**

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Working Party on Lighting and Light-Signalling (GRE)  
(Fifty-first session, 15-19 September 2003,  
agenda item 1.4.2.)

PROPOSAL FOR A DRAFT AMENDMENTS TO REGULATION No. 113

(Headlamps emitting a symmetrical passing beam)

Transmitted by the expert from the Working Party "Brussels 1952" (GTB)

Note: The text reproduced below was prepared by GTB in order to introduce into the Regulation provisions regarding the definition and measurement of the cut-off gradient. Similar provisions concerning Regulations Nos. 98 and 112 have already been discussed by GRE at its fiftieth session (TRANS/WP.29/GRE/50, paras. 41-43 and 50-51).

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Note: This document is distributed to the Experts on Lighting and Light-Signalling only.

**A. PROPOSAL**

List of contents, annexes, amend the list to read:

"

.....

Annex 7- Minimum requirements for sampling by an inspector

Annex 8- Definition and sharpness of the "cut-off" line for headlamps for symmetrical passing-beam headlamps and aiming procedure by means of this cut-off line"

Text of the Regulation

Paragraphs 6.2. to 6.2.2.2., amend to read:

"6.2. Provisions concerning passing beams:

6.2.1. For a correct aiming the passing beam shall produce a sufficiently sharp "cut-off" to permit a satisfactory visual adjustment with its aid as indicated in paragraph 6. below. The "cut-off" must be substantially horizontal and shall be as straight as possible from at least 3° L to 3° R for Class A, B, C and D headlamps. In case that visual aim leads to problems or ambiguous positions, the instrumental method as specified in annex 8, paragraphs 2. and 4., shall be applied and the quality or rather the sharpness of the "cut-off" and the linearity shall be checked on performance.

6.2.2. The headlamp shall be so aimed that:

6.2.2.1. For horizontal adjustment: The beam is as symmetrical as possible with reference to line v-v;

6.2.2.2. For vertical adjustment: ~~The headlamp shall be so aimed that the~~ horizontal part of the "cut-off" line is adjusted to its nominal position 1% below the h-h-line which is 10 cm below the headlamp axis on the screen at 10 m distance or which is 25 cm below the headlamp axis on the screen at 25 m distance.

If, however, vertical adjustment cannot be performed repeatedly to the required position within the allowed tolerances, the instrumental method of annex 8, paragraphs 4. and 5. shall be applied to test compliance with the required minimum quality of the "cut-off" line and to perform the beam vertical adjustment."

Annex 1, item 9, amend to read:

"9. Brief description:

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

Number and category(ies) of filament lamp(s): .....  
.....  
The determination of cut-off sharpness yes / no  
If yes, it was carried out at 10m / 25m 2 / "

Annex 5

Add a new paragraph 1.5., to read:

"1.5. If, however, vertical adjustment cannot be performed repeatedly to the required position within the allowed tolerances, in a series of samples the quality of cut-off according to the procedure described in to annex 8, paragraphs 2. and 4. shall be tested at one of the sampled headlamps."

Annex 7

Add a new paragraph 1.3., to read:

"1.3. If, however, vertical adjustment cannot be performed repeatedly to the required position within the allowed tolerances, in a series of samples the quality of cut-off according to the procedure described in to annex 8, paragraphs 2. and 4 shall be tested at one of the sampled headlamps."

Add a new annex 8, to read:

"Annex 8

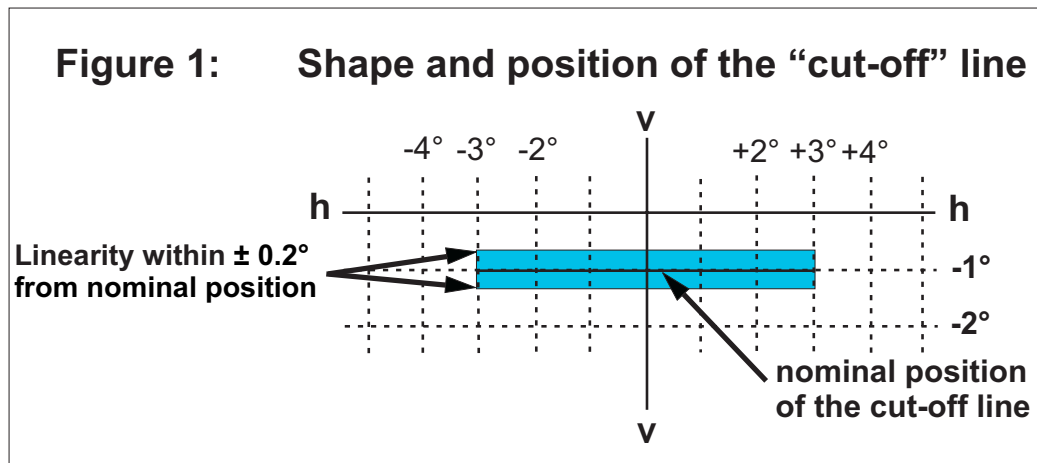
DEFINITION AND SHARPNESS OF THE "CUT-OFF" LINE FOR  
SYMMETRICAL PASSING-BEAM HEADLAMPS AND  
AIMING PROCEDURE BY MEANS OF THIS CUT-OFF LINE

1. General:

1.1. The luminous intensity distribution of the symmetrical passing-beam headlamps shall incorporate a "cut-off" line which enables the symmetrical passing-beam headlamp to be adjusted correctly for the photometric measurements and for the aiming on the vehicle. The characteristics of the "cut-off" line shall comply with the requirements set out in paragraphs 2. to 4. below:

2. Shape of the cut-off line:

2.1. For visual adjustment of the symmetrical passing-beam headlamp the cut-off line shall provide: a horizontal line for vertical adjustment of the symmetrical passing-beam headlamp extending to either side of the v-v-line (see Figure1) as specified in paragraph 6.2.1. of this Regulation.



3. Adjustment of the symmetrical passing-beam headlamp:

3.1. Horizontal adjustment: The beam with the "cut-off" line shall be so positioned that the projected beam pattern appears approximately symmetrical to the v-v-line.

3.2. Vertical adjustment: After horizontal adjustment of the symmetrical passing-beam headlamp according to paragraph 3.1. above, the vertical adjustment shall be performed in such a way that the beam with its cut-off line is moved upwards from the lower position until the cut-off line is situated at nominal vertical position. For nominal vertical adjustment the cut-off line is positioned on the v-v-line at 1° below the h-h-line.

If the horizontal part is not straight but slightly curved or inclined, the cut-off line shall not exceed the vertical range formed by two horizontal lines which are situated from 3° left to 3° right of the v-v-line at 0.2° for class B and [0.3°] for class A, C and D head lamps above and below the nominal position of the cut-off (see Figure 1).

3.3. When the vertical adjustments of three different individuals differs by more than 0.2° for class B and [0.3°] for class A, C and D head lamps, the horizontal part of the cut-off line is assumed not to provide sufficient linearity or sharpness for performing visual adjustment. In this case the quality of cut-off shall be tested instrumentally for compliance with requirements as follows.

4. Measurement of the quality of cut-off:

4.1. Measurements shall be performed by vertically scanning through the horizontal part of the cut-off line in angular steps not exceeding 0.05°

- at either a measurement distance of 10 m and a detector with a diameter of approximately 10 mm.
- or at a measurement distance of 25 m and a detector with a diameter of approximately 30 mm.

The measurement of the cut-off quality shall be considered acceptable if the requirements of the paragraph 4.1.2. of this Annex shall comply with at least one measurement at 10 m or 25 m.

The measuring distance at which the test was determined shall be noted down in paragraph 9., annex 1 "Communication form" of this Regulation.

The scanning is performed from its lower position upwards through the cut-off line along the vertical lines at  $-3^\circ$ ,  $-1.5^\circ$ ,  $+1.5^\circ$  and  $+3^\circ$  from the v-v-line. When so measured, the quality of the cut-off line shall meet the following requirements:

4.1.1. Not more than one cut-off line shall be visible. 1/

4.1.2. Sharpness of cut-off: if scanned vertically through the horizontal part of the cut-off line along the  $\pm 2.5^\circ$  -lines, the maximum value measured for:

$$G = (\log E_V - \log E_{(V+0.1^\circ)})$$

is called the sharpness factor G of the cut-off line. The value of G shall not be less than 0.13 for class B and 0.08 for classes A, C and D.

4.1.3. Linearity: the part of the cut-off line which serves for vertical adjustment shall be horizontal from  $3^\circ$ L to  $3^\circ$ R of the v-v-line. This requirement is deemed to be met if the vertical positions of the inflection points according to paragraph 3.2. above at  $3^\circ$  left and right of the v-v-line do not differ by more than  $0.2^\circ$  for class B and  $[0.3^\circ]$  for class A, C and D head lamps from the nominal position at the v-v-line.

5. Instrumental vertical adjustment: if the cut-off line complies with the above quality requirements, the vertical beam adjustment can be performed instrumentally. For this purpose the inflection point where  $d^2(\log E) / dv^2 = 0$  is positioned on the v-v-line in its nominal position below the h-h-line. The movement for measuring and adjusting the cut-off line shall be upwards from below the nominal position."

\* \* \*

## B. JUSTIFICATION

Verification of the light distribution pattern of a passing beam requires exact and correct vertical aiming with the aid of the cut-off. The quality of the cut-off therefore can have a significant influence on the photometric measurement procedure.

On the basis of similar proposals for Regulations Nos. 98 and 112 which are already being discussed in GRE, GTB has prepared a proposal which would introduce into Regulation No. 113 provisions regarding the definition and measurement of the cut-off.

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1/ This paragraph will be amended, if an objective test method is available.