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Economic Commission for Europe**Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on Lighting and Light-Signalling****Sixty-eighth session**

Geneva, 16–18 October 2012

Item 5(f) of the provisional agenda

Collective Amendments: Regulations Nos 3, 6, 7, 48, 77 and 91**Proposal for collective amendments to Regulations Nos. 3, 6,
7, 48, 77 and 91****Submitted by the experts from the Working Party “Brussels 1952”***

The text reproduced below was prepared by the expert from the Working Party “Brussels 1952” (GTB) amending the geometric visibility provisions. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106, ECE/TRANS/2010/8, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

I. Proposals

A. Proposal for Supplement 11 to the 04 series of amendments to Regulation No.48

Insert new paragraph 2.30. to read:

“2.30. “H plane” means the horizontal plane containing the centre of reference of the lamp.”

Paragraph 5.8., renumber subparagraphs and amend to read:

"5.8. The maximum height above the ground shall be measured from the highest point and the minimum height from the lowest point of the apparent surface in the direction of the reference axis.

Where the (maximum and minimum) height above the ground clearly meets the requirements of the Regulation, the exact edges of any surface need not be determined.

5.8.1. For the purposes of reducing the geometric visibility angles, the position of a lamp with regard to height above the ground, shall be measured from the horizontal plane containing the reference axis of the lamp (H plane).

5.8.2 In the case of dipped-beam headlamp, the minimum height in relation to the ground is measured from the lowest point of the effective outlet of the optical system (e.g. reflector, lens, projection lens) independent of its utilisation.

5.8.3. The position, as regards width, will be determined from that edge of the apparent surface in the direction of the reference axis which is the furthest from the median longitudinal plane of the vehicle when referred to the overall width, and from the inner edges of the apparent surface in the direction of the reference axis when referred to the distance between lamps.

Where the position, as regards width, clearly meets the requirements of the Regulation, the exact edges of any surface need not be determined."

Paragraphs 6.5.5. to 6.5.5.2., including the figures, amend to read:

"6.5.5. Geometric visibility

6.5.5.1. Horizontal angles: (see figure below)

~~Vertical angles: 15° above and below the horizontal for direction indicator lamps of categories 1, 1a, 1b, 2a, 2b and 5. The vertical angle below the horizontal may be reduced to 5° if the lamps are less than 750 mm above the ground; 30° above and 5° below the horizontal for direction indicator lamps of category 6. The vertical angle above the horizontal may be reduced to 5° if the optional rear lamps are not less than 2,100 mm above the ground.~~

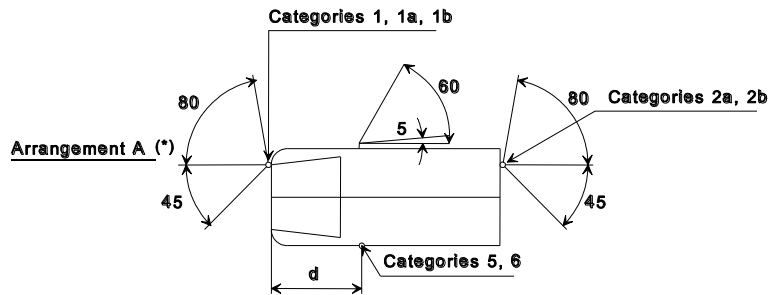
Vertical angles: 15° above and below the horizontal for direction indicator lamps of categories 1, 1a, 1b, 2a, 2b and 5.

However:

- where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°;
- where an optional rear lamp is mounted above 2,100 mm (measured according to the provisions of paragraph 5.8.1) the upward angle of 15° may be reduced to 5°.

30° above and 5° below the horizontal for direction indicator lamps of category 6.

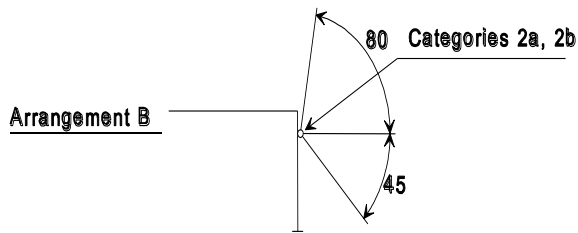
Figure (see paragraph 6.5.)



(*) The value of 5° given for dead angle of visibility to the rear of the side direction-indicator is an upper limit $d \leq 1.80$ m (for M_1 and N_1 category vehicles $d \leq 2.50$ m).

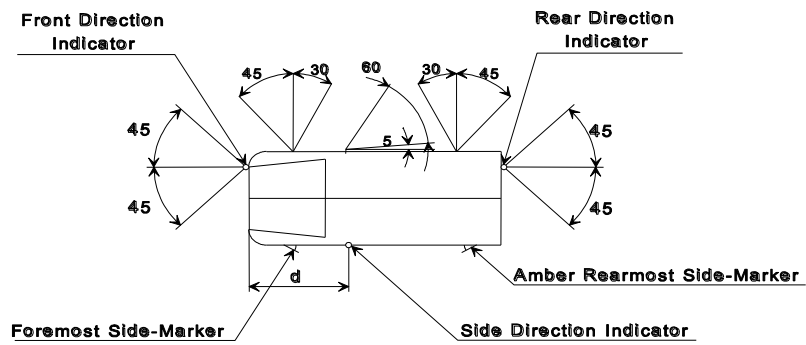
For M_1 and N_1 category vehicles, the value of 45° inward for the direction indicator lamps of categories 1, 1a or 1b, whose lower edge of the apparent surface is less than 750 mm above the ground, may be reduced to 20° under the horizontal plane containing the reference axis of this lamp.

For the direction indicator lamps of categories 1, 1a, or 1b, 2a and 2b mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.



6.5.5.2. or, at the discretion of the manufacturer, for M_1 and N_1 category vehicles: Front and rear direction indicator lamps, as well as side-marker lamps (**).

Horizontal angles: (see figure below)



(**) The value of 5° given for the dead angle of visibility to the rear of the side direction-indicator is an upper limit. $d \leq 2.50$ m

The value of 45° inward for the direction indicator lamps of categories 1, 1a or 1b, whose lower edge of the apparent surface is less than 750 mm above the ground, may be reduced to 20° under the horizontal plane containing the reference axis of this lamp.

However, for the direction indicator lamps of categories 1, 1a, or 1b, 2a and 2b mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.

~~Vertical angles: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° if the lamps are less than 750 mm above the ground.~~

Vertical angles: 15° above and below the horizontal. However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°.

To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5 square centimetres, except for side direction-indicators of categories 5 and 6. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded."

Paragraph 6.7.5., amend to read:

"6.7.5. Geometric visibility

Horizontal angle:

For S1 or S2 categories devices: 45° to the left and to the right of the longitudinal axis of the vehicle.

However, for the stop lamps of categories S1 and S2 mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.

For S3 or S4 categories devices: 10° to the left and to the right of the longitudinal axis of the vehicle;

Vertical angle :

For S1 or S2 categories devices: 15° above and below the horizontal.

~~However, the vertical angle below the horizontal may be reduced to 5°, if the height of the lamp is less than 750 mm. The vertical angle above the horizontal may be reduced to 5° in the case of optional lamps not less than 2,100 mm above the ground;~~

However,

- **where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°;**
- **where an optional lamp is mounted above 2,100 mm (measured according to the provisions of paragraph 5.8.1) the upward angle of 15° may be reduced to 5°.**

For S3 or S4 categories devices: 10° above and 5° below the horizontal."

Paragraphs 6.9.5. to 6.9.5.2., amend to read:

"6.9.5. Geometric visibility

6.9.5.1. Horizontal angle: 45° inwards and 80° outwards.

~~For M₁ and N₁ category vehicles where the lower edge of the apparent surface of the lamps is less than 750 mm above the ground, the value of 45° inward may be reduced to 20° under the horizontal plane containing the reference axis of this lamp.~~

However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.

In the case of trailers, the angle inwards may be reduced to 5°.

Vertical angle: 15° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5° in the case of lamps less than 750 mm above the ground.~~ **However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°.**

6.9.5.2. For M₁ and N₁ category vehicles, as an alternative to paragraph 6.9.5.1., at the discretion of the manufacturer or his duly accredited representative, and only if a front side-marker lamp is installed on the vehicle:

Horizontal angle: 45° outwards to 45° inwards.

~~Where the lower edge of the apparent surface of the lamps is less than 750 mm above the ground, the value of 45° inward may be reduced to 20° under the horizontal plane containing the reference axis of this lamp.~~

However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.

Vertical angle: 15° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5° if the lamps are less than 750 mm above the ground.~~

However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°.

To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5 cm². The illuminating surface area of any retro-reflector that does not transmit light shall be excluded."

Paragraphs 6.10.5. to 6.10.5.2., amend to read:

"6.10.5. Geometric visibility

6.10.5.1. Horizontal angle: 45° inwards and 80° outwards.

However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.

Vertical angle: 15° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5°, if the height of the lamp is less than 750 mm. The vertical angle above the horizontal may be reduced to 5° in the case of optional lamps not less than 2,100 mm above the ground;~~

However,

- **where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°;**
- **where an optional lamp is mounted above 2,100 mm (measured according to the provisions of paragraph 5.8.1) the upward angle of 15° may be reduced to 5°.**

6.10.5.2. For M₁ and N₁ category vehicles, as an alternative to paragraph 6.10.5.1., at the discretion of the manufacturer or his duly accredited representative, and only if a rear side-marker lamp is installed on the vehicle,

Horizontal angle: 45° outwards to 45° inwards. **However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.**

Vertical angle: 15° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm.~~

However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°.

To be considered visible, the lamp must provide an unobstructed view of the apparent surface of at least 12.5 square centimetres. The illuminating surface area of any retro-reflector that does not transmit light shall be excluded."

Paragraph 6.12.5., amend to read:

"6.12.5. Geometric visibility

Horizontal angle: 45° outwards, forwards and rearwards.

However, where a front or rear parking lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the inward angle of 45° may be reduced to 20° under the H plane.

Vertical angle: 15° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm.~~

However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°."

Paragraph 6.14.5., amend to read:

"6.14.5. Geometric visibility

Horizontal angle: 30° inwards and outwards.

Vertical angle: 10° above and below horizontal. ~~The vertical angle below the horizontal may be reduced to 5° in the case of a retro-reflector less than 750 mm above the ground.~~

However, where a retro-reflector is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 10° may be reduced to 5°."

Paragraph 6.15.5., amend to read:

"6.15.5. Geometric visibility

Horizontal angle: 30° inwards and outwards.

Vertical angle: 15° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5° in the case of a retro-reflector less than 750 mm above the ground.~~

However, where a retro-reflector is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 15° may be reduced to 5°."

Paragraph 6.16.5., amend to read:

"6.16.5. Geometric visibility

Horizontal angle: 30° inwards and outwards. In the case of trailers, the angle inwards may be reduced to 10°. If because of the construction of the trailers this angle cannot be met by the mandatory retro-reflectors, then additional (supplementary) retro-reflectors shall be fitted, without the width limitation (paragraph 6.16.4.1.), which shall, in conjunction with the mandatory retro-reflectors, give the necessary visibility angle.

Vertical angle: 10° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5° in the case of a retro-reflector less than 750 mm above the ground.~~ **However, where a retro-reflector is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 10° may be reduced to 5°."**

Paragraph 6.17.5., amend to read:

"6.17.5. Geometric visibility

Horizontal angle: 45° to the front and to the rear.

Vertical angle: 10° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5° in the case of a retro-reflector less than 750 mm above the ground.~~ **However, where a retro-reflector is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 10° may be reduced to 5°."**

Paragraph 6.18.5., amend to read:

"6.18.5. Geometric visibility

Horizontal angle: 45° to the front and to the rear; however for vehicles on which the installation of the side-marker lamps is optional this value can be reduced to 30°.

If the vehicle is equipped with side-marker lamps used to supplement the reduced geometric visibility of front and rear direction indicator lamps conforming to paragraph 6.5.5.2. and/or position lamps conforming to paragraphs 6.9.5.2. and 6.10.5.2., the angles are 45° towards the front and rear ends of the vehicle and 30° towards the centre of the vehicle (see the figure in paragraph 6.5.5.2. above).

Vertical angle: 10° above and below the horizontal. ~~The vertical angle below the horizontal may be reduced to 5° in the case of a side marker lamp less than 750 mm above the ground.~~ **However, where a lamp is mounted below 750 mm (measured according to the provisions of paragraph 5.8.1), the downward angle of 10° may be reduced to 5°."**

B. Proposal for Supplement 14 to the 02 series of amendments to Regulation No.3

Annex 7:

Insert a new paragraph 3.2., to read:

"3.2. However, in the case where a retro-reflecting device of Class IA, Class IB, Class IIIA or Class IIIB is intended to be installed with its H plane at a mounting height less than 750 mm above the ground, the CIL values are verified only up to an angle of 5° downwards."

Renumber former paragraph 3.2. to read paragraph 3.3.

Insert a new paragraph 3.4., to read:

"3.4. However, in the case where a retro-reflecting device of Class IVA is intended to be installed with its H plane at a mounting height less than 750 mm above the ground, the CIL values are verified only up to an angle of 5° downwards."

C. Proposal for Supplement 24 to the 01 series of amendments to Regulation No.6

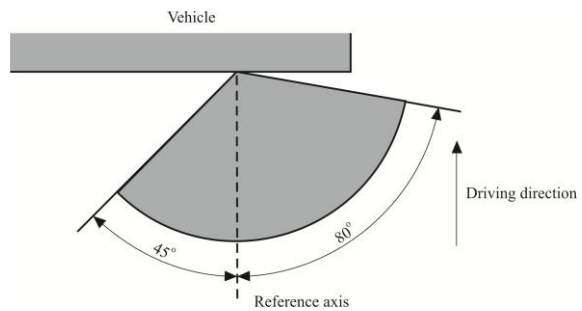
Annex 1, amend to read:

"...

In all cases, the minimum vertical angles of light distribution in space of direction indicator lamps are 15° above and 15° below the horizontal except:

- (a) Direction indicator lamps **intended to be installed with the reference axis of the lamp at** with a mounting height of equal to or less than 750 mm above the ground, for which they are 15° above and 5° below the horizontal;
- (b) **Optional direction indicator lamps intended to be installed with the reference axis of the lamp at a mounting height of more than 2100 mm above the ground, for which they are 5° above and 15° below the horizontal;**
- (c) Direction indicator lamps of Category 6, ...

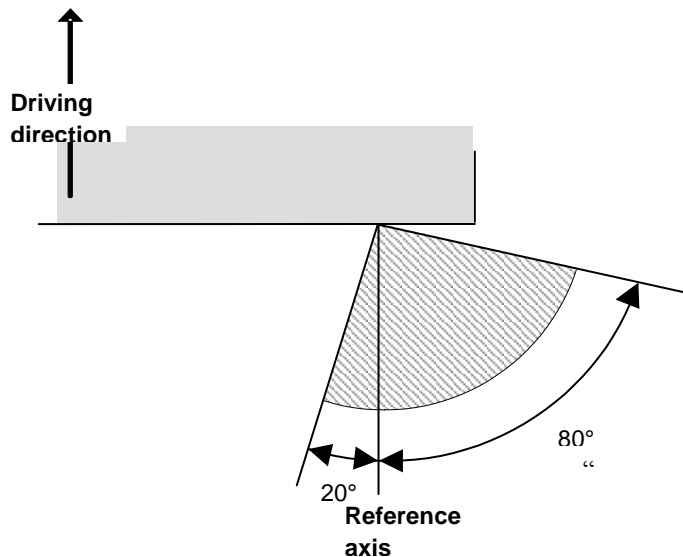
H plane: "horizontal plane going through the reference centre of the lamp"



- Categories 2a and 2b: Direction indicators for the rear of the vehicle
- Category 2a: Rear direction indicator lamps with steady luminous intensity
- Category 2b: Rear direction indicator lamps with variable luminous intensity

Add a new diagram and associated text, to read:

“



Under the H plane for lamps intended to be installed with this plane at a mounting height less than 750 mm above the ground.

Categories 5 and 6: Supplementary side direction indicators for use on a vehicle also equipped with categories 1, 1a or 1b and 2a or 2b direction indicators

Annex 4, Paragraph 2.1.3., amend to read:

~~“2.1.3. However, in the case where a device is intended to be installed at a mounting height of equal to or less than 750 mm above the ground, the photometric intensity is verified only up to an angle of 5° downwards.”~~

However, in the case where a device is intended to be installed with its H plane at a mounting height less than 750 mm above the ground, the photometric intensity is verified only up to an angle of 5° downwards.”

D. Proposal for Supplement 22 to the 02 series of amendments to Regulation No.7

Annex 1, amend to read:

“ ...

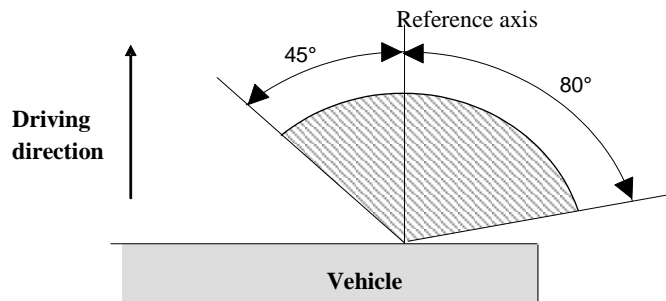
In all cases, the minimum vertical angles of light distribution in space are 15° above and 15° below the horizontal for all categories of devices included in this Regulation, except:

- ~~(a) For lamps with a permissible mounting height \leq 750 mm above the ground, for which they are 15° above and 5° below the horizontal;~~
- ~~(b) For category S3 or S4 stop lamp for which they are 10° above and 5° below the horizontal.~~
- (a) For lamps intended to be installed with their H plane at a mounting height less than 750 mm above the ground, for which they are 15° above and 5° below the horizontal;**
- (b) Optional lamps intended to be installed with their H plane at a mounting height more than 2100 mm above the ground, for which they are 5° above and 15° below the horizontal;**
- (c) For category S3 or S4 stop lamp for which they are 10° above and 5° below the horizontal.”**

Front position lamps,
End-outline marker
lamps

On and above the H
plane for all lamps.

Under the H plane for
lamps intended for
M2, M3, N2 or N3
category vehicles.



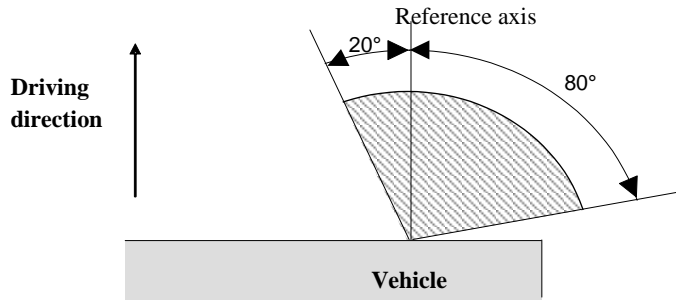
Front position lamps,
Under the H plane for
M1 or N1 category
vehicles.

H plane: "horizontal plane going through the reference centre of the lamp"

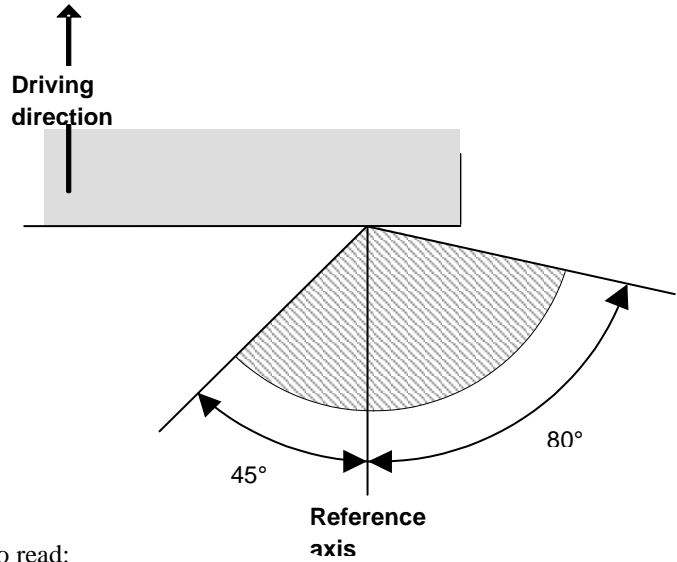
Add a new diagram and associated text, to read:

“

Under the H plane for front position lamps intended to be installed with this plane at a mounting height less than 750mm above ground.



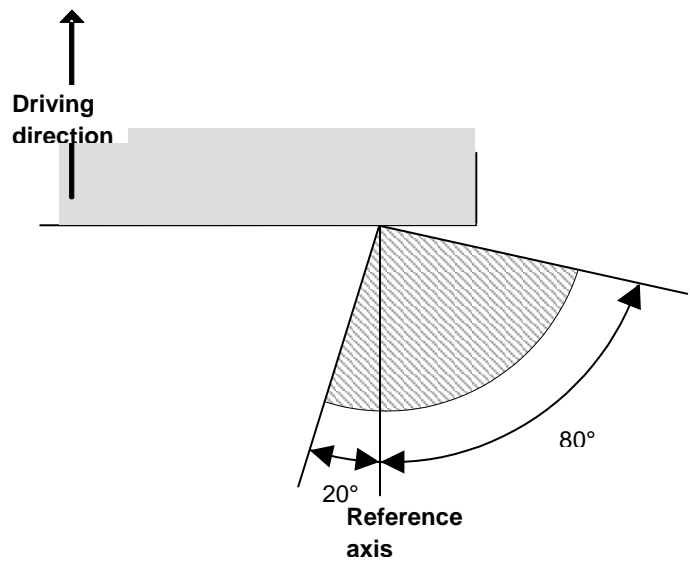
Rear position lamps,
end-outline marker lamps



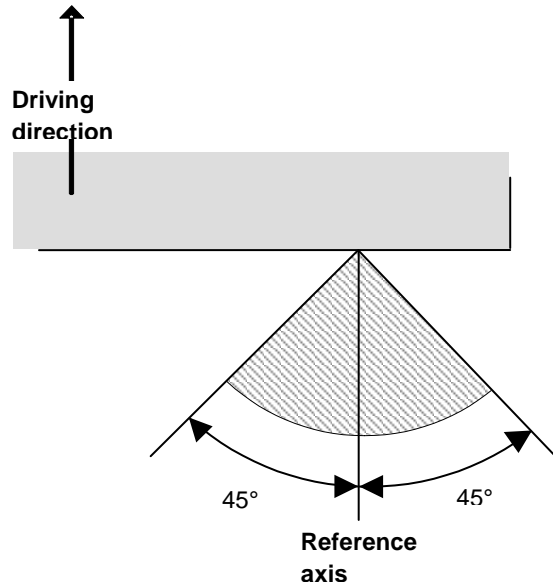
Add a new diagram and associated text, to read:

“

Under the H plane for rear position lamps intended to be installed with this plane at a mounting height less than 750mm above ground.



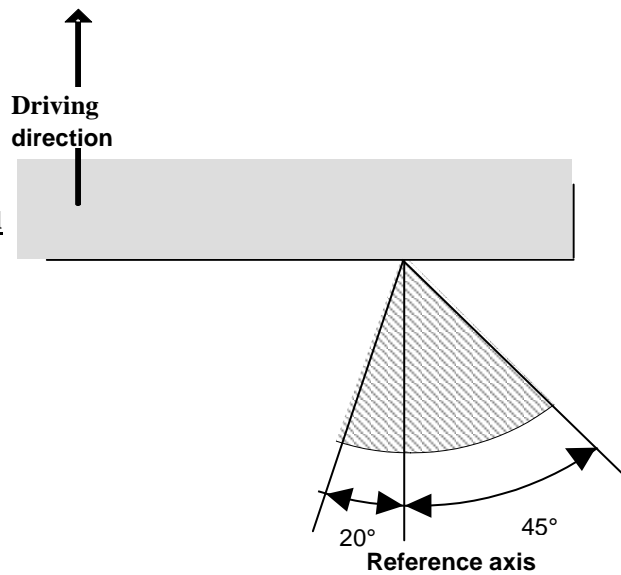
”Stop-lamps (S1 and S2)



Add a new diagram and associated text, to read:

“

Under the H plane for stop lamps (S1 and S2) intended to be installed with this plane at a mounting height less than 750mm above ground.



Stop-lamps (S3 and S4)

”

E. Proposal for Supplement 16 to the 00 series of amendments to Regulation No.77

Annex 3, amend to read:

“MINIMUM ANGLES REQUIRED FOR THE LIGHT DISTRIBUTION IN SPACE

~~In all cases, the minimum vertical angles of light distribution in space are 15° above and 15° below the horizontal except for lamps with a mounting height of equal to or less than 750 mm above the ground, for which they are 15° above and 5° below the horizontal.~~

In all cases, the minimum vertical angles of light distribution in space are 15° above and 15° below the horizontal except for lamps intended to be installed with their H plane at a mounting height less than 750 mm above the ground, for which they are 15° above and 5° below the horizontal.”

Annex 4, Paragraph 2.3., amend to read:

~~“2.3. — However in the case where a device is intended to be installed at a mounting height of equal to or less than 750 mm above the ground, the photometric intensity is verified only up to an angle of 5° downwards.~~

2.3. However in the case where a device is intended to be installed **with its H plane** at a mounting height less than 750 mm above the ground, the photometric intensity is verified only up to an angle of 5° downwards.”

F. Proposal for Supplement 15 to the 00 series of amendments to Regulation No.91

Annex 1, amend to read:

“MINIMUM ANGLES REQUIRED FOR LIGHT DISTRIBUTION IN SPACE

.....

~~The angle of 10° below the horizontal may be reduced to 5° in case of lamps with a mounting height of equal to or less than 750 mm above the ground.~~

The angle of 10° below the horizontal may be reduced to 5° in case of lamps intended to be installed with their H plane at a mounting height less than 750 mm above the ground.”

Annex 4, paragraph 2.3., amend to read:

~~“2.5. — However, in the case where the device is intended to be installed at a mounting height of equal to or less than 750 mm above the ground, the photometric intensity is verified only up to an angle of 5° downwards.~~

“2.5. However, in the case where the device is intended to be installed **with its H plane** at a mounting height less than 750 mm above the ground, the photometric intensity is verified only up to an angle of 5° downwards.”

II. Justification

1. During the sixty-fourth GRE session, the GTB proposal to amend Regulation No. 48 (ECE/TRANS/WP.29/GRE/2010/29) on reducing geometric visibility angles for rear signalling lamps and retro-reflectors was not adopted.
 2. GTB was invited to reconsider the requirements on reducing geometric visibility angles when the lamp is installed at less than 750 mm from the ground and to unify the installation requirements for the front and rear signalling and retro-reflective devices. GRE could not accept the reference to the lower edge of the apparent surface as the criterion for determining the mounting height of the lamp and suggested that a more realistic alternative should be developed.
 3. The proposed text aims to introduce revised requirements for reducing geometric visibility angles for cases of installation below 750 mm and above 2100 mm from the ground and for all vehicle categories covered by Regulation No. 48. The criterion for determining the mounting height above the ground is based upon the determination of a horizontal plane, "H Plane", containing the reference axis of the lamp or retro-reflector, instead of the lower edge of the apparent surface as originally proposed. A new definition for "H plane" is included in the proposed amendment to Regulation No.48. In such a way that there is no more need to repeat this definition in each specific Regulation.
 4. The proposal for amendment to Regulation No. 48 was submitted for discussion to GRE at its sixty-seventh session and was adopted in principle. This collective amendment includes the associated amendments to Regulations Nos. 3, 6, 7, 48, 77 and 91.
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