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World Forum for Harmonization of Vehicle Regulations

Working Party on Lighting and Light-Signalling

Sixty-second session
Geneva, 6 - 9 October 2009
Item 11 of the provisional agenda

REGULATION No. 99
(Gas-discharge light sources)

Proposal for draft Supplement 6 to the original version of Regulation No. 99

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

The text reproduced below was prepared by the expert from GTB in order to specify the measurement of the arc, the maximum lamp outline, and to ensure that gas discharge light sources in this regulation are of the low and Ultra Violet (UV) type. The modifications to the existing text of the Regulation are marked in bold 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

Paragraph 3.10., amend to read:

"3.10. UV radiation

The UV radiation of the gas-discharge light source shall be such that **the gas discharge light source is of the low UV type complying with:**

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

where...."

Annex 1,

List of sheets for gas-discharge light sources and their sequence in this annex, amend to read:

Sheet numbers	
DxR/1 to 7	(Sheet DxR/6: two pages)
DxS/1 to 6	

Sheets DxR/1 to 3 and DxR/6, replace by new sheets, to read (see next pages):

Sheets DxS/1 to 3 and DxS/6, replace by new sheets, to read (see next pages):

CATEGORIES D1R, D2R, D3R AND D4R

Sheet DxR/1

The drawings are intended only to illustrate the essential dimensions (in mm)
of the gas-discharge light source

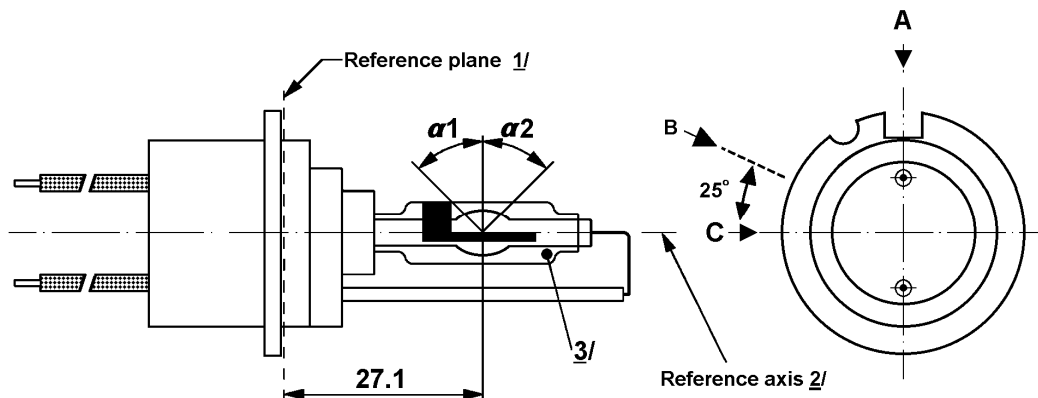


Figure 1 - Category D1R - Type with cables - Cap PK32d-3

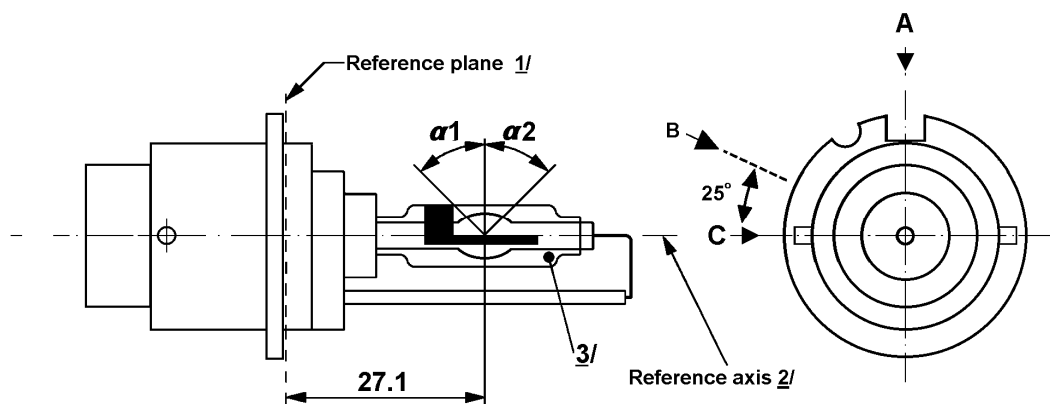


Figure 2 - Category D2R - Type with connector - Cap P32d-3

- 1/ The reference plane is defined by the positions on the surface of the holder on which the three supporting bosses of the cap ring will rest.
- 2/ See sheet DxR/3.
- 3/ With respect to the reference axis, when measured at a distance of 27.1 mm from the reference plane the eccentricity of the outer bulb shall be less than ± 0.5 mm in direction C and less than $- 1$ mm /+ 0.5 mm in direction A.

CATEGORIES D1R, D2R, D3R AND D4R

The drawings are intended only to illustrate the essential dimensions (in mm) of the gas-discharge light source

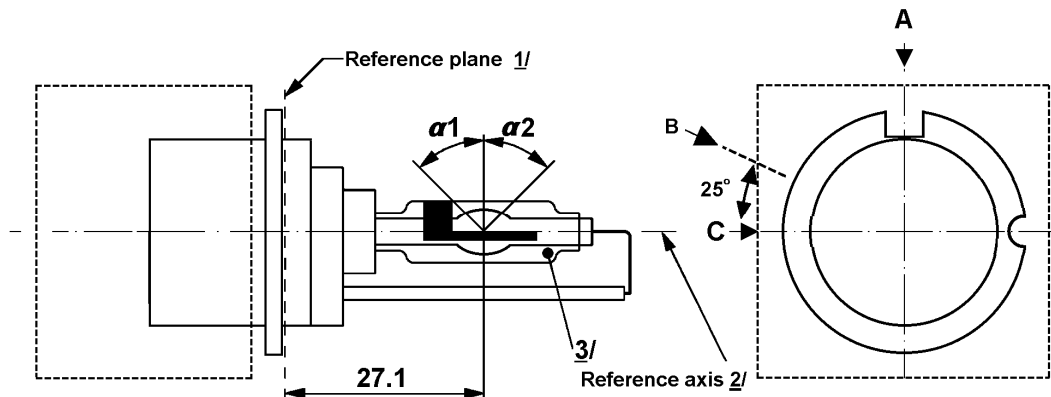


Figure 3 – Category D3R - Type with starter – Cap PK32d-6

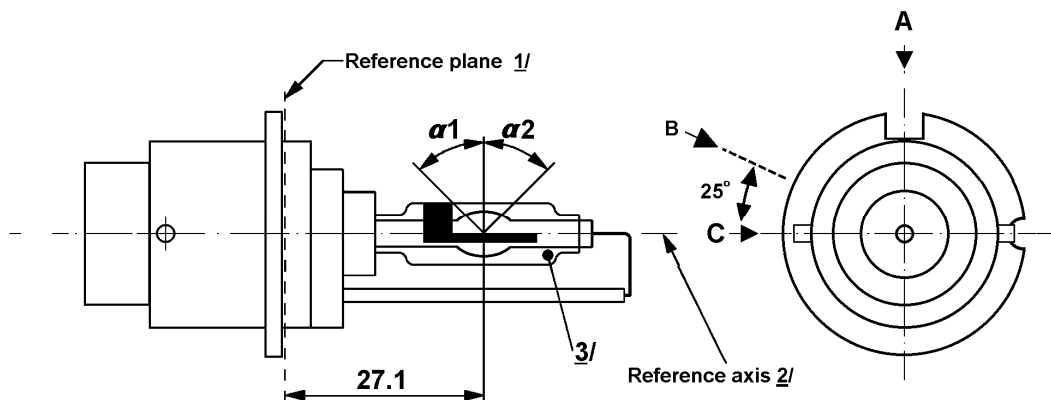


Figure 4 - Category D4R - Type with connector – Cap P32d-6

- 1/ The reference plane is defined by the positions on the surface of the holder on which the three supporting bosses of the cap ring will rest.
- 2/ See sheet DxR/3.
- 3/ With respect to the reference axis, when measured at a distance of 27.1 mm from the reference plane the eccentricity of the outer bulb shall be less than ± 0.5 mm in direction C and less than $- 1$ mm $/+ 0.5$ mm in direction A.

Figure 5
Definition of reference axis 1/

The cap shall be pushed in this direction

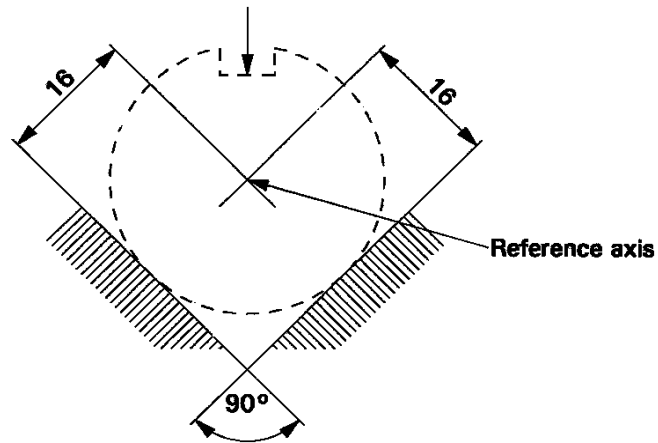
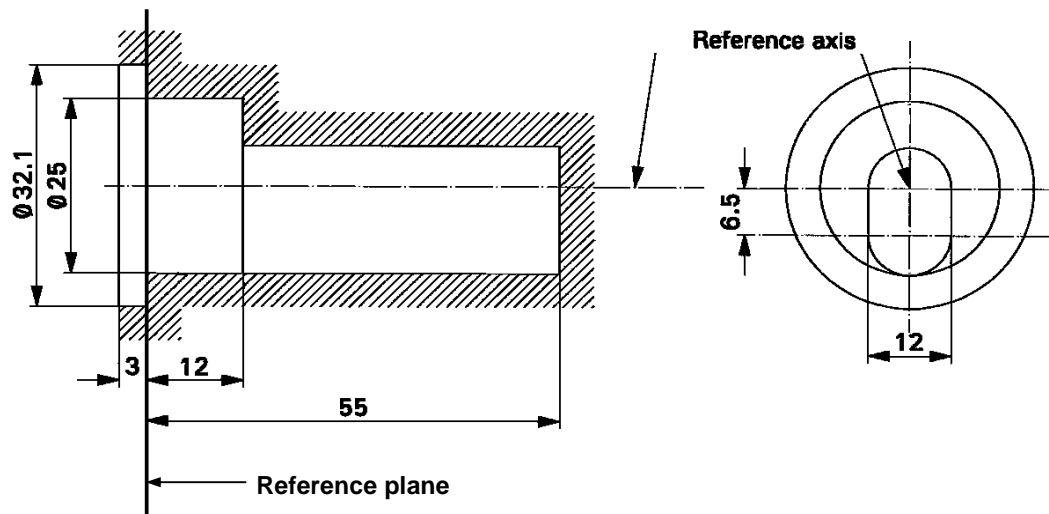


Figure 6
Maximum lamp outline 2/

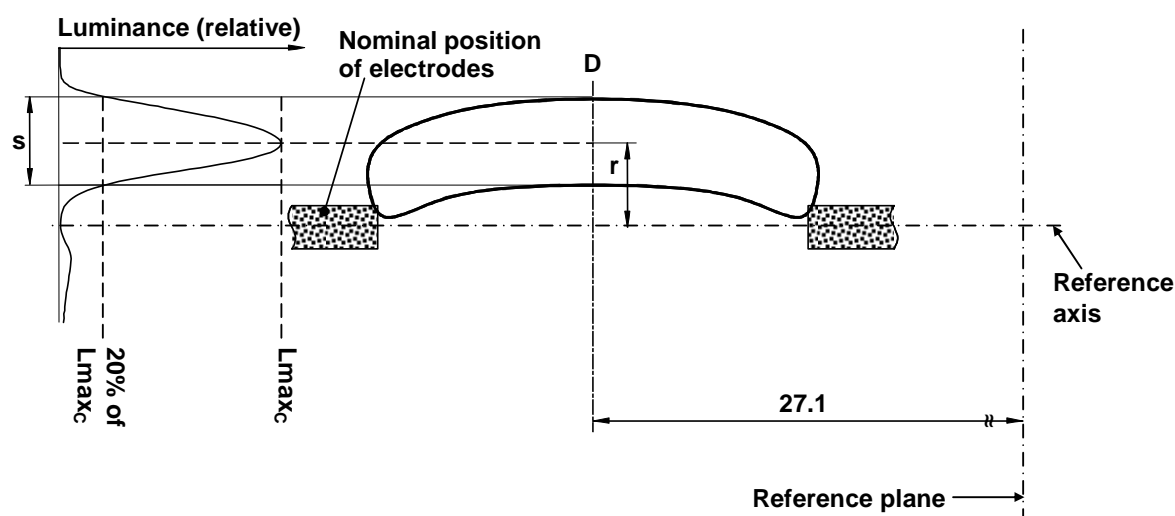


- 1/ The reference axis is perpendicular to the reference plane and crosses the intersection of the two parallel lines as indicated in figure 5.
- 2/ Glass bulb and supports shall not exceed the envelope, as indicated in figure 6. The envelope is concentric with the reference axis.

Position and form of the arc

This test is used to determine the form and sharpness of the arc and its position relative to the reference axis and plane by determining its bending and diffusion; by measuring the luminance in the central cross section D, where L_{max_C} is the maximum luminance of the arc measured from viewing direction C; see sheet D_xR/2.

L_{max_C}



Relative luminance distribution in the central cross section D.

The form of the arc is for illustration purpose only.

Measuring direction C as defined on sheet D_xR/7.

When measuring the relative luminance distribution in the central cross section D as indicated in the drawing above, the maximum value L_{max_C} has the distance r from the reference axis. The points of 20% of L_{max_C} have the distance s, as shown in the drawing above.

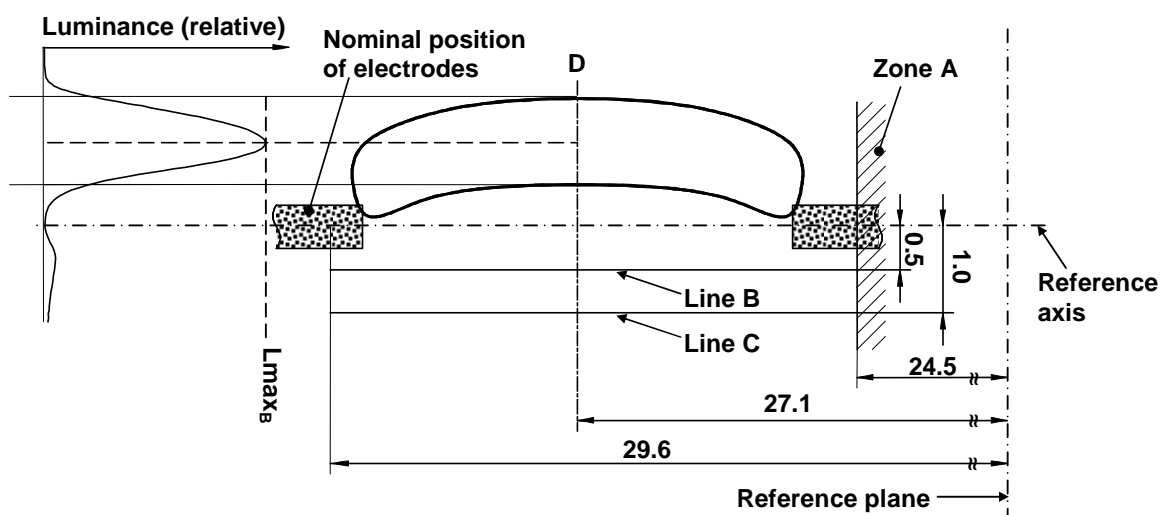
Dimension in mm	Production light sources		Standard light sources
	D1R/D2R	D3R/D4R	
r (arc bending)	0.50 ± 0.25	0.50 ± 0.25	0.50 ± 0.20
s (arc diffusion)	1.10 ± 0.25	1.10 + 0.25/-0.40	1.10 ± 0.25

CATEGORIES D1R, D2R, D3R AND D4R

Stray light

This test is used to determine unwanted reflected stray light by measuring the luminance in Zone A and at lines B and C, where L_{max_B} is the maximum luminance of the arc measured from viewing direction B; see sheet DxR/2.

L_{max_B}



Relative luminance distribution in the central cross section D.

The form of the arc is for illustration purpose only.

Measuring direction B as defined on sheet DxR/7.

When measuring the luminances from measuring direction B as defined on sheet DxR/7 with a set-up as outlined in annex 5, however with a circular field of 0.2M mm diameter, the relative luminance expressed as a percentage of L_{max_B} (at cross section D) shall be:

Zone A	$\leq 4.5 \%$
Line B	$\leq 15 \%$
Line C	$\leq 5.0 \%$

The area of zone A is defined by the black coating, the outer bulb and a plane at 24.5 mm from the reference plane.

CATEGORIES D1S, D2S, D3S AND D4S

The drawings are intended only to illustrate the essential dimensions (in mm) of the gas-discharge light source

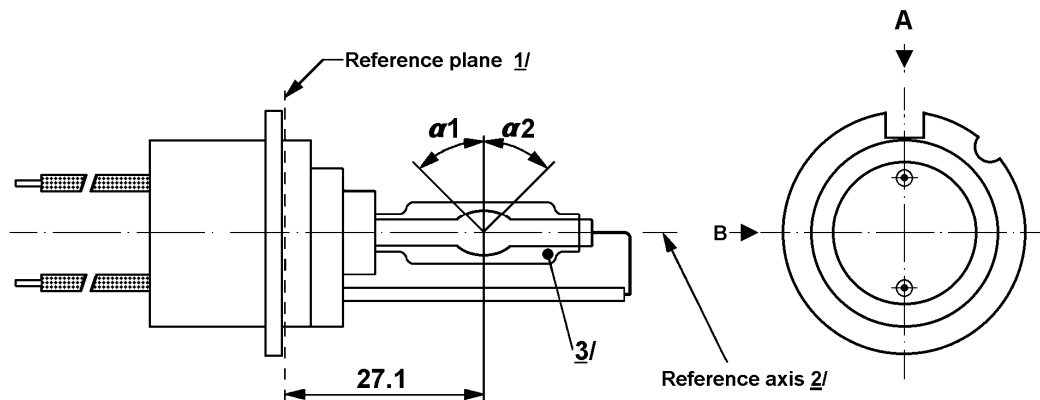


Figure 1 - Category D1S - Type with cables - Cap PK32d-2

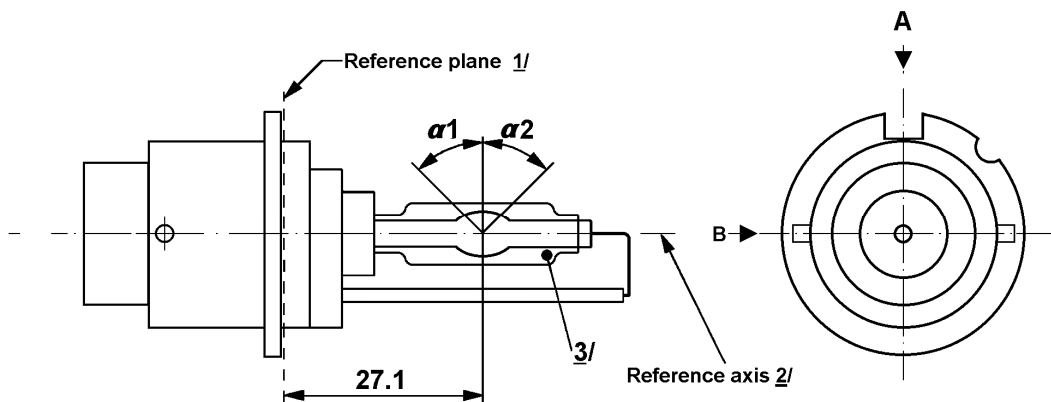


Figure 2 - Category D2S - Type with connector - Cap P32d-2

- 1/ The reference plane is defined by the positions on the surface of the holder on which the three supporting bosses of the cap ring will rest.
- 2/ See sheet DxS/3.
- 3/ When measured at a distance of 27.1 mm from the reference plane and with respect to the mid-point of the inner bulb, the outer bulb shall have an eccentricity of 1 mm max.

CATEGORIES D1S, D2S, D3S AND D4S

Sheet DxS/2

The drawings are intended only to illustrate the essential dimensions (in mm)
of the gas-discharge light source

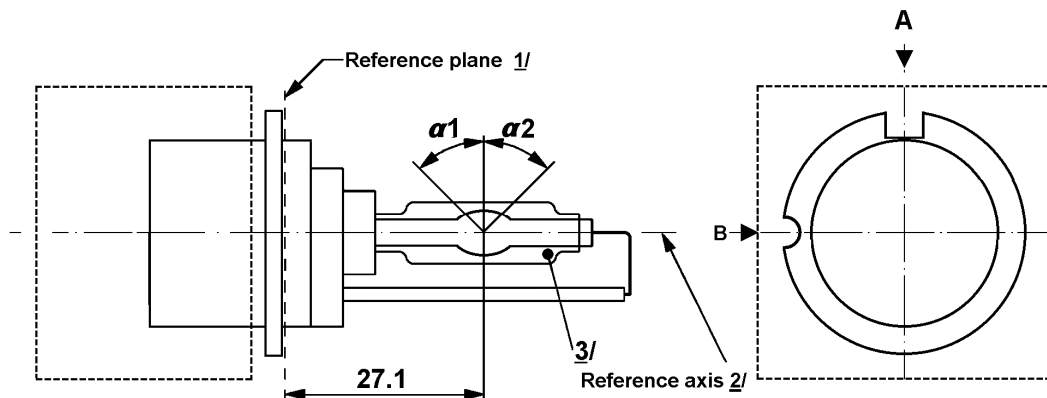


Figure 3 - Category D3S - Type with starter - Cap PK32d-5

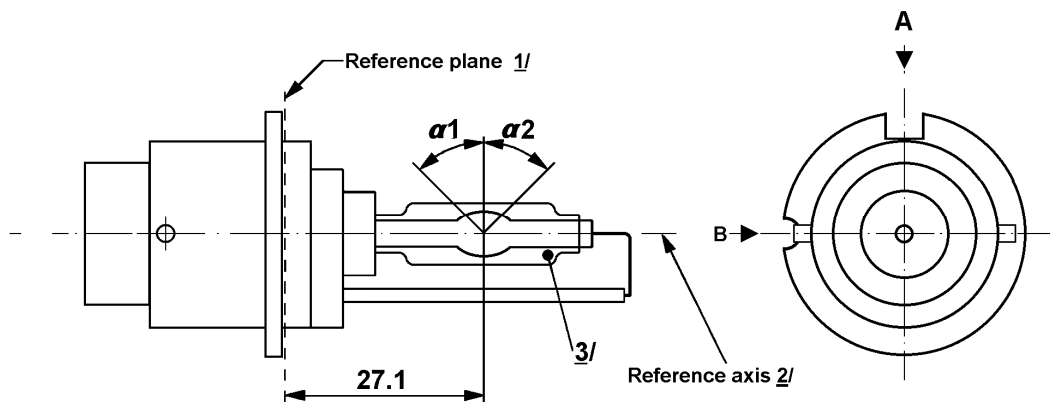


Figure 4 - Category D4S - Type with connector - Cap P32d-5

- 1/ The reference plane is defined by the positions on the surface of the holder on which the three supporting bosses of the cap ring will rest.
- 2/ See sheet DxS/3.
- 3/ When measured at a distance of 27.1 mm from the reference plane and with respect to the mid-point of the inner bulb, the outer bulb shall have an eccentricity of 1 mm max.

Figure 5
Definition of reference axis 1/

The cap shall be pushed in this direction

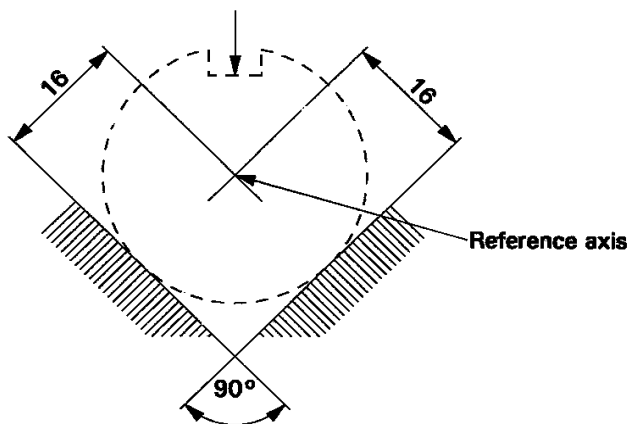
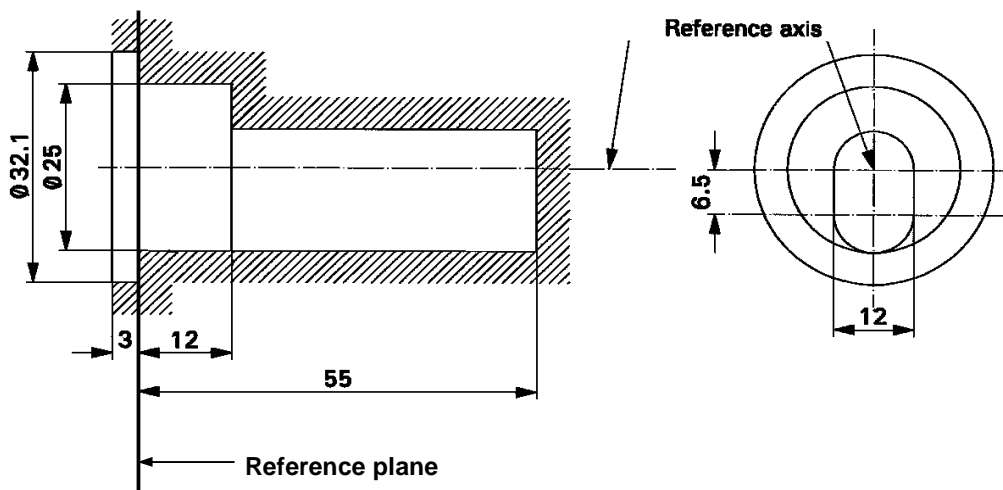


Figure 6
Maximum lamp outline 2/



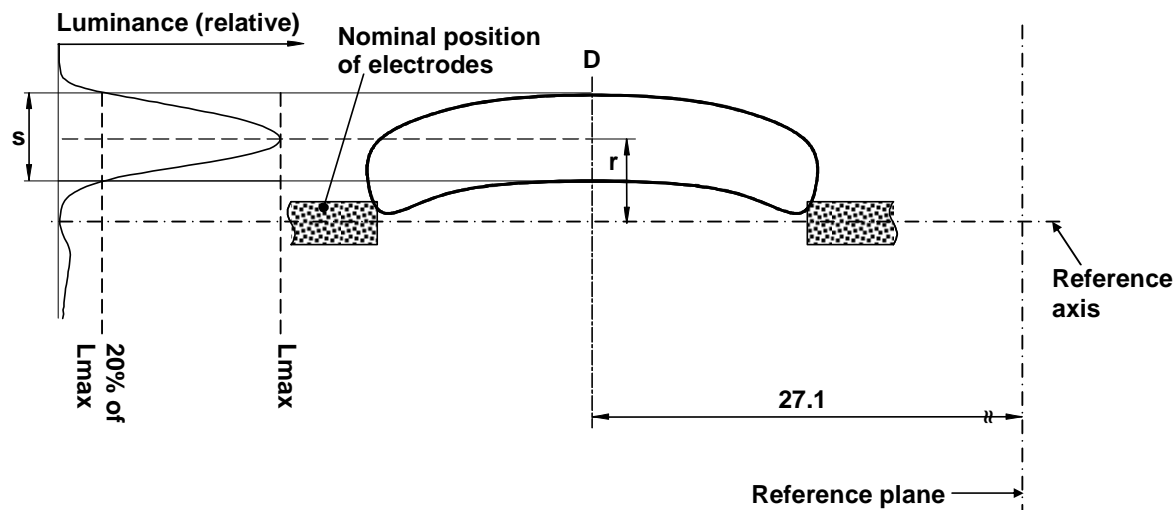
- 1/ The reference axis is perpendicular to the reference plane and crosses the intersection of the two parallel lines as indicated in figure 5.
- 2/ Glass bulb and supports shall not exceed the envelope, as indicated in figure 6. The envelope is concentric with the reference axis.

CATEGORIES D1S, D2S, D3S AND D4S

Sheet DxS/6

Position and form of the arc

This test is used to determine the form of the arc and its position relative to the reference axis and the reference plane by measuring its bending and diffusion in the cross section at a distance 27.1 mm from the reference plane.



Relative luminance distribution in the central cross section D.

The form of the arc is for illustration purpose only.

Measuring direction B: light source side view

When measuring the relative luminance distribution in the central cross section as indicated in the drawing above, the maximum value shall be located within the distance r from the reference axis. The point of 20% of the maximum value shall be within s:

Dimension in mm	Production light sources	Standard light sources
r (arc bending)	0.50 ± 0.40	0.50 ± 0.20
s (arc diffusion)	1.10 ± 0.40	1.10 ± 0.25

B. JUSTIFICATION

The position and form of the arc of gas discharge light sources D1R, D2R, D3R and D4R shall be measured as prescribed on sheet DxR/6. The drawing on this sheet shows the reference plane on the left-hand side. This drawing should be mirrored.

Moreover, Lmax is currently not clearly defined. It is proposed to measure arc bending and arc diffusion in the central cross section D by "Lmax_C" in viewing direction C and to measure unwanted stray light in Zone A, Line B and C by "Lmax_B" in viewing direction B. The measuring directions have been clarified as well.

For consistency reasons, similar changes are proposed for gas discharge light sources D1S, D2S, D3S and D4S, as far as applicable (black stripes, unwanted reflected stray light only for "R"-categories).

The position and dimension of the maximum lamp outline should be specified with respect to the reference axis and the reference plane. In figures 6 of sheets DxR/3 and DxS/3, the reference plane is missing. Accordingly, this is to be corrected.

Headlamp regulations specify that UV-resistance testing of internal materials is not necessary if low UV-type gas discharge light sources as specified in Regulation No. 99 are applied. This proposal is to clarify that Regulation No. 99 is only specifying low UV type gas discharge light sources, by specifying low UV explicitly and replacing the drawings of the S-types.
