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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****Eightieth session**

Geneva, 23-26 October 2018

Item 5 of the provisional agenda

UN Regulations Nos. 37 (Filament lamps), 99 (Gas discharge light sources), 128 (Light emitting diodes light sources) and the Consolidated Resolution on the common specification of light source categories**Proposal for amendment to version [4] of the Consolidated Resolution on the common specification of light source categories****Submitted by the Task Force on Substitutes and Retrofits (TF SR)***

The text reproduced below was prepared by the Task Force on Substitutes and Retrofits (TF SR) as a revision of the original proposal prepared by the expert from the International Automotive Lighting and Light Signalling Expert Group (GTB with the aim to introduce a new light emitting diode (LED) substitute light source category PY21W/LED. This proposal is based on ECE/TRANS/WP.29/GRE/2017/17, and is part of a package which also includes amendments to UN Regulation No. 128. The comments made during the seventy-ninth session of GRE have been taken into account as well as the draft amendments to R.E.5 in documents ECE/TRANS/WP.29/2018/32 and ECE/TRANS/WP.29/2018/33. The modifications to the existing text of the Resolution are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2018–2019 (ECE/TRANS/274, para. 123 and ECE/TRANS/2018/21/Add.1, cluster 3.1), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate



I. Proposal

The Status table, insert a new row at the bottom to read:

[4]	[2019-xx-xx]	[177]	[ECE/TRANS/WP.29/2019/xx]	Introduction of a new LED substitute light source category PY21W/LED as a package with Supplement [9] to Regulation No.128
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Insert a new paragraph 2.1.1.3.1., to read:

“2.1.1.3.1. “LED substitute light source” means a LED light source of a category which has a counterpart light source category producing light by another light generating technology.”

Paragraph 3.3., insert at the end new tables for Group 3 and Group 4, to read:

“

<i>Group 3</i>				
RESERVED				

<i>Group 4</i>		
<i>LED substitute light source categories¹ only for use in lamps approved with filament light source(s) of its counterpart light source category</i>		
<i>Category</i>	<i>Counterpart filament light source category</i>	<i>Sheet number(s)</i>
PY21W/LED	PY21W	PY21W/LED/1 to 4

¹ Not for use in conformity of production control of lamps.

Annex 3,

List of sheets for LED light sources and their sequence, amend to read:

“

<i>Sheet number(s)</i>	_____
	L1/1 to 5
	LR1/1 to 5
	LW2/1 to 5
	Lx3/1 to 6
	LR4/1 to 5
	Lx5/1 to 6
	PY21W/LED/1 to 4

”

After sheet Lx5/6, insert new sheets PY21W/LED/1 to 4, to read:
(see the following pages; one page per sheet)

"

The drawings are intended only to illustrate the essential dimensions (in mm) of the LED light source.

Figure 1
Main drawing

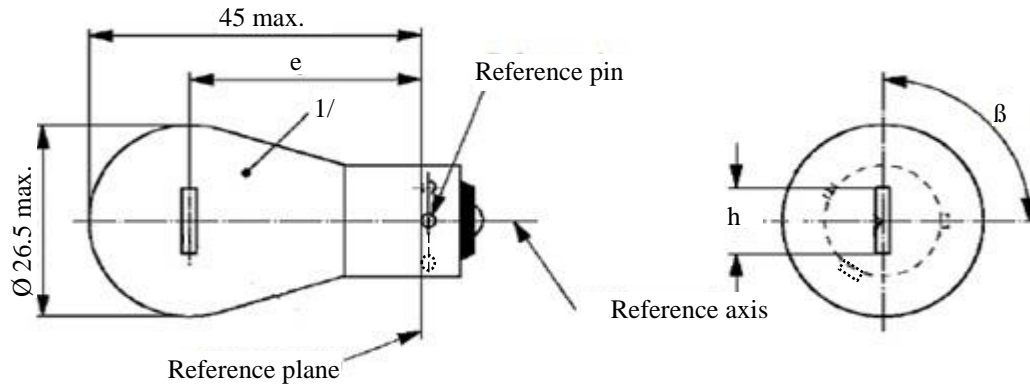


Table 1
Essential electrical and photometric characteristics of LED light sources

Dimensions in mm		LED light sources of normal production			Standard LED light source
		min.	nom.	max.	nom.
e			31.8 ^{2/}		31.8 ^{2/}
h			9.0 ^{2/}		9.0 ^{2/}
β		75°	90°	105°	90°±10°
Cap [BAU15s-3(110°)] in accordance with IEC Publication 60061 (sheet 7004-[19A-1])					
Electrical ^{5/} and photometric characteristics					
Rated values	Volts	12	24		12
	Watts		7 ^{3/}		7 ^{3/}
Test voltage	Volts	13.5	28.0		13.5
Objective values	Watts	9 max. ^{3/}	10 max. ^{3/}		9 max. ^{3/}
	Electrical current (in mA at 9-16V DC)		150 min. 750 max.		
	Luminous flux ^{3/, 4/} (in lm at 13.5 V DC)		280 ± 20 %		280 ± 10 %
	Luminous flux ^{3/} (in lm at 9 V DC)		56 min.		56 min.

¹ The light emitted from the LED light source shall be amber.
² To be checked by means of a "Box-System"; sheet PY21W/LED/2.
³ Operated in flashing mode for 30 minutes (frequency = 1.5 Hz, duty cycle 50 per cent ON, 50 per cent OFF) and measured in the ON-state of flashing mode after 30 minutes of operation.
⁴ The value measured at elevated ambient temperature of 80°C shall be at least 65% of this value.
⁵ In case of a failure of any of the light emitting elements, the LED light source shall either still comply to the requirements concerning luminous flux and luminous intensity distribution or stop emitting light whereby/in the latter case the electrical current draw, when operated between 12 V and 14 V, shall be less than 50 mA.

Screen projection requirements

The following test is intended to define the requirements for the apparent light emitting area of the LED light source and to determine whether the light emitting area is correctly positioned relative to the reference axis and reference plane in order to check compliance with the requirements.

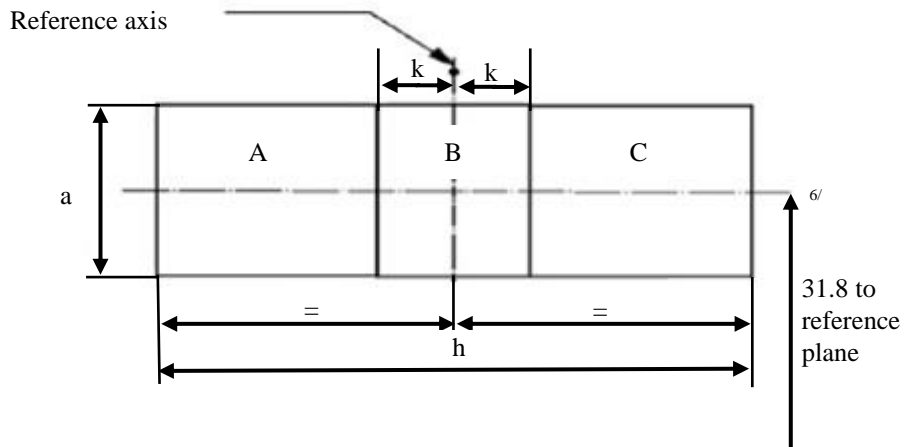
The position of the light emitting area is checked by means of a box system defined by the projections when viewing along direction $\gamma = 0^\circ$ (top view), $\gamma = \pm 45^\circ$ (inclined view) and $\gamma = \pm 90^\circ$ (front and rear view) in the plane C_0 (C, γ as defined in Figure 3).

The proportion of the total luminous flux emitted into these viewing directions from the area(s) as defined in figure 2:

- A, B and C together shall be 80 per cent or more;
- B shall be 25 per cent or more;
- A and C shall each be 15 per cent or more.

Figure 2

Box definition of the light emitting area with dimensions as specified in table 2



The lateral position of the light emitting area needs to be centred in the plane containing the reference axis and being perpendicular to the plane containing the reference axis and the reference pin.

Table 2

Dimensions of the box system in figure 2

<i>Dimensions in mm</i>	<i>a</i>	<i>h</i>	<i>k</i>
Top view ($\gamma = 0^\circ$)	5.0	9.0	1.0
Inclined view ($\gamma = \pm 45^\circ$)	7.0		
Front / Rear view ($\gamma = \pm 90^\circ$)	5.0		

⁶ This dot and dash line applies to front and rear view only.

Normalized luminous intensity distribution

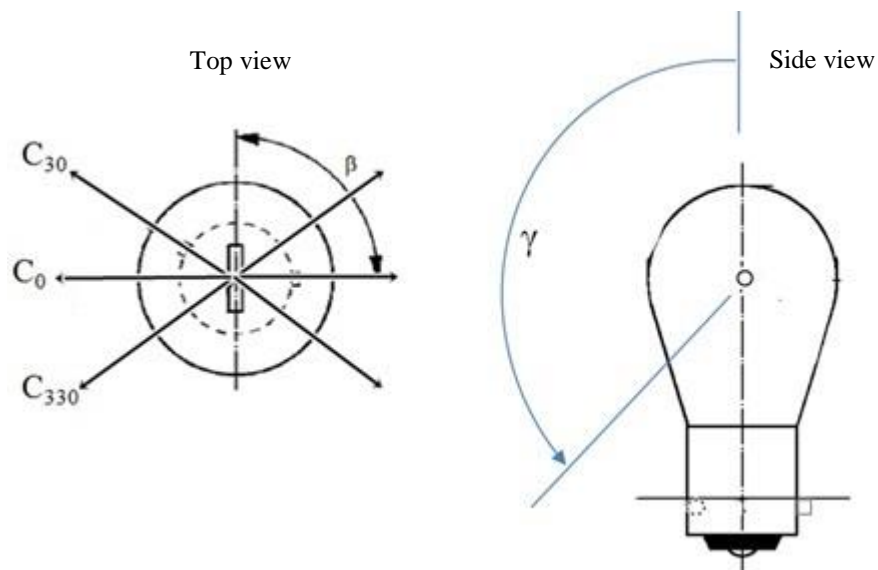
The following test is intended to determine the normalized luminous intensity distribution of the light source in the planes containing the reference axis as described in figure 3. The intersection of the reference axis and the edge of the box is used as the coordinate system origin.

The light source is mounted on a flat plate with the corresponding mounting lug features. The plate is mounted to the goniometer table by a bracket, so that the reference axis of the light source lines up with one of the rotating axis of the goniometer.

Luminous intensity data is recorded with a standard photo-goniometer. The measurement distance should be chosen appropriately, to make sure that the detector is located in the far field of the light distribution.

Figure 3

Setup to measure the luminous intensity distribution (Definition of C-Planes and angle γ)



The measurements shall be performed in C-planes, which contain the reference axis of the light source. The C-planes shall be C_0 , C_{30} and C_{330} . The test points for each plane and multiple polar angles γ are specified in Table 3.

The measured luminous intensity values, normalised to the measured luminous flux of the individual light source under test, shall be converted to normalised luminous intensity values of a 1000 lm light source. These data shall comply with the tolerance band as defined in Table 3.

C-planes: See CIE publication 70-1987: "The measurement of absolute luminous intensity distributions".

Category PY21W/LED

Sheet PY21W/LED/4

Table 3
Test point values of normalized intensity in the planes C₀, C₃₀, C₃₃₀

γ	<i>LED light source of normal production</i>		<i>Standard LED light source</i>	
	<i>Minimum intensity in cd/1000 lm</i>	<i>Maximum intensity in cd/1000 lm</i>	<i>Minimum intensity in cd/1000 lm</i>	<i>Maximum intensity in cd/1000 lm</i>
-150°	60	140	80	120
-125°	60	140	80	120
-100°	60	140	80	120
-75°	60	140	80	120
-50°	60	140	80	120
-25°	60	140	80	120
0°	60	140	80	120
25°	60	140	80	120
50°	60	140	80	120
75°	60	140	80	120
100°	60	140	80	120
125°	60	140	80	120
150°	60	140	80	120

The luminous intensity distribution as described in table 3 shall be “substantially uniform”, i.e. in between two adjacent grid points the relative luminous intensity requirement is calculated by linear interpolation using the two adjacent grid points.

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II. Justification

1. This proposal is part of a package with a related proposal for amendment to UN Regulation No. 128 to introduce LED substitute light sources.
 2. In the proposal of ECE/TRANS/WP.29/GRE/2017/17 three categories were developed, taking into account informal document GRE-77-02, on equivalence criteria (photometric, electrical, dimensional and thermal), including among others: near-field photometry, far-field photometry, colour, spectral content, failure behaviour, minimum and maximum electrical current, voltage behaviour, thermal behaviour, mechanical dimensions, cap. See also the equivalence reports in GRE-77-03.
 3. In this revised proposal a modified category PY21W/LED is specified, equipped with a different cap than the cap of its counterpart filament light source category to prevent misuse. Proposals for the other two categories C5W/LED and R5W/LED were left out to provide the relevant experts more time to develop an interlock feature for these categories, too.
 4. Amendments due to ECE/TRANS/WP.29/2018/32 (editorial corrections) and ECE/TRANS/WP.29/2018/33 (introduction of forward lighting light source categories L1A/6 and L1B/6) have been also taken into account in this proposal.
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