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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

AMENDMENT 1
AMENDEMENT 1

Lamps, light sources and LED packages for road vehicles – Performance requirements

Lampes, sources lumineuses et LED encapsulées pour véhicules routiers – Exigences de performances

IEC 60810:2017-09/AMD1:2019-04(en-fr)

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Lamps, light sources and LED packages for road vehicles – Performance requirements

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FOREWORD

This amendment has been prepared by subcommittee 34A: Lamps, of IEC technical committee 24: Lamps and related equipment.

The text of this amendment is based on the following documents:

CDV	Report on voting
34A/2106/CDV	34A/2129/RVC

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Replace, throughout the document, all instances of "JESD22-A101C" *with* "JESD22-A101D".

Replace, throughout the document, all instances of "JESD22-A108D" *with* "JESD22-A108F".

Replace, throughout the document, all instances of "JESD22-A113F" *with* "JESD22-A113H".

Replace, throughout the document, all instances of "JESD22-B101B" *with* "JESD22-B101C".

Replace, throughout the document, all instances of "JESD22-B106D" *with* "JESD22-B106E".

Replace, throughout the document, all instances of "JESD22-B116:1998", "JESD22-B116" *and* "STD22-B116" *with* "JESD22-B116B".

2 Normative references

Add the following new references:

CIE 015:2018, *Colorimetry*

R.E.5, Consolidated Resolution on the common specification of light source categories

R.E.5 is published by UNECE under the reference ECE/TRANS/WP.29/1127 and is

available at the following address (website checked on 6 March 2019)
http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

Delete the following two references:

Addendum 36: Regulation No. 37, Uniform provisions concerning the approval of filament lamps for use in approved lamp units of power-driven vehicles and of their trailers

Addendum 127: Regulation No. 128, Uniform provisions concerning the approval of light emitting diode (LED) light sources for use in approved lamp units on power-driven

*Replace the reference to "*JESD22-A113F*" with the following new reference:*

JESD22-A113H, *Preconditioning of nonhermetic surface mount devices prior to reliability testing*

5 Filament lamp data

Table 3 – Rated life values for continuous operation

Delete, under the "UN" column heading, all of the references to category sheet "R37", replace the column heading "UN" with "R.E.5", replace footnote "a" with a new footnote "a" and delete footnote "b", as follows:

Table 3 – Rated life values for continuous operation

Filament lamp data sheet number		Type	12 V			24 V		
IEC 60809[a]	R.E.5	Category	Test V	B_3/h	T_c/h	Test V	B_3/h	T_c/h
Lamps for front lighting applications								
2310	H1	H1	13,2	150	400	28,0	90	250
2320	-	H2	13,2	90	250	28,0	90	250
2330	H3	H3	13,2	150	400	28,0	90	250
2120	H4	H4 (HB/LB)	13,2	125/250	250/500	28,0	100/200	200/400
2315	H7	H7	13,2	300	500	28,0	200	400
2365	H8	H8, H8B	13,2	400	800			
2370	H9	H9, H9B	13,2	250	500			
2375	H10	H10	13,2	800	1 600			
2380	H11	H11, H11B	13,2	350	600	28,0	300	600
2385	H12	H12	13,2	480	970			
-	H13	H13,H13A (HB/LB)	13,2	170/1 200	350/2 500			
-	H15	H15 (HB/DRL)	13,2	250/2 000	500/4 000	28,0	200/1 500	400/3 000
-	H16	H16, H16B	13,2	500	1 000			
-	H17	H17	13,2	100/200	200/400			
-	H18	H18	13,2	300	500			
-	H19	H19 (HB/LB)	13,2	125/250	250/500			
-	H20	H20	13,2	100	200			

Filament lamp data sheet number		Type	12 V			24 V		
IEC 60809[a]	R.E.5	Category	Test V	B_3/h	T_c/h	Test V	B_3/h	T_c/h
3430	H27W	H27W/1 H27W/2	13,5	90	190			
2325	HB3	HB3/ HB3A	13,2	250	500			
2335	HB4	HB4/ HB4A	13,2	850	1 700			
2420	HIR2	HIR2	13,2	300	600			
2130	HS1	HS1 (HB/LB)	13,2	75/150	150/300			
2340	HS2	HS2	13,2	100	250			
-	PSX26 W	PSX26W	13,2	1 000	2 000			
2110	R2	R2 (HB / LB)	13,2	30/60	90/160			
2150	S1/S2	S2	13,2	50/100	100/200			
Lamps for signalling applications								
		C5W	13,5	350	750	28,0	120	350
3410	H6W	H6W, HY6W	13,5	350	700			
-	H10W	H10W/1	13,5	150	400			
-	H10W	HY10W/1	13,5	300	600			
3420	H21W	H21W	13,5	200	400	28,0	90	180
-	HY21W	HY21W	13,5	200	400	28,0	90	180
-	P13W	P13W	13,5	4 000	8 000			
-	P19W	P19W	13,5	1 000	2 000			
3310	P21W	P21W	13,5	120	320	28,0	60	160
3120	P21/4W	P21/4W	13,5	60/600	160/1 600	28,0	60/600	160/1 600
3110	P21/5W	P21/5W	13,5	60/600	160/1 600	28,0	60/600	160/1 600
-	P24W	P24W	13,5	750	1 500			
3315	P27W	P27W	13,5	550	1 320			
-	P27/7W	P27/7W	13,5	550/3 690	1 320/8 82 0			
-	PR21W	PR21W	13,5	120	320	28,0	60	160
-	PR21/5 W	PR21/5W	13,5	60/600	160/1 600			
-	P19W	PSY19W	13,5	1 200	2 400			
-	P24W	PSY24W	13,5	1 000	2 000			
-	P19W	PY19W	13,5	1 200	2 400			
3311	PY21W	PY21W	13,5	120	320	28,0	60	160
-	P24W	PY24W	13,5	1 000	2 000			
3141	PY27/7 W	PY27/7W	13,5	550/3 600	1 300/8 00 0			
3320	R5W	R5W	13,5	100	300	28,0	80	225
3330	R10W	R10W	13,5	100	300	28,0	80	225
-	R10W	RY10W	13,5	100	300			
3340	T4W	T4W	13,5	300	750	28,0	120	350
4310	W3W	W3W	13,5	500	1 500	28,0	400	1 100
4320	W5W	W5W	13,5	200	500	28,0	120	350

Filament lamp data sheet number		Type	12 V			24 V		
IEC 60809[a]	R.E.5	Category	Test V	B_3/h	T_c/h	Test V	B_3/h	T_c/h
4340	W16W	W16W	13,5	250	700			
4321	W5W	WY5W	13,5	200	500			
4120	C21W	C21W	13,5	40	110			
-	WY16W	WY16W	13,5	250	700			
-	W21W	W21W	13,5	120	320			
-	W21/5W	W21/5W	13,5	60/600	160/1 600			
-	WY21W	WY21W	13,5	120	320			
-	W15/5W	W15/5W	13,5	120/600	320/1 600			
-	W10W	W10W	13,5	100	300			
-	WY10W	WY10W	13,5	100	300			

The values indicated are minimum requirements. Depending on some particular customers' specifications, different values may be obtained, i.e. shorter life/higher luminous flux or longer life/lower luminous flux. This shall be negotiated between filament lamp manufacturers and their customers.

If there is no direct contact between the customer and supplier, the information on deviation from recommended life time data shall be given on the package and/or in publicly available technical documentation.

[a] If an R.E.5 sheet number is referenced, the IEC sheet number refers to the data sheet given in withdrawn IEC 60809:1995/AMD5:2012 and is given for information only.

Table 4 – Rated luminous flux-maintenance values for continuous operation

Delete, under the "UN" column heading, all the references to category sheet "R37", replace the column heading "UN" with "R.E.5", replace footnote "e" with a new footnote "e" and delete footnote "f", as follows:

Table 4 – Rated luminous flux-maintenance values for continuous operation

Filament lamp data sheet number		Type	12 V			24 V		
IEC 60809[e]	R.E.5	Category	Test V	Luminous flux maintenance		Test V	Luminous flux maintenance	
				h	%		h	%
Lamps for front lighting applications								
2110	R2	R2	13,2	55[c] 110[d]	85 70	28,0 28,0	55[c] 110[d]	85 70
2120	H4	H4	13,2	110[c] 225[d]	85 85	28,0	110[c] 225[d]	85 85
2125	-	H6	14,0	75[c] 150[d]	85 80	–	–	–
2305		H5	14,0	75	85	–	–	–
2310	H1	H1	13,2	170	90	28,0	170	90
2320		H2	13,2	170	90	28,0	170	90
2330	H3	H3	13,2	170	90	28,0	170	90
3110	P21/5W	P21/5W	13,5	110[a] 750[b]	70 70	28,0	110[a] 750[b]	70 70
3120	P21/4W	P21/4W	13,5	110[a]750[b]	70 70	28,0	Under consideration	Under consideration
3310	P21W	P21W	13,5	110	70	28,0	110	70
3320	R5W	R5W	13,5	150	70	28,0	150	70
3330	R10W	R10W	13,5	150	70	28,0	150	70
3340	T4W	T4W	13,5	225	70	28,0	225	70
4110	C5W	C5W	13,5	225	60	28,0	225	60
4120	C21W	C21W	13,5	75	60	–	–	–
4310	W3W	W3W	13,5	750	60	28,0	750	60
4320	W5W	W5W	13,5	225	60	28,0	225	60

The values indicated are minimum requirements. Depending on some particular customers' specifications, different values may be obtained, i.e. shorter life/higher luminous flux or longer life/lower luminous flux. This shall be negotiated between filament lamp manufacturers and their customers.

Luminous flux-maintenance values for extended operation times are under consideration.

[a] High-wattage filament.

[b] Low-wattage filament.

[c] Main or upper beam filament.

[d] Dipped or lower beam filament.

[e] If an R.E.5 sheet number is referenced, the IEC sheet number refers to a data sheet given in withdrawn IEC 60809:1995/AMD5:2012 and is given for information only.

7.3 Luminous flux and colour maintenance

Replace the fifth paragraph with the following new paragraph:

For LED light sources which fulfil the requirements of the corresponding category sheet of R.E.5 the $L_{70}B_{10}$ values shall be not less than those specified in Table 5.

Table 5 – Minimum $L_{70}B_{10}$ values for replaceable LED light sources

Replace, in the first column heading, the reference to "UN R 128" with "R.E.5" and add below the existing row "LY5A, LY5B", a new row "L1/6A, L1/6B", as follows:

Category according to R.E.5	Minimum $L_{70}B_{10}$ h
...	...
LY5A, LY5B	500 [fl]
L1/6A, L1/6B	2 000
....	

7.7 Mass

Table 9 – Maximum mass for LED light sources

Add, in the last row, "L1/6" to the category list, as follows:

LR3, LR4, LR5, LW3, LW5, LY3, LY5, L1/6	PGJ18.5	35

7.8.2 Typical circuits for LR3, LR5, LY3, LY5, LW3 and LW5 LED light sources

Replace the existing title of Subclause 7.8.2 with the following new title:

7.8.2 Typical circuits for LR3, LR5, LY3, LY5, LW3, LW5 and L1/6 LED light sources

Replace, in the first paragraph, the introductory phrase with the following:

A typical electrical circuit for LR3, LR5, LY3, LY5, LW3, LW5 and L1/6 light source contains

Figure 8

Replace the title of Figure 8 with the following new title:

Typical electrical circuit for an LR3, LR5, LY3, LY5, LW3, LW5 and L1/6 LED light source

7.9 Maximum power consumption

Replace the existing Subclause 7.9, including its title, with the following new Subclause 7.9:

7.9 Maximum power consumption and minimum current draw

For the LED light sources listed in Table 10 the maximum power consumption at test voltages of 9,0 V DC, 13,5 V DC and 16,0 V DC shall not exceed the values given after continuous operation for 1 min and 30 min at 23 °C ± 5 °C.

For these electrical measurements, a temperature tolerance of ±5° C is given. For products where it is known that the electrical characteristics depend very strongly on temperature, tighter temperature tolerances should be considered.

Table 10 – Maximum power consumption

	Test voltage		
	9,0 V DC	**13,5 V DC**	**16,0 V DC**
LR3	3,5 W	3,5 W	5,0 W
LR4 (minor/major function)	1,0/3,5 W	1,0/3,5 W	1,5W/5,0W
LR5	3,5 W	3,5 W	5,0 W
LW3	5,0 W	5,0 W	10,0 W
LY3 [a]	5,0 W	5,0 W	10,0 W
LW5	8,0 W	8,0 W	10,0 W
LY5 [a]	8,0 W	8,0 W	12,0 W
L1/6	6,0 W	6,0 W	10,0 W
[a] During the ON state, tested in flashing mode, i.e. ON/OFF ratio of 1:1. NOTE The values given in Table 10 for maximum power at 13,5 V DC are taken from UN R128.			

For the LED light sources listed in Table 13, the minimum current draw at normal operation at the specified test voltages shall not be below the values given after continuous operation for 1 min and 30 min at 23 °C ± 5 °C.

Test voltages for 12 V light sources are: between 12,0 V and 14,0 V DC, tested at 12,0 V, 13,0 V and 14,0 V DC.

Table 13 – Minimum current draw at normal operation

	Minimum current draw in mA
LR3	75
LR4 (minor function)	-
LR4 (major function)	75
LR5	75
LW3	75
LY3 [a]	100
LW5	100
LY5 [a]	100
L1/6	100
[a] During the ON state, tested in flashing mode, i.e. ON/OFF ratio of 1:1, 90 Hz.	

7.14 Electrostatic discharge test (ESD)

Replace the content of Subclause 7.14 with the following:

The purpose of this test is to evaluate the performance of the LED light source under stress due to electrostatic discharge at the terminals of the LED light source and at the housing. The test and classification shall be conducted according to ISO 10605 on a test quantity of at least 10 LED light sources under the following test conditions:

- ESD packing, handling tests according to the conditions described in Table 14;
- ESD power test according to the conditions described in Table 15.

The LED light sources have successfully completed the tests, if after the test

- the luminous flux has not changed by more than 10 % compared to the initial value;

- the chromaticity values (cx, cy) remain within the colour boundaries of UN Regulation No. 48;
- the electrical current at test voltage has not changed by more than 10 % compared to the initial value.

Values are based on a non-compliance level of 10 %.

- Pin P1: Ground;
- Pin P2: V+.

Table 14 – ESD packaging, handling (light source not connected)

Test	Test settings	Test applied to
ESD1	Pin P1 grounded, wire length max. 200 mm Discharge network: 2 kΩ / 150 pF Test level: ±4 kV (contact) Number of discharges: 3 Discharge interval: ≥ 3 s	Pin P2
ESD2	Pin P1 and Pin P2 not grounded Discharge network: 2 kΩ / 150 pF Test level: ±4, ±6, ±8 kV (contact) Number of discharges for each pin and for each test level: 10 Discharge interval: ≥ 3 s	Pin P1, Pin P2
ESD3	Pin P1 and Pin P2 not grounded Discharge network: 2 kΩ/150 pF Test level: ±4 kV, ±6 kV, ±8 kV (contact) ±6 kV, ±8 kV (air) Number of discharges for each test level: 10 Discharge interval: ≥ 3 s	Housing

Table 15 – ESD powered test (light source connected)

Test	Test settings[a]	Test applied to
ESD4	Direct discharges Discharge network: 2 kΩ / 330 pF Test level: ±4 kV, ±8 kV (contact) ±4 kV, ±8 kV (air) Number of discharges for each test level: 10 Discharge interval: ≥ 3 s	Housing
[a] Test voltage as specified on the category sheet.		

Add, at the end of Subclause 7.15, the following new Subclause 7.16:

7.16 White colour groups

The light source shall be marked with the applicable colour group name or its abbreviation or its nominal CCT value as defined in Table 16.

These three white colour groups are defined with a nominal correlated colour temperature (CCT).

The white colour space, which is sub-divided by these colour groups, is defined in UN lighting regulations, for example UN R 128 and UN R 48 and in IEC 60809:2014 and IEC 60809:2014/AMD1:2017, 4.4.

The three colour groups are separated by their x-coordinate value from the CIE x,y chromaticity co-ordinates according to CIE 015, as shown in Table 16 and Figure 13.

Table 16 – Three white colour groups, their abbreviation, nominal CCT and CIE x-coordinate boundary value

White colour group	Abbreviation	Nominal CCT	CIE x-coordinate boundary value
Cool white	CW	5 700 K	x ≤ 0,345
Neutral white	NW	4 500 K	0,345 < x < 0,405
Warm white	WW	3 500 K	x ≥ 0,405

NOTE These colour groups were chosen to allow colour matching with existing light source technologies. “neutral white” corresponds to the typical white colour of HID light sources, “warm white” corresponds to the typical white colour of halogen light sources.

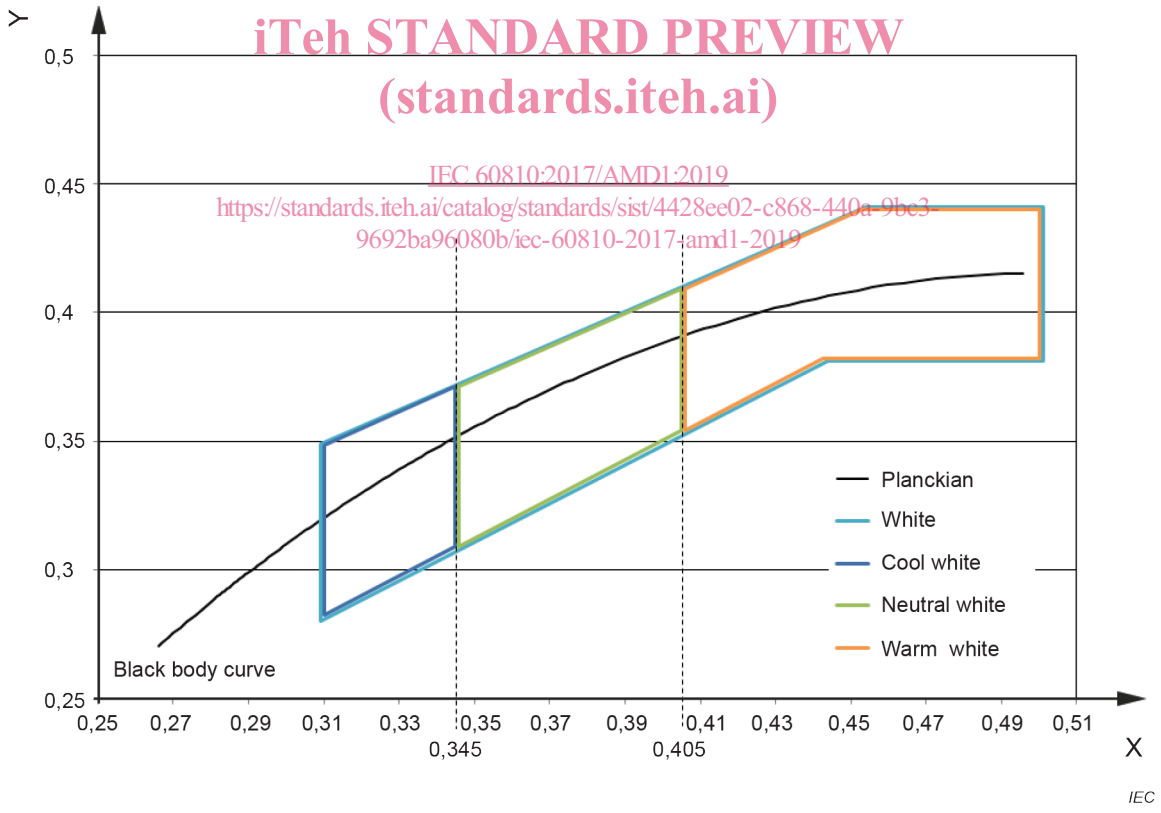

Figure 13 – Three white colour groups

For the purpose of measuring the colour group of a white LED light source, the CIE colour coordinates (x,y) shall be tested under the following conditions:

- integral colour measurement after 30 min operation;
- $T_{ambient}$ = 23 °C ± 2,5 °C;