

Lamps for road vehicles – Performance requirements

ICS 29.140.99

National foreword

This British Standard is the UK implementation of EN 60810:2003+A2:2013. It is identical to IEC 60810:2003, incorporating amendments 1:2008 and 2:2013. It supersedes BS EN 60810:2003+A1:2008 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and related equipment, to Subcommittee CPL/34/1, Electric lamps.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

The publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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**Lamps for road vehicles -
Performance requirements
(IEC 60810:2003)**

Lampes pour véhicules routiers -
Prescriptions de performances
(CEI 60810:2003)

Lampen für Straßenfahrzeuge -
Anforderungen an die Arbeitsweise
(IEC 60810:2003)

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 34A/1031/FDIS, future edition 3 of IEC 60810, prepared by SC 34A, Lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60810 on 2003-09-01.

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The following dates were fixed:

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Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A to E and ZA are normative and annexes F and G are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60810:2003 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-64	NOTE	Harmonized as EN 60068-2-64:1994 (not modified).
IEC 60682	NOTE	Harmonized as EN 60682:1993 (not modified).

Foreword to amendment A1

The text of document 34A/1244/CDV, future amendment 1 to IEC 60810:2003, prepared by SC 34A, Lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60810:2003 on 2008-09-01.

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Endorsement notice

The text of amendment 1:2008 to the International Standard IEC 60810:2003 was approved by CENELEC as an amendment to the European Standard without any modification.

Foreword to amendment A2

The text of document 34A/1629/FDIS, future edition 1 of IEC 60810:2003/A2, prepared by SC 34A, "Lamps", of IEC TC 34, "Lamps and related equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60810:2003/A2:2013.

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Endorsement notice

The text of the International Standard IEC 60810:2003/A2:2013 was approved by CENELEC as a European Standard without any modification.

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LAMPS FOR ROAD VEHICLES ± PERFORMANCE REQUIREMENTS

1 Scope

A2 This International Standard is applicable to lamps (filament lamps, discharge lamps and LED light sources) to be used in headlamps, fog-lamps and signalling lamps for road vehicles. It is especially applicable to those lamps which are listed in IEC 60809. However, the standard may also be used for other lamps falling under the scope of this standard. **A2**

It specifies requirements and test methods for the measurement of performance characteristics such as lamp life, lumen maintenance, torsion strength, glass bulb strength and resistance to vibration and shock. Moreover, information on temperature limits, maximum lamp outlines and maximum tolerable voltage surges is given for the guidance of lighting and electrical equipment design.

For some of the requirements given in this standard, reference is made to data given in tables. For lamps not listed in such tables, the relevant data are supplied by the lamp manufacturer or responsible vendor.

The performance requirements are additional to the basic requirements specified in IEC 60809. They are, however, not intended to be used by authorities for legal type-approval purposes.

A2 NOTE 1 **A2** In the various vocabularies and standards, different terms are used for “incandescent lamp” (IEV 845-07-04) and “discharge lamp” (IEV 845-07-17). In this standard, “filament lamp” and “discharge lamp” are used. However, where only “lamp” is written both types are meant, unless the context clearly shows that it applies to one type only.

A2 NOTE 2 This standard does not apply to luminaires.

NOTE 3 In this standard, the term LED light source is used, in other standards the term LED lamps may be used to describe similar products. **A2**

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

A2 CISPR 25, *Vehicles, boats and internal combustion engines – Radio disturbance characteristics – Limits and methods of measurement for the protection of on-board receivers* **A2**

IEC 60050(845):1987, *International Electrotechnical Vocabulary (IEV) ± Chapter 845: Lighting*

A2 IEC 60061-1, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Lamp caps* **A2**

IEC 60068-2-6:1995, *Environmental testing ± Part 2: Tests ± Test Fc: Vibration (sinusoidal) ± Basic safety publication*

A2 IEC 60068-2-14, *Environmental testing – Part 2–14: Tests – Test N: Change of temperature* **A2**

IEC 60068-2-47:1999, *Environmental testing ± Part 2-47: Test methods ± Mounting of components, equipment and other articles for vibration, impact and similar dynamic tests*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 60809, *Lamps for road vehicles ± Dimensional, electrical and luminous requirements*

ISO 5344:1980, *Electrodynamic test equipment for generating vibration ± Methods of describing equipment characteristics*

Ⓐ₂ UN/ECE Regulation No. 128, *Uniform provisions concerning the approval of light emitting diode (LED) light sources for use in approved lamp units on power-driven vehicles and their trailers* Ⓐ₂

3 Terms and definitions

For the purpose of this document, the following definitions apply, in addition to the definitions in IEC 60050(845) and IEC 60809.

3.1 life

total time (expressed in hours) during which a lamp has been operated before it becomes useless. For filament lamps, it is considered to be so according to one of the following criteria:

- a) the end of life is the time when the filament fails;
- b) the life of a dual-filament lamp is the time until either filament fails, if the lamp is tested in a switching cycle involving alternative operation of both filaments

3.2 characteristic life

Ⓐ₂ **T (or T_c)** Ⓐ₂

constant of the Weibull distribution indicating the time up to which 63,2 % of a number of tested lamps of the same type have ended their individual lives

3.3 life B3

constant of the Weibull distribution indicating the time during which 3 % of a number of the tested lamps of the same type have reached the end of their individual lives

3.4 lumen maintenance

ratio of the luminous flux of a lamp at a given time in its life to its initial luminous flux, the lamp being operated under specific conditions

Ⓐ₂ Example 1 L_{70} is the time in hours to 70 % lumen maintenance.

Example 2 L_{50} is the time in hours to 50 % lumen maintenance. Ⓐ₂

3.5 initial luminous flux

Ⓐ₂ luminous flux of a lamp measured after the ageing specified in Annex C of IEC 60809 for filament lamps or in Annex D of this standard for discharge lamps or in Annex I of this standard for LED light sources Ⓐ₂

3.6 rated value

value of a characteristic specified for operation of a lamp at test voltage and/or other specified conditions

3.7

pinch temperature limit

maximum admissible pinch temperature to ensure satisfactory lamp performance in service

3.8

solder temperature limit

maximum admissible solder temperature to ensure satisfactory lamp performance in service

3.9

maximum lamp outline

contour limiting the space to be reserved for the lamp in the relevant equipment

3.10

heavy-duty lamp

lamp declared as such, by the manufacturer or responsible vendor, which shall comply with the heavy-duty test conditions specified in Table B.2 of this standard in addition to the requirements specified in IEC 60809



3.11

life B_{10}

constant of the Weibull distribution indicating the time during which 10 % of a number of the tested lamps of the same type have reached the end of their individual lives

3.12

LED package

solid state device embodying a p-n junction, emitting optical radiation when excited by an electric current

Note 1 to entry: Examples are shown in Figure 1.

Note 2 to entry: In UNECE terminology the term "LED" is used with the same definition.

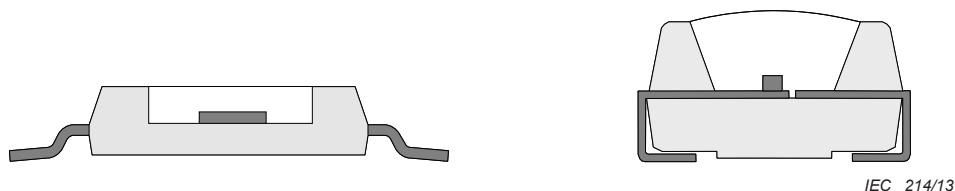


Figure 1 – Examples of LED packages

3.13

LED light source

light source where the visible radiation is emitted from one or more LED(s)

Note 1 to entry: An LED light source may or may not require an additional electronic control gear and may or may not require additional provisions for thermal management.

3.13.1

LED module

LED light source which can only be replaced with the use of mechanical tools

NOTE 1 LED modules are generally considered as components for use in trades, professions or industries and are generally not intended for sale to the general public.

NOTE 2 Examples are shown in Figures 2 and 3. 

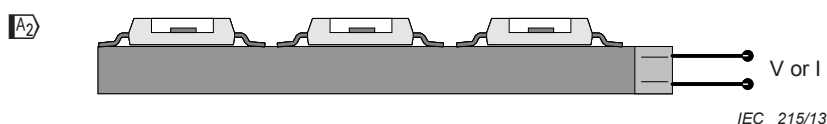


Figure 2 – Example for an LED module without integrated heatsink

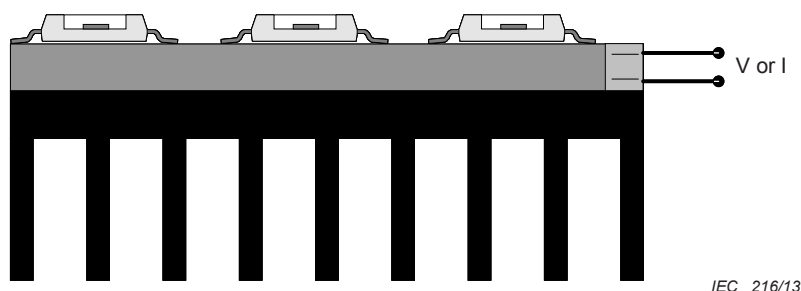


Figure 3 – Example for an LED module with integrated heatsink

3.13.2

replaceable LED light source

LED light source which can be easily replaced without the use of special tools

NOTE 1 Replaceable LED light sources are usually intended for sale to the general public as a replacement part.

NOTE 2 An example is shown in Figure 4.

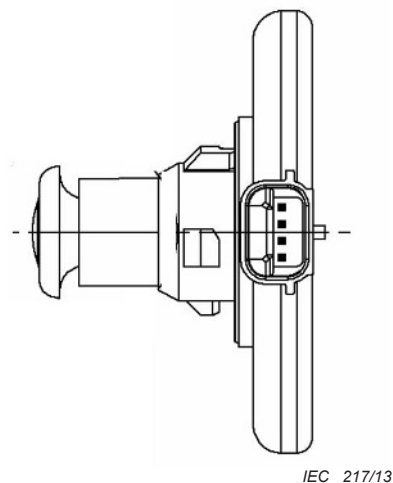


Figure 4 – Example for a replaceable LED light source

3.13.3

non-replaceable LED light source

LED light source which cannot be removed from the device or luminaire

NOTE 1 Non-replaceable LED light sources are usually intended as components for integration into the luminaire or device by manufacturers. They are designed and intended to be indivisible parts of a lighting or light signalling device, or of parts or modules or units of such devices.

NOTE 2 An example is shown in Figure 5. 

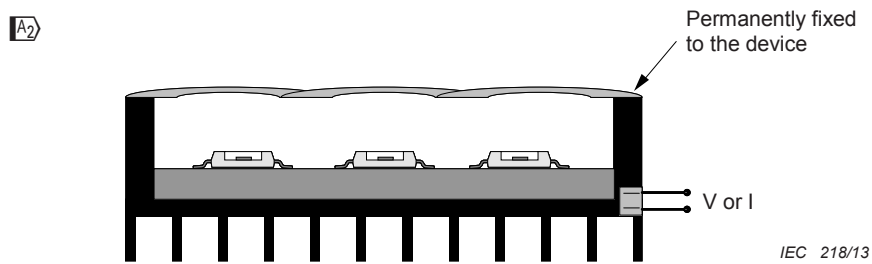


Figure 5 – Example for a non-replaceable LED light source

3.14

T_p of a LED light source

temperature at a specified location on the surface of the LED light source (T_p -point) that can be measured during operation of the light source and that can be correlated to the temperature of the p-n junction of the LED

Note 1 to entry: The T_p -point is generally specified by the manufacturer of the LED light source or by its datasheet.

3.15

electronic light source controlgear

one or more component(s) between supply and light source to control voltage and/or electrical current of the light source A_2

4 Requirements and test conditions for filament lamps

4.1 Basic function and interchangeability

Filament lamps shall comply with IEC 60809.

4.2 Torsion strength

The cap shall be strong and firmly secured to the bulb.

Compliance is checked before and after the life test by submitting the filament lamp to the following torque values:

filament lamps with bayonet caps

- with 9 mm shell-diameter: 0,3 Nm*;
- with 15 mm shell-diameter: 1,5 Nm*;
- with 20 mm shell-diameter: 3,0 Nm*;

filament lamps with screw caps

- with 10 mm shell-diameter: 0,8 Nm*.

The torque shall not be applied suddenly but shall be increased progressively from 0 to the specified amount.

Values are based on a non-compliance level of 1 %.

* Under consideration.

4.3 Characteristic life T

The life T measured on a test quantity of at least 20 filament lamps shall be at least 96 % of the rated value, given in Table 3.

Compliance is checked by life tests as prescribed in Annex A.

4.4 Life B3

The life B3 shall not be less than the rated value given in Table 3.

Compliance is checked by life tests as prescribed in Annex A.

The number of filament lamps failing before the required time shall not exceed the values in Table 1.

Table 1 ± Conditions of compliance for life B3

Number of filament lamps tested	Acceptance number
23 to 35	2
36 to 48	3
49 to 60	4
61 to 74	5
75 to 92	6

4.5 Lumen maintenance

The lumen maintenance shall be not less than the rated value given in Table 4. This value is based on a non-compliance level of 10 %.

4.6 Resistance to vibration and shock

In the event of service life being influenced by vibration or shock, the test methods and schedules detailed in Annex B shall be used to assess the performance.

The filament lamps are deemed to have satisfactorily completed the wideband or narrowband random vibration test as described in Annex B, if they continue to function during and after the test.

The number of filament lamps failing one of the tests shall not exceed the values in Table 2 (values are based on the AQL of 4 %).

Table 2 ± Conditions of compliance for the vibration test

Number of filament lamps tested	Acceptance number
14 to 20	2
21 to 32	3
33 to 41	4
42 to 50	5
51 to 65	6

4.7 Glass-bulb strength

In the event of bulbs being impaired by mechanical handling for their assembly in equipment, the test methods and schedules defined in Annex C shall be used to assess the performance. The bulbs have to withstand the specified compression strength.

5 Filament lamp data

5.1 Rated life and lumen-maintenance values for road vehicle filament lamps tested under conditions as prescribed in Annex A

Table 3 ± Rated life values for continuous operation

Filament lamp Data sheet Nos.	Type	12 V			24 V		
	Category	Test V	B3 h	T h	Test V	B3 h	T h
60809-IEC-2110	R2	13,2	90	250	28,0	90	250
60809-IEC-2120	H4	13,2	350	700	28,0	180 ^a	500 ^a
60809-IEC-2125	H6	14,0	(Under consideration)	300	—	—	—
60809-IEC-2305	H5	14,0	(Under consideration)	100	—	—	—
60809-IEC-2310	H1	13,2	150	400	28,0	90 ^a	250 ^a
60809-IEC-2320	H2	13,2	90	250	28,0	90	250
60809-IEC-2330	H3	13,2	150	400	28,0	90 ^a	250 ^a
60809-IEC-3110	P21/5W	13,5	60 ^b 600 ^c	160 ^b 1 600 ^c	28,0	60 ^b 600 ^c	160 ^b 1 600 ^c
60809-IEC-3120	P21/4W	13,5	60 ^b 600 ^c	160 ^b 1 600 ^c	28,0	60 ^b 600 ^c	160 ^b 1 600 ^c
60809-IEC-3310	P21W	13,5	120	320	28,0	60 ^a	160 ^a
60809-IEC-3320	R5W	13,5	100	300	28,0	80 ^a	225 ^a
60809-IEC-3330	R10W	13,5	100	300	28,0	80 ^a	225 ^a
60809-IEC-3340	T4W	13,5	300	750	28,0	120 ^a	350 ^a
60809-IEC-4110	C5W	13,5	350	750	28,0	120 ^a	350 ^a
60809-IEC-4120	C21W	13,5	40	110	28,0	—	—
60809-IEC-4310	W3W	13,5	500	1 500	28,0	400 ^a	1 100 ^a
60809-IEC-4320	W5W	13,5	200	500	28,0	120 ^a	350 ^a
NOTE 1 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 lumen maintenance. This has to be negotiated between filament lamp manufacturers and their customers.							
^a Extended values are under consideration.							
^b High-wattage filament.							
^c Low-wattage filament.							

Table 4 ± Rated lumen-maintenance values for continuous operation

Filament lamp Data sheet Nos.	Type	12 V			24 V		
	Category	Test V	Lumen maintenance		Test V	Lumen maintenance	
			h	%		h	%
60809-IEC-2110	R2	13,2	55 ^c 110 ^d	85 70	28,0 28,0	55 ^c 110 ^d	85 70
60809-IEC-2120	H4	13,2	110 ^c 225 ^d	85 85	28,0	110 ^c 225 ^d	85 85
60809-IEC-2125	H6	14,0	75 ^c 150 ^d	85 80	–	–	–
60809-IEC-2305	H5	14,0	75	85	–	–	–
60809-IEC-2310	H1	13,2	170	90	28,0	170	90
60809-IEC-2320	H2	13,2	170	90	28,0	170	90
60809-IEC-2330	H3	13,2	170	90	28,0	170	90
60809-IEC-3110	P21/5W	13,5	110 ^a 750 ^b	70 70	28,0	110 ^a 750 ^b	70 70
60809-IEC-3120	P21/4W	13,5	110 ^a 750 ^b	70 70	28,0	(Under consideration) (Under consideration)	(Under consideration) (Under consideration)
60809-IEC-3310	P21W	13,5	110	70	28,0	110	70
60809-IEC-3320	R5W	13,5	150	70	28,0	150	70
60809-IEC-3330	R10W	13,5	150	70	28,0	150	70
60809-IEC-3340	T4W	13,5	225	70	28,0	225	70
60809-IEC-4110	C5W	13,5	225	60	28,0	225	60
60809-IEC-4120	C21W	13,5	75	60	–	–	–
60809-IEC-4310	W3W	13,5	750	60	28,0	750	60
60809-IEC-4320	W5W	13,5	225	60	28,0	225	60
NOTE 1 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 lumen maintenance. This has to be negotiated between filament lamp manufacturers and their customers.							
NOTE 2 Lumen-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.							