

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD

**Self-ballasted LED-lamps for general lighting services –
Performance requirements**

IEC/PAS 62612:2009
<https://standards.iteh.ai/catalog/standards/sis/42e0495e-4444-45ae-8307-87ccc570fcf/iec-pas-62612-2009>



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SELF-BALLASTED LED-LAMPS
FOR GENERAL LIGHTING SERVICES –****Performance requirements**

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A PAS is a technical specification not fulfilling the requirements for a standard, but made available to the public.

IEC-PAS 62612 has been processed by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
34A/1318/PAS	34A/1325/RVD

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single 3-year period, following which it shall be revised to become another type of normative document, or shall be withdrawn.

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SELF-BALLASTED LED-LAMPS FOR GENERAL LIGHTING SERVICES –

Performance requirements

1 General

1.1 Scope

This PAS specifies the performance requirements for self-ballasted LED lamps with a supply voltage up to 250 V, together with the test methods and conditions required, intended for domestic and similar general lighting purposes, having:

- a rated wattage up to 60 W;
- a rated voltage of up to 250 V AC or DC;
- a lamp cap according to IEC 62560¹⁾.

The requirements of this PAS relate to type testing.

This PAS does not cover self-ballasted LED lamps that intentionally produce tinted or coloured light neither does it cover OLEDs.

Recommendations for whole product testing or batch testing are under consideration.

These performance requirements are additional to the requirements in IEC 62560¹⁾ (safety standard for self-ballasted LED lamps).

NOTE When operated in a luminaire, the claimed performance data can deviate from the values established via this PAS.

1.2 Statement

It may be expected that self-ballasted LED lamps which comply with this PAS will start and operate satisfactorily at voltages between 92 % and 106 % of rated supply voltage and at an ambient air temperature of between –10 °C and 40 °C and in a luminaire complying with IEC 60598-1.

For compliance with EMC requirements, reference is made to regional requirements. For relevant standards, see Bibliography.

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.

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

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

1) In preparation.

IEC 60598-1, *Luminaires – Part 1: General requirements and tests*

IEC 60630, *Maximum lamp outlines for incandescent lamps*

IEC/TR 61341, *Method of measurement of centre beam intensity and beam angle(s) of reflector lamps*

CIE 84:1989, *Measurement of Luminous Flux*

3 Terms and definitions

For the purposes of this PAS, the following terms and definitions apply.

For terms and definitions in the field of LED and LED modules, reference is made to IEC 62504, which is currently in preparation, and IEC 60050-845. Both will not be repeated here.

3.1

self-ballasted LED-lamp

unit which cannot be dismantled without being permanently damaged, provided with a lamp cap conforming to IEC 60061-1 and incorporating a LED light source and any additional elements necessary for starting and stable operation of the light source

3.2

type

LED lamps that, independent of the type of cap, have an identical photometric and electrical rating

3.3

rated value

quantity value for a characteristic of a LED-lamp for specific operating conditions

The value and the conditions are specified in this PAS, or assigned by the manufacturer or responsible vendor.

3.4

test voltage

voltage at which tests are carried out

3.5

lumen maintenance

luminous flux at a given time in the life of a LED-lamp divided by the initial value of the luminous flux of the lamp and expressed as a percentage of the initial luminous flux

3.6

initial values

photometric and electrical characteristics at the end of the ageing period and/or stabilization time

3.7

life (of an individual LED-lamp)

length of time during which a complete LED-lamp provides more than 50 % (or 70 % alternatively; see Note 3) of the rated luminous flux, under standard test conditions

A LED-lamp has thus reached its end of life when it no longer provides 50 % (or 70 % alternatively) of the rated luminous flux. Life is always published in combination with the failure rate (see Note 4 and 3.9).

NOTE 1 LED lamps have a different end of life characteristic than conventional lamps, because they are not subject to sudden lamp failure but will typically dim over time in a gradual way.

NOTE 2 The built-in electronic driver, however, may show a sudden end of life failure. The definition under 3.7 implies that a LED-lamp giving no light at all, due to electronic driver failure, has actually reached end of life, since it no longer complies with the minimum luminous flux level as declared by the manufacturer or responsible vendor.

NOTE 3 The maximum lumen maintenance reduction figure may vary depending on the application of the LED lamp. This PAS uses a value of 50 % (L_{50}) as an example, which is often used for consumer applications. For professional applications, a lumen maintenance figure of 70 % (L_{70}) can be chosen. Dedicated information on the chosen percentage is to be provided by the manufacturer.

NOTE 4 End of lamp life is normally determined when 50 % of the lamps has failed, indicated in combination with the chosen lumen maintenance value: L_{70} , F_{50} or L_{50} , F_{50} . For professional applications, the value L_{70} , F_{10} is advised, meaning 10 % of the lamps has failed when the point of 70 % lumen maintenance has been reached.

3.8 rated lamp life

length of time during which a complete LED-lamp provides more than 50 % (or 70 % alternatively) of the rated luminous flux, published in combination with the failure rate, as declared by the manufacturer or responsible vendor

NOTE 1 For sample size, see Clause 6.

NOTE 2 Note 1, Note 2 and Note 4 of 3.7 apply.

3.9 failure rate

F_x
percentage of a number of tested lamps of the same type that have reached the end of their individual lives

NOTE 1 For self-ballasted LED lamps, the failure rate expresses the combined effect of LED and ballast failure.

NOTE 2 For self-ballasted LED lamps, normally a failure rate of 10 % or/and 50 % are being applied, indicated as F_{10} or/and F_{50} .

3.10 colour code

colour characteristics of a LED-lamp giving white light are defined by the correlated colour temperature and the colour rendition index

3.11 stabilisation time

time which the LED-lamp requires to obtain stable thermal conditions

3.12 ageing

preconditioning period of the LED-lamps

3.13 type test

test or series of tests made on a type test sample for the purpose of checking compliance of the design of a given product with the requirements of the relevant standard

3.14 type test sample

sample consisting of one or more similar units submitted by the manufacturer or responsible vendor for the purpose of the type test

4 Marking

4.1 General requirements for marking

For this performance PAS, the following data are to be provided visible (in addition to the mandatory data of IEC 62560) by the manufacturer or responsible vendor, and placed as specified in 4.2.

4.2 Places of marking (see Table 1)

Table 1 – Places where marking is required

	(A) Product and packaging ^a	(B) Product datasheets or leaflets ^a
a) Rated luminous flux of the LED lamp, expressed in lumen, also in the case of spot lamps for which normally only the rated luminous intensity in combination with the beam angle (according IEC/TR 61341) is given.	x	x
b) Lamp colour code (See ILCOS* and NOTE 1). NOTE 1 Example of lamp colour code 830/4A, meaning CRI between 77 and 86, a nominal CCT of 3 000 K, a CCT spread within a 4-step MacAdams ellipse and a drop in lumen output of max 10 % at 25 % of rated lamp life (with a maximum duration of 6 000 h). NOTE 2 The actual luminous intensity (coupled to a specific beam angle) is not an element of this PAS, but the related luminous flux (from which the beam intensity and angle are originated) is subject of further testing; via calculation, it can be determined whether the rated luminous intensities are realistic within the beam angle specified by the manufacturer. *: Extension for LED in preparation.	x	x
c) Rated life and the related lumen maintenance factor (L_x)	x	x
e) Failure rate (F_x), corresponding to the rated life	–	x
f) Lumen maintenance category (Cat A to E, see 10.1)	–	x
g) Rated correlated colour temperature including tolerance category (Cat 1 to Cat 8, see Clause 9).	–	x
h) Rated colour rendition index	–	x
x = required – = not required		
^a Marking according to one of both columns is required. For non-professional purposes, column (A), and for professional purposes, column (B) is applicable.		

5 Dimensions

The LED-lamp dimensions shall comply with the requirements as indicated by the manufacturer or responsible vendor. The outlines of the LED-lamp shall not exceed those of the lamp to be replaced (see also IEC 60630).

6 Test conditions

Test conditions for testing electrical and photometric characteristics, lumen maintenance and life are given in Annex A.

All tests are measured on “n” lamps. The number “n” is declared by the manufacturer or responsible vendor, but shall be a minimum of 20 lamps.

Lamps which are intended for retrofit purposes shall be equipped with adequate means of cooling.

7 Lamp wattage

The power dissipated by the LED-lamp shall not exceed the rated wattage by more than 15 %.

8 Luminous flux

The initial luminous flux of a LED lamp measured shall not be less than 90 % of the rated luminous flux.

9 Correlated colour temperature and colour rendering

9.1 CCT

Reference is made to IEC 60081, Annex D: Chromaticity co-ordinates. The rated correlated colour temperature (CCT) of a lamp shall preferably be one of the following six values:

2 700 K, 3 000 K, 3 500 K, 4 000 K, 5 000 K or 6 500 K

For reference purposes, the standardized chromaticity co-ordinates corresponding to these CCT values are given in Table 2 (IEC 60081, Clause D.2, modified).

Table 2 – Correlated colour temperatures and chromaticity co-ordinates

Colour Indication	CCT	x	y
F 6500	6400	0,313	0,337
F 5000	5000	0,346	0,359
F 4000	4040	0,380	0,380
F 3500	3450	0,409	0,394
F 3000	2940	0,440	0,403
F 2700	2720	0,463	0,420

The initial CCT of a LED lamp is measured as the value after an operation time of 25 % of rated lamp life (with a maximum duration of 6 000 h). The measured actual CCT values (both initial and at 25 % of rated lamp life with a maximum duration of 6 000 h) are expressed as fitting within one of 8 categories (see Table 3), which correspond to a particular MacAdams ellipse around the rated CCT value, whereby the size of the ellipse (expressed in n -steps) is a measure for the tolerance/deviation of an individual lamp.

The measured CCT value of a LED lamp (the initial value and at 25 % of rated lamp life with a maximum duration of 6 000 h) shall not move beyond the CCT tolerance category as indicated by the manufacturer or responsible vendor (see Table 1).