

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Self-ballasted LED-lamps for general lighting services by voltage > 50 V – Safety specifications

Lampes à LED autoballastées pour l'éclairage général fonctionnant à des tensions > 50 V – Spécifications de sécurité

[IEC 62560:2011](https://standards.iteh.ai)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SELF-BALLASTED LED-LAMPS FOR GENERAL
LIGHTING SERVICES BY VOLTAGE > 50 V –
SAFETY SPECIFICATIONS**

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IEC 62560 edition 1.1 contains the first edition (2011-02) [documents 34A/1425/FDIS and 34A/1447/RVD] and its amendment 1 (2015-04) [documents 34A/1836/FDIS and 34A/1845/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 62560 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this standard, the following print types are used:

- requirements proper: in roman type.
- *test specifications: in italic type.*

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

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- withdrawn,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

The contents of the corrigendum of January 2012 and the corrigendum of Amendment 1 of June 2015 have been included in this copy.

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INTRODUCTION

There will be and are already LED products in the market which substitute existing lamps, either as retrofit mains voltage incandescent or self-ballasted fluorescent lamps or as replacement for tungsten halogen lamps below 50 V.

The present document takes up the supply voltage range from > 50 V up to 250 V. A proposal for a safety standard for LED lamps with voltages \leq 50 V may follow in due time.

Future work will also consequently comprise performance standards for all kind of LED lamps, including minimum photometric requirements for type testing.

Due to the urgent need of establishing this standard, it will be a stand-alone standard for the time being, not excluding a future relocation as a part of IEC 60968, self-ballasted lamps.

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SELF-BALLASTED LED-LAMPS FOR GENERAL LIGHTING SERVICES BY VOLTAGE > 50 V – SAFETY SPECIFICATIONS

1 Scope

This International Standard specifies the safety and interchangeability requirements, together with the test methods and conditions required to show compliance of LED-lamps with integrated means for stable operation (self-ballasted LED-lamps), intended for domestic and similar general lighting purposes, having:

- a rated wattage up to 60 W;
- a rated voltage of > 50 V up to 250 V;
- caps according to Table 1.

The requirements of this standard relate only to type testing.

Recommendations for whole product testing or batch testing are identical to those given in Annex C of IEC 62031.

NOTE 1 Where in this standard the term “lamp(s)” is used, it is understood to stand for “self-ballasted LED-lamp(s)”, except where it is obviously assigned to other types of lamps.

NOTE 2 This standard includes photobiological safety.

2 Normative references

The following reference 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 reference document (including any amendments) applies.

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

IEC 60061-3, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 3 : Gauges*

IEC 60360, *Standard method of measurement of lamp cap temperature rise*

~~IEC 60432-1, *Incandescent lamps – Safety specifications – Part 1: Tungsten filament lamps for domestic and similar general lighting purposes*~~

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60598-1:2008, *Luminaires – Part 1: General requirements and tests*

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods; Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products*

IEC 60695-2-12:2000, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods; Glow-wire flammability test method for materials*

IEC 60695-2-13:2000, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods; Glow-wire ignitability test method for materials*

IEC 61199:1999, *Single-capped fluorescent lamps – Safety specifications*

IEC 61347-1:2007 —, *Lamp controlgear – Part 1: General and safety requirements*

IEC 62031:2008, *LED modules for general lighting – Safety requirements*

~~IEC/TR 62471-2, *Photobiological safety of lamps and lamp systems – Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety*~~

IEC/TS 62504, *Terms and definitions of LEDs and LED modules in general lighting*¹

IEC TR 62778: 2014, *Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires*

ISO 4046-4:2002, *Paper, board, pulp and related terms – Vocabulary – Part 4: Paper and board grades and converted products*

3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC/TS 62504 (in preparation), IEC 62031 and the following apply.

3.1

self-ballasted LED-lamp

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

NOTE Lamp caps are given in IEC 60061-1.

3.2

rated voltage

voltage or voltage range marked on the lamp

3.3

rated wattage

wattage marked on the lamp

3.4

rated frequency

frequency marked on the lamp

¹ To be published.

3.5 cap temperature rise

Δt_s

surface temperature rise (above ambient) of a standard test lampholder fitted to the lamp, when measured in accordance with the standard method, in case of an Edison screw cap or a bayonet cap

NOTE The standard method for Edison screw cap or bayonet cap is that given in IEC 60360.

3.6 live part

conductive part which may cause an electric shock in normal use

3.7 type

lamps that have an identical electrical rating and a similar cap

3.8 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

3.9 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

3.10 ultraviolet hazard efficacy of luminous radiation

$K_{S,v}$

quotient of an ultraviolet hazard quantity to the corresponding photometric quantity

NOTE 1 Ultraviolet hazard efficacy of luminous radiation is expressed in mW/klm.

NOTE 2 The ultraviolet hazard efficacy of luminous radiation is obtained by weighting the spectral power distribution of the lamp with the UV hazard function $S_{UV}(\lambda)$. Information about the relevant UV hazard function is given in IEC 62471. It only relates to possible hazards regarding UV exposure of human beings. It does not deal with the possible influence of optical radiation on materials, such as mechanical damage or discoloration.

4 General requirements and general test requirements

4.1 The lamps shall be so designed and constructed that in normal use they function reliably and cause no danger to the user or surroundings.

In general, compliance is checked by carrying out all the tests specified.

4.2 Self-ballasted LED-lamps are non-repairable, factory-sealed units. They shall normally not be opened for any tests. In the case of doubt based on the inspection of the lamp and the examination of the circuit diagram, and in agreement with the manufacturer or responsible vendor, either the output terminals shall be short-circuited or, in agreement with the manufacturer, lamps specially prepared so that a fault condition can be simulated shall be submitted for testing (see Clause 13).

4.3 In general, all tests are carried out on each type of lamp or, where a range of similar lamps is involved, for each wattage in the range or on a representative selection from the range, as agreed with the manufacturer.

4.4 When the lamp fails safely during one of the tests, it is replaced, provided that no fire, smoke or flammable gas is produced. Further requirements on failing safe are given in Clause 12.

5 Marking

5.1 Lamps shall be clearly and durably marked with the following mandatory markings:

- a) mark of origin (this may take the form of a trademark, the manufacturer's name or the name of the responsible vendor);
- b) rated voltage or voltage range (marked "V" or "volts");
- c) rated wattage (marked "W" or "watts");
- d) rated frequency (marked in "Hz").

5.2 In addition, the following information shall be given by the lamp manufacturer on the lamp or immediate lamp wrapping or container or in installation instructions.

- ~~a) Burning position, if restricted, shall be marked with the appropriate symbol. Symbol examples are shown in Annex B.~~
- b) rated current (marked "A" or "ampere");
- c) "For lamps with a weight significantly higher than that of the lamps for which they are a replacement, attention should be drawn to the fact that the increased weight may reduce the mechanical stability of certain luminaires and lampholders and may impair contact making and lamp retention."
- d) Special conditions or restrictions which shall be observed for lamp operation, for example operation in dimming circuits. Where lamps are not suitable for dimming, the following symbol in Figure 1 may be used:



Figure 1 – Dimming not allowed

- ~~e) For eye protection, see requirements of IEC/TR 62471-2~~
Lamps with bulbs not suitable for water contact shall be marked with the symbol according to Figure 6. The marking shall be provided on the packaging or accompanying information. The height of the graphical symbol shall be at least 5 mm. The symbol is not needed if a written cautionary notice is provided such as 'Use in Dry Locations only'.



[SOURCE: IEC 60417-6179-1 (2014-10)]

Figure 6 – Lamp not suitable for use under moisture

5.3 Compliance is checked by the following:

Presence and legibility of the marking required in 5.1 – by visual inspection.