IEC 62838

Edition 1.0 2015-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

LEDsi lamps for general lighting services with supply voltages not exceeding 50 V a.c. r.m.s. or 120 V ripple free d.c. – Safety specifications

Lampes à LEDsi pour l'éclairage général fonctionnant à des tensions d'alimentation ne dépassant pas 50 V en courant alternatif efficace ou 120 V en courant continu lisse – Spécifications de sécurité

IEC 62838:2015-10(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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LEDsi LAMPS FOR GENERAL LIGHTING SERVICES WITH SUPPLY VOLTAGES NOT EXCEEDING 50 V A.C. R.M.S. OR 120 V RIPPLE FREE D.C. – SAFETY SPECIFICATIONS

FOREWORD

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International Standard IEC 62838 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment

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

FDIS	Report on voting
34A/1852/FDIS	34A/1869/RVD

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

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*

– notes: in small roman type

The committee has decided that the contents of this 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- withdrawn,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.

The contents of the corrigendum of October 2017 have been included in this copy.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This standard provides the requirements and conditions of compliance for the safety of semi-integrated LED lamps with supply voltages equal to or less than 50 V a.c. r.m.s. or equal to or less than 120 V ripple free d.c.

The establishing of this standard does not exclude a future relocation as a sub-part of IEC 60968, self-ballasted lamps, or a merging with the standard for self-ballasted LED lamps with supply voltages greater than 50 V.

LEDsi LAMPS FOR GENERAL LIGHTING SERVICES WITH SUPPLY VOLTAGES NOT EXCEEDING 50 V A.C. R.M.S. OR 120 V RIPPLE FREE D.C. – 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, intended for domestic and similar general lighting purposes, having:

– a rated power up to 60 W

– a rated voltage equal to or less than 50 V a.c. r.m.s. or equal or less 120 V ripple free d.c.,

– caps according to Table 1.

NOTE 1 The value of 60 W rated power is under consideration. Heat management may require lower power.

This standard shall be used for products in conjunction with ELV lighting installations.

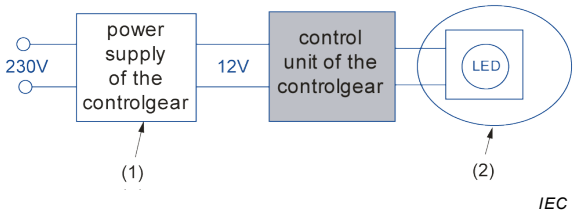
With reference to IEC 60364-7-715, in ELV lighting installations only SELV sources are applied. Where bare conductors are used, the maximum lamp voltage shall be 25 V a.c. or 60 V d.c.

The requirements of this standard relate only to type testing.

For lamps > 25 V a.c. or 60 V d.c., recommendations for whole production testing or batch testing are given in IEC 60598-1 Table Q.1, column class III luminaire, column 4 or 5.

NOTE 2 Where in this standard the term “lamp(s)” is used, it is understood to stand for semi-integrated LED lamp(s) with supply voltages as in the scope above, except where it is obviously assigned to other types of lamps.

An overview of systems composed of LED modules, lamps and controlgear is given in IEC 62504. Supply voltage does not mean necessarily mains voltage, e.g. 230 V / 50 Hz. A semi-integrated LED lamp can also be driven on a supply voltage with 12 V a.c. or d.c. The control unit in the controlgear in a semi-integrated LED lamp then provides the conversion of 12 V a.c. or d.c. to a special current and voltage to power the LED inside the semi-integrated LED lamp. Schematically, the types of LEDni and LEDsi lamps are shown in Figure 1.

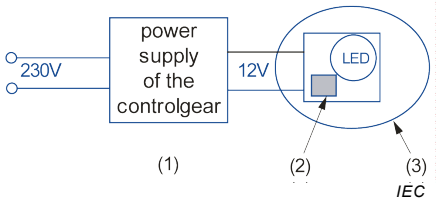


a) Example of a non-integrated LED lamp with supply voltage ≤ 50V

Key

1 Converter not LED specific, but designed typically for incandescent or tungsten halogen lamps.

2 Non-integrated LED light source, typically a module. It may have an IEC 60061-1 conform cap which is LED specific and not retrofit.



b) Example of a semi-integrated LED lamp with supply voltage ≤ 50V, in the scope of this standard

Key

1 Converter not LED specific, but designed typically for incandescent or tungsten halogen lamps.

2 LED control unit.

3 Semi-integrated LED lamp as defined in 3.15.4 of IEC 62504.

NOTE Figure 1a) type is not covered by this standard.

Figure 1 – Types of LED lamps with supply voltage ≤ 50V

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 – 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 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-7-715:2011, *Electrical installations – Requirements for special installations or locations – Extra-low-voltage lighting installations*

IEC 60417, *Graphical symbols for use on equipment* (available from: http://www.graphical-symbols.info/equipment)

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

IEC 61347-1:2015, *Lamp controlgear – Part 1: General and safety requirements*

IEC 62031, *LED modules for general lighting – safety requirements*

IEC 62504, *General lighting – LEDs and LED modules – terms and definitions*

IEC 62560, *Self-ballasted LED lamps for general lighting services by voltage > 50 V – Safety specifications*

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

3 Terms and definitions

For the purposes of this document the terms and definitions of IEC 62031, IEC 62504, IEC 62560 and IEC 61347-1 as well as the following apply.

3.1
ultraviolet hazard efficacy of luminous radiation
$K_{S,v}$
quotient of a ultraviolet hazard quantity to the corresponding photometric quantity

Note 1 to entry: Ultraviolet hazard efficacy of luminous radiation is expressed in mW/klm.

Note 2 to entry: 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 requirement and general test requirements

The requirements of IEC 62560 apply.

5 Marking

The requirements of IEC 62560 apply.

Deviating from the frequency marking in IEC 62560, 5.1 d), the following applies.

If a lamp is only suitable for DC, it shall be marked "DC" or "⎓"(IEC 60417-5031 (2002-10)).

If a lamp is only suitable for AC electronic, it shall be marked “AC electronic” or “ electronic ~ ” (IEC 60417-5032 (2002-10)).

If a lamp is only suitable for AC 50 Hz/60Hz, it shall be marked “AC 50 Hz/60Hz” or “ ~ 50 Hz/60 Hz".

If a lamp is suitable for AC electronic and AC 50 Hz/60Hz, it shall be marked “AC”; the addition “electronic and 50 Hz/ 60 Hz” is optional.

If a lamp is suitable for DC, AC electronic and AC 50 Hz/60 Hz, it shall only be marked with the voltage, not with the frequency.

Lamps with bulbs not suitable for water contact shall be marked with the symbol according to Figure 2. 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.

IEC 60417-6179-1 (2014-10)

Figure 2 – Lamp not suitable for use under moisture

6 Interchangeability

6.1 Cap interchangeability

Interchangeability shall be ensured by the use of caps in accordance with IEC 60061-1 and gauges in accordance with IEC 60061-3; see Table 1. Caps originally developed for single-capped extra low voltage (ELV) lamps shall not be used for mains voltage lamps. Examples of ELV lamp caps are given in Table 1, see also IEC 60432-3.

Lamps with additional mechanical fixation (e.g. rim mounted lamps) are exempted of the bending moment and mass requirements of Table 1.

Compliance is checked by the use of the relevant gauges.

Table 1 – Interchangeability gauges, lamp cap dimensions, bending moment and mass

Lamp cap	Cap sheet no. from IEC 60061-1	Cap dimensions to be checked by the gauge	Gauge sheet no. from IEC 60061-3	Bending moment Nm	Mass g
G4	7004-72	"Go" and "Not Go"	7006-72 Gauge A	u.c.	20
GU4	7004-108	"Go" and "Not Go"	7006-108	u.c.	u.c.
GU5.3	7004-109	"Go" and "Not Go"	7006-109	u.c.	u.c.
GX5.3	7004-73A	"Go" and "Not Go"	7006-73B	u.c.	u.c.
G6.35	7004-59	"Go" and "Not Go"	7006-61	u.c.	u.c.
		"Go"	7006-61A	u.c.	u.c.
GY4	7004-72A	u.c.	u.c.	u.c.	u.c.
GY6.35	7004-59	"Go" and "Not Go"	7006-61	u.c.	u.c.
		"Go"	7006-61A	u.c.	u.c.
GU7	7004-113	"Go" and "Not Go"	7006-113	u.c.	u.c.
G53	7004-143	u.c.	u.c.	u.c.	u.c.
NOTE u.c.: under consideration					

6.2 Bending moment and mass imparted by the lamp at the lampholder

The value of the bending moment, imparted by the lamp at the lampholder shall not exceed the value given in Table 1. For the measurement method, see IEC 62560, 6.2.

Compliance shall be checked by measurement.

The value of the lamp mass shall not exceed the relevant value of Table 1.

Compliance shall be checked by measurement.

7 Protection against accidental contact with live parts

Lamps which are intended for ELV installations as specified in the scope may have accessible conductive parts, but where voltage exceeds 25 V a.c. r.m.s. or 60 V d.c. ripple free, the touch current shall not exceed:

– for a.c.: 0,7 mA (peak)

– for d.c.: 2,0 mA.

The limits given are based on IEC 60364-4-41.

The external metal parts other than current-carrying metal parts of the cap of all lamps shall not be or become live. For testing, any movable conductive material shall be placed in the most onerous position without using a tool.

Compliance is checked by the touch current requirements of IEC 60598-1, Section 8 and Annex G.

8 Insulation resistance and electric strength after humidity treatment

8.1 General

Insulation resistance and electric strength shall be adequate between live parts of the lamp and accessible parts of the lamp.

8.2 Insulation resistance

The lamp shall be conditioned for 48 h in a cabinet containing air with a relative humidity between 91 % and 95 %. The temperature of the air is maintained within 1 °C of any convenient value between 20 °C and 30 °C.

Insulation resistance shall be measured in the humidity cabinet with a d.c. voltage of approximately 500 V, 1 min after application of the voltage.

The insulation resistance between live parts of the cap and accessible parts of the lamp (accessible parts of insulating material are covered with metal foil) shall be not less than 1 MΩ.

8.3 Electric strength

Immediately after the insulation resistance test, the same parts as specified above shall withstand a voltage test for 1 min with an a.c. voltage as follows.

During the test the supply contacts of the cap are short-circuited. Accessible parts of insulating material of the cap are covered with metal foil. Initially no more than half the voltage prescribed in Table 2 is applied between the contacts and the metal foil. It is then gradually raised to the full value.

No flashover or breakdown shall occur during the test. Measurements shall be carried out in the humidity cabinet.

NOTE 1 The distance between the foil and the live parts is under consideration.