

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Lampholders for tubular fluorescent lamps and starterholders

Douilles pour lampes tubulaires à fluorescence et douilles pour starters

IEC 60400:2008

<https://standards.iteh.ai/catalog/standards/iec/55e4096a-7a7a-4ecc-ad1c-0bccc9926472/iec-60400-2008>



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**LAMP HOLDERS FOR TUBULAR FLUORESCENT LAMPS
AND STARTER HOLDERS**

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This consolidated version of IEC 60400 consists of the seventh edition (2008) [documents 34B/1383/FDIS and 34B/1399/RVD] and its amendment 1 (2011) [documents 34B/1591/FDIS and 34B/1600/RVD]. It bears the edition number 7.1.

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience. A vertical line in the margin shows where the base publication has been modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through.

International Standard IEC 60400 has been prepared by subcommittee 34B: Lamp caps and holders, of IEC technical committee 34: Lamps and related equipment.

In this edition, information on lampholders intended to be used in applications where they are accessible in normal use (class II luminaires as well as class I luminaires) has been introduced, as well as requirements for contact-making to pins for single-capped fluorescent lamps, introduction of new fits in the text and Annex A, and requirements for shade holder rings have been adopted.

In this standard, the following print types are used:

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

The committee has decided that the contents of the base publication and its amendments 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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LAMP HOLDERS FOR TUBULAR FLUORESCENT LAMPS AND STARTER HOLDERS

1 General

1.1 Scope

This International Standard states the technical and dimensional requirements for lampholders for tubular fluorescent lamps and for starterholders, and the methods of test to be used in determining the safety and the fit of the lamps in the lampholders and the starters in the starterholders.

This standard covers independent lampholders and lampholders for building-in, used with tubular fluorescent lamps provided with caps as listed in Annex A, and independent starterholders and starterholders for building-in, used with starters in accordance with IEC 60155, intended for use in a.c. circuits where the working voltage does not exceed 1 000 V r.m.s.

This standard also covers lampholders for single-capped tubular fluorescent lamps integrated in an outer shell and dome similar to Edison screw lampholders (e.g. for G23 and G24 capped lamps). Such lampholders are tested in accordance with the following clauses and subclauses of IEC 60238: 8.4; 8.5; 8.6; 9.3; 10.7; 11; 12.2; 12.5; 12.6; 12.7; 13; 15.3; 15.4; 15.5 and 15.9.

This standard also covers lampholders which are integral with a luminaire or intended to be built into appliances. It covers the requirements for the lampholder only. For all other requirements, such as protection against electric shock in the area of the terminals, the requirements of the relevant appliance standard are to be observed and tested after building into the appropriate equipment, when that equipment is tested according to its own standard. Lampholders for use by luminaire manufacturers only are not for retail sale.

This standard also applies, as far as is reasonable, to lampholders and starterholders other than the types explicitly mentioned above and to lamp connectors.

Where the term "holder" is used in the standard, both lampholders and starterholders are intended.

Where the term "bi-pin lampholder" is used, lampholders for wedged caps are also intended.

1.2 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 – Part 1: Lamp caps*

IEC 60061-2, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 2: Lampholders*

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

IEC 60068-2-20:1979, *Environmental testing – Part 2: Tests – Test T: Soldering*

IEC 60068-2-75:1997, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

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

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 60238, *Edison screw lampholders*

IEC 60352-1:1997, *Solderless connections – Part 1: Wrapped connections – General requirements, test methods and practical guidance*

IEC 60399, *Barrel thread for lampholders with shade holder ring*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
Amendment 1 (1999)

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

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

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 60695-11-5:2004, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

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

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

2 Terms and definitions

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

2.1

rated voltage

voltage declared by the manufacturer to indicate the highest working voltage for which the holder is intended

2.2

working voltage

highest r.m.s. voltage which may occur across any insulation, transients being disregarded, both when the lamp or starter is operating under normal conditions and when the lamp or starter is removed

2.3

flexible lampholders for linear double-capped fluorescent lamps

pair of lampholders in which the base of each holder is rigidly mounted in the luminaire but which has one or both of the lampholders so designed as to allow axial movement of the contacts to provide compensation for variations in lamp lengths and, where necessary, to permit insertion and removal of the lamp

NOTE In case of doubt as to whether a lampholder G5, GX5 or G13 provides the required axial movement of the contacts, a test with the device shown in Figure 3 may be carried out.

2.4**inflexible lampholders for linear double-capped fluorescent lamps**

pair of lampholders intended for rigid mounting and in which no axial movement of the contacts is provided or is needed, either for the insertion and removal of the lamp or as compensation for variation in lamp lengths

2.5**flexibly mounted lampholders for linear double-capped fluorescent lamps**

pair of lampholders which do not in themselves provide for any axial movement of the contact system but which are intended to be mounted in a luminaire in a specified manner so that the combination provides the necessary axial movement of the contact system

NOTE Lampholders of this type may or may not also be suitable for rigid mounting.

2.6**lamp connectors**

set of contacts mounted on flexible conductors which provide for electrical contact but do not support the lamp

2.7**holder for building-in**

holder designed to be built into a luminaire, an additional enclosure or the like

2.7.1**unenclosed holder**

holder for building-in so designed that it requires additional means, for example an enclosure, to meet the requirements of this standard with regard to protection against electric shock

2.7.2**enclosed holder**

holder for building-in so designed that on its own it fulfils the requirements of this standard with regard to protection against electric shock and IP classification, if appropriate

2.8**independent holder**

holder so designed that it can be mounted separately from a luminaire and at the same time providing all the necessary protection according to its classification and marking

2.9**rated operating temperature**

highest temperature for which the holder is designed

2.10**rated lampholder rearside temperature**

rearside temperature for lampholders with T marking ascertained by test b) in 17.1, or a higher temperature as declared by the manufacturer

2.11**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

2.12**type test sample**

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

2.13**live part**

conductive part which may cause an electric shock

2.14**rated pulse voltage**

highest peak value of the pulse voltages the holder is able to withstand

2.15**multilamp ballast**

electronic mains ballast designed and declared to comply for application of lamps with different keys

2.16**impulse withstand categorie**

numeral defining a transient overvoltage condition

NOTE Impulse withstand categories I, II, III and IV are used.

a) Purpose of classification of impulse withstand categories

Impulse withstand categories are to distinguish different degrees of availability of equipment with regard to required expectations on continuity of service and on an acceptable risk of failure.

By selection of impulse withstand levels of equipment, insulation co-ordination can be achieved in the whole installation reducing the risk of failure to an acceptable level providing a basis for overvoltage control.

A higher characteristic numeral of an impulse withstand category indicates a higher specific impulse withstand of the equipment and offers a wider choice of methods for overvoltage control.

The concept of impulse withstand categories is used for equipment energized directly from the mains.

b) Description of impulse withstand categories

Equipment of impulse withstand category I is equipment which is intended to be connected to the fixed electrical installations of buildings. Protective means are taken outside the equipment - either in the fixed installation or between the fixed installation and the equipment - to limit transient overvoltages to the specific level.

Equipment of impulse withstand category II is equipment to be connected to the fixed electrical installations of buildings.

Equipment of impulse withstand category III is equipment which is part of the fixed electrical installations and other equipment where a higher degree of availability is expected.

Equipment of impulse withstand category IV is for use at or in the proximity of the origin of the electrical installations of buildings upstream of the main distribution board.

2.17**primary circuit**

circuit which is directly connected to the AC mains supply

It includes, for example, the means for connection to the AC mains supply, the primary windings of transformers, motors and other loading devices.

2.18**secondary circuit**

circuit which has no direct connection to a primary circuit and derives its power from a transformer, converter or equivalent isolation device, or from a battery

Exception: autotransformers. Although having direct connection to a primary circuit, the tapped part of them is also deemed to be a secondary circuit in the above sense.

NOTE Mains transients in such a circuit are attenuated by the corresponding primary windings. In addition, inductive ballasts reduce the mains transient voltage height. Therefore, components located after a primary circuit or after an inductive ballast can be suited for an impulse withstand category of one step lower, i.e. for impulse withstand category II.

2.19
basic insulation

insulation applied to live parts to provide basic protection against electric shock

NOTE Basic insulation does not necessarily include insulation used exclusively for functional purposes.

2.20
supplementary insulation

independent insulation applied in addition to basic insulation in order to provide protection against electric shock in the event of a failure of basic insulation

2.21
double insulation

insulation comprising both basic insulation and supplementary insulation

2.22
reinforced insulation

single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation under the conditions specified

NOTE The term "insulation system" does not imply that the insulation must be one homogeneous piece. It may comprise several layers which cannot be tested singly as supplementary or basic insulation.

2.23
enclosed reinforced insulated lampholder

lampholder for building-in so designed that on its own it fulfils the requirements for double or reinforced insulated parts in class II applications

2.24
partly reinforced insulated lampholder

lampholder for building-in, so designed that some parts of the lampholder require additional means to fulfil the requirements with regard to double or reinforced insulation

NOTE In some cases, the dimensions might be achieved only after mounting into the luminaire.

3 General requirement

Holders shall be so designed and constructed that, in normal use, they function reliably and cause no danger to persons or surroundings.

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

In addition, the enclosure of independent holders shall comply with the appropriate requirements of IEC 60598-1, including the classification and marking requirements of that standard.

4 General conditions for tests

4.1 Tests according to this standard are type tests.

NOTE The requirements and tolerances permitted by this standard are related to testing of a type test sample submitted for that purpose.

Compliance of the type test sample does not ensure compliance of the whole production of a manufacturer with this safety standard.

In addition to type testing, conformity of production is the responsibility of the manufacturer and may include routine tests and quality assurance.

For further information, see IEC 60061-4 (inclusion of guidance on conformity testing during manufacture is in preparation).

4.2 Unless otherwise specified, the tests are made at an ambient temperature of $20\text{ °C} \pm 5\text{ °C}$ and with the holder in the most unfavourable position for normal use.

4.3 The tests shall be carried out in the order of the clauses, unless another succession of tests is specified.

Holders intended to provide an IP classification greater than IP20 shall be subjected to the tests in 11.1 and 11.2 after the test in 17.1.

4.4 The tests and inspections are carried out on a total of:

- eight pairs of matching lampholders intended for linear double-capped fluorescent lamps;

NOTE If a pair of lampholders consists of identical holders, it is sufficient for one holder instead of one pair to be subjected to all the tests, except for the test of item d) in 10.5, where one pair is needed.

- eight specimens intended for single-capped fluorescent lamps and eight starter-holders; in the order of the clauses, as follows:
- two pairs or two specimens: Clause 5 up to and including Clause 16 (except for 9.2 and 9.5);

NOTE The tests of 9.2 are carried out on the number of separate specimens as required by the relevant standards.

- three pairs or three specimens: 9.5 and 17.1;
- two pairs or two specimens: 17.2 up to and including 17.5 (of which one specimen for the test in 17.2 and the other for the tests in 17.4 and 17.5);
- one pair or one specimen: 17.6 and Clause 18.

In the case of flexible and inflexible lampholders G5, GX5 or G13 (see **Definitions** 2.3 and 2.4 respectively), the specimens are mounted on two pairs of mounting sheets as specified in Figure 2.

One pair of holders is mounted so as to represent the minimum mounting distance for this pair of holders according to the manufacturer's mounting instructions; the other pair is mounted at the maximum distance. The matching mounting sheets are marked.

In special cases, it may be necessary to test more than the number of specimens specified above.

Together with these specimens, the manufacturer's mounting instructions (see 7.3) shall be supplied.

For holders intended to provide an IP classification greater than IP20 with detachable gaskets having a maximum operating temperature different from the values in 17.1, an additional set of gaskets shall be supplied with the specimen, together with information on their maximum operating temperature (this is part of the manufacturer's mounting instructions).

NOTE This does not refer to detachable gaskets on the mounting surface of the holder (see 17.1).

4.5 Holders are deemed to comply with this standard if no specimen fails in the complete series of tests specified in 4.4.

If one specimen fails in one test, that test and the preceding ones which may have influenced the result of that test are repeated on another set of specimens to the number required in 4.4, all specimens of which shall then comply with the repeated tests and with the subsequent tests.

Holders are deemed not to comply with this standard if there are more failures than that of one specimen in one of the tests.

NOTE In general, it will only be necessary to repeat the relevant test, unless the specimen fails in the tests according to Clause 13 or 14, in which case the tests must be repeated from the test according to Clause 12 onwards.

A second type test sample, which may be required should one specimen fail, may be submitted together with the first sample.

If the additional type test sample is not submitted at the same time, a failure of one specimen entails a rejection.

5 Electrical rating

The electrical rating shall be:

- not less than 125 V and not more than 1 000 V a.c. r.m.s.;
- not less than 1 A;
- not less than 2 A for lampholders GX5, G13, 2G8, 2G13, G20, Fa6, Fa8 and R17d.

NOTE In countries where marking of rated wattage is required in place of rated current, the rating of the G5 lampholder should be not less than 75 W.

6 Classification

Holders are classified as follows.

6.1 According to protection against electric shock:

- unenclosed holders;
- enclosed holders;
- independent holders;
- unenclosed lampholders;
- enclosed lampholders;
- independent lampholders;
- partly reinforced insulated lampholders;
- enclosed reinforced insulated lampholders.

NOTE Where a lampholder is used with a working voltage of 50 % or less of its maximum rating, it may be regarded as equivalent to a reinforced insulated lampholder.

6.2 According to the degree of protection against ingress of dust or water in accordance with the system of classification (IP Code) explained in IEC 60529.

Symbols for the degrees of protection are given in 7.4 (independent and enclosed holders only).

6.3 According to the resistance to heat:

- holders for rated operating temperatures up to and including 80 °C;
- holders for rated operating temperatures over 80 °C.

NOTE The measuring point for the operating temperature is that area of the lampholder where it touches the lamp cap.