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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Miscellaneous lampholders –
Part 1: General requirements and tests

Douilles diverses pour lampes –
Partie 1: Prescriptions générales et essais

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MISCELLANEOUS LAMPHOLDERS –

Part 1: General requirements and tests

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60838-1 has been prepared by subcommittee 34B: Lamp caps and holders, of IEC technical committee 34: Lamps and related equipment.

This consolidated version of IEC 60838-1 consists of the fourth edition (2004) [documents 34B/1152/FDIS and 34B/1171/RVD] and its amendment 1 (2008) [documents 34B/1384/FDIS and 34B/1400/RVD].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 4.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

In this edition the new requirements for creepage distances and clearances have been adopted which are currently circulated by SC34D to amend the IEC 60598 family of luminaire standards.

It also includes additional requirements regarding testing of lampholders for double-ended R7s/RX7s lamps.

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

IEC 60838 consists of the following parts, under the general title *Miscellaneous lampholders*:

Part 1: General requirements and tests

Part 2-1: Particular requirements – Lampholders S14

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result 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

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

MISCELLANEOUS LAMPHOLDERS –

Part 1: General requirements and tests

1 General

1.1 Scope

This part of IEC 60838 applies to lampholders of miscellaneous types intended for building-in (to be used with general purpose light sources, projection lamps, floodlighting lamps and street-lighting lamps with caps as listed in annex A) and the methods of test to be used in determining the safe use of lamps in lampholders.

This part of IEC 60838 also covers lampholders which are integral with a luminaire. It covers the requirements for the lampholder only.

This part of IEC 60838 also covers lampholders integrated in an outer shell and dome similar to Edison screw lampholders. Such lampholders are further tested in accordance with the following 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.

Requirements for lampholders for tubular fluorescent lamps, Edison screw lampholders and bayonet lampholders are covered by separate standards.

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.

NOTE With regard to IEC 60598-1, the references cited in this document are liable to change.

IEC 60061(all parts), *Lamp caps and holders together with gauges for the control of interchangeability and safety*

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 60112:1979, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60238:2004, *Edison screw lampholders*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

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

IEC 60399: *Standard sheets for barrel thread for E14 and E27 lampholders with shade holder ring*

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

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

IEC 60664-1:1992, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*[2)]
Amendment 1 (2000)
Amendment 2 (2002)

IEC 60695-2-11, *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*

ISO 1456:2003, *Metallic coatings – Electrodeposited coatings of nickel plus chromium and of copper plus nickel plus chromium*

ISO 2081:1986, *Metallic coatings – Electroplated coatings of zinc on iron or steel*

ISO 2093:1986, *Electroplated coatings of tin – Specification and test methods*

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

2 Definitions

For the purpose of this International Standard, the following definitions apply.

2.1
rated voltage
the voltage declared by the manufacturer to indicate the highest working voltage for which the lampholder is intended

2.2
working voltage
the highest r.m.s. voltage that may occur across any insulation, transients being disregarded, both when the lamp is operating under normal conditions and when the lamp is removed

2.3
rated current
the current declared by the manufacturer to indicate the highest current for which the lampholder is intended

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1) A consolidated edition 2.1 (2001) exists that includes edition 2.0 (1989) and its Amendment 1 (1999).

2) A consolidated edition 1.2 (2002) exists that includes edition 1.0 (1992), its amendment 1 (2000) and amendment 2 (2002).

2.4
lampholder for building-in
a lampholder designed to be built into a luminaire, an additional enclosure or the like

2.4.1
unenclosed lampholder
a lampholder for building-in so designed that it requires additional means, for example enclosures, to meet the requirements of this standard with regard to protection against electric shock

2.4.2
enclosed lampholder
a lampholder for building-in so designed that it fulfils on its own the requirements of this standard with regard to protection against electric shock

2.5
rated operating temperature
The highest temperature for which the lampholder is designed

2.6
rated pulse voltage
the highest peak value of pulse voltages the holder is able to withstand

2.7
lamp connectors
a set of contacts specially designed to provide for electrical contact but not supporting the lamp

2.8
type test
a 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

2.9
type test sample
a sample consisting of one or more similar specimens submitted by the manufacturer or responsible vendor for the purpose of a type test

2.10
live part
a conductive part which may cause an electric shock

2.11
impulse withstand category
a 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.

2.12
primary circuit

a 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

2.13
secondary circuit

a 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. Also 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.

3 General requirement

Lampholders 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.

4 General conditions for tests

4.1 Tests according to this standard are type tests.

NOTE The requirements and tolerances permitted by the standard are related to testing of type test sample submitted for that purpose. Compliance of type test sample does not ensure compliance of the whole production of a manufacturer with this safety standard. Conformity of production is the responsibility of the manufacturer and should include routine tests and quality assurance in addition to type testing.

For further information see IEC 60061-4[3)] (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 °C ± 5 °C and with the holder in the most unfavourable position for normal use.

If a lampholder is declared to accept different lamp fits, it shall comply with the requirements of each of the fits mentioned.

Compliance is checked with separate sets of specimens according to 4.3.

3) IEC 60061-4: *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 4: Guidelines and general information*

If the use of different lamp fits in turn is permitted by the manufacturer, only one set of specimens is used to check compliance with all requirements.

For all tests the most critical of the relevant fits and gauges shall be used and in the most onerous sequence.

4.3 The tests and inspections are carried out in the order of the clauses, on a total of

– 10 pairs of matching holders intended for linear double-capped lamps;

NOTE If a pair of holders consists of identical holders, it is sufficient that one holder instead of one pair is subjected to all the tests, except for the tests of clause 7, 10.2, 10.3, clause 12, clause 15 and 16.6 where pairs are needed.

– 10 specimens intended for single-capped lamps;

in the order of the clauses, as follows:

– three pairs or three specimens: clauses 3 up to and including 14 (except for 8.2);

NOTE The tests of 8.2 are carried out on the number of separate specimens as required by the relevant standards.

– three pairs or three specimens: clause 15 and 16.6;
– one pair or one specimen: 16.1;
– one pair or one specimen: 16.3;
– one pair or one specimen: 16.4;
– one pair or one specimen: 16.5 and clause 17.

Together with these units, the manufacturer's mounting instructions (see 6.3) shall be supplied.

In such cases, where according to the mounting instructions the rated pulse voltage of the holder can only be achieved with a cap inserted, suitable caps shall be supplied together with the type test sample. The relevant tests are then carried out with a cap inserted.

4.4 Lampholders are deemed to comply with this standard if no specimen fails in the complete series of tests specified in 4.3.

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 for the number required by 4.3, all of which shall then comply with the repeated tests and with the subsequent tests. Lampholders are deemed not to comply with this standard if there are more failures than one.

The applicant may submit, together with the first set of specimens, the additional set which may be needed in case of failure of one specimen. The testing station shall then, without further request, test the additional specimens and will reject only if a further failure occurs.

If the additional set of specimens is not submitted at the same time, a failure of one specimen will entail the rejection.

5 Classification

Lampholders are classified as follows.

5.1 According to their installation conditions:

– unenclosed lampholders;
– enclosed lampholders.

5.2 According to their resistance to heat:

– for rated operating temperatures up to and including 80 °C;

– for rated operating temperatures over 80 °C (T-marked lampholders).

The measuring point for the operating temperature is that area of the lampholder which makes electrical contact with the lamp cap/base. If the heat resistance of insulating parts, terminals and leads of the lampholder deviates from this operating temperature, these different values shall be stated in the manufacturer's catalogue and are checked after appropriate installation in a luminaire or other additional enclosure, when that equipment is tested according to its own standard.

6 Marking

6.1 Lampholders shall be marked with the following mandatory markings:

a) mark of origin (this may take the form of a trade mark, manufacturer's identification mark or the name of the responsible vendor);

b) either a unique catalogue number or an identifying reference.

NOTE An identifying reference may include numbers, letters, colour, etc., to identify the lampholder by reference to the manufacturer's catalogue or similar literature.

If a combination of lampholder components determines the lampholder designation, for example an assembly of a lamp connector and a retaining spring, the combination should be clearly identifiable.

Compliance is checked by inspection.

6.2 In addition to the above mandatory markings, the following information shall be given either on the lampholder or be made available in the manufacturer's catalogue or the like:

a) the rated voltage in volts and rated pulse voltage in kilovolts (kV), if applicable;

NOTE Some lampholders still show rated voltages higher than 500 V. This is an earlier way of expressing the permissible pulse voltage via a rated voltage. For such lampholders, the creepage distances and clearances can be found in IEC 60598-1.

b) the rated current in amperes;

c) the rated operating temperature T, if greater than 80 °C, in steps of 10 °C;

d) the conductor sizes for which the terminal is designed.

If symbols are used, these shall be as follows.

For electrical rating:

– volt: V;

– ampere: A;

– watt: W;

– pulse voltage: kV.

NOTE Alternatively, for volt and ampere ratings, figures may be used alone, the figure for the rated current being marked before or above that for the rated voltage and separated from the latter by an oblique stroke or line. Therefore the marking of current and voltage may be as follows:

2 A 250 V or 2/250 or $\frac{2}{250}$

For the rated pulse voltage, the symbol shall be preceded by its value (e.g. 5 kV).

For rated operating temperature:

the symbol T shall be followed by its value in °C (e.g. T 300).

For cross-section of conductors:

the relevant value or values in the case of a range, in square millimetres (mm^2), shall be followed by a small square (e.g. 0,5 □).

Compliance is checked by inspection.

For lampholders according to this standard, the distances for impulse withstand category II are usually applicable. For holders in equipment where a higher degree of availability is expected, distances for impulse withstand category III may be applicable. This information has to be indicated in the manufacturer's catalogue or the like.

Lampholders complying with the electrical strength test for double or reinforced insulation and having creepage distances and clearances equivalent to double or reinforced insulation offer an adequate level of protection for the use in luminaries where they are accessible in normal use. Such lampholders are addressed as lampholders for use in class II applications. This information shall be indicated in the manufacturer's catalogue or the like.

NOTE 3 Values for creepage distances and clearances as well as test voltages for the electrical strength test for double or reinforced insulation are given in IEC 60598-1.

To achieve sufficient creepage distances and clearances to outer accessible surfaces, additional attachments could be used. In some cases, these dimensions might be achieved only after mounting the lampholder in the luminaire. Relevant information should be provided in the manufacturer's catalogue or the like.

6.3 The instructions supplied by the holder manufacturer or responsible vendor shall contain all the information required to ensure correct mounting and operation of the connectors or holders.

NOTE The information may be part of the manufacturer's or responsible vendor's catalogue.

Compliance is checked by inspection.

6.4 Marking shall be durable and easily legible.

Compliance is checked by inspection and by trying to remove the marking by rubbing lightly for 15 s with a piece of cloth soaked with water and for a further 15 s with a piece of cloth soaked with petroleum spirit.

After the test the marking shall still be legible.

NOTE The petroleum spirit used should consist of a solvent hexane with a content of aromatics of maximum 0,1 volume percentage, a kauri-butanol value of 29, an initial boiling point of approximately 65 °C, a dry-point of approximately 69 °C and a specific density of approximately 0,68 g/cm^3.

7 Protection against electric shock

7.1 Enclosed lampholders shall be so constructed that, when the holder has been built in or installed and wired as in normal use, their live parts are not accessible

– without a lamp inserted;

– with the appropriate lamp inserted, and

– during insertion or removal of the lamp.

For lampholders which have been in use for a long time, such as B22d-3, BY22d, G22, G38, P28s, P30s and P40, the above requirement applies only with the appropriate lamp inserted.

The insertion of only one pin of the lamp (in case of caps with more than one pin) to the first point of contact with live parts shall be prevented.

Lampholders G22 and G38 are exempted from this requirement.

Compliance is checked by means of the standard test finger specified in IEC 60529.This test finger is applied in every possible position with a force not exceeding 10 N, an electrical indicator being used to show contact with live parts.

It is recommended that a voltage of not less than 40 V be used.

The lampholders are mounted as in normal use, i.e. on a supporting surface or the like with the most unfavourable conductor size fitted for which it is intended before being subjected to the above test.

Unenclosed lampholders are only tested after appropriate installation in a luminaire or other additional enclosure when that equipment is tested according to its own standard.

7.2 Lampholders for double-ended lamps shall be so constructed that, when the two holders have been built in or installed and wired as in normal use, their live parts are not accessible

– without a lamp inserted;
– with the appropriate lamp inserted, and
– during insertion and removal of the lamp.

In case of lampholders R7s/RX7s, a test which simulates insertion or removal of the lamp is not available because in both cases testing has to be done against the spring force of the single contact. This situation does not give the repeatability required for judgement. Therefore, this test is replaced by one with the lamp inserted.

Compliance is checked in accordance with IEC 60061 or unless otherwise specified in IEC 60061, with the standard test finger.

8 Terminals

8.1 Lampholders shall be provided with at least one of the following means of connection:

– screw-type terminals;
– screwless terminals;
– tabs or pins for push-on connections;
– posts for wire wrapping;
– soldering lugs;
– connecting leads (tails).

Terminal screws and nuts shall have a metric ISO thread.

Lampholders with screwless terminals, unless intended for sale to luminaire or equipment manufacturers, shall be provided with terminals which are equally satisfactory with both rigid (solid or stranded) conductors and flexible cables or cords.

Other means of connection than those specified are permitted provided they are equal in performance to the methods listed. An example for such a means of connection is a contact of a lampholder for extra low voltage halogen lamps providing electrical connection to a metal part of the luminaire during lampholder assembly.

Compliance is checked by the tests of 8.2 or 8.3 respectively.