

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Miscellaneous lampholders –
Part 1: General requirements and tests**

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

IEC 60838-1:2004

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MISCELLANEOUS LAMPHOLDERS –

Part 1: General requirements and tests

FOREWORD

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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], its amendment 1 (2008) [documents 34B/1384/FDIS and 34B/1400/RVD] and its amendment 2 (2011) [documents 34B/1581/FDIS and 34B/1594/RVD].

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

It bears the edition number 4.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

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

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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 60417, *Graphical symbols for use on equipment*

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

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).

2.3

rated current

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

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.

**2.14
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.

**2.15
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

**2.16
double insulation**

insulation comprising both basic insulation and supplementary insulation

**2.17
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.

**2.18
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

2.19

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.

2.20

polarized lampholder

lampholder for building-in, specially designed for asymmetric rated pulse voltages, where the rated ignition voltage (higher rated pulse voltage) is designated to a fixed contact

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 60061-4³⁾ (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.

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);

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

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;
- 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.

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.

5.3 According to polarization

- non-polarized lampholders;
- polarized lampholders.

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 Available technical documentation of the manufacturer like printed catalogues or online catalogues should allow a clear identification of a lampholder either by a unique catalogue number or by an identifying reference on the holder, specifying the essential characteristic features and the basic design of the product supplemented by a clear description. Variations of the basic design like for example different cable length, fixing means, colours etc., which do not affect safety or performance of the lampholder, may be disregarded in the type reference marked on the product. Variations included in the type testing procedure are listed in the corresponding test reports.

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. For polarized lampholders, the rated voltage in volts and the pair of rated pulse voltages;


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;
- e) the high voltage arrow (see IEC 60417-5036:2002-10) for polarized lampholders to identify the connection for the higher pulse voltage, if applicable. It shall be visible close to the relevant terminal or wire entry during lampholder installation.

If symbols are used, these shall be as follows.

For electrical rating:

- volt: V;
- ampere: A;
- watt: W;
- pulse voltage: kV;

- high pulse voltage terminal/wire on polarized lampholders:  (see IEC 60417-5036:2002-10)

NOTE 1 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 polarized lampholders, the two rated pulse voltages shall be separated by an oblique stroke (e. g. 15/2,5 kV).

NOTE 2 The figure marked before the oblique stroke represents the higher pulse voltage, the figure behind represents the rated pulse voltage based on the impulse withstand category of the lampholder.

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.

Enclosed reinforced insulated lampholders offer an adequate level of protection for use in luminaires where they are accessible in normal use. This information shall be indicated in the manufacturer's catalogue or the like.

For partly reinforced insulated lampholders, sufficient creepage distances and clearances to outer accessible surfaces will require additional protection to some parts of the lampholder by the luminaire design or by use of additional attachment(s) or cover(s). This information shall be indicated 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/cm³.

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.