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UL 496

Underwriters Laboratories Inc.

Standard for Safety

Lampholders

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UL Standard for Safety for Lampholders, UL 496

Thirteenth Edition, Dated September 30, 2008

Revisions: This Standard contains revisions through and including October 1, 2008.

Summary of Topics

The revisions dated October 1, 2008 have been issued to revise the future effective date information for Supplement SD. No changes in requirements have been made. The new edition of UL 496 has been issued to:

1. Add new requirement to address "cemented joints" for insulating barriers

2. Extend E39 mogul base switchless lampholder rating to 2000W in Table 18 to address HID lamps with this rating

3. Add rating requirements for compact fluorescent lampholders not in Table 20

4. Revise insulation-piercing terminal lampholder temperature test to also cover E12 (candelabra) lampholders

5. Add requirements for open rated E26 and E39 metal halide HID lampholders and revise conformity gauges to match current ANSI standard references

6. Add supplemental requirements to address lampholders for use with instant-start electronic ballasts

7. Add requirements to address non-screwshell type lampholders which have required a pulse rating in excess of 5 kV

8. Add requirements covering GU24 and GU24-1 holders restricted to fluorescent and LED self-ballasted lamp and fluorescent lamp adapter use

9. Add requirements for weight, size, and moment limitations from previous edition of UL 496

10. Add supplemental requirements to address lampholder fittings with photocontrol

11. Add temperature test requirements for dimmer-type lampholders

12. Clarify requirements for SPE and SPT cord for leads

13. Add requirements for proper spacing of male adapter installed in three-way lampholders

14. Add mold stress-relief test requirements for thermoplastic enclosures

15. Miscellaneous corrections and clarifications

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Text that has been changed in any manner is marked with a vertical line in the margin.

The following table lists the future effective dates with the corresponding reference.

Future Effective Date	References
December 15, 2008	Paragraphs 4.2.2.4.1, 4.8.4.1, 4.8.6.13, 4.8.7, 4.10.4, 5.1.3.1, 5.2.8, 5.2.11, 5.2.14.5, 5.2.14.6, 7.1.9, and 7.2.2
December 15, 2010	Paragraphs 2.34, 4.8.3.1, 4.8.3.2, 4.8.3.3, 4.8.3.4, 5.2.15.1.1, 5.2.16, 6.2.2, 7.1.5, 7.3.2, SA3.2 – SA3.4, and SA3.8, Supplement SD, and Tables 13, 14, and SA1

The new and revised requirements are substantially in accordance with UL's Proposal(s) on this subject dated January 19, 2007 and January 11, 2008.

As indicated on the title page (page 1), this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this Standard outlining the procedures to be followed to retain the approved text of this ANSI/UL Standard.

The UL Foreword is no longer located within the UL Standard. For information concerning the use and application of the requirements contained in this Standard, the current version of the UL Foreword is located on ULStandardsInfoNet at: http://ulstandardsinfonet.ul.com/ulforeword.html

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The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the preface. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a ″SUPERSEDED REQUIREMENTS″ notice.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing, Recognition, and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

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This Standard consists of pages dated as shown in the following checklist:

Page	Date
1-5	September 30, 2008
6	October 1, 2008
7-106	September 30, 2008
SR1-SR4	September 30, 2008

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Lampholders

September 30, 2008

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This standard is issued jointly by the Canadian Standards Association (CSA) and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of CSA and UL. CSA and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

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The most recent designation of ANSI/UL 496 as an American National Standard (ANSI) occurred on September 29, 2008. The ANSI approval for this standard does not include the cover page, transmittal pages, title page, or superseded requirements.

This ANSI/UL Standard for Safety, which consists of the Thirteenth edition, is under continuous maintenance, whereby each revision is ANSI approved upon publication.

NOTE – The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights.

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Preface

This is the common CSA and UL standard for lampholders. It is the sixth edition of CSA C22.2 No. 43, and the thirteenth edition of UL 496. This edition of CSA C22.2 No. 43 supersedes the previous editions published in 2004, 1984, 1965, 1958, and 1937. This edition of UL 496 supersedes the previous edition published in 2004.

This common standard was prepared by a task force comprising members representing the Canadian Standards Association (CSA), Underwriters Laboratories Inc. (UL), NEMA (National Electrical Manufacturers Association), and EFC (Electro-Federation Canada). The efforts and support of the Technical Harmonization Committee for Lampholders of the Council on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA) are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This standard was reviewed by the CSA Integrated Committee on Lighting Products, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

This standard has been approved by the American National Standards Institute (ANSI) as an American National Standard.

A UL standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Level of harmonization

This standard uses the IEC format but is not based on, nor is it to be considered equivalent to, an IEC standard. This standard is published as an identical standard for CSA and UL.

An identical standard is a standard that is exactly the same in technical content except for national differences resulting from conflicts in codes and governmental regulations. Presentation is word for word except for editorial changes.

Reasons for differences from IEC

This standard provides requirements for Lampholders in accordance with the codes of Canada and USA. At present there is no IEC standard for Lampholders for use in accordance with these codes. Therefore, this standard does not employ any IEC standard for base requirements.

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Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

CSA effective date

The effective date for CSA International will be announced through CSA Informs or a CSA Certification Notice.

UL effective date

As of December 15, 2004, all products Listed or Recognized by UL must comply with the requirements in this standard except for clauses, figures, and tables in the following list, which are effective December 15, 2008.

Clauses 4.2.2.4.1, 4.8.4.1, 4.8.6.13, 4.8.7, 4.10.4, 5.1.3.1, 5.2.8, 5.2.11, 5.2.14.5, 5.2.14.6, 7.1.9, and 7.2.2.

Between December 15, 2004 and December 15, 2008, new product submittals to UL may be evaluated under all requirements in this standard or, if requested in writing, evaluated under presently effective requirements only. The presently effective requirements are contained in the Twelfth edition of UL 496 and the Eighth edition of UL 542.

As of December 15, 2008, all products Listed or Recognized by UL must comply with the requirements in this standard except for clauses, figures, and tables in the following list, which are effective December 15, 2010.

Clauses 2.34, 4.8.3.1, 4.8.3.2, 4.8.3.3, 4.8.3.4, 5.2.15.1.1, 5.2.16, 6.2.2, 7.1.5, 7.3.2, SA3.2 – SA3.4, and SA3.8, Supplement SD, and Tables 13, 14, and SA1.

Between December 15, 2008 and December 15, 2010, new product submittals to UL may be evaluated under all requirements in this standard or, if requested in writing, evaluated under presently effective requirements only. The presently effective requirements are contained in the Twelfth edition of UL 496.

A UL effective date is one established by Underwriters Laboratories Inc. and is not part of the ANSI approved standard.

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1 Scope

1.1 The requirements of this standard cover holders and connectors for electric lamps, including incandescent, fluorescent, and other electric-discharge-type lamps, rated as indicated in Clause 6, to be used in accordance with the Canadian Electrical Code (CEC), Part I, C22.1, and the National Electrical Code (NEC), ANSI/NFPA 70.

1.2 These requirements cover screw lampholders, including those intended to be mounted directly on an outlet-box, lampholders for special uses, lampholders for electric signs, and adapters that convert one lampholder size to another.

1.3 These requirements also cover holders for automatic starters used with fluorescent lamps.

1.4 These requirements also cover GU24 and GU24-1 holders for fluorescent self-ballasted lamps and fluorescent lamp adapters with mating pin bases.

1.5 These requirements also cover indicator lamps.

1.6 These requirements also cover lampholder inserts.

1.7 These requirements also cover naval-use lampholders. See Supplement SB.

1.8 These requirements do not cover fluorescent self-ballasted lamps and fluorescent lamp adapters covered in UL 1993.

1.9 These requirements do not cover seasonal-lighting lampholders, which are covered in UL 588, and CSA C22.2 No. 37.

1.10 These requirements do not cover electrode receptacles for use in gas-tube signs, which are covered in UL 879 and CSA C22.2 No. 34.

1.11 These requirements do not cover devices requiring a cross-bar, mounting strap, or other mounting means; such devices are considered to be luminaires.

1.12 These requirements do not cover nightlights, which are covered in UL 1786 and CSA C22.2 No. 256.

2 Definitions

2.1 For the purpose of this standard, the following definitions apply:

2.2 Actuating member – the part of a switch actuator that extends outside the body and is exposed to contact by the user.

2.3 Actuator – the part that drives a switch mechanism into action.

2.4 Adapter – a device that adapts one form or size of connecting means to another, and in some cases incorporates circuits or controls such as a dimmer or photo-control or a switch.

2.5 Base – that part of a lampholder that is used for mounting of the device.

2.6 Cap – a component of screw-type lampholders that is provided to supply a mounting means for the lampholder, enclose live or current-carrying parts, and/or prevent inadvertent accessibility to live parts.

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Note: Internationally, the word "cap" is used in place of the North American term "base" to describe the means of connection of the lamp to the lampholder.

2.7 Center contact – a contact used in a screw lampholder to engage the center contact of a lamp base.

2.8 Current tap – an adapter that is screwed into a base-supply lampholder and provides multiple outlets of the lampholder or slotted receptacle type.

2.9 Damp location – an interior or exterior location that is normally or periodically subject to condensation of moisture. Damp locations include partially protected locations under canopies, roofed open porches, and similar locations.

2.10 Device screw base – a cylindrical component of a screw device having an external male thread or form for engaging a corresponding lampholder.

2.11 Dry location – a location not normally subject to dampness. Dry locations include locations subject to temporary dampness, as in the case of a building under construction, provided ventilation is adequate to reduce the likelihood of accumulation of moisture.

2.12 Enclosure – that part or parts of a lampholder that:

a) renders inaccessible all or any parts of the equipment that may otherwise present a risk of electric shock, or

b) retards propagation of flame caused by electrical disturbances occurring within.

2.13 General-use – suitable for direct installation in the field.

2.14 Holder, GU24 and GU24-1 – a holder with a twist and lock bi-pin configuration that is intended to supply power to fluorescent self-ballasted lamps and fluorescent lamp adapters with mating pin bases. This holder is not intended for use with incandescent lamps.

2.15 Husk – a covering over a screwshell, usually of paper, that renders the screwshell and terminals inaccessible.

2.16 Indicator lamp – an indicating device consisting of a lamp, with or without a lampholder, that is provided with leads or terminals. In some cases indicator lamp also incorporates a bracket or other mounting provision.

2.17 Insulating link – a section of the chain of a pull-type switching mechanism intended to prevent the accessible portion of the chain from becoming energized.

2.18 Interior – a component of an screw metal shell lampholder that engages the threads of the lamp base and that supports live parts, such as lamp contacts, switch contacts, and actuators, and that is intended to be enclosed within a body.

2.19 Intermediate contact – a contact used in an E26d or E39d double-contact lampholder to engage the ring contact of a double-filament lamp.

2.20 Isolated screwshell – a mechanical device for engaging the threads of a screw base lamp that supports the lamp but is not conductively connected to the supply circuit.

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2.21 Lamp base – the part of a lamp that engages the lampholder and makes contact with the electrical circuits of the lampholder.

2.22 Lamp cavity – that portion of the lampholder which is provided for the insertion of the lamp.

2.23 Lamp connector – a set of contacts provided with flexible conductors which provides for electrical connection to a lamp but does not provide support.

2.24 Lampholder – a wiring device intended for making connection to the electrical circuits of a lamp and, in some cases, providing support.

2.25 Lampholder, bayonet – a device equipped with retaining slots in the shell for holding the lamp base.

2.26 Lampholder, candle-type (stem type) – a screw lampholder having an insulating covering (husk), such as paper, over the screwshell and terminals, which in some cases provides the required depth of lamp cavity. In some cases the lampholder also has a close-fitting, nonmetallic outer decorative casing.

Note: These lampholders are commonly used in luminaires and portable luminaires to give the appearance of a candle.

2.27 Lampholder, ceiling outlet-box – a lampholder intended for mounting to a ceiling outlet-box that also serves as the outlet-box cover.

2.28 Lampholder, circuit-interrupting – a fluorescent-type lampholder that incorporates a switch to de-energize a circuit when the lamp is removed.

2.29 Lampholder, cleat-type – a lampholder used for open wiring on insulators that in some cases have exposed wiring terminals prior to installation.

2.30 Lampholder, flush-type – a lampholder intended for mounting in an outlet-box with a cover plate, usually serving as a pilot or indicator light.

2.31 Lampholder insert – a device that is interposed between the base of a screw lamp and the lampholder center contact.

Note: Such devices are commonly used to reduce the lamp power consumption or for remote control such as dimming.

2.32 Lampholder, metal cap and shell – a lampholder type consisting of a metal cap and shell, an interior, and an insulating lining.

2.33 Lampholder, multiple – a device containing more than one lampholder that attach to a common mounting bracket or that connect to the supply by common leads.

2.34 Lampholder, open-rated – a screw lampholder with an EX26 medium base or EX39 mogul base and intended for use with a “Type O” metal halide lamp. These lampholders have a physical means that only allows the use of a lamp that is “Type O” and excludes lamps with an E26 or E39 base.

2.35 Lampholder, pendant-type (cord-grip lampholder) – a lampholder intended to be supported and suspended by a flexible cord.

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2.36 Lampholder, pulse-rated – a lampholder or lamp connector intended for use with a lamp that requires a starting pulse in excess of 600 Vpk.

2.37 Lampholder, refrigeration – a lampholder intended to be installed in a refrigerated compartment of refrigerators or freezers.

2.38 Lampholder, screw – a lampholder employing a threaded screwshell.

Note: Standardized screw types include the following bases:

a) E10 (miniature),

b) E11 (mini can),

c) E12 (candelabra),

d) E17 (intermediate),

e) E26 (medium),

f) E29 (admedium) (not standardized),

g) E39 (mogul).

2.39 Lampholder, screw-ring – an externally threaded lampholder intended for mounting in a panel opening by means of a threaded ring.

2.40 Lampholder, seasonal-lighting – a lampholder that is restricted for use with Christmas-tree and decorative lighting outfits and which by its construction and application is not suitable for general use.

2.41 Lampholder, skeleton-type – a screw lampholder that does not use conductive screwshell threads to make electrical contact with the lamp screw base. Electrical contact with the lamp screw base is made with one or more separate contacts in the side wall of the lamp cavity or a ring contact in the bottom of the lamp cavity.

2.42 Lampholder, temporary use – a lampholder intended for installation and use in accordance with Article 527 of the National Electrical Code, ANSI/NFPA 70, and Section 76 of the Canadian Electrical Code, Part I, C22.1.

2.43 Lampholder, weatherproof – a lampholder intended for direct exposure to the weather.

2.44 Lamplock – a feature intended to keep a lamp from being removed except by a person having a key or special tool.

2.45 Lining – an intermediate piece of insulating material constructed to prevent electrical contact between live parts, such as the screwshell, and the outer shell, cap, or cover.

2.46 Live part – a part that is energized during normal operation.

2.47 Normal hand tools – any standard American or metric wrench or screwdriver (straight blade, Phillips (cross point) or Robertson head (square)).

2.48 Ratcheting mechanism – a device mechanism that does not permit removal of the lamp or lamp adapter.

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2.49 Rated operating temperature – the highest temperature for which the device is rated.

2.50 Rated voltage – the voltage declared by the manufacturer to indicate the highest working voltage for which the device is rated.

2.51 Screwshell – a cylindrical component of a screw lampholder having an internal thread or form for the retention of the corresponding lamp.

Note: In some constructions, the screwshell is permanently fixed to or integral with the outer shell.

2.52 Screw types – a trade name (e.g., medium-screw) or designation (e.g., E26) assigned to a standardized lamp and lampholder configuration to control their interchangeability. Lamp base and holder designations, where referenced in this standard, are those assigned by the International Electrotechnical Commission (IEC).

Note: They may be followed by the commonly used trade name in parentheses.

2.53 Sealing compound – an insulating material that may be used to insulate live parts on the underside of a lampholder from the surface to which it is intended to be mounted or used to fill a void for the purpose of reducing clearances.

2.54 Set screw – a threaded device for securing a lampholder to its support or for securing leads within a terminal assembly.

2.55 Shell – a component of a screw metal shell lampholder that serves as the enclosure. A shell may also serve as the mounting surface for reflectors or guards.

2.56 Terminal – provision for the connection of supply conductors.

2.57 Terminal, insulation displacement – a terminal having a two-pronged contact that punctures the conductor insulation and captivates the conductor strands between the prongs.

Note: Stripping the insulation from the conductor is not required for this type of connection.

2.58 Terminal, insulation-piercing – a terminal having a contact pin that punctures the conductor insulation and penetrates between the conductor strands.

Note: Stripping the insulation from the conductor is not required for this type of connection.

2.59 Terminal, push-in – a terminal in which the stripped end of a conductor is pushed into the terminal and the clamping pressure is maintained by a spring mechanism without the use of screws.

2.60 Terminal, screw – a terminal in which the conductor is bent around the screw and clamped directly under the head of the screw when it is tightened.

2.61 Upset – a process for peening, staking, cross threading, or rounding, for example, a screw's shaft end to prevent it from loosening or being backed out.

2.62 Vulcanized fiber – a material normally used as electrical insulation, made by combining layers of chemically jelled paper.

Note: "Fish paper" is a designation commonly used in the trade to refer to thin sheets of electrical grade vulcanized fiber.

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2.63 Wet location – a location in which uncontrolled liquids may drip, splash, or flow on or against electrical equipment.

3 General

3.1 Components

3.1.1 Except as indicated in Clause 3.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Annex A for a list of standards covering components generally used in products covered by this standard. A component shall comply with the Underwriters Laboratories Inc. or the Canadian Standards Association standards as appropriate for the country where the product is to be used.

3.1.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

3.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

3.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3.2 Units of Measurement

3.2.1 The values given in SI (metric) units shall be normative. Any other values given shall be for information purposes only.

3.3 Reference Publications

3.3.1 For undated references to standards, such reference shall be considered to refer to the latest edition and all revisions to that edition up to the time when this standard was approved. For dated references to standards, such reference shall be considered to refer to the dated edition and all revisions published to that edition up to the time the standard was approved.

3.3.2 This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below.

CSA (Canadian Standards Association)

CSA C22.1-06
Canadian Electrical Code (CEC), Part I

CAN/CSA-C22.2 No. 0-M91 (R2006)
General Requirements – Canadian Electrical Code, Part II

CSA C22.2 No. 0.3-01 (R2005)
Test Methods for Electrical Wires and Cables

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CSA C22.2 No. 0.15-01 (R2006)
Adhesive Labels

CAN/CSA-C22.2 No. 0.17-00 (R2004)
Evaluation of Properties of Polymeric Materials

CAN/CSA-C22.2 No. 18.1-04
Metallic Outlet Boxes

CSA C22.2 No. 34-M1987 (R2004)
Electrode Receptacles, Fittings, and Connectors for Gas Tubes

CSA C22.2 No. 37-M1989 (R2004)
Christmas Tree and Other Decorative Lighting Outfits

CAN/CSA-C22.2 No. 38-05
Thermoset-Insulated Wires and Cables

CSA C22.2 No. 42-99 (R2004)
General Use Receptacles, Attachment Plugs, and Similar Wiring Devices

CSA C22.2 No. 49-06
Flexible Cords and Cables

CSA C22.2 No. 75-08
Thermoplastic-Insulated Wires and Cables

CSA C22.2 No. 127-99 (R2004)
Equipment and Lead Wires

CSA C22.2 No. 153-M1981 (R2003)
Quick-Connect Terminals

CSA C22.2 No. 158-1987 (R2004)
Terminal Blocks

CSA C22.2 No. 256-05
Direct Plug-In Nightlights

UL (Underwriters Laboratories Inc.)

UL 44
Thermoset-Insulated Wires and Cables

UL 62
Flexible Cords and Cables

UL 83
Thermoplastic-Insulated Wires and Cables

UL 94
Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

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UL 310
Electrical Quick-Connect Terminals

UL 486E
Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

UL 498
Attachment Plugs and Receptacles

UL 514A
Metallic Outlet Boxes

UL 588
Seasonal and Holiday Decorative Products

UL 746A
Polymeric Materials – Short-Term Property Evaluations

UL 746B
Polymeric Materials – Long-Term Property Evaluations

UL 746C
Polymeric Materials – Use in Electrical Equipment Evaluations

UL 879
Electrode Receptacles for Gas-Tube Signs

UL 969
Marking and Labeling Systems

UL 1581
Electrical Wires, Cables, and Flexible Cords

UL 1786
Direct Plug-In Nightlights

UL 1993
Self-Ballasted Lamps and Lamp Adapters

ANSI (American National Standards Institute)

ANSI C81.61-1990 (R1996)
Electrical Lamp Bases

ANSI C81.62-1991 (R1996)
Lampholders for Electric Lamps

ANSI C81.63-1991 (R1996)
Gauges for Electric Lamp Bases and Lampholders

ANSI MC96.1-1982
Standard for Temperature-Measurement Thermocouples

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ANSI/NFPA 70-2008
National Electrical Code (NEC)

ASTM International (American Society for Testing and Materials)

ASTM E28-1999 (R2004)
Test Method for Softening Point of Resins Derived from Naval Stores by Ring-and-Ball Apparatus

NEMA (National Electrical Manufacturers Association)

NEMA C78.901
Single-Based Fluorescent Lamps – Dimensional and Electrical Characteristics

3.4 Terminology

3.4.1 Where the term “lampholder” is used in this standard, it applies equally to lampholders and lamp connectors unless otherwise indicated.

4 Construction

4.1 Enclosures

4.1.1 A lampholder enclosure shall have the necessary strength and rigidity to resist the abuses likely to be encountered during normal service. The degree of resistance inherent in the unit shall preclude breaking, warping, or cracking without the required spacings being reduced or parts becoming loosened or displaced.

4.1.2 A lampholder enclosure shall not warp, creep, crack, or distort under conditions of arcing, temperature, and mechanical stress that are likely to occur in service.

4.1.3 Polymeric enclosure materials shall comply with the requirements in Clause 4.2.

4.2 Insulating Materials

4.2.1 Thermoset and Inorganic

4.2.1.1 Insulating material used for the support of, or as the retaining means for, live parts shall be porcelain, glass, urea composition, or other equivalent insulating material.

4.2.1.2 Phenolic composition may be used in a lampholder that is rated at not more than 1000 V.

4.2.1.3 A supporting base on which uninsulated live parts are mounted shall be of porcelain, cold-molded or phenolic composition, or other insulating material that is acceptable for the particular application.

4.2.1.4 Vulcanized fiber may be used for insulating washers, separators, and barriers, but not as the sole support for uninsulated live parts.

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4.2.2 Thermoplastic

4.2.2.1 General

4.2.2.1.1 A thermoplastic material used in a lampholder shall comply with Clauses 4.2.2.2.1 – 4.2.2.4.1 and the mold stress-relief distortion test specified in Clause 5.2.17.

4.2.2.2 Flammability

4.2.2.2.1 A thermoplastic (polymeric) insulating material used to enclose electrical parts or used to provide direct or indirect support of live parts shall be classed either V-2, V-1, V-0, 5VA, or 5VB, by the burning tests described in UL 94 and CAN/CSA-C22.2 No. 0.17. Outlet-box mounted ceiling receptacles shall be rated 5VA.

4.2.2.3 Electrical properties

4.2.2.3.1 A thermoplastic (polymeric) insulating material used to enclose electrical parts or used to provide direct or indirect support of live parts for outdoor applications shall have a minimum comparative tracking index (CTI) of 175 as determined in accordance with the methods described in UL 746A, UL 746B, and CAN/CSA-C22.2 No. 0.17.

4.2.2.4 Thermal index

4.2.2.4.1 A thermoplastic insulating material used to enclose electrical parts or used to provide direct or indirect support of live parts shall possess a minimum relative thermal index (RTI) of 90 °C (194 °F) for a fluorescent-type lampholder and 150 °C (302 °F) for a screw-type lampholder, determined in accordance with the methods described in UL 746B and CAN/CSA-C22.2 No. 0.17.

4.2.2.4.2 Lampholders marked with a temperature rating in accordance with Clause 7.5 shall possess a minimum relative thermal index (RTI) of at least their marked rating.

4.3 Sealing Compound

4.3.1 The depth or thickness of sealing compound over a live nut, screw head, or rivet shall not be less than 1.6 mm (1/16 in). If the underside of the base is not recessed and if in some cases it will be in contact with the surface upon which the lampholder is mounted, the depth or thickness of the sealing compound shall not be less than 3.2 mm (1/8 in).

4.3.2 Sealing compound shall be insulating and shall not soften at a temperature of 100 °C (212 °F). Compliance shall be determined by the sealing compound softening test specified in Clause 5.2.2.

4.3.3 Sulfur shall not be acceptable as a sealant.

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4.4 Mounting

4.4.1 Bracket

4.4.1.1 A mounting bracket for a bayonet or screw lampholder shall be attached to the lampholder such that it cannot rotate during installation or removal of a lamp. A single rivet or screw shall not be considered to prevent rotation unless additional means such as projections, keys, or the like are provided to restrict movement.

Note: A lamp connector need not be prevented from turning during installation or removal of a lamp.

4.4.1.2 A mounting hole tapped to receive a screw shall be acceptable if it contains no fewer than two threads for the screw if in metal, or no fewer than five threads if in insulating material. Spring clips, clamps, or other means that provide equivalent support and restriction of rotation may also be used.

4.4.2 Cord pendant

4.4.2.1 The cap of a pendant-type lampholder shall have provision for strain relief such that a pull exerted on the flexible cord is not transmitted directly to the wiring terminals. If a knot is provided for strain-relief, all surfaces of the cap that a knot can touch shall be smooth and well insulated.

4.4.2.2 Hard fiber shall be acceptable as the insulating material employed if the bushing is not less than 1.2 mm (3/64 in) thick and if it is formed and secured in place such that it cannot be affected by conditions of ordinary moisture.

4.4.2.3 A threaded, insulating bushing shall not be used in a threaded nipple to form a pendant cap if the pipe size of the nipple is smaller than 9.5 mm (3/8 in).

4.4.2.4 A cord-grip shall be provided on a pendant lampholder designed for use with a jacketed flexible cord such as Type S, SJ, or SV.

4.4.3 Cap and shell

4.4.3.1 The cord-inlet hole in a metal pendant cap shall be provided with a bushing of porcelain, phenolic or cold-molded composition, or other insulating material that is acceptable for the purpose. An insulating bushing shall not soften at a temperature of 90 °C (194 °F). Hot-molded shellac or tar composition shall not be used in an insulating bushing.

4.4.3.2 A metal eyelet or grommet may be used as a side outlet for flexible cord in a metal cap, provided that all edges against which the cord may bear are smooth and well rounded, and provided that the eyelet is insulated from the metal of the cap at all points by fiber or other acceptable insulating material not less than 0.8 mm (1/32 in) thick.

4.4.3.3 A means shall be provided for securely attaching the bracket or cap of a cap and shell lampholder to the supporting base. The bracket or cap shall be prevented from turning with respect to the body or outer shell after assembly.

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4.4.4 Screw-ring

4.4.4.1 A screw-ring lampholder, when mounted as intended, shall be secured such that it cannot be turned relative to the mounting surface. Compliance may be accomplished by a lug or recess in the rim of the lampholder base, or other equivalent means.

4.4.5 Surface (Cleat-type)

4.4.5.1 Live screw heads or nuts on the underside of a base designed for surface mounting shall be countersunk not less than 3.2 mm (1/8 in) in the clear, and then covered with a waterproof, insulating, sealing compound that does not soften at a temperature of 100 °C (212 °F) as determined by the sealing compound softening test specified in Clause 5.2.2.

Note: If such parts are staked, upset, or otherwise secured so they cannot loosen, they may be insulated from the mounting surface by material other than sealing compound or by 12.7 mm (1/2 in) or more air separation from the mounting surface.

4.4.6 Outlet-box

4.4.6.1 A metal base in the form of an outlet-box cover shall comply with UL 514A and CAN/CSA-C22.2 No. 18.1.

4.4.6.2 A mounting screw provided with a ceiling outlet-box lampholder shall not project more than 22.2 mm (7/8 in) beyond the strap or cover and shall have a flat or blunt end. The end of the screw may have thread-cleaning slots or grooves but shall not have any burrs, fins, or other sharp edges that can damage wiring.

4.4.7 Flush-type

4.4.7.1 A flush-type lampholder shall be provided with means for mounting in a standard flush-device box or on a standard outlet-box cover.

4.4.7.2 A metal yoke, strap, or mounting ears shall not be less than 1.02 mm (0.040 in) or more than 2.3 mm (0.09 in) thick. If a nonferrous metal is used, it shall be of sufficient thickness to provide mechanical strength and rigidity not less than that of 1.02 mm (0.040 in) thick steel. The yoke, strap, or mounting ears may be provided with extension plaster ears, which may be scored or perforated so that they can be broken off when not needed. See Clause 7.1.2.

4.4.7.3 With reference to Clause 4.4.7.2, if a yoke, mounting ears, or strap is made of steel, the corrosion protection for a lampholder for use in a flush-device box or on an outlet-box cover shall be a zinc or equivalent coating not less than 0.0038 mm (0.00015 in) thick in accordance with the method for determining protection against corrosion in UL 514A and CAN/CSA-C22.2 No. 0, or other coatings determined to be acceptable for the particular application.

4.4.7.4 A nonmetallic yoke, strap, or mounting ears shall be of a material and construction determined to be acceptable for the intended use.

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4.4.7.5 A flush-type lampholder shall have a means for grounding the yoke or strap that is independent of the mounting means.

4.4.7.6 With regard to Clause 4.4.7.5, a wire-binding screw intended for the field connection of an equipment-grounding conductor shall have a green-colored head that is hexagonal shaped, slotted, or both. A wire-binding screw shall be an M4 (No. 8) or larger. A sheet metal screw is not acceptable for this purpose.

4.4.7.7 With regard to Clause 4.4.7.6, a grounding screw shall be provided with a means to retain the wire under the head of the screw, such as:

a) a cupped washer; or

b) a minimum of two “dimples” raised 1.02 mm (0.040 in) above the metal surface and spaced to position the wire under the screw head; or

c) any equivalent means that accomplishes the same function.

4.4.7.8 A flush-type lampholder with which in some cases a metal flush plate is used shall be constructed such that the metal flush plate is bonded to the grounded outlet-box when the lampholder is installed in the intended manner.

4.4.7.9 A flush plate provided with a lampholder or as an integral part thereof shall be:

a) 0.76 mm (0.030 in) or thicker ferrous metal, of 1.02 mm (0.040 in) or thicker nonferrous metal, or of 2.5 mm (0.10 in) or thicker nonconductive, noncombustible material; or

b) thinner than 2.5 mm (0.10 in) at a break-off line and at a restricted area involving decorative lines or the like, provided that the strength of the plate as a whole is not adversely affected.

4.4.8 Threaded nipple

4.4.8.1 The female nipple integral with the lampholder cap shall have no fewer than five full clean-cut threads of standard pitch as indicated in Table 1.

4.4.8.2 The female nipple in a mogul-, admedium-, or medium-screw lampholder cap shall be provided with a No. 8-40 setscrew. The setscrew shall not be required if:

a) the nipple of a cap is of the 1/2 in trade size pipe or larger, has a tapered thread, and is designed to be tightened with a wrench;

b) the nipple is on the support of a candle-type lampholder; or

c) the nipple of the cap of a lampholder is intended for factory use only when assembled in a luminaire or portable luminaire.

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4.4.8.3 A minimum No. 5-40 setscrew may be employed in the nipple or the support of a lampholder of the intermediate-base or smaller size.

4.4.8.4 A No. 6-32 or No. 8-32 setscrew may be employed in a nipple of nonmetallic material.

4.4.8.5 A cap with a threaded nipple for attachment to rigid metal conduit of the 1/2 in or larger trade size shall be provided with a positive end stop for the conduit and a bushing or an equivalent smooth, well-rounded surface to prevent damage to insulated wires entering the cap from the conduit.

4.5 Accessibility of Live Parts

4.5.1 General

4.5.1.1 Except as provided in Clause 4.5.3.1, accessibility to uninsulated live parts of a lampholder shall be determined while the lampholder is completely assembled and mounted as intended:

a) without a lamp;

b) with the appropriate lamp inserted; and

c) during the insertion or removal of a lamp.

4.5.1.2 The probes specified in Table 2 shall not contact live parts when inserted through any openings in an enclosure, with the probe in every possible position. The probes shall be used as measuring instruments to judge accessibility and not as instruments to judge the strength of the material. Where necessary, an electrical indicator may be used to determine whether contact is made with live parts.

4.5.2 Fluorescent lampholders

4.5.2.1 An uninsulated live part shall not be contacted by the appropriate rod probe illustrated in Figure 2 and Figure 3.

4.5.2.2 With regard to Clause 4.5.2.1, a fluorescent lampholder that is intended for use in dwellings shall comply with item (a) or (b), as applicable, when a probe is applied externally to the lamp contact opening of the lampholder:

a) for a lampholder rated at 600 V or less, there shall not be contact between the probe illustrated in Figure 2 and live parts.

b) for a lampholder rated at more than 600 V but not more than 1000 V, the spacing between the probe illustrated in Figure 3 and live parts shall not be less than 3.2 mm (1/8 in).

4.5.2.3 With regard to Clause 4.5.2.1, a lampholder that is intended for use in locations other than dwellings and which is marked in accordance with Clause 7.4.9 shall comply with item (a) or (b) if rated 1000 V or less, and with item (a) if rated 2500 V:

a) the diameter of the opening for insertion of the lamp shall not be more than 28.6 mm (1-1/8 in); the spacing between the plane of the opening and any uninsulated live parts behind the opening within the lampholder shall not be less than 9.5 mm (3/8 in).

b) if applied externally to the opening intended to accommodate the lamp, the probe illustrated in Figure 2 shall not make contact with uninsulated live parts; the spacing between such live parts and the plane of the opening shall not be less than 1.6 mm (1/16 in).

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4.5.3 All other lampholders

4.5.3.1 To reduce the likelihood of unintentional contact that may involve a risk of electric shock from an uninsulated live part, an opening in the enclosure of a lampholder shall not be contacted by the articulate probe illustrated in Figure 1. Accessibility shall be determined only with the lamp fully installed.

Note: Wiring terminals and cleat-type lampholders need not comply with this requirement.

4.6 Corrosion Protection

4.6.1 Iron and steel parts and other parts not inherently corrosion-resistant shall be protected against corrosion by painting, enameling, galvanizing, plating, or other equivalent means.

4.7 Current-Carrying Parts

4.7.1 Current-carrying parts shall be made of:

a) copper, copper alloy;

b) other corrosion-resistant metal having equivalent conductivity and mechanical strength;

c) corrosion-resistant (stainless steel) alloy for current-carrying parts that are not subjected to arcing. The center contact shall not be considered to be an arcing part;

d) plated steel when used for wire-binding nuts and screws; or

e) plated or unplated steel for current-carrying parts exposed to temperatures exceeding 218 °C (424 °F).

4.7.2 Zinc or cadmium plating shall not be used on terminal parts of a lampholder where the parts will come in contact with branch circuit conductors other than the grounding conductors.

4.7.3 A current-carrying part shall be secured such that it cannot be turned relative to the surface on which it is mounted.

4.7.4 Positive electrical contact shall be maintained at any point at which a connection is made between current-carrying parts.

4.7.5 The wiring terminals of a lampholder constructed for installation in an outlet-box shall be located or protected such that they will not be forced against the wires in the box.

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4.8 Supply Connections

4.8.1 General

4.8.1.1 A lampholder shall be capable of being readily wired as intended. If a lampholder is intended for the connection of conductors, wiring terminals or leads shall be provided.

4.8.1.2 A lampholder intended for factory assembly into portable luminaires or appliances may employ solder terminals provided that such lampholders are for factory assembly only and are marked in accordance with Clause 7.3.1. The solder terminals may be in the form of a terminal plate with a hole, an eyelet connected to the screwshell and/or center contact, or other such termination.

4.8.2 Screw terminals

4.8.2.1 A screw for securing lead wires shall be of the wire-binding type.

4.8.2.2 A terminal plate having a tapped hole for a wire-binding screw shall be of metal not less than 0.76 mm (0.030 in) thick and shall not have fewer than two full threads in the metal.

4.8.2.3 For a binding screw having 32 or more threads per inch (25.4 mm), a terminal plate formed from stock not less than 0.76 mm (0.030 in) thick may have the metal extruded at the screw hole to provide two full threads for the binding screw.

4.8.2.4 With reference to the requirement in Clause 4.8.2.2, metal having a thickness of not less than 1.52 mm (0.060 in) shall be considered acceptable for a tapped hole for a screw having 32 threads per inch (25.4 mm).

4.8.2.5 A terminal employing a wire-binding screw shall be provided with upturned lugs or the equivalent to hold a wire under the head of the screw.

4.8.2.6 A wire-binding screw shall thread into metal.

4.8.2.7 Thread-cutting screws shall not be used for field connections.

4.8.2.8 Wire-binding screws of a screw lampholder shall comply with the requirements in Clause 4.8.8.

4.8.2.9 The minimum size and the maximum number of threads per inch (25.4 mm) of wire-binding screws shall be as indicated in Table 3, except that the wire-binding screws of an intermediate-screw lampholder for use in electric signs shall not be smaller than M3.5 (No. 5).

4.8.2.10 The wiring terminals of a lampholder designed for mounting in an outlet-box shall be located or protected such that upon installation they are not forced against the wiring in the box.

4.8.2.11 With reference to the requirement in Clause 4.8.2.10, a lampholder shall not be acceptable if the minimum required clearance is not maintained between each terminal and the metal of a standard box of the type in which it is intended to be installed.

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4.8.2.12 The terminals of a lampholder designed for open wiring or for use in electric signs, and the circuit wires connected to such a lampholder, shall not be less than 12.7 mm (1/2 in) from the surface wired over if the device is rated at 250 V or less, and shall not be less than 25.4 mm (1 in) from the surface wired over if the device is rated at more than 250 V.

4.8.2.13 The terminal parts of a cleat-type lampholder shall not overhang the supporting base and shall be spaced at least 6.4 mm (1/4 in) from any mounting screw.

4.8.3 Insulation-piercing terminals

4.8.3.1 Screw lampholders employing insulation-piercing terminals shall be specified for use only with:

a) fixture wire and Type SP, SPE, or SPT flexible cords that comply with UL 62, CSA C22.2 No. 49, and C22.2 No. 127;

b) insulated conductors that comply with UL 44 and CAN/CSA-C22.2 No. 38; or

c) insulated conductors that comply with UL 83 and CSA C22.2 No. 75.

Note: A lampholder intended for temporary use in accordance with the National Electrical Code, ANSI/NFPA 70, and the Canadian Electrical Code, Part I, C22.1, need not comply with the requirements in this clause.

4.8.3.2 Lampholders employing insulation-piercing terminals intended for use with Type SP, SPE, or SPT flexible cord shall be for factory assembly only and shall be marked in accordance with Clause 7.3.2.

4.8.3.3 Lampholders employing insulation-piercing terminals intended for use with Type SP, SPE, or SPT flexible cord shall be specified for use with a minimum 105 °C (221 °F) rated flexible cord.

4.8.3.4 Lampholders intended for use with Type SP, SPE, or SPT flexible cord shall comply with the temperature tests specified in Clause 5.2.15, and shall be evaluated for the intended application, such as the marked wattage rating and the position of the lamp base, and as specified by the manufacturer with regard to the type of flexible cord used.

4.8.4 Push-in terminals

4.8.4.1 Lampholders with push-in terminals shall comply with the security of leads test specified in Clause 5.1.2, and shall be evaluated for the intended wire sizes and types.

4.8.4.2 Lampholders with push-in terminals shall comply with the marking requirements in Clause 7.3.3.

4.8.4.3 An outlet-box lampholder employing push-in terminals intended for use with copper conductors only shall be constructed such that it will permit insertion of a 14 AWG (2.1 mm^2) conductor, but will reject a 12 AWG (3.3 mm^2) or larger conductor. Compliance shall be determined by the tests specified in Clause 5.1.3.

4.8.4.4 Openings in an outlet-box lampholder not intended for wire termination shall reject a 14 AWG (2.1 mm^2) or larger solid conductor.

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4.8.5 Set screws

4.8.5.1 Lampholders employing set screws for supply connections shall be specified for use only with solid or tinned stranded wire, and shall comply with the performance requirements specified in UL 486E or CSA C22.2 No. 158.

4.8.6 Lead wires

4.8.6.1 Lead wires shall be of appliance wiring material, flexible cord, or fixture wire and shall be suitable for the application.

4.8.6.2 For a mogul-base lampholder that is intended only for use in a luminaire or portable luminaire, leads having an ampacity of 6 A or more shall be acceptable on a 750 W lampholder, and leads having an ampacity of 12 A or more shall be acceptable on a 1500 W lampholder. Leads having an ampacity of 16 A or more shall be acceptable on a 2000 W lampholder.

Note 1 A mogul-screw lampholder rated 1500 W and marked in accordance with Clause 7.4.7 may employ leads having an ampacity of 8 A or more.

Note 2 A mogul-screw lampholder rated 2000 W and marked in accordance with Clause 7.4.7 may employ leads having an ampacity of 11 A or more.

4.8.6.3 The lead wires of an outlet-box lampholder shall not be smaller than 16 AWG (1.3 mm^2).

4.8.6.4 A lead wire for a double-based fluorescent lampholder rated at 2500 V shall not be smaller than 14 AWG (2.1 mm^2).

4.8.6.5 The lead wire insulation shall be acceptable for use at a maximum potential (at least 300 V) and at a temperature required for the application, with minimum of 90 °C.

4.8.6.6 Wire leads provided as an integral part of a lampholder for use with pulse-rated lamps shall be rated a minimum 600 V.

4.8.6.7 A screw lampholder with lead wires shall have the lead wires identified such that they comply with the requirements in Clause 4.8.8.

4.8.6.8 A single-conductor lead wire with thermoplastic-insulation shall be:

a) fixture wire;

b) provided with a braid covering; or

c) a type that has a voltage rating of at least 600 V.

4.8.6.9 Rubber insulated lead wires shall be provided with an overall braid.

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4.8.6.10 A braided lead wire on a lampholder for damp or wet locations shall be sealed in place with an acceptable sealing compound or by equivalent means.

4.8.6.11 Lead wires intended for connection to branch circuit conductors shall be not less than:

a) 100 mm (4 in) measured from the outside of the lampholder body for outlet-box, canopy, or similar type lampholders;

b) for lampholders for the factory assembled type, a lead length is not specified;

c) for weatherproof lampholders, the requirements of Clause 4.11.2.1.2; and

d) 152 mm (6 in) for a grounding lead wire, if provided.

4.8.6.12 Lamp connectors shall be provided with stranded lead wires only.

4.8.6.13 A soldered connection shall be made mechanically and electrically secure before soldering.

4.8.6.14 Lead wires shall be prevented from contacting edges which contain burrs that could damage the lead insulation.

4.8.6.15 Leads shall be securely terminated to the electrical components of the lampholder. Compliance shall be determined by the security of leads test specified in Clause 5.1.2.

4.8.7 Quick-connect terminals

4.8.7.1 Quick-connect terminals shall comply with the dimension requirements in UL 310 and CSA C22.2 No. 153.

4.8.8 Polarization

4.8.8.1 A conductor terminal intended for connection of the neutral conductor of the branch circuit shall be substantially white in color or shall be marked neutral, W, N, or white adjacent to the terminal. Lampholders intended for factory assembly need not be identified where polarity of the lampholder may be determined by visual examination.

4.8.8.2 With regard to Clause 4.8.8.1, the terminal connected to the screwshell may be identified by the white head of the wire-binding screw provided the screw is not readily removable from its terminal plate and it does not appear to relate to parts other than the screwshell.

4.8.8.3 A white terminal plate of a binding-screw terminal that is plainly visible after wiring and that does not appear to relate to the center contact of the lampholder may serve as the terminal identification specified in Clause 4.8.8.1 if all the line-terminal binding screws are of the same color.

4.8.8.4 If the terminal that would be plated white to comply with the requirement in Clause 4.8.8.1 is not visible, the wire-entrance hole for the connection to that terminal shall be marked with the word “white” or colored white directly adjacent to the lead wire entry hole.

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4.8.8.5 A lampholder in which the cap or supporting base is provided with terminals for the connection of circuit conductors shall be constructed such that the device cannot be assembled with the center contact in electrical connection with the identified terminal in the cap or base.

4.8.8.6 If a screw lampholder is provided with lead wires or flexible cord, the identification of the leads shall be in accordance with Table 4 or 5.

4.8.9 Grounding

4.8.9.1 A grounding lead, if provided, shall have insulation that is green, with or without one or more yellow stripes.

4.9 Creepage Distances and Clearances

4.9.1 Creepage distances and clearances shall not be less than those specified in Clause 4.9 for other than pulse-rated lampholders, which are required to comply with Clause 5.2.13.

4.9.2 Creepage distances and clearances shall be measured with and without a lamp installed as intended. If the lampholder is a circuit-interrupting type in which all parts are de-energized in the absence of a lamp, the spacing shall be measured only with a lamp installed. For holders for fluorescent lamps that involve a telescoping section that abuts the lamp, this section shall be depressed 1.6 mm (1/16 in) while the measurement is being made.

4.9.3 On a spring contact lampholder, the creepage distances and clearances shall be maintained in any position up to 3.2 mm (1/8 in) from the fully depressed position of the spring.

4.9.4 Uninsulated live parts that are supported by friction alone and movable non-current-carrying metal parts in proximity to uninsulated live parts shall maintain the minimum creepage distances and clearances specified under all conditions.

4.9.5 The minimum acceptable creepage distances and clearances between leads on a neon indicator lamp that is operated in series with a resistor shall be based on the actual voltage between the lamp leads.

4.9.6 For the purpose of these measurements, the lampholder mounting surface shall be considered to be a grounded, non-current-carrying metal part.

4.9.7 A dead metal screw head, rivet, or the like shall not be considered accessible if, after the device is installed in the intended manner, the dead metal part is located in a maximum 7.1 mm (9/32 in) diameter hole and is recessed not less than 4.8 mm (3/16 in).

4.9.8 A non-current-carrying dead metal part interposed between live parts of opposite polarity or between a live part and a grounded or exposed non-current-carrying metal part shall be considered as reducing the spacing by the dimension of the interposed non-current-carrying metal part.

4.9.9 Creepage distances and clearances shall be measured between uninsulated live parts:

a) of opposite polarity;

b) and non-current-carrying metal parts;

c) and the intended mounting surface; and

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d) non-current-carrying metal parts likely to be exposed to contact when the device is installed in the intended manner shall comply with Table 6.

4.9.10 For fluorescent type, ferrule cap, and recessed single-pin lampholders rated at 1000 V, there shall be a spacing through air and over surface between an uninsulated live part and the outer surface of the lampholder. The spacing shall not be less than 4.8 mm (3/16 in) if the body of the holder is of glass, porcelain, or a polymeric material with a minimum comparative tracking index of 175 V, determined in accordance with the methods described in UL 746B and CAN/CSA-C22.2 No. 0.17. For other materials, this spacing shall not be less than 6.4 mm (1/4 in). This requirement does not apply:

a) at an opening for insertion of a lamp terminal or pin; or

b) to an uninsulated live part if the part is enclosed (in a luminaire enclosure, for example) while the lampholder is mounted in the intended manner.

4.9.11 An insulating barrier may be used in lieu of the required spacings provided that it complies with the barrier requirements contained in UL 746C and CAN/CSA-C22.2 No. 0.17.

4.9.12 If the insulating barrier in Clause 4.9.11 has an interface between two surfaces of insulating materials, which could allow a current path through the interface, the surfaces shall be bonded together to form a solid homogeneous cemented joint. Acceptable materials for providing a cemented joint are: epoxy, acrylic adhesive, polyurethane adhesive, and solvent cements. Sonic welding may also be used to bond materials together. Friction interface alone shall not be acceptable.

4.10 Screw Devices

4.10.1 Lamp support

4.10.1.1 A screw-type lampholder shall provide threads, or their mechanical equivalent, to engage:

a) at least two threads of a standard lamp base to enable electrical contact to be made when the lamp is fully seated; and

b) one full thread for an intermediate- or candelabra-screw flush-mounted pilot light.

4.10.1.2 Other forms of lamp-base support and other means for making electrical contact are acceptable if they meet the requirements of Clause 5.2.3.

4.10.1.3 A lampholder with a skeleton type of construction shall comply with the requirements of Clause 5.2.3.

4.10.1.4 The lamp support means for a medium-screw lampholder shall demonstrate sufficient mechanical strength for the intended application. Compliance shall be determined in accordance with Clause 5.2.3.

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4.10.2 Lamp cavity

4.10.2.1 The dimensions of the lamp cavity shall be in conformity with the specifications of ANSI C81.62. Compliance shall be determined by Clause 5.2.4.

4.10.2.2 The depth of the lamp cavity of a lampholder shall be in accordance with Table 7. The maximum-depth requirement in Table 7 shall not apply if the insulating-material outer shell is flared and extends beyond the specified limit to provide further protection against contact with live parts. The outer shell shall prevent contact with the screwshell of an installed lamp, as determined by the application of the articulate probe shown in Figure 1.

4.10.2.3 The depth of the lamp cavity shall be measured from the plane of the fixed or fully depressed center contact to the plane of the rim:

a) of the insulating lining; or

b) of the lampholder body if the body is of insulating material.

4.10.2.4 If a lampholder interior is held in place between sections of a lampholder body or shell in which there can be movement of the interior, the depth of the lamp cavity shall be measured with the interior held as close as possible toward the open end of the lampholder.

4.10.2.5 If the method of mounting a lampholder affects the depth of the lamp cavity, the determination shall be made with the device mounted as intended. For example, a medium-screw lampholder of the screw-ring type intended to be mounted in the sheet-metal face of an electric sign, a metal canopy, or the like shall comply with the requirements of Clause 4.10.2.2 while mounted in a metal sheet 0.8 mm (1/32 in) thick.

4.10.3 Screwshell and device screw base

4.10.3.1 Except as limited by Clause 4.10.3.3 and 4.10.3.4, a metal screwshell or a screw base metal shell shall be of copper, brass, aluminum, or other metal acceptable for the purpose.

4.10.3.2 The female screwshell of a medium-base or larger lampholder intended for use with an infrared lamp or similar equipment shall be of copper, copper alloy, or corrosion-resistant (stainless) steel alloy. Copper or copper-alloy screwshells shall be plated with nickel or equivalent oxidation-resistant metals.

4.10.3.3 Where permitted, aluminum alloy for use in a metal screwshell or a screw base metal shell shall be a wrought alloy employing manganese and/or magnesium as the principal alloying material (with the possible addition of chromium), and not containing more than 1.5 percent of iron and silicon combined and not more than 1 percent of all other usual impurities of aluminum (including a maximum of 0.25 percent of copper).

4.10.3.4 A screwshell or the metal shell of a device screw base used in wet or damp location lampholders shall be made from:

a) copper, or a copper alloy with a minimum 80 percent copper;

b) nickel alloy; or

c) stainless steel.

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4.10.3.5 The minimum thickness of a metal lampholder screwshell shall be as indicated in Table 8. The minimum thickness of a metal screw base shall be as indicated in Table 9.

4.10.3.6 To determine if a metal screwshell or a screw base metal shell complies with the requirement in Clause 4.10.3.5, measurements of metal thickness shall be made on the flat surface of the bottom of the screwshell or screw base, respectively, by means of pointed- or round-nose micrometer calipers.

4.10.3.7 A screwshell or device screw base shall demonstrate sufficient mechanical strength for the intended application. Compliance shall be determined by Clause 5.2.3.

4.10.3.8 A screwshell or device screw base shall comply with Clause 5.2.4.

4.10.3.9 The metal screwshell of an all-rubber, molded, pendant, weatherproof lampholder shall be tinned or otherwise suitably treated to resist corrosion that might result from contact with the rubber.

4.10.3.10 The skeleton type of construction shall not be used on a device screw base.

4.10.3.11 A device screw base intended to lock in place and be non-removable shall be provided with a ratcheting mechanism, or the equivalent, so that the lampholder it is installed in is not damaged.

4.10.4 Center contact

4.10.4.1 The center contact of a spring type of lampholder intended for use with single-filament lamps shall have a width at the lamp-contact end to provide a circular area, located centrally in the well of the lampholder, when the contact is fully depressed, of at least the diameter shown in Table 10. This circular area may be in the form of an annulus provided that the diameter of the central hole is not greater than 50 percent of the width of the contact at this point. Contacts other than the spring type shall have a circular area of at least the diameter shown in Table 10.

4.10.5 Metal cap and shell (outer shell)

4.10.5.1 General

4.10.5.1.1 Means shall be provided for securely attaching the cap of a lampholder to the body or outer shell. The cap shall be prevented from turning with respect to the body or outer shell after assembly.

4.10.5.1.2 Caps and outer shells of ferrous metal shall be protected against corrosion by enameling, lacquering, galvanizing, plating, or other equivalent means.

4.10.5.1.3 The thickness of metal of the lampholder cap and of the outer shell shall be as indicated in Table 11.

4.10.5.1.4 To determine if an outer shell complies with the requirement in Clause 4.10.5.1.3, measurements shall be made with round-nose micrometer calipers. The average shall be taken of four measurements, 90 degrees apart, around the shell where its diameter is greatest and the surface cylindrical.

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