

UL 496

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Edison-Base Lampholders

Underwriters Laboratories Inc. (UL)
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UL Standard for Safety for Edison-Base Lampholders, UL 496

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Revisions: This Standard contains revisions through and including April 11, 2000. UL is in the process of converting its Standards for Safety to the Standard Generalized Markup Language (SGML), and implementing an SGML compliant document management and publishing system. SGML - an international standard (ISO 8879-1986) - is a descriptive markup language that describes a document's structure and purpose, rather than its physical appearance on a page. Significant benefits that will result from UL's use of SGML and these new systems include increased productivity, reduced turnaround times, and data and information consistency, reusability, shareability, and portability. However, the fonts, pagination, and general formatting of UL's new electronic publishing system differ from that of UL's previous publishing system. Consequently, when revision pages are issued for a Standard with the new publishing system, these differences may result in the printing of pages on which no requirements have been changed - these additional pages result from relocation of text due to repagination and reformatting of the Standard with the new publishing system.

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The new requirements are substantially in accordance with UL's Bulletin(s) on this subject dated March 15, 1999. The bulletin(s) is now obsolete and may be discarded.

The revisions dated April 11, 2000 include a reprinted title page (page1) for this Standard.

As indicated on the title page (page1), this UL Standard for Safety has been adopted by the Department of Defense.

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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 and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction which conflict with specific requirements of the Standard cannot be judged to comply with the Standard. A product employing materials or having forms of construction not addressed by this Standard may be examined and tested according to the intent of the requirements and, if found to meet the intent of this Standard, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover Edison-base lampholders to be used in accordance with the National Electrical Code.

1.2 These requirements do not cover non-Edison-screw lampholders for special uses – such as projection lamps, electrode receptacles, and sign lamps.

1.3 These requirements do not cover seasonal-lighting lampholders which are covered by the Standard for Christmas-Tree and Decorative-Lighting Outfits, UL 588.

1.3 revised August 5, 1998

1.4 To differentiate between similar devices, an Edison-base lampholder to be mounted directly on an outlet box is considered to be a surface-type lampholder, whereas such a device requiring a cross-bar, mounting strap, or other mounting means is considered to be a fixture and is not covered by these requirements.

1.5 These requirements and the Standard for Attachment Plugs and Receptacles, UL 498, cover current taps having a lamp screw shell or screw base.

1.6 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

1.6 revised April 11, 2000

2 Glossary

2.1 For the purposes of this Standard, the following definitions apply.

2.2 **TERMINAL, INSULATION PIERCING (PIN-TYPE)** – A terminal having a contact pin that punctures the conductor insulation and penetrates between the conductor strands. This does not include insulation displacement terminals where the conductor is positioned between the pins of the terminal.

2.3 **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.

2.4 **LAMPHOLDER, SKELETON-TYPE** – An Edison-screw lampholder that does not use conductive screw shell 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.

3 Components

3.1 Except as indicated in 3.2, a component of a product covered by this Standard shall comply with the requirements for that component.

3.2 A component need not comply with a specific requirement that:

- a) Involves a feature or characteristic not needed in the application of the component in the product covered by this Standard, or
- b) Is superseded by a requirement in this Standard.

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

3.4 Specific components are recognized as being 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 for which they have been recognized.

4 Units of Measurement

4.1 If a value for measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

5 References

5.1 Any undated reference to a code or standard appearing in the requirements of this Standard shall be interpreted as referring to the latest edition of that code or standard.

CONSTRUCTION

GENERAL

6 General

6.1 Any screw provided with a lampholder for use in mounting the device to an outlet box or other enclosure shall not project more than 7/8 inch (22.2 mm) 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.

7 Enclosure

7.1 General

7.1.1 An Edison-base lampholder, other than the surface-cleat type, shall be provided with an enclosure that prevents unintentional contact with all uninsulated live parts of the device, except the screw shell and center contact in the lamp cavity, while the lampholder is completely assembled and installed as intended.

7.1.2 A metal base in the form of an outlet-box cover shall comply with the Standard for Metallic Outlet Boxes, UL 514A.

7.2 Supporting base

7.2.1 Means shall be provided for securely attaching the body of a lampholder to the supporting base. While attached to the supporting base, the body shall not be capable of turning with respect to the base.

7.2.2 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. A supporting base for surface mounting shall be provided with two or more holes for mounting screws.

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

7.2.4 Live screw heads or nuts on the underside of a base designed for surface mounting shall be countersunk not less than 1/8 inch (3.2 mm) in the clear, and then covered with a waterproof, insulating, sealing compound that does not soften at a temperature of 100°C (212°F); except that, 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 1/2 inch (12.7 mm) or more air separation from the mounting surface.

7.3 Sealing compound

7.3.1 The depth or thickness of sealing compound over a live nut or screw head shall not be less than 1/16 inch (1.6 mm). If the underside of the base is not recessed and if it may 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 1/8 inch (3.2 mm).

7.3.2 Sealing compound shall be insulating and shall not soften at a temperature of 100°C (212°F). See the Sealing Compound Test, Section 39.

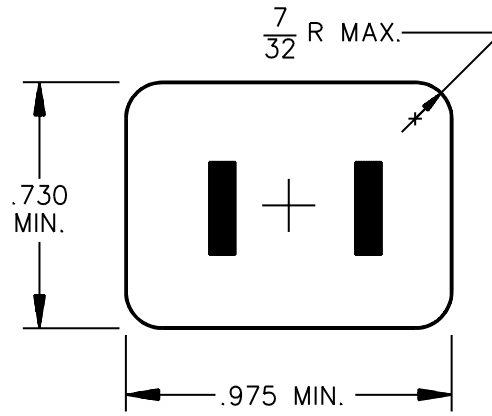
7.3.3 Sulfur is not acceptable as a sealant.

8 Lampholders With Male Blades

8.1 Lampholder fittings, lampholder adapters, miscellaneous lampholders, and other similar devices, each employing parallel blades for connection to the line, shall be constructed as shown in Figure 8.1.

Exception: A device may employ a smaller face size if the probe shown in Figure 8.2 does not make contact with the line blades when applied at any point on the circumference of the device face. The surface "Z-W" is to be applied against the outside edge of the device face with the surface "Y-W" perpendicular to the blades.

Figure 8.1
Minimum face dimensions

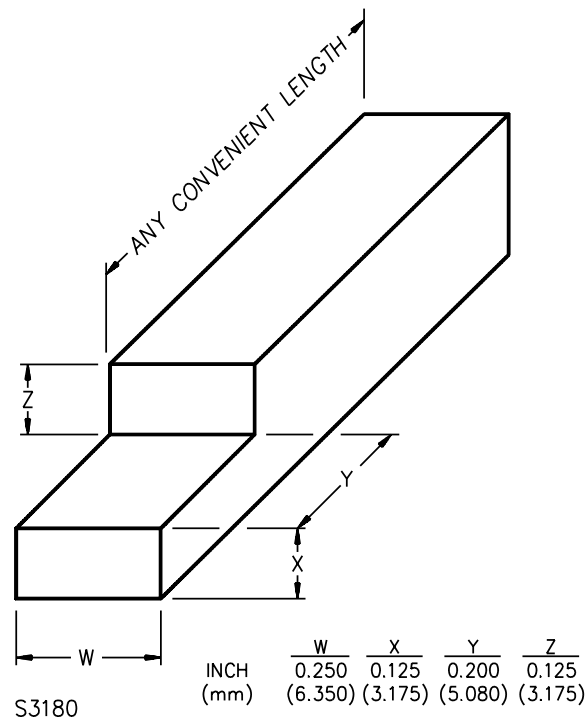


BLADES CENTERED

SA1945

inch	$\frac{7}{32}$	0.730	0.975
(mm)	(5.6)	(18.5)	(24.8)

Figure 8.2
Minimum face size probe



9 Flush-Type Lampholders

9.1 General

9.1.1 A flush-type lampholder shall be provided with means for mounting in a standard flush-device box or on a standard outlet-box cover. A yoke, strap, or mounting ears shall be of metal not less than inch (1.02 mm) thick and, if of steel, shall be protected against corrosion or otherwise coated. If a nonferrous metal is used, it shall be of a thickness to provide mechanical strength and rigidity not less than that of 0.040 inch (1.02 mm) thick steel.

9.1.2 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 43.2.

9.2 Grounding

9.2.1 A flush-type lampholder with which a metal flush plate may be used shall be constructed so that the metal flush plate is bonded to the outlet box (if of metal) while the lampholder is installed in the intended manner.

9.3 Flush plates

9.3.1 A flush plate provided with a lampholder or as an integral part thereof shall be of 0.030 inch (0.76 mm) or thicker ferrous metal, of 0.040 inch (1.02 mm) or thicker nonferrous metal, or of 0.10 inch (2.5 mm) or thicker nonconductive noncombustible material.

9.3.2 A flush plate of insulating material may be thinner than 0.10 inch (2.5 mm) 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.

9.4 Cap

9.4.1 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.

9.4.2 The thickness of metal of the lampholder cap shall be as indicated in Table 9.1.

Table 9.1
Minimum thickness of metal in inches (mm)

Table 9.1 revised April 11, 2000

Size of lampholder	Sheet brass	Sheet aluminum	Other metal
Mogul	0.025 (0.64)	0.032 (0.81)	Mechanical strength and rigidity not less than brass
Admedium or smaller	0.013 (0.33)	0.018 (0.46)	

9.4.3 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 9.2.

Table 9.2
Pitch of threads

Pipe size in inches	Threads per inch (25.4 mm)
1/8	27
1/4	18
3/8	18
1/2	14
3/4	14

9.4.4 A nipple that is not integral with the cap shall be fastened:

- a) So that it cannot be turned relative to the cap, and
- b) To provide mechanical strength at least equivalent to that of a unit piece.

9.4.5 The female nipple in a mogul-, admedium-, or medium-base lampholder cap or support shall be provided with a No. 8 – 40 setscrew.

Exception No. 1: The setscrew may be omitted in the nipple of a cap if the nipple is of the 1/2-inch trade size pipe or larger, has a tapered thread, and is designed to be tightened with a wrench.

Exception No. 2: The setscrew may be omitted in the nipple on the support of a candle-type lampholder.

Exception No. 3: The setscrew may be omitted in the nipple of the cap of a lampholder that is intended for use only in an electric fixture or portable lamp, provided that such caps without setscrews are shipped directly to the manufacturers of fixtures or portable lamps.

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

9.4.7 A No. 8 – 32 setscrew may be employed in a nipple of nonmetallic material.

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

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

9.4.10 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.

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

9.4.12 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 3/8 inch (9.5 mm).

9.4.13 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 1/32 inch (0.8 mm) thick.

9.4.14 A metal cord-grip may be provided on a pendant lampholder designed for use with a jacketed type of flexible cord such as Type S or SJ.

9.4.15 The cap of an Edison-plug-type lampholder shall provide electrical connection through the device from screw shell to screw shell and from center contact to center contact. If wire leads are supplied as a part of the cap for attachment to the wiring terminals of the body, the identification of the leads shall be in accordance with 11.3.17.

9.5 Outer shell

9.5.1 The thickness of metal of the outer shell shall be as indicated in Table 9.3.

Table 9.3
Minimum thickness of metal in inches (mm)

Size of lampholder	Sheet brass	Sheet aluminum	Other metal
Mogul	0.025 (0.64)	0.032 (0.81)	Mechanical strength and rigidity not less than brass
Admedium or smaller	0.013 (0.33)	0.018 (0.46)	

9.5.2 To determine if an outer shell complies with the requirement in 9.5.1, measurements are to be made with round-nose micrometer calipers. The average is to be taken of four measurements, 90 degrees apart, around the shell where its diameter is greatest and the surface cylindrical.

9.5.3 Rubber shall not be employed for the outer shell or body of a lampholder, except for a molded-rubber, pendant, weatherproof lampholder, as indicated in 21.1. The rubber compound shall comply with the requirement in 38.2.1. See also the Insulation Resistance Test, Section 36.

9.6 Corrosion protection

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

10 Lining

10.1 General

10.1.1 The inside of a metal shell and cap shall be lined completely with insulating material such that the metal cannot become a part of the circuit, even though the wires inside the lampholder become loosened or detached from their positions under the terminal screws. The lining shall not extend beyond the shell more than 1/8 inch (3.2 mm), and shall be located so that any uninsulated live part of a lamp base cannot become exposed while the lamp is in place. The lining of a metal cap shall be secured in place.

10.1.2 In a lampholder of conventional form, a removable ring of any material inserted between the outer shell and the screw shell for insulating purposes is not acceptable. This does not apply to the use of rings in a lamp cluster or in a device in which the outer shell is of porcelain or acceptable molded composition, if such rings serve to hold the several porcelain or composition parts together and thus are a necessary part of the complete device.

10.1.3 A lining for a medium-base lampholder shall comply with the Lining Tests, Section 29.

10.2 Form

10.2.1 The lining shall be in one piece and shall not be slit, notched, or cut, except as may be necessary for the operation or assembly of the device.

10.2.2 The requirement in 10.2.1 does not necessitate a cap lining being integral with a lining for an outer shell.

10.3 Thickness

10.3.1 The thickness of a lampholder lining, as measured by means of round-nose micrometer calipers, shall not be less than 1/32 inch (0.8 mm).

11 Interior

11.1 Base

11.1.1 A base on which uninsulated live parts are mounted (parts such as a wiring terminal, switching mechanism, center contact, or screw shell) shall be of porcelain, cold-molded or phenolic composition, or other insulating material acceptable for the particular application.

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

Exception: Vulcanized fiber may be used for the ratchet wheel of a pull-type switching mechanism.

11.2 Current-carrying parts

11.2.1 Iron or steel, plain or plated, shall not be used for parts that are depended upon to carry current.

Exception: A corrosion-resistant (stainless-steel) alloy may be used for wire-binding nuts and screws and also for current-carrying parts that are not subjected to arcing.

11.2.2 Steel that is protected against corrosion by cadmium plating, zinc plating, or equivalently protective coating may be used for wire-binding nuts and screws that are not depended upon to carry current.

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

11.3 Terminals

11.3.1 If a lampholder is intended for the connection of conductors, wiring terminals or leads shall be provided. The setscrew form of wiring terminal shall not be used.

Exception No. 1: Lampholders intended for factory assembly into portable lamps or appliances may employ solder terminals when provided with the marking required in 43.9. These solder terminals may be in the form of a terminal plate with a hole, an eyelet connected to the screw shell and/or center contact, or other such termination.

Exception No. 2: The setscrew form of wiring terminal may be used if it is acceptable for the particular application considering appropriate conductor sizes, proper preparation of leads, method of securing conductors to terminals, and other features necessary to make a proper connection.

11.3.2 A terminal plate having a tapped hole for a wire-binding screw shall be of metal not less than 0.030 inch (0.76 mm) thick and shall have no fewer than two full threads in the metal.

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

11.3.4 With reference to the requirement in 11.3.2, metal having a thickness of not less than 0.060 inch (1.52 mm) is considered to be acceptable for a tapped hole for a screw having 32 threads per inch (25.4 mm).

11.3.5 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.

11.3.6 A wire-binding screw shall thread into metal.

11.3.7 The minimum size and the maximum number of threads per inch of wire-binding screws shall be as indicated in Table 11.1, except that the wire-binding screws of an intermediate-base lampholder for use in electric signs shall not be smaller than No. 5.

Table 11.1
Minimum screw size and maximum pitch

Size of lampholder	Minimum acceptable size of screw	Maximum acceptable number of threads per inch (25.4 mm)
Mogul	8	32
Admedium	6	36
Medium	6	36
Intermediate	4	40
Candelabra	3	48
Miniature	3	48

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

11.3.9 With reference to the requirement in 11.3.8, a lampholder is not acceptable if it does not include a clearance that would provide the minimum required spacing between each terminal and the metal of a standard box of the type in which it is intended to be installed.

11.3.10 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 1/2 inch (12.7 mm) from the surface wired over if the device is rated at 250 V or less, and shall not be less than 1 inch (25.4 mm) from the surface wired over if the device is rated at more than 250 V.

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

11.3.12 The terminal connected to the screw shell of a lampholder, when visible, shall be identified by means of a metal coating substantially white in color, or the terminal may be made of material substantially white in color. The terminal connected to the center contact shall be of a readily distinguishable, different color.

Exception: The terminal associated with the screw shell of a lampholder intended only to be factory wired and permanently secured on flexible cord or on wire need not be identified where polarity of the lampholder can be determined by visual examination.

11.3.13 A white head of a wire-binding screw that is not readily removable from its terminal plate and that does not appear to relate to parts other than the screw shell, may serve as the terminal identification specified by 11.3.12.

11.3.14 If the terminal that would be plated white to comply with the requirement in 11.3.12 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 hole.

11.3.15 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 11.3.12 if all the line-terminal binding screws are of the same color.

11.3.16 Pin-type terminals shall be constructed to make a permanent and secure connection with circuit conductors when installed.

11.3.17 If, instead of wiring terminals, wire leads or flexible-cord leads are provided with a lampholder, the identification of the leads shall be in accordance with Table 11.2 or 11.3.

Table 11.2
Polarity identification of single-conductor lampholder leads

Identification obtained by	Acceptable combinations	
	Wire connected to the screw shells of lampholders (identified wire)	All other wires
Color of braid	A. Solid white or natural grey (without tracer)	White or natural grey with tracer in braid or solid color other than white, natural grey, or green (without tracer)
Color of insulation ^a	B. Color other than white, natural grey, or green (with tracer in braid)	Solid color other than white, natural grey, or green (without tracer)
Color of separator ^a	C. White or natural grey stripe on contrasting color other than green or solid white or natural grey (with no stripe)	Solid color other than white, natural grey, or green
Metal coating on conductor ^b	D. Solid white or natural grey	Solid color other than white, natural grey, or green
	E. Tin or other acceptable metal on all strands of the conductor	No tin or other metal on the strands of the conductor
^a If color of braid, insulation, or separator is used for identification, all conductors are to be either acceptably metal-coated or not metal-coated. ^b If an acceptable metal coating is used for identification, all braids and/or insulation are to have the same color and shape.		

11.3.18 Wire leads supplied as a part of a lampholder for the connection of the device to the line conductors of the supply circuit shall not be less than 4 inches (102 mm) in length measured from the outside of the lampholder body. A grounding lead, if provided, shall not be less than 6 inches (152 mm) long and shall have an outer identification of a green color with or without one or more yellow stripes.

Exception No. 1: The length is not specified for wire leads of a lampholder intended for mounting on an appliance.

Exception No. 2: Wire leads supplied as part of weatherproof or molded-rubber pendant type lampholders shall be as described in 20.3 and 21.4.

Table 11.3
Polarity identification of flexible-cord lampholder leads

Identification obtained by	Acceptable combinations	
	Wire connected to the screw shells of lampholders (identified wire)	All other wires
Color of braids on individual conductors	A. Solid white or natural grey (without tracer) B. Solid white or natural grey (without tracer) ^a C. Color other than white, natural grey, or green (with tracer in braid) D. Solid white or natural grey ^b	Solid color other than white, natural grey, or green (without tracer) White or natural grey with tracer in braid ^a Solid color other than white, natural grey, or green (without tracer)
Color of insulation on individual conductors	E. White or natural grey ^c	Solid color other than white, natural grey, or green ^b
Color of separators on individual conductors	F. Tin or other acceptable metal on all strands of the conductor ^d G. A stripe, ridge or groove on the exterior surface of the cord ^c	Color other than white, natural grey, or green ^c No tin or other white metal on the strands of the conductor ^d
Other means		
^a Only for Types C and PD cords. ^b Only for cords (other than Types SP-1, SP-2, SPT-1 and SPT-2) having no braid on any individual conductor. ^c Only for Types SP-1, SP-2, SPT-1 and SPT-2 cords. ^d Only for Types SPT-1 and SPT-2 cords.		

11.3.19 Use may be made of any wire in which the conductor is stranded and not smaller than No. 18 AWG (0.82 mm²) if:

- a) The wire is acceptable for use in electric fixtures, or
- b) The insulation is acceptable for use at a maximum potential (at least 300 V) and at a temperature required for the application. If the insulation is thermoplastic, the wire must have an overall braid unless the wire is acceptable for use at 600 V or higher potential. If the insulation is of rubber, the wire must have an overall braid regardless of its potential rating.

11.3.20 For a mogul-base lampholder that is intended only for use in a fixture or portable lamp, leads having an ampacity of 6 A or more are acceptable on a 750-W lampholder, and leads having an ampacity of 12 A or more are acceptable on a 1500-W lampholder.

Exception: Mogul-base lampholders rated 1500 W and marked in accordance with 43.21 may employ leads having an ampacity of 8 A or more.

11.3.21 The wire leads of a lampholder designed to be mounted in or on an outlet box shall not be smaller than No. 16 AWG (1.3 mm²).

11.3.22 The wire leads of an admedium-base or smaller fixture-type lampholder shall not be smaller than No. 18 AWG (0.82 mm²).

11.3.23 Wire employed in a swivel-joint lampholder for fixture or portable-lamp use shall be provided with a braid.

11.4 Screw shells

11.4.1 Screw shells shall be of copper, brass, or other metal acceptable for the purpose and, in the medium-base size, shall comply with the Security Tests of Screw Shell, Section 30. Aluminum and brass screw shells shall not be used in weatherproof lampholders except for brass that is resistant to corrosion cracking as a result of its composition.

11.4.2 The female screw shell 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 screw shells shall be plated with nickel or equivalent oxidation-resistant metal.

11.4.3 In an all-rubber, molded pendant, weatherproof lampholder, the screw shell shall be tinned or otherwise acceptably treated to resist corrosion that might result from contact of the metal with the rubber.

11.4.4 Lampholder screw shells shall have right-hand threads.

11.4.5 Screw shells shall be made go and not go when they are tested by means of gauges made in conformity with the specifications for Gauges for Electric Lamp Bases and Lampholders, ANSI C81.63.

11.4.6 A general-use lampholder shall provide threads or their mechanical equivalent, that engage at least two full threads of a standard lamp base and provide electrical contact therewith while the lamp is fully seated.

Exception No. 1: In the case of an intermediate- or candelabra-base flush-mounted pilot light, one full thread is acceptable.

Exception No. 2: The skeleton type of construction shall not be used in place of a male screw shell, but may be used in place of a female screw shell if it complies with the Security Tests of Screw Shell, Section 30.

Exception No. 3: Other forms of lamp-base support and other means for making electrical contact are acceptable if they are investigated and determined to be acceptable for the application.

11.4.7 The skeleton type of construction does not provide electrical contact through 360 degrees of the lamp base perimeter, but it does give, within the limitations of its construction, electrical contact through two turns of its threaded body. Such construction generally consists of one or more narrow strips of metal secured to a molded, threaded body of insulating material. The strip generally extends the length of and conforms in shape to the molded threads.

11.4.8 The minimum thickness of lampholder screw shells shall be as indicated in Table 11.4.

Table 11.4
Minimum thickness of screw shell in inches (mm)

Trade size of lampholder and nominal diameter in inches	Copper or copper-alloy screw shell	Aluminum or aluminum-alloy ^a screw shell	Corrosion-resistant steel (stainless) screw shell
Mogul – 1-1/2			
Male	0.020 (0.51)	b	c
Female	0.020 (0.51)	b	c
Admedium – 1-1/8			
Female	0.012 (0.30)	b	c
Medium – 1			
Male	0.008 (0.20)	0.011 (0.28)	c
Female	0.012 (0.30)	0.015 (0.38)	c
Intermediate – 21/32			
Male	0.008 (0.20)	0.011 (0.28)	c
Female	0.010 (0.25)	0.013 (0.33)	c
Candelabra – 1/2			
Male	0.008 (0.20)	0.011 (0.28)	c
Female	0.010 (0.25)	0.013 (0.33)	c
Miniature – 3/8			
Male	0.008 (0.20)	0.011 (0.28)	c
Female	0.008 (0.20)	0.011 (0.28)	c

^a An aluminum alloy is acceptable for the screw shells of lampholders except the weatherproof type and those employed in wet locations, such as outdoor types of electric signs and certain outdoor types of electric fixtures. An aluminum alloy for use in a screw shell is required to 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).

^b Aluminum is acceptable only if, in addition to being compliance with note^a the material is shown by the results of an appropriate investigation to be acceptable for the particular application.

^c Corrosion-resistant steel (stainless is acceptable if the results of an appropriate investigation indicate that the material is intended for the particular application.

11.4.9 To determine if a screw shell complies with the requirement in 11.4.8, measurements of the thickness of metal are to be made on the flat surface of the bottom of the shell by means of pointed- or round-nose micrometer calipers.

11.5 Switching mechanism

11.5.1 A single-pole switching mechanism shall interrupt the electrical connection to the center contact of a lampholder.

Exception: In a candelabra-base lamp adapter with nonpolarized parallel blades, a single-pole switching mechanism may interrupt the electrical connection to either the screw shell or the center contact.

11.5.2 The switching mechanism of a lampholder shall be of the quick-break type. The switching mechanism of a lampholder rated at 660 W or more shall be of the quick-make and quick-break type.

11.5.3 With reference to the requirement in 11.5.2, a lampholder with a quick-break switching mechanism is acceptable if the rate of motion of the contactor, when the device is operated as in actual service, is not subject to control by the operator at the point of break.

11.6 Actuator

11.6.1 An actuator (the part that drives the switch mechanism into action) that is a live part shall not be provided with a live threaded stem. A probe, as illustrated in Figure 11.1, when applied to a completely assembled lampholder with the actuating member removed shall not contact the live parts of the actuator.

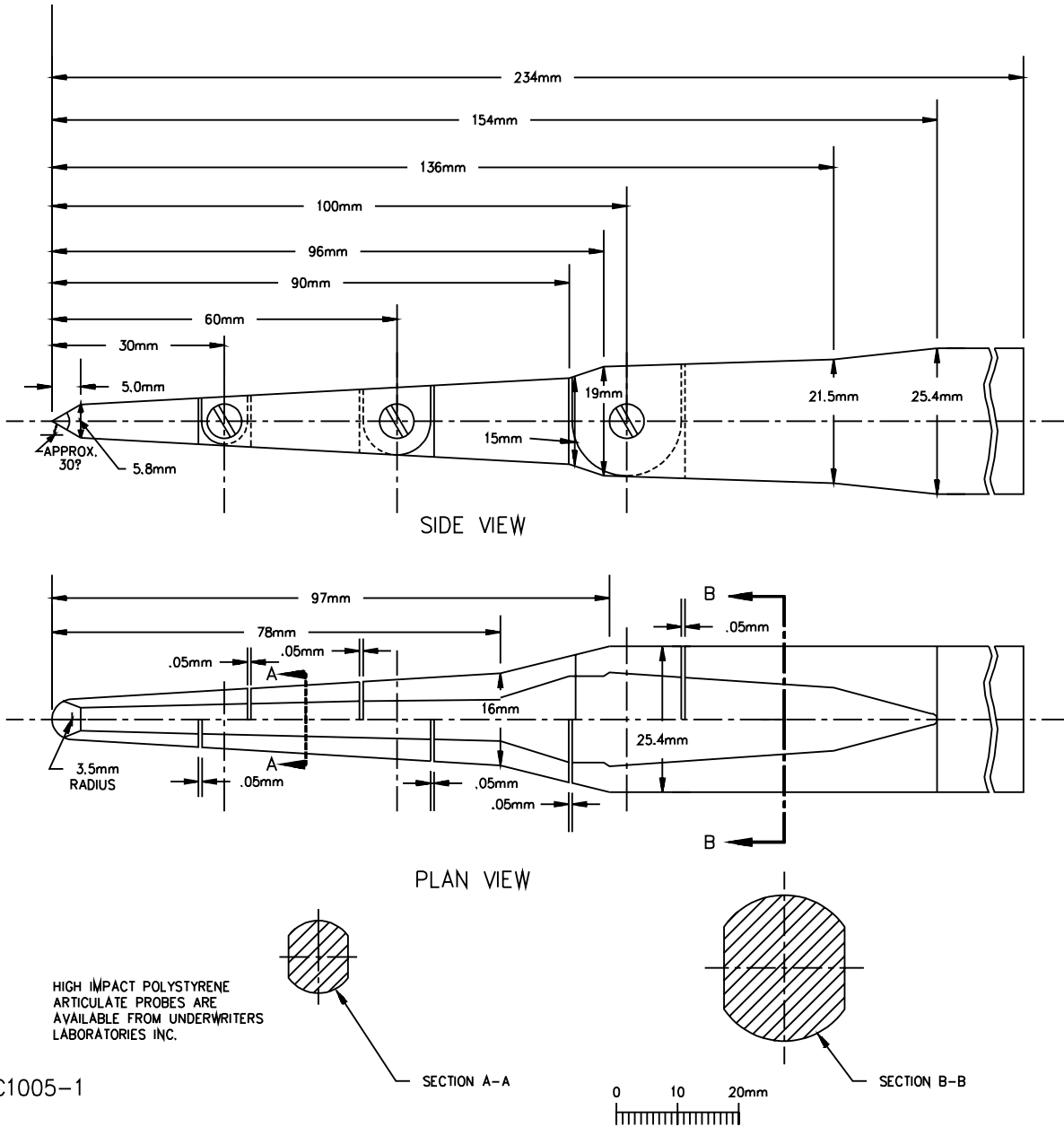
11.6.2 An actuating member (that part of the actuating mechanism that extends outside the lampholder body and is exposed to contact by the user) if of metal shall be insulated from live parts. An actuating member made of insulating material shall comply with the Effect of Heat Test on Actuating Members, Section 33.

11.7 Insulating links

11.7.1 An insulating link shall be designed for ready attachment to the conventional metal chain employed in pull-type lampholders.

Figure 11.1 Articulate probe

Figure 11.1 revised March 9, 1998



SC1005-1

11.7.2 An insulating link shall be so constructed that there is a distance over the surface of the insulating material of not less than 1/2 inch (12.7 mm).

11.7.3 An insulating link shall be marked with the manufacturer's name or trademark and, if practicable, with the catalog number or the equivalent.

11.7.4 A link made by the manufacturer of the lampholder and assembled in the pull-chain at the factory need not comply with the requirements in 11.7.1 – 11.7.3.

11.8 Lamp cavity

11.8.1 The depth of the lamp cavity of a lampholder shall be in accordance with Table 11.5.

Table 11.5
Depth of lamp cavity

Trade size of lampholder	Depth of lamp cavity, inches (mm)			
	Minimum		Maximum	
Mogul	1-5/8	(41.3)	1-11/16	(42.9)
Admedium	1-1/8	(28.6)	1-3/16	(30.2)
Medium	15/16	(23.8)	1	(25.4)
Intermediate	25/32	(19.8)	27/32	(21.4)
Candelabra	5/8	(15.9)	11/16	(17.5)
Miniature	15/32	(11.9)	17/32	(13.5)

11.8.2 If a lampholder interior is held in place between sections of a lampholder body or shell in which there can be vertical 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.

11.8.3 The depth of the lamp cavity is to be measured from the plane of the depressed center contacts to the plane of the rim of the insulating lining, or of the lampholder body if the body is of insulating material.

Exception: The maximum-depth requirement in Table 11.5 does 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.

11.8.4 If the method of mounting a lampholder affects the depth of the lamp cavity, the determination is to be made with the device mounted as intended. For instance, a medium-base 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 is to comply with the requirements in 11.8.1 while mounted in a metal sheet 1/32 inch (0.8 mm) thick.

11.9 Spacings

11.9.1 An incandescent-to-fluorescent lamp adapter fitting shall comply with:

- a) The requirements contained in 11.9.2 – 11.9.5, or
- b) The applicable requirements in the Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, UL 840.

11.9.2 There shall be a spacing through air or over surface of not less than 3/64 inch (1.2 mm) for a device rated at 250 V or less, and not less than 1/8 inch (3.2 mm) for a device rated at more than 250 V, between uninsulated live parts of opposite polarity and between an uninsulated live part and a dead metal part that is likely to be grounded or exposed to contact by persons when the device is installed in the intended manner.

Exception: For an incandescent-to-fluorescent lampholder fitting, there shall be a minimum spacing of 1/4 inch (6.4 mm) through air and 3/8 inch (9.5 mm) over surface between live parts of opposite polarity and between live parts and dead metal parts (excluding integral spacings of electrical components).

11.9.3 The minimum acceptable spacing between leads on a neon pilot lamp that is operated in series with a resistor may be based on the actual voltage between lamp leads.

11.9.4 The dead metal mentioned in 11.9.2 includes a metal surface (a metal face plate in the case of a flush-type lampholder) on which the device is mounted in the intended manner. A dead metal screw head, rivet, or the like is not to be considered exposed for persons to contact after the device is installed in the intended manner, if the dead metal is located in a 9/32-inch (7.1-mm) or smaller-diameter hole and is recessed not less than 3/16 inch (4.8 mm) in the clear.

11.9.5 In measuring a spacing, an isolated dead metal part interposed between live parts of opposite polarity or between a live part and a grounded or exposed dead metal part is to be considered as reducing the spacing by an amount equal to the dimension of the isolated dead metal part in the direction of the measurement.

12 Assembly

12.1 A lampholder shall be capable of being readily wired as intended.

12.2 The interior of a lampholder shall be secured so that it cannot be turned relative to the cap or base.

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

12.4 A multiple lampholder or a current tap having two or more screw-shell outlets shall be constructed with all screw shells having a common electrical connection.

12.5 The chain of a lampholder having a pull-type mechanism shall not become energized nor shall it cause the mechanism to jam when the chain is suddenly and completely released after having been pulled to the full on position and the full off position.

12.6 There shall not be exposed live parts on the underside of a supporting base less than 1/2 inch (12.7 mm) from a plane surface on which the device is intended to be mounted.

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

12.8 Uninsulated live parts, other than wiring terminals, on surfaces of insulating material with which wires or flexible cord may be in contact shall be recessed. A lampholder intended to be mounted in a fixture canopy shall have no exposed uninsulated live parts within the canopy.

12.9 A canopy lampholder that utilizes eyelets, rivets, or screws for securing the screw shell and center contact in place does not present uninsulated live parts within the canopy if it is recessed at least 3/16 inch (4.8 mm) in a hole not larger than 9/32 inch (7.1 mm) in diameter. The requirement in 12.8 necessitates recessing of the end of the helical spring that passes through the head of the adjusting screw in the conventional pull-type mechanism unless the screw is dead at all times.

12.10 Screws upon which the general assembly of a lampholder depends shall, where practicable, resist loosening or backing by sealing, staking, or equivalent means.

12.11 An insulating link should be provided in the chain of a lampholder having a pull-type mechanism if the enclosure of the device is other than metal and if the device is for use in a damp location such as a kitchen, bathroom, or basement. If an insulating link is provided, it is to be located as close as possible to the chain outlet without interfering with the operation of the mechanism.

13 Corrosion Protection

13.1 All iron and steel parts are to be protected against corrosion.

FEATURES APPLYING TO PARTICULAR TYPES OF LAMPHOLDERS

14 Adapters

14.1 The male screw shell of an adapter shall be the same size or larger than the female screw shell of the adapter.

14.1 revised April 11, 2000

14.1.1 An E26 (medium) screw base shall have at least 3.25 mm (0.13 inches) of distance between the bottom of the screw shell and the bottom of the eyelet contact. The minimum spacing over the surface of the insulating material or through air shall not be less than 3 mm (0.12 inches).

Exception: An adapter not intended for use in a portable lamp and marked in accordance with 43.24 is not required to comply with this requirement.

Added 14.1.1 effective April 11, 2002

14.2 The length of the male screw base of an adapter, measured vertically from the plane of the eyelet contact to the plane of the rim of the screw base, shall not be greater than the minimum cavity depth indicated in Table 11.5.

14.2 revised April 11, 2000

15 Fittings

15.1 An incandescent-to-fluorescent lampholder fitting shall have weight and size limitations as given in Table 15.1.

Table 15.1
Weight, size, and moment limitations

Intended for use	Maximum weight ^a		Maximum size, any dimension		Maximum moment ^{a,b}	
	Pounds	(kg)	Inches	(mm)	Inch-pounds	(N·m)
Only with ceiling fixtures	5 ^c	(2.27) ^c	16 ^d	(406) ^d	20 ^e	(2.26) ^e
With portable table lamps or portable long chain swag lamps	2.5 ^f	(1.13) ^f	8-1/2 ^{g,h}	(216) ^{g,h}	12 ^f	(1.36) ^f

^a For weight and moment measurements, fittings are to be provided with lamps.

^b The product of the weight of a fitting by distance between the center contact and the center of gravity of the fitting.

^c For units that have provisions for attachment of glassware where glassware is not provided the maximum weight is 5 lb (2.27 kg); for units provided with glassware or units that do not have provisions for attachment of glassware the maximum weight is 6 lb (2.72 kg).

^d Includes lamp in place.

^e For units that have provisions for attachment of glassware where the glassware is not provided, for calculation purposes, it is to be assumed that glassware weighing 1 lb (0.453 kg) will be used.

^f Includes weight of glassware and/or shade if provided with fitting.

^g Excludes lamp or lamp supports if instructions indicate that they should not be in place until after the fitting is installed and the maximum dimension of the completely assembled unit is less than 12-1/2 inches (317 mm).

^h Maximum dimension is 12-1/2 inches (317 mm) if the fitting is provided with a slip-ring male screw shell that prevents over-torquing by slipping at less than 10 in-lbf (1.13 N·m).

15.2 If a fitting is constructed so that alignment of the fitting with relation to the existing incandescent fixture or portable lamp is an important criteria and requires an adjustment greater than ± 20 degrees to properly clear harps in portable lamps, provision shall be made to facilitate adjustment in the alignment of the male screw base with relation to the remainder of the fitting. Examples of the consideration are:

- a) Rectangular-shaped fittings in which it is desirable to position the fitting to be parallel with existing walls when installed in ceiling-type fixture, and
- b) Fittings which may have to be rotated more than 20 degrees to properly clear harps in portable lamps.

15.3 An incandescent-to-fluorescent lampholder fitting marked for use with portable lamps shall not have any operating potential more than 150 V between any conductors of the power supply or to ground.

15.4 An incandescent-to-fluorescent lamp adapter fitting for use with long-chain portable lamps shall be provided with insulating material not less than 1/32 inch (0.8 mm) thick between the metal enclosure and:

- a) A ballast enclosure,
- b) Splices or fixture-type wire connectors, and
- c) Dead metal parts, including mounting screws, rivets, yoke, clamp, and the like of an electrical component such as a lampholder, a starter holder, and the like, unless the component is provided with a minimum spacing of 5/8 inch (15.9 mm) through air and over surface, between its live parts and the component dead metal parts.

Exception: A fitting that complies with 11.9.1(b) need not comply with the 5/8 inch minimum spacing requirement.

15.5 An incandescent-to-fluorescent lampholder fitting for use with portable table lamps or portable longchain (swag) lamps shall not have provision for direct support of a shade or glassware on the fitting itself unless the shade/or glassware is provided with the fitting.

15.6 An incandescent-to-fluorescent lampholder fitting shall be provided with means to retain the fluorescent lamp or lamps in place in the event the fitting is mounted so that gravity tends to dislodge the lamps.

Exception: A fitting marked in accordance with 43.12 need not comply with this requirement.

15.7 An incandescent-to-fluorescent lamp adapter fitting intended for use with portable table lamps, with or without an attachment intended to keep the outer shell from separating from the cap of the lampholder of the portable table lamp, shall be marked in accordance with 43.14.

Exception: If the fitting, including the lamp, weighs less than 8 ounces (226.8 g), it may instead be marked in accordance with the exception to 43.14.

15.8 If the attachment described in 15.7 complies with 32.1.1 – 32.1.4 the fitting may, instead of the marking contained in 43.14, be marked in accordance with 43.15.

Exception: If the fitting, including the lamp, weighs less than 8 ounces (226.8 g), it may instead be marked in accordance with the exception to 43.15.

16 Lamp Locks

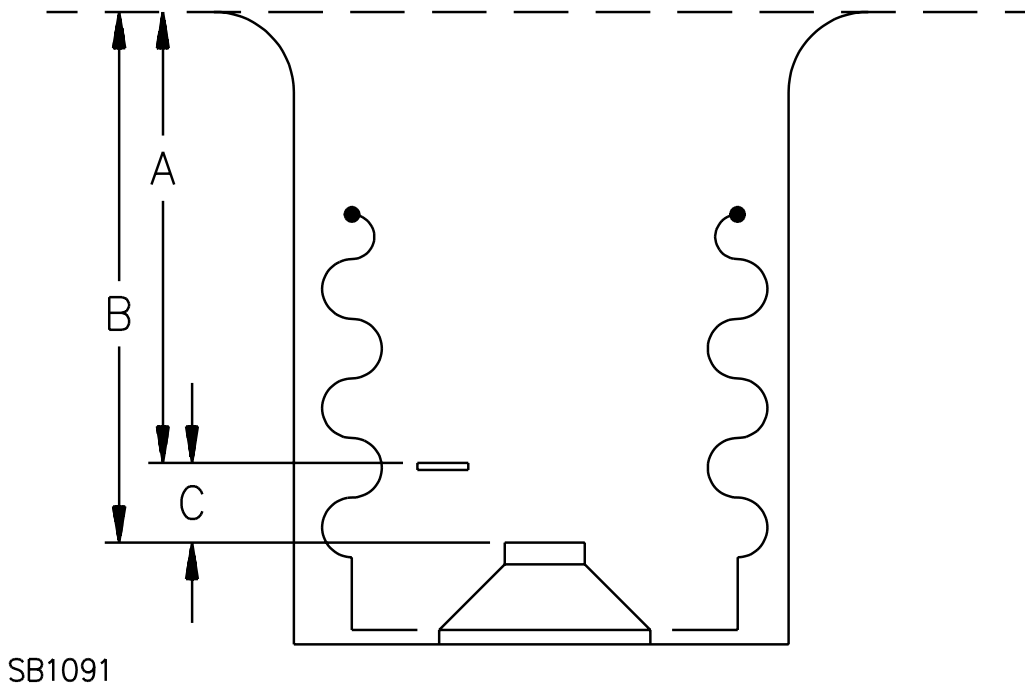
16.1 A lampholder provided with a lamp lock (a feature intended to keep lamp(s) from being removed except by a person having a key or special tool) shall be so constructed that operation of the lock as in actual service does not damage the enclosure, lining, or interior; does not result in the loosening of any of the parts of the complete assembly; and does not expose live parts for persons to contact unintentionally.

17 Lampholders for Double-Filament Lamps

17.1 A medium-base or mogul-base lampholder for use with double-filament lamps shall have a center contact and an intermediate contact to accommodate the corresponding lamp contacts, as show in Figure 17.1.

Figure 17.1
Lampholder with intermediate contact

Figure 17.1 revised March 9, 1998



17.2 In a mogul-base lampholder the distance (A) from the plane of the rim of the insulating body or lining to the intermediate contact (stationary, or while fully depressed if of the spring type) shall be $1-17/32$ inch (38.9 mm), with a plus tolerance of $1/16$ inch (1.6 mm); or the distance (B) from the plane of the rim of the body or lining to the center contact (stationary, or while fully depressed if of the spring type) shall be $1-21/32$ inches (42.1 mm), with a plus tolerance of $1/16$ inch (1.6 mm). In addition, when the position of either the center or intermediate contact has been determined in this manner, the other contact shall be capable of assuming positions $1/16 - 3/16$ inch (1.6 – 4.8 mm) (C) from the plane of the located contact in its stationary or fully depressed position.

17.3 In a medium-base lampholder, the distance (A) from the plane of the rim of the insulating body or lining to the intermediate contact (stationary, or while fully depressed if of the spring type) shall be $27/32$ inch (21.4 mm), with a plus tolerance of $1/16$ inch (1.6 mm); or the distance (B) from the plane of the rim of the body or lining to the center contact (stationary, or while fully depressed if of the spring type) shall be $29/32$ inch (23.0 mm), with a plus tolerance of $1/16$ inch (1.6 mm). In addition, when the position of either the center or intermediate contact has been determined in this manner, the other contact shall be capable of assuming positions $1/32 - 1/8$ inch (0.8 – 3.2 mm) (C) from the plane of the located contact in its stationary or fully depressed position.

17.4 The requirements in 17.1 – 17.3 provide for the proper location of a double-filament lamp in the lampholder, with no metal of the lamp base extending beyond the rim of the body or lining while the lamp is fully screwed in place. These requirements also indicate that either or both the center and intermediate contacts may be of the spring type, but only one contact may be solid.

17.5 There shall be a spacing of not less than 3/64 inch (1.2 mm) between the center contact and the intermediate contact with no lamp in the lampholder or with a double-filament lamp partly or fully screwed in place.

17.6 There shall be a distance of not less than 5/16 inch (7.9 mm) between the intermediate contact and the axis of a mogul-base lampholder, and not less than 3/16 inch (4.8 mm) between the intermediate contact and the axis of a medium-base lampholder.

18 Screw-Ring Lampholders

18.1 A lampholder of the threaded screw-ring type for use in electric signs and in fixture canopies shall be secured so that it cannot be turned relative to the mounting surface, and shall be provided with a gasket of material acceptable for the purpose. The gasket shall comply with the test requirement in 34.1.

18.2 Compliance of a lampholder with the requirement in 18.1 is usually accomplished by a lug or recess in the rim of the lampholder base. Ordinary rubber is not acceptable as a gasketing material.

19 Sign Lampholders

19.1 A lampholder designed for use in electric signs shall employ an enclosure of porcelain, phenolic or cold-molded composition and shall not be provided with a switching mechanism. Fiber or other absorptive insulating material shall not be employed in a sign lampholder designed for outdoor use. See also 11.3.10.

19.2 A porcelain lampholder installed in the intended manner and to be used in outdoor types of electric signs shall be glazed on all surfaces that are exposed to the weather on the outside of the sign other than the interior surface of the lamp cavity.

20 Weatherproof Lampholders

20.1 The enclosure of a weatherproof lampholder shall be of porcelain, cold-molded or phenolic composition, or other material acceptable for the purpose. See 38.1.1 – 38.1.5.

20.2 A weatherproof lampholder designed for attachment to rigid metal conduit shall be constructed so that water cannot readily enter the conduit either around the gasket or nipple or through the lamp cavity.

20.3 If wire leads are provided as a part of a weatherproof lampholder and are intended to be exposed after installation, they shall, except as provided in 20.4, be stranded Type TW wire or the equivalent, not smaller than No. 14 AWG for the mogul and medium-base sizes, not smaller than No. 18 AWG for the candelabra and miniature-base sizes, and shall be sealed in place or otherwise made raintight. The leads shall not be less than 6 inches (152 mm) in length, except that the attached leads of a pendant-type lampholder shall not be less than 4-1/2 inches (114 mm) in length (measured outside of the body), and shall emerge from the lampholder not less than 1/4 inch (6.4 mm) apart.

20.3 revised March 18, 1999

20.4 A weatherproof lampholder of the medium-base size provided with a threaded nipple smaller than the 1/2 inch size may be supplied with leads of No. 16 or No. 18 AWG (1.3 or 0.82 mm²) conductors having rubber or thermoplastic insulation not less than 1/32 inch (0.8 mm) in thickness, provided the leads enter the lampholder through the nipple. Such leads need not be sealed in place.

20.5 A weatherproof lampholder provided with pin-type terminals (see 11.3.16) shall be raintight.

20.6 To determine if a lampholder complies with the requirement in 20.5, the lampholder is to be supported in the intended manner and subjected for 1 hour to a water spray adjusted to be approximately equivalent to a beating rain, and applied to the lampholder from the top and sides. The entrance of water into the lampholder body, including the lamp cavity, is not acceptable.

20.7 Fiber and similar absorptive materials shall not be use in a weatherproof lampholder.

21 Molded-Rubber, Pendant Type

21.1 A molded-rubber, pendant, weatherproof lampholder shall be made in the keyless, medium-base size only and shall employ a rubber compound intended for continuous use at a temperature of 60°C (140°F). See 38.2.1 – 38.4.3.

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21.2 The thickness of a wall of rubber compound in a finished lampholder shall not be less than 3/16 inch (4.8 mm) except that a thickness of 1/8 inch (3.2 mm) is acceptable at points such as a shade-holder grooves.

21.3 The depth of the lamp cavity as measured vertically from the plane of the depressed center contact to the plane of the rim of the molded-rubber body shall not be less than 15/16 inch (23.8 mm) or more than 1 inch (25.4 mm), except that a lamp cavity having a depth greater than 1 inch may be acceptable if the lampholder properly accommodates a medium-base lamp.

21.4 A molded-rubber, weatherproof lampholder shall be provided with individual wire leads not less than 4-1/2 inches (114 mm) in length (measured outside of the body) that consist of stranded Type TW wire or the equivalent, not wire leads without braids and employing not less than 1/16 inch (1.6 mm) of 40-percent-rubber, sunlight-resistant insulation may be used if the compound is acceptable for the purpose.

21.5 The female screw shell shall be tinned or otherwise acceptably coated to resist corrosion. See 11.4.1.

22 Lampholders – High-Pressure Sodium Lamps

22.1 A lampholder intended to be used with high-pressure sodium lamps shall:

- a) Be a switchless mogul-base or medium-base screw-shell type,
- b) Employ an enclosure of porcelain, phenolic, cold-molded composition or other material found acceptable for the purpose,
- c) Be for indoor/outdoor use,
- d) Have a peak starting pulse rating of:
 - 1) 4 or 5 kv if of the mogul-base type, or
 - 2) 4 kv if of the medium-base type, and
- e) Be rated 1500 W, 600 V if of the mogul-base type, or 660 W, 600 V if of the medium-base type.

Exception: A lampholder may have a pulse rating greater than that specified in (d) above, provided:

- a) It employs an enclosure of an inorganic material (e.g. porcelain);*
- b) It is rated in integer multiples of 1 kv; and*
- c) It complies with the Dielectric Voltage-Withstand Test, Section 23.*

22.2 Fiber and similar absorptive insulating materials shall not be used in a lampholder for use with high-pressure sodium lamps.

22.3 Wire leads provided as an integral part of a lampholder for use with high-pressure sodium lamps shall be rated not less than 600 V.

23 Dielectric Voltage-Withstand Test

23.1 A lampholder for use with high-pressure sodium lamps shall be capable of withstanding for 1 minute without breakdown, a 60 Hz essentially sinusoidal potential following exposure to moist air for 48 hours. The moist air shall have a relative humidity of 88 ± 2 percent at a temperature of $32.0 \pm 2^\circ\text{C}$ ($89.6 \pm 3.6^\circ\text{F}$). The test potential shall be applied between parts of opposite polarity and between live parts and dead metal parts with a dummy ceramic lamp base (mogul or medium, whichever is applicable) inserted into the lampholder after conditioning. The test potential shall be 4000 V, rms, for lampholders with a starting pulse rating of 4 kv, and 7070 V, rms, for lampholders with a starting pulse rating of 5 kv. The dummy ceramic lamp base shall be dimensioned in accordance with the specifications for Electrical Lamp Bases, ANSI C81.61.

Exception: A lampholder that employs an enclosure of inorganic material (e.g. porcelain) shall be tested at an rms voltage that is the same numeric value as the pulse rating in volts peak.

23.2 A lampholder for use with high-pressure sodium employing integral leads shall have separate sample leads subjected to a dielectric voltage-withstand test. Six sample leads, each approximately 12 inches (305 mm) long, shall be wound four times around a 3/4-inch (19.0 mm) diameter steel mandrel. The samples shall then be exposed to moist air for 48 hours at a relative humidity of 88 ± 2 percent at a temperature of $32.0 \pm 2^\circ\text{C}$ ($89.6 \pm 3.6^\circ\text{F}$). Following the exposure the samples shall be capable of withstanding without breakdown a 60 Hz essentially sinusoidal potential for 1 minute between the conductor and the mandrel. The test potential shall be equal to the test potential which the lampholder is subject to in 23.1.

23.3 To determine whether or not a sample complies with the requirements in 23.1 and 23.2, each sample is to be tested by means of a 500-VA or larger-capacity testing transformer, the output voltage of which is essentially sinusoidal and can be varied. The applied potential is to be increased gradually from zero until the required test value is reached, and held at that value for 1 minute. The increase in the applied potential is to be at a uniform rate and as rapid as consistent with its value being correctly indicated by the voltmeter. The dielectric voltage-withstand is to be conducted in the humidity chamber or immediately upon removal from the test chamber.

24 Lampholders Employing Insulation Piercing Terminals

24.1 E26 (medium) base lampholders employing insulation piercing terminals shall be specified for use only with:

- a) Fixture wire and Type SPE or SPT flexible cords that comply with the Standard for Flexible Cord and Fixture Wire, UL 62;
- b) Insulated conductors that comply with the Standard for Rubber-Insulated Wires and Cables, UL 44; or
- c) Insulated conductors that comply with the Standard for Thermoplastic-Insulated Wires and Cables, UL 83.

Exception: A lampholder intended for temporary use need not comply with the requirements in this section.

24.1 revised August 5, 1998

24.2 Lampholders intended for use with Type SPE or SPT flexible cord shall be for factory assembly only and marked in accordance with 43.10.

24.3 Lampholders intended for use with Type SPE or SPT flexible cord shall be specified for use with a minimum 105°C (221°F) rated flexible cord.

24.4 Lampholders intended for use with Type SPE or SPT flexible cord shall comply with the Insulation Piercing Terminal Lampholder Tests, Section 40, and shall be evaluated for their 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.

25 Seasonal Lighting Lampholders

Section 25 deleted August 5, 1998

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PERFORMANCE

26 General

26.1 The performance of a lampholder shall be investigated by means of tests on each of six representative samples in commercial form, as described in Sections 27 – 38. The sequence of tests is not specified, except that tests that are made on the same set of samples shall be conducted in the order indicated.

27 Switching Mechanism Tests

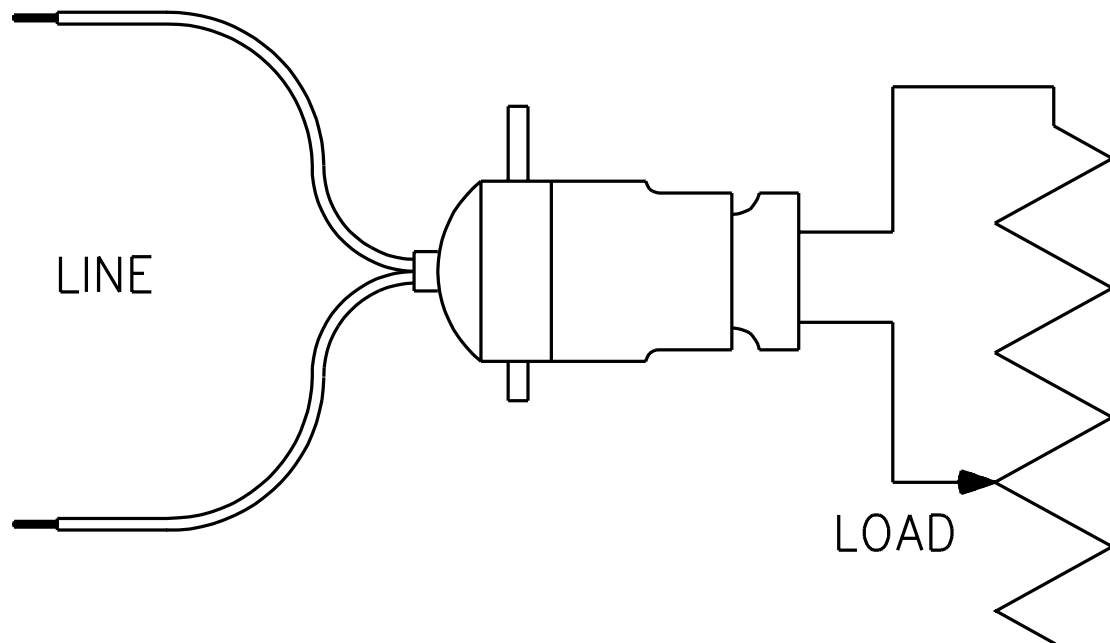
27.1 General

27.1.1 A lampholder provided with a switching mechanism shall be capable of performing acceptably when subjected to the overload test and then the endurance test in accordance with the requirements in 27.1.2 – 27.3.3. There shall be no electrical or mechanical failure of the mechanism nor shall there be undue pitting or burning of the contacts.

27.1.2 For the overload and endurance tests, line connections shall be made to the wiring terminals or leads as in actual service, and the load shall be connected by means of a plug or the equivalent to the screw shell and center contact of the lampholder. Proper connections are shown in Figure 27.1.

Figure 27.1
Electrical connections for lampholder testing

Figure 27.1 revised March 9, 1998



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27.1.3 The load connected to each lampholder may consist of carbon-filament lamps or resistors.

Exception: For endurance testing the switching mechanism of a medium-base lampholder for double-filament lamps and the switching mechanism of any mogul-base lampholder are to be tested with a tungsten-filament-lamp load as described in 27.3.2.

27.1.4 The overload test and the endurance test shall be conducted with the lampholders connected to an Edison three-wire, direct-current circuit with grounded neutral. Exposed dead metal parts, such as the cap, shell, metal pull-chain, or the like, shall be grounded. A single-pole mechanism shall be connected in the ungrounded conductor that is negative with respect to the neutral or grounded conductor of the circuit.

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27.1.5 A switching mechanism shall not be adjusted, lubricated, or otherwise conditioned either before or during the overload or endurance test.

27.1.6 The requirement in 27.1.5 does not apply to a manufacturer's regular practice of lubricating lampholders after they are completely assembled.

27.2 Overload

27.2.1 A lampholder provided with a switching mechanism shall be capable of performing acceptably when operated under the following conditions. The lampholder shall be so mounted and wired that actual service conditions are represented. It shall be operated manually by means of its actuating member. It shall be subjected to 50 cycles of operation making and breaking a circuit of current and voltage according to its wattage rating, as indicated in Table 27.1. It shall be operated at 6 – 10 cycles per minute. The voltage of the test circuit shall not be less than 95 percent or more than 105 percent of the voltage value indicated in Table 27.1.

Table 27.1
Overload test current and voltage

Trade size of lampholder	Rating in watts	Current and voltage of test circuit	
		Amperes	Volts
Mogul	1500	9.0	250
	750 ^a	4.5	250
Medium ^b	660	4.5	250
	250 ^a	1.5	250
Intermediate	75	0.9	125
Candelabra	75	0.9	125
Miniature	75	0.9	125

^a In testing lampholders for double-filament lamps, the division of the current (at 250 V) is to be as follows: for a 750-W mogul-base lampholder, 3 A to the center contact and 1-1/2 A to the intermediate contact; and for a 250-W medium-base lampholder, 1 A to the center contact and 1/2 A to the intermediate contact.

^b A lampholder of the dimmer or regulating type of any rating is to be tested at 150 percent of its rated wattage at rated voltage.

27.3 Endurance

27.3.1 A lampholder provided with a switching mechanism shall be capable of performing acceptably when operated under the following conditions. The lampholder shall be so mounted and wired that actual service conditions are represented. It shall be operated by means of its actuating member either manually or by means of a machine. It shall be subjected to 6000 cycles of operation making and breaking a circuit of current and voltage according to its wattage rating, as indicated in Table 27.2 at 6 – 10 cycles per minute. The voltage of the test circuit shall not be less than 95 percent or more than 105 percent of the voltage value indicated in Table 27.2.

Table 27.2
Endurance test current and voltage

Trade size of lampholder	Rating in watts	Current and voltage of test circuit	
		Amperes	Volts
Mogul	1500	12.0	125
Medium ^b	750 ^a	6.0	125
	660	3.0	250
	250 ^a	1.0	250
Intermediate	75	0.6	125
Candelabra	75	0.6	125
Miniature	75	0.6	125

^a In testing lampholders for double-filament lamps, the division of the current (at 125 V) is to be as follows: for a 750-W mogul-base lampholder, 4 A to the center contact and 2 A to the intermediate contact; and for a 250-W medium-base lampholder, 1 A to the center contact and 1 A to the intermediate contact.

^b A lampholder of the dimmer or regulating type of any rating is to be tested at its rated wattage at rated voltage.

27.3.2 The switching mechanism of a medium-base lampholder for double-filament lamps and the switching mechanism of any mogul-base lampholder is to be tested with a tungsten-filament lamp load or the equivalent, according to the method described in the Standard for General-Use Snap Switches, UL 20, except that, in the case of a lampholder for double-filament lamps, the load is necessarily to be divided into two sections – one representing each filament of the lamp. Following the usual cycle of high-medium-low-off, this means that the "low" load actually is to be turned on and off twice during each complete cycle.

27.3.3 The endurance test with tungsten-filament lamps, indicated in 27.3.2, is the only endurance test – that is, it is not in addition to the regular endurance test conducted with carbon-filament lamps.

28 Insulating Links Tests

28.1 Mechanical strength

28.1.1 An insulating link shall withstand for a period of 1 minute a direct pull of 40 lbf applied between the chain attachments at either end; except that, in the case of a factory-assembled link that is not detachable from the chain, the link shall not break before the chain breaks when the complete assembly is subjected to a direct pull of not more than 40 lbf (178 N) between the chains at either end.

28.1.2 Equipment for the mechanical-strength test is to consist of a pair of special connectors for attachment of the two ends of an insulating link. Each connector is to consist of a 0.156-inch (3.96-mm) diameter steel rod with one end formed into a hook (for convenience in attaching it to a testing machine) and the other end machined to provide a sphere 0.128 inch (3.25 mm) in diameter (approximately the same as the ball section of the conventional chain). The steel between the sphere and the rod proper is to have a rectangular, 0.03 by 0.065 inch (0.76 by 1.65 mm), cross section – the smaller dimension corresponding to the diameter of the dumbbell section of the chain. A connector is to be attached to each end of an insulating link, the assembly connected in a testing machine, and the load applied slowly and gradually until the force is 40 lbf (178 N). The load is then to be held constant for 1 minute or until failure occurs.

28.2 Dielectric voltage-withstand test

28.2.1 An insulating link shall withstand without breakdown for a period of 1 minute the application of a 60-Hz essentially sinusoidal potential of 1500 V between metal chains attached to both ends, after the link has been exposed to a saturated moist atmosphere for a period of 48 hours as described in 28.2.2.

28.2.2 Prior to testing, the insulating links are to be conditioned by exposure for 48 hours in a saturated moist atmosphere at a temperature of $32.0 \pm 2.0^{\circ}\text{C}$ ($89.6 \pm 3.6^{\circ}\text{F}$). The samples are to be suspended over water in a small, flat-bottomed vessel with a tight-fitting cover – the water to be about 1/2 inch (12.7 mm) deep and the samples to clear the water by 1 inch (25.4 mm) or more. The closed vessel containing the water and the suspended samples is to be placed in a controlled-temperature cabinet, with a free circulation of air around the vessel, and the temperature of the air within the cabinet is to be maintained at the value specified.

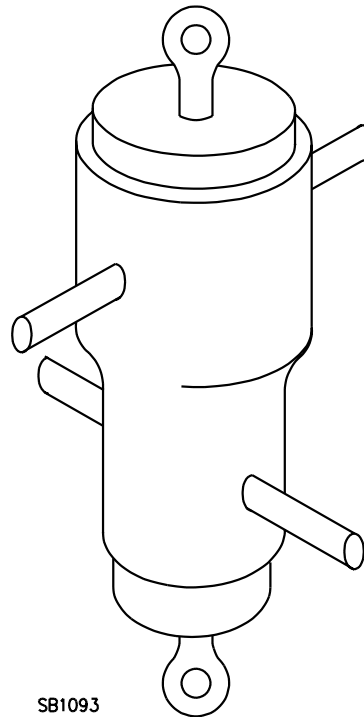
29 Lining Tests

29.1 Mechanical strength

29.1.1 A lampholder lining shall withstand for 1 minute, without tearing or breaking, a steady pull of 18 lbf (80 N) applied to rods passing through 1/4-inch (6.4-mm) diameter holes punched at diametrically opposite points on the lining and located as shown in Figure 29.1.

29.1.2 Each sample is to be prepared by punching four 1/4-inch (6.4-mm) holes as follows. Two holes are to be punched at diametrically opposite points so that there is 1/4 inch (6.4 mm) of lining between each hole and the upper edge. Similarly, two holes are to be punched 1/4 inch (6.4 mm) from the lower edge so that a line through their centers is at right angles to a line through the centers of the upper holes.

Figure 29.1
Test set-up for mechanical strength of lampholder lining



29.1.3 Metal plugs with supporting rings are to be provided – the plugs having different diameters, 1-1/4 and 1-1/16 inch (31.8 and 27.0 mm), to accommodate the large and small ends of a lining. A plug is to be placed in each end of each sample to be tested and a metal rod or mandrel approximately 0.23 inch (5.9 mm) in diameter and 3 inches (76 mm) in length is to be inserted in the holes in the lining and the hole in the plug. The sample is then ready to support a weight which would supply an 18 lbf (80 N). A sample with holes punched, plugs in place, mandrels inserted, and ready to support a weight is shown in Figure 29.1.

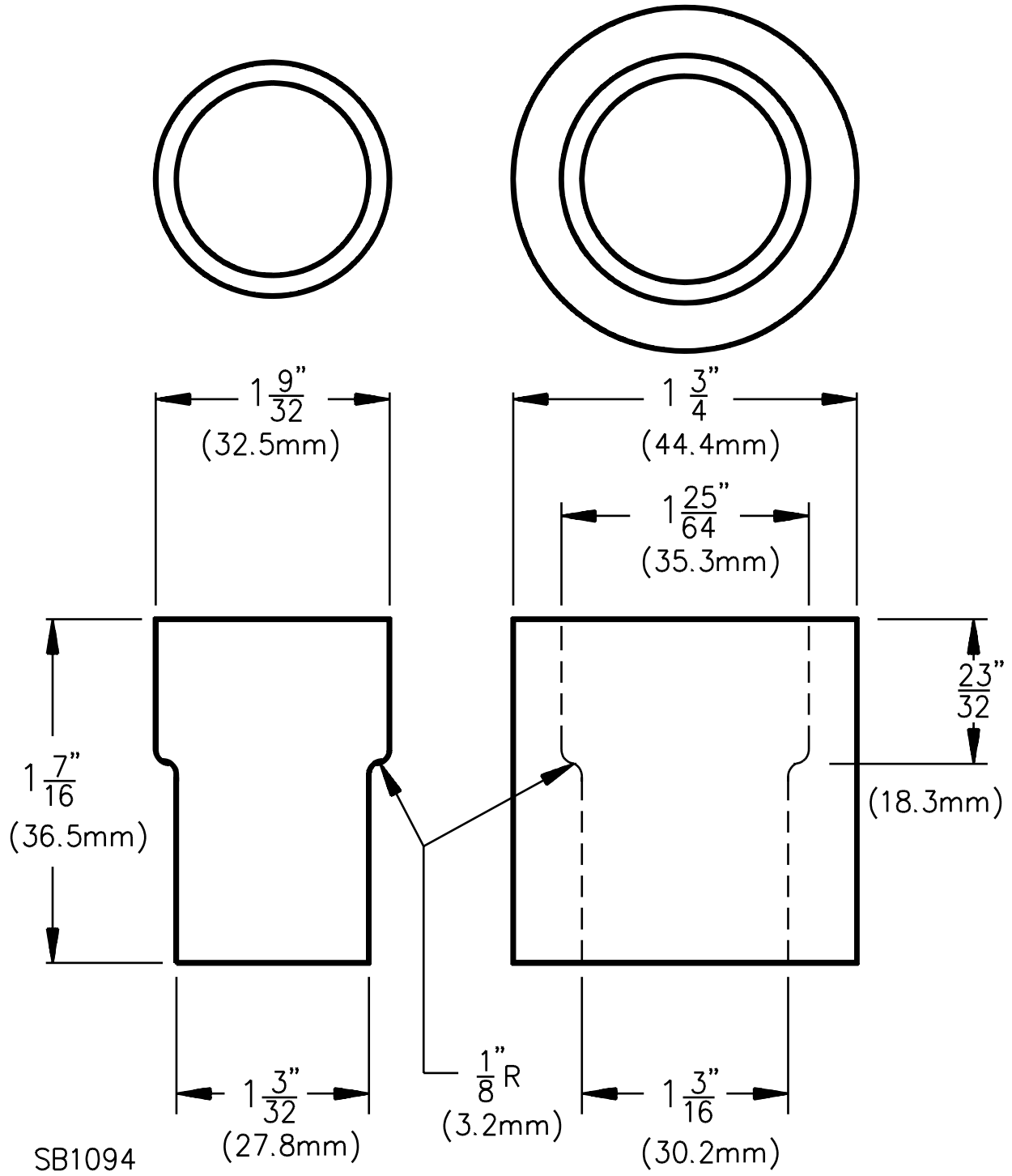
29.2 Dielectric voltage-withstand test

29.2.1 A lampholder lining shall withstand for 1 minute without breakdown the application of a 60-Hz essentially sinusoidal potential of 4000 V.

29.2.2 Samples of linings that have not been cut or slotted are to be tested with the apparatus and according to the method described in 29.2.3 – 29.2.5.

29.2.3 The apparatus is to consist of a desiccator containing dry calcium chloride, two brass electrodes of the form and dimensions shown in Figure 29.2, a voltmeter, and a testing transformer.

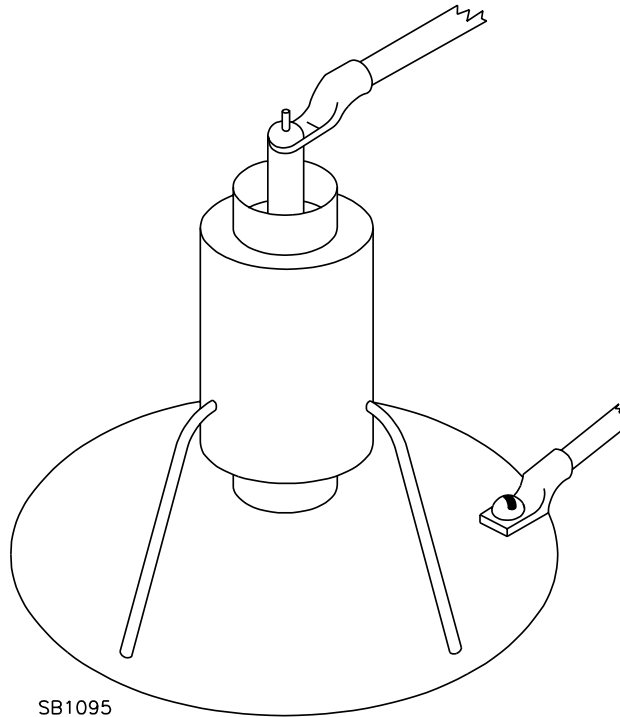
Figure 29.2
Brass electrodes for liner dielectric test
Dimensions in inches, (mm)
Figure 29.2 revised March 9, 1998



29.2.4 Each sample is to remain in the desiccator at room temperature for 24 hours, after which it is to be tested promptly.

29.2.5 The lining is to be placed in the outer, hollow electrode so that it extends approximately 1/4 inch (6.4 mm) beyond the metal at each end. The inner, solid electrode is then to be placed within the sample so that the lining extends beyond the metal approximately 1/4 inch (6.4 mm) at each end. Leads from the testing transformer are then to be connected to the electrodes and, starting at zero, the applied potential is to be increased at a rate that is uniform and is as rapid as can be correctly indicated by the voltmeter. The increase is to continue in this manner until the voltage is 4000 V. If the 4000-V level is reached without breakdown, the voltage is to be held constant at that voltage for 1 minute. The lining is not acceptable if breakdown occurs at less than 4000 V or in less than 60 seconds at 4000 V. A sample lining with electrodes in place and leads connected is shown in Figure 29.3.

Figure 29.3
Set-up for dielectric test of lampholder lining



29.3 Effect of heat

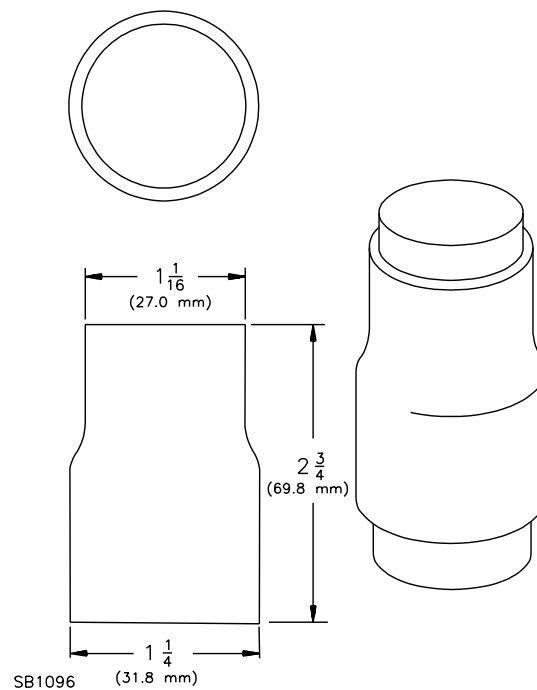
29.3.1 A lampholder lining shall not char, crack, crumble, or become brittle as the result of continuous subjection to the most severe temperature conditions of intended service.

29.3.2 Each sample to be tested is to be placed on a dummy interior made of porcelain, metal, or other material that is not affected by the oven temperature during the test. The dummy is to be formed to represent the size and shape of the interior of a lampholder, as shown in Figure 29.4. It is to be made somewhat longer than the lining so that it supports the sample completely during the test.

29.3.3 The sample is to be placed in an oven and maintained at a temperature of $150 \pm 5^\circ\text{C}$ ($302 \pm 9^\circ\text{F}$) for 72 hours. A sample is not acceptable if it fails to meet the requirement in 29.3.1 or cracks as the result of shrinkage on the dummy interior.

29.3.4 After removal from the oven, the lining is to be tested for mechanical strength in accordance with 29.1.1 – 29.1.3, except that the force applied is to be 14 lbf (62 N) instead of 18 lbf (80 N).

Figure 29.4
Dummy interior and set-up if heating test of lampholder lining
Dimensions in inches (mm)



30 Security Tests of Screw Shell

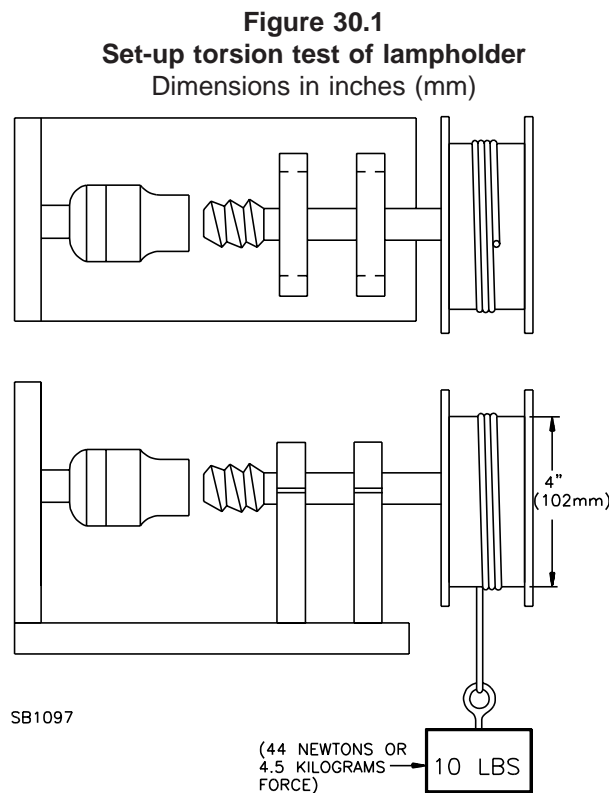
30.1 A medium-base screw shell shall be so secured in a lampholder that the shell does not turn, pull out, or become loose or distorted enough to adversely affect the assembly when the shell is subjected for 1 minute:

- a) To a straight pull of 20 lbf (89 N) and
- b) To a torque of 20 lb-in (2.26 N-m).

30.2 Samples are to be tested:

- a) By means of a weight which applies a 20 lbf (89 N), attached to a threaded plug that can be screwed into a female shell, or a threaded receptacle that can be screwed onto a male shell; and
- b) By means of a similar threaded plug or receptacle to which a torque of 20 lb-in (2.26 N-m) can be imparted while the plug or receptacle engages the screw shell and thrusts against the center contact of the lampholder.

Figure 30.1 shows a device for making the torsion test.



30.3 In conducting the torsion test specified in 30.1 and 30.2, the threaded plug or threaded receptacle is to be made to engage fully with the screw shell being tested and then, with the lampholder firmly held, the torque is to be applied very gradually so that there is no sudden jerk on the screw shell.

31 Security Test of Cap of Metal-Shell Lampholders

31.1 The cap of a metal-shell medium-base lampholder shall be so secured to the outer shell that the cap does not separate from the shell when subjected to a cantilever load for a period of 1 minute as described in 31.2. For lampholders with threading on the outside of the shell near the open end of the shell (UNO thread) the load shall be 30 lbf-in (3.39 N·m) and for lampholders without an external thread the load shall be 15 lbf-in (1.69 N·m).

31.2 The samples to be tested, complete with interior mechanism, are to be mounted on an appropriate nipple. A threaded plug with attached shaft is to be inserted into the lamp opening. A weight is to be suspended from the shaft so as to subject the lampholder to the appropriate cantilever load. The value of the cantilever load is to be such that the appropriate bending moment is applied at the point of attachment of the cap to the outer shell. During this test, the lampholder is to be rotated at an even rate through 360 degrees.

32 Impact Test for Attachments Provided with Incandescent-to-Fluorescent Lampholder Fittings

32.1 General

32.1.1 An attachment provided with an incandescent-to-fluorescent lampholder fitting for use with portable table lamps, that is intended to maintain the securement of the outer shell to the cap of the existing lampholder of a portable table lamp, shall be subjected to the following impact test. As a result of the impact there shall be no separation of the lampholder, fracturing of the attachment, or other deleterious effects.

32.1.2 Six different attachments shall be tested individually, three tested with the harp oriented parallel to the plane in which the unit is dropped, and three tested with the harp oriented perpendicular to this plane. The incandescent-to-fluorescent lampholder fitting is to be installed into the test jig described in 32.1.3 using the attachment and according to the manufacturer's instructions. The test jig is to be held at an angle of 80 degrees to the floor, and permitted to drop freely onto a hardwood surface.

32.1.3 The test jig mentioned in 32.1.2 is to consist of a lamp harp 9 inches (230 mm) high, 4-1/4 inches (108 mm) wide, secured to a standard 1/8-inch (3.2-mm) stem. A conventional push-type metal shell lampholder with two pairs of lances securing it to its cap, is to be mounted on the stem in the intended fashion. The distance from the bottom of the stem to the top of the lampholder is to be 36 inches (914 mm). A circular piece of 1/2-inch (13-mm) plywood, 15 inches (381 mm) in diameter, and weighing approximately 32 oz (907 g), is to be fastened to the top part of the harp, which is used to secure the shade. The shade support shall be rigidly attached to the harp so that the plywood cannot pivot about the axis of the harp.

32.1.4 The hardwood surface mentioned in 32.1.2 is to consist of a layer of nominal 1-inch (25-mm) tongue-and-groove oak flooring mounted on two layers of nominal 3/4-inch (19-mm) plywood. The oak flooring is to be nominally 3/4 inch thick (actual size 3/4 by 2-1/4 inches or 18 by 57 mm). The assembly is to rest on a concrete floor or an equivalent nonresilient surface during the test.

32.2 Abnormal operation test

32.2.1 An incandescent-to-fluorescent fitting is to be connected to a supply circuit of the rated voltage with the starter shorted and the unit placed in a porcelain-bodied lampholder that is mounted on a tissue-lined pineboard with the adapter in a base-down position. A double layer of cheesecloth is to be draped loosely over the complete test assembly. Any exposed dead metal part is to be connected to earth ground through a 3-A fuse.

32.2.2 The test is to be conducted for 7 hours or until ultimate results are achieved. The fitting is not acceptable if a risk of fire (see 32.2.3) and/or shock (see 32.2.4) develops. The test fitting shall then be subjected to the dielectric voltage-withstand test as described in 32.3.1.

32.2.3 A risk of fire is considered to exist if the test results in any of the following:

- a) The cheesecloth glows or flames.
- b) The tissue paper glows or flames.

32.2.4 A risk of electric shock is considered to exist if the test results in the 3-A fuse connected to earth ground opening or rupturing.

32.3 Dielectric voltage-withstand test

32.3.1 An incandescent-to fluorescent lampholder fitting shall withstand for 1 minute without breakdown the application of a 60-Hz essentially sinusoidal potential of 1000 V plus twice the rated voltage applied between any live parts and any accessible dead metal parts.

33 Effect of Heat Test on Actuating Members

33.1 An actuating member of insulating material shall not soften or become damaged when it is caused to operate the mechanism after having been exposed to a temperature of 90°C (194°F).

33.2 To determine if an actuating member complies with the requirement in 33.1, the lampholder assembly is to be subjected to a temperature of 90°C (194°F) until the insulating material under consideration is thoroughly heated (1 hour in a constant temperature oven usually is sufficient). The actuating member is then to be operated manually as in actual service at no load (as by turning the key or by pressing the buttons of a push-type mechanism) and should not be affected adversely to the extent that it is deformed so as to reduce the electrical spacings below those required by 11.9.2 or fails to operate the mechanism for 25 cycles of make and break at the rate of 6 – 10 cycles per minute. At the conclusion of this test the operating mechanism is to be capable of performing its intended function. In conducting this test, the actuating member should not be operated more violently than would be the case in the intended service, and care is to be taken to conduct the test immediately after each individual sample is removed from the oven.

34 Effect of Heat Test on Gaskets

34.1 A gasket shall withstand a temperature of 90°C (194°F) for 72 hours without being affected adversely.

35 Security Test of Lampholder Leads

35.1 The connection of each wire lead to a lampholder shall withstand a pull of 20 lbf (89 N) for 1 minute without being affected adversely.

36 Insulation Resistance Test

36.1 When tested as described in 36.2 – 36.5, the insulation resistance shall not be less than 100 megohms:

- a) Between a molded-in live part and any dead metal part or surface of insulating material that is exposed for persons to contact or that may be in contact with ground in service, and
- b) Between any internal surface that is contacted by a molded-in or other live part and any surface of insulating material that is exposed for persons to contact or that could be in contact with ground in service.

36.2 In determining compliance with the requirement in 36.1, the insulation resistance is to be measured by a magneto megohmmeter which has an open-circuit output of 500 V or by equivalent equipment.

36.3 The megohmmeter test between molded-in live parts and exposed metal parts that may be grounded requires no additional instruction. However, in measuring insulation resistance from or to an insulating-material surface, it is necessary to apply electrodes to the insulating material as described in 36.4.

36.4 To provide the electrode to contact an exterior surface, a quantity of No. 7 lead drop shot [approximate diameter 0.10 inch (2.5 mm)] is to be placed in a container that is open at the top and, after cord holes and other openings through which the shot could enter are carefully plugged with a high-resistance insulating material, the device is to be immersed in the shot so that the shot serves as an electrode in contact with the exterior surface to which the test is to be applied. A cavity that is a molded-in live part, or a cavity from which assembled-in live parts have been removed, is similarly to be filled with No. 7 drop shot to provide the other electrode.

36.5 All rubber parts are to be at least 48 hours at room temperature before being subjected to the above tests.

37 Temperature Test of Dimmer-Type Lampholders

37.1 A lampholder of the dimmer or regulating type shall not show a temperature rise of more than 75°C (135°F) when operated continuously with a lamp having the same rating as the lampholder and when the dimming mechanism is in any position between off and full on.

37.2 The temperature rise of 75°C (135°F) is based on a maximum acceptable temperature of 100°C (212°F) and an assumed ambient temperature of 25°C (77°F).

38 Weatherproof Lampholders Tests

38.1 Softening of molded composition

38.1.1 The enclosure of a weatherproof lampholder employing material that softens with the application of heat shall withstand a temperature of 60°C (140°F) under the conditions described in 38.1.2 – 38.1.5.

38.1.2 A specimen is to be obtained by cutting through the lampholder body in a plane parallel to and approximately 3/4 inch (19.0 mm) from the outer rim. After smoothing this cut surface with fine sandpaper, the specimen is to be placed in an oven that previously has been heated thoroughly to a temperature of 60°C (140°F). The specimen is to remain in the oven at that temperature for 3 hours.

38.1.3 The specimen is to be placed on a horizontal surface in the oven, with its cut surface up, and is to support the 3-lb (1.4 kg) weight described in 38.1.4 for the full 3 hours.

38.1.4 The weight is to consist of a lead-filled section of cylindrical copper tubing having a wall thickness of approximately 1/16 inch (1.6 mm). The cylinder is to be approximately 2-3/16 inches (55.6 mm) in diameter and 2 inches (50.8 mm) long. In the surface of the lead at one end of the cylinder, three 1/4-inch (6.4-mm) steel balls [protruding approximately 3/32 inch (2.4 mm)] are to be set equally spaced around a circle 1-1/4 inches (31.8 mm) in diameter and concentric with the axis of the cylinder.

38.1.5 During the 3-hour heating period, the weight is to rest on the specimen with the three steel balls pressing against the cut surface of the composition. Upon removal of the weight and specimen from the oven, there are to be no depressions in the composition that are caused by the steel balls and are visible to the naked eye.

38.2 Accelerated aging of molded rubber

38.2.1 Molded rubber employed in a pendant-type, weatherproof lampholder shall comply with the requirements in 38.3.1 – 38.4.3.

38.3 Oven aging test

38.3.1 The physical properties of a molded-rubber compound, unaged and after air oven aging, shall be as indicated in 38.3.2 and Table 38.1.

38.3.1 revised March 9, 1998

Table 38.1
Physical properties of natural or synthetic rubber compounds used in pendant-type weatherproof lampholders

Table 38.1 revised August 5, 1998

Condition of specimens at time of measurement	Maximum acceptable set in recovery test (1-inch or 25-mm bench marks stretched to 2-1/2 inches or 62.5 mm)	Maximum acceptable ultimate elongation (1-inch or 25-mm bench marks)	Minimum acceptable tensile strength
Unaged	1/4 inch (6.2 mm) (25 percent)	2-1/2 inch (62.5 mm) (250 percent)	850 lbf/in ² (5.9 MN/m) ²
Aged in an air oven for 70 hours at 100.0 ±2.0°C (212.0 ±3.6°F)	not measured	65 percent of the result with unaged specimens	75 percent of the result with unaged specimens

38.3.2 Test specimens are to be taken from lampholders, and are to be prepared and handled precisely in accordance with the methods described in the Standard for Electrical Wires, Cables, and Flexible Cords, UL 1581.

38.3.2 revised March 9, 1998

38.4 Air-oven test

38.4.1 A molded-rubber compound shall be acceptable for continuous use at a temperature of 60°C (140°F).

38.4.2 To determine if a compound is for continuous use at 60°C (140°F), an investigation is to be made of the physical properties of specimens taken from lampholders, two sets of which have been maintained at temperatures of 60°C (140°F) and 66.0°C (150.8°F) respectively, in ovens. Individual samples are to be investigated after periods of 10 days, 1 month, and 2 months in the oven continuously at the temperature specified.

38.4.3 With respect to tensile strength and elongation, after the 2-month period, a deterioration of more than 16 percent for samples aged at 60°C (140°F) and of more than 37 percent for samples aged at 66.0°C (150.8°F) is not acceptable. Consideration is also to be given to the rate of deterioration as indicated by deterioration curves: a rapid rate of deterioration during the last test period is undesirable.

39 Sealing Compound Test

39.1 A determination of the softening point of a sealing compound is to be made in accordance with the Test Method for Softening Point by Ring and Ball Apparatus, ASTM E28-1992.

40 Insulation Piercing Terminal Lampholder Tests

40.1 General

40.1.1 E26 (medium) base lampholders employing insulation piercing terminals specified for use with Type SPE or SPT flexible cord, as indicated in 24.4, are to be tested in accordance with 40.1.2 – 40.5.4.

40.1.2 All values for temperature are based on an ambient of 25°C (77°F). The temperature test may be conducted at any ambient temperature within the range of 10 – 40°C (50 – 104°F).

40.1.3 Temperatures are to be measured by thermocouples consisting of wire not larger than No. 24 AWG (0.21 mm²) and not smaller than No. 30 AWG (0.05 mm²). The thermocouples and the related instrument are to be accurate and calibrated in accordance with standard laboratory practice. The thermocouple wires are to conform with the requirements for special thermocouples as listed in the table of limits of error in the Standard for Temperature-Measurement Thermocouples, ANSI MC96.1-1982. Thermocouples using iron and constantan No. 30 AWG (0.05 mm²) wire are to be used with a potentiometer-type instrument whenever a referee temperature measurement by thermocouple is necessary.

40.1.4 Thermocouples are to be placed on the wire insulation as close to the terminal connections as possible. They are to be placed in the same location on each lampholder tested.

40.1.5 For each of the tests in this section, the lampholders are to be in the position and under the conditions most likely to cause maximum temperatures to be reached. Unless otherwise stated, the tests in this section are to be performed with an incandescent lamp of the rated wattage, installed as intended. The lampholder is to be connected to a supply circuit of 60 Hz and operated at the rated wattage of the lampholder.

40.2 Temperature test – thermal cycling

40.2.1 Six previously untested lampholders are to be assembled to conductors of the size and type for which they are intended. The lampholders are to be connected to the rated load and the temperature of the insulation piercing terminal connections is to be monitored continuously with thermocouples. The devices are to be operated for a period of seven hours and the temperature of the insulation piercing terminal connections recorded.

40.2.2 The same six lampholders are to be cycled for a total of 180 cycles at a rate of 3-1/2 hours on and 1/2 hour off. The temperatures of the insulation piercing terminal connections are to be monitored continuously throughout the 180 cycle period. After the last cycle, the lampholders are to be energized for a period of seven hours, after which temperatures are again to be measured. The off cycle time may be extended for the convenience of measurement.

40.2.3 Throughout the test described in 40.2.2, the maximum temperature of the insulation piercing terminal connections on each lampholder shall not be more than 30°C (54°F) higher than the temperatures measured on the same lampholder in 40.2.1. In no case shall the temperature of the insulation piercing terminal connections exceed 90°C (194°F).

40.3 Strain relief/terminal temperature

40.3.1 Six previously untested lampholders are to be assembled to conductors of the size and type for which they are intended. The lampholders are to be connected to the rated load and the temperature of the insulation piercing terminal connections monitored continuously with thermocouples. The lampholders are to be operated for a period of seven hours and the temperature of the insulation piercing terminal connections recorded.

40.3.2 The same lampholders are to be placed in an air-circulating oven for 15 days. The oven is to be at a temperature of 90°C (194°F).

40.3.3 The same lampholders are to be allowed to cool to room temperature. Each lampholder is to be mounted as intended and the supply cord subjected to a pull of 35 lbs (156 N). The pull is to be gradually applied in any direction consistent with normal use and maintained for a period of one minute.

Exception: A lampholder marked in accordance with 43.10 to indicate that supplemental strain relief is required is to be subjected to a pull of 20 lbs (89 N).

40.3.4 The same lampholders are then to be connected to the rated load and the temperature of the insulation piercing terminal connections monitored continuously with thermocouples. The lampholders are to be energized for a period of 30 days.

40.3.5 Throughout the testing in 40.3.4, the temperature of the insulation piercing terminal connections on each lampholder shall not be more than 30°C (54°F) higher than the temperature measured in 40.3.1. In no case shall the temperature of the insulation piercing terminal connections exceed 90°C (194°F).

40.4 Switching mechanism/insulation piercing terminal temperature test

40.4.1 Lampholders employing insulation piercing terminals that also employ a switching mechanism are to be subjected to the conditioning and test described in 40.4.2.

40.4.2 Six previously untested lampholders are to be assembled to conductors of the size and type for which they are intended and sequentially subjected to the following:

- a) Overload Conditioning – in accordance with the Switching Mechanism Tests, Section 27.
- b) Stress Relief Oven Conditioning – The devices are to be aged in an air circulating oven for 15 days at a temperature of 90°C (194°F).
- c) Endurance Conditioning – in accordance with the Switching Mechanism Tests, Section 27.
- d) Temperature Test – The temperatures of the insulation piercing terminal connections are to be monitored continuously by means of thermocouples. The lampholders are to be connected to the rated load and energized for a period of seven hours. During this test, the temperature of the insulation piercing terminal connections shall not exceed 90°C (194°F).

40.5 Rewiring/terminal temperature test

40.5.1 Six previously untested lampholders are to be assembled to conductors of the size and type for which they are intended. The lampholders are to be connected to the rated load and the temperature of the terminal connections are to be monitored continuously. The lampholders shall be operated for a period of seven hours and the temperature of the terminal connections recorded.

Exception: If disassembly of the lampholder would cause damage such that rewiring is not possible, then the test in 40.5.1 – 40.5.4 need not be performed.

40.5.2 The conductors are then to be removed from the lampholders and the same lampholders are to be assembled to new conductors. After waiting a minimum of five minutes, the conductors are to be replaced with new conductors and the process repeated until a total of ten conductors have been installed on each lampholder. The tenth set of conductors is to remain installed on the lampholders.

40.5.3 The lampholders are then to be connected to the rated load and the temperature of the insulation piercing terminal connections is to be monitored continuously with thermocouples. The lampholders are to be energized for a period of 30 days.

40.5.4 The maximum temperature of the insulation piercing terminal connections on each lampholder as measured in 40.5.3 shall not be more than 30°C (54°F) higher than the temperatures measured in 40.5.1. In no case shall the temperature of the insulation piercing terminal connections exceed 90°C (194°F).

41 Seasonal Lighting Lampholder Tests

Section 41 deleted August 5, 1998

RATINGS

42 General

42.1 The ratings of a lampholder shall be in accordance with Table 42.1.

Exception No. 1: A combination device employing a medium-base screw shell (male or female) and parallel or tandem blades or slots shall be rated in accordance with Table 42.2.

Exception No. 2: A lampholder of the dimmer or regulating type shall be rated in watts and volts in accordance with test performance. See also 42.3.

Exception No. 3: A lampholder adapter, consisting of parallel attachment plug blades assembled to a candelabra base lampholder may be marked with a wattage rating less than 75 W in conjunction with the 125 V rating. If the adapter employs a switching mechanism, the test circuit values for the overload and endurance tests shall be as indicated for candelabra base lampholders in Tables 27.1 and 27.2 respectively.

Table 42.1
Lampholder ratings

Trade size of lampholders and nominal diameter in inches (mm)			Rating of lampholder with a switching mechanism		Ratings of switchless lampholders	
			Watts	Volts	Watts	Volts
Mogul	1-1/2	(38.1)	1500	250	1500	600 ^a
			750	250	1500	250
Admedium	1-1/8	(28.6)	–	–	660	250
			–	–	660	600
Medium	1	(25.4)	660	250	660	600 ^b
			250	250	660	250
Intermediate	21/32	(16.7)	75	125	75	250
Candelabra	1/2	(12.7)	75	125	75	125
Miniature	3/8	(9.5)	75	125	75	125

^a Lampholders intended for use with high-pressure sodium lamps also have a 4 or 5 kv starting pulse rating.
^b Lampholders intended for use with high-pressure sodium lamps also have a 4 kv starting pulse rating.

Table 42.2
Ratings of combination devices

Means of connection to load	Ratings of device in which the line connections consist of:			
	Wiring terminals or leads	A male screw shell	Parallel blades	Tandem blades
Parallel slots	–	660 W, 125 V	–	–
Tandem slots	–	660 W, 250 V	–	–
Female screw shell ^a	–	–	660 W, 125 V	660 W, 250 V
Parallel slots and female screw shell ^a	Slots ^b : 15A, 125 V	660 W, 125 V	Slots: 15 A, 125 V	
Tandem slots and female screw shell ^a	Shell ^c : 660 W, 125 V Slots ^b : 15 A, 250 V	660 W, 250 V	Shell: 660 W, 125 V	Slots: 15 A, 250 V
	Shell ^c : 660 W, 250 V		–	Shell: 660 W, 250 V

^a If the lampholder portion of a device involves a switching mechanism, its rating may be 660 or 250 W depending upon the mechanism. In either case, the overload and endurance tests on the mechanism are to be conducted at 250 V.
^b If common wiring terminals or leads are provided, the rating of the receptacle outlet portion may be 660 W.
^c If separate wiring terminals or leads are provided, the lampholder portion of the device may be rated at 250 V.

42.2 A lampholder with a switching mechanism may be rated at 660 W or more only if the mechanism is of the quick-make-and-break type.

42.3 A medium-base lampholder of the dimmer or regulating type shall be rated at not less than 150 W and not less than 120 V ac or 125 V dc.

MARKINGS

43 General

43.1 A lampholder shall be marked with the manufacturer's name or trademark, or any other distinctive marking by means of which the organization responsible for the product can readily be identified; and with the electrical ratings.

43.2 The electrical rating and other marking of the lampholder shall not appear on the extension plaster ears whether separate pieces or integral with the mounting means, unless the marking and rating also appear elsewhere on the device.

43.3 If the catalog number is not marked on the lampholder, it shall appear on the carton or other container in which the device is packaged.

43.4 The manufacturer's name, trademark, or other distinctive marking and, if practicable the rating of a lampholder shall be visible after installation.

Exception No. 1: The marking of a lampholder that has an integral flush plate or outlet-box cover of insulating material may be on the inside of the plate or cover.

Exception No. 2: The marking on a surface-type lampholder may be on the inside of the insulating cover or on the side of the base that is exposed when the cover is removed.

43.5 The rating on a glazed porcelain lampholder may be so located that it can be made visible after installation by removing the body or shell without disconnecting any wires; if practicable the marking shall be visible after installation without disassembling any parts of the device. The marking on a lampholder for use in a fixture canopy may be so located that it will be readily visible upon removing the canopy.

43.6 If a manufacturer produces or assembles devices at more than one factory, each finished device shall have a distinctive marking – which may be in code – by means of which it can be identified as the product of a particular factory.

43.7 A lampholder intended for use with high- pressure sodium lamps that meets the requirements in Lampholders – High-Pressure Sodium Lamps, Section 22, and the Dielectric Voltage-Withstand Test, Section 23, shall be marked with the statement "Starting Pulse Rating 5 KV" or "Starting Pulse Rating 4 KV" or equivalent, whichever is applicable.

43.8 A metal-shell lampholder with an insulating liner shall be provided with wiring and assembly instructions. These instructions shall include the appropriate conductor sizes, proper preparation of leads (including strip gauge), method of securing conductors to terminals, assembly of outer shell to cap, and other information necessary to make a proper assembly. The instructions shall be provided in one of the following locations:

- a) On an individual package or blister-package device.
- b) On a sheet, the number which is equal to the number of devices in the carton, for over-the-counter sales.

Exception: This marking is not required for devices bulk-packed for factory assembly.

43.9 Lampholders provided with solder terminals shall be bulk-packed for factory assembly. Each carton shall contain the following information:

- a) "For factory assembly into portable lamps or appliances only."
- b) The appropriate conductor sizes.
- c) The proper strip length of conductors.

43.10 Lampholders employing insulation piercing terminals intended for use with Type SPE or SPT flexible cord shall have the smallest unit shipping container or a stuffer sheet provided with the container marked with the following information.

- a) "For factory assembly into portable lamps and fixtures."
- b) The appropriate conductor size and flexible cord-type, and that a minimum 105°C (221°F) flexible cord is required.
- c) Whether supplemental strain relief is required, in accordance with the exception to 40.3.3.
- d) All necessary instructions for assembly.

43.11 An incandescent-to-fluorescent lampholder fitting shall be marked with one of the following, in accordance with its intended use:

- a) "For use only with ceiling fixtures,"
- b) "For use with ceiling fixtures or portable table lamps," or
- c) "For use with ceiling fixtures, long-chain (swag) lamps, or portable table lamps",

on one or more of the following locations: on the fitting, on an individual package or blister package, on a sheet packed with the fitting, or on a sheet, the number of which is equal to the number of fittings in the carton, for over-the-counter sales.

43.12 An incandescent-to-fluorescent lampholder fitting not provided with lamp-retaining means as described in 15.6 shall be marked on the individual package and on the fitting to indicate an intended mounting position such that the lamps will be retained in place by gravity.

43.13 An incandescent-to-fluorescent lampholder fitting shall be marked on the individual unit package, and on the fitting, "CAUTION – To prevent risk of fire, do not use fitting on dimming circuits."

Exception: This marking is not required if it is determined that use on dimming circuits will not result in a increased risk of fire, electric shock, or personal injury.

43.14 An incandescent-to-fluorescent lampholder fitting intended for use with portable table lamps, with or without an attachment described in 15.7, shall be marked on the fitting and on the instructions provided on the individual unit package or on a stuffer sheet as follows: "CAUTION – Added weight of fitting may cause instability of free-standing portable lamp. Use only with portable table lamps in which the distance from the bottom of the base to the top of the lampholder does not exceed three (3) times minimum base width. Use only with portable table lamps which are provided with lamp shades."

Exception: If the fitting, including the lamp, weighs less than 8 ounces (226.8 g), the fitting need not contain the above marking provided it is marked "See Instructions for Proper Use".

43.15 An incandescent-to-fluorescent lampholder fitting intended for use with portable table lamps that is provided with an attachment that complies with 32.1.1 – 32.1.4, may instead of the marking contained in 43.14, be marked on the fitting and on the instructions provided on the individual unit package or on a stuffer sheet as follows: "Caution – Added weight of fitting may cause instability of free-standing portable lamps. Use only with portable table lamps provided with lamp shades. Be sure to install attachment provided with fitting to existing lampholder in accordance with instructions."

Exception: If the fitting, including the lamp, weighs less than 8 ounces (226.8 g), the fitting need not contain the above marking provided it is marked "See Instructions for Proper Use".

43.16 An incandescent-to-fluorescent lampholder fitting shall be provided with instructions detailing recommended methods of installation.

43.17 A medium-base lampholder rated 660 W or less that is not marked "CO/ALR" and that has provisions for mounting to a standard outlet box shall be marked as indicated in 43.18. This requirement applies only to devices intended for installation in a 15- or 20-A branch circuit and that employs one or more of the following means for wire securement:

- a) Wire-binding screws,
- b) Back-wired pressure plates, or
- c) Push-in terminals.

43.18 The devices mentioned in 43.17 shall be marked with one of the following, or its equivalent:

- a) "Notice – Use only copper or copper-clad wire with this device,"
- b) "Notice – Connect only copper or copper-clad wire to this device," or
- c) "Notice – Use only devices marked CO/ALR with aluminum wire."

Exception: If the device itself carries the marking, one of the abbreviated markings in 43.20 may be used.

43.19 The marking in 43.18 shall be located as follows:

a) For individually packaged devices, the marking shall appear on one of the following:

- 1) The device,
- 2) A stuffer sheet, or
- 3) The device carton.

b) For bulk-shipped devices, the marking shall be on the device. For the purpose of this requirement, bulk-shipped is defined as any carton having more than one device except for individual packages containing two (2) devices intended for sale directly to the user.

43.20 If the marking required in 43.17 appears on the device, one of the abbreviated markings shown below may be used to indicate that the lampholder is for use with either copper or copper-clad wire. The marking shall be legible with letters at least 1/16 inch (1.6 mm) high.

- a) "Use copper wire only,"
- b) "Cu wire only,"
- c) "Use copper or copper-clad wire only," or
- d) "Cu and Cu-clad wire only."

43.21 Mogul-base lampholders rated 1500 W and employing leads having an ampacity of 8 A shall be marked "Not For Use With Incandescent Lamps" or an equivalent wording.

43.22 Deleted August 5, 1998

43.23 A lampholder intended for temporary use shall be marked as follows: "Temporary use only."

Added 43.23 effective March 18, 2001

43.24 An adapter not intended for use in a portable lamp and which does not comply with the dimensional requirements in 14.1.1 shall be marked: "CAUTION - Risk of electric shock or fire. Do not install in a three-way lampholder."

Added 43.24 effective April 11, 2002

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SUPPLEMENT SA - EDISON-BASE LAMPHOLDERS FOR NAVAL USE

INTRODUCTION

SA1 Scope

SA1.1 These requirements cover edison-base and double-contact bayonet lampholders for use with lamps of various types on military Naval ships. An edison-base lampholder shall comply with all the applicable requirements of the preceding sections of this Standard, except as modified or added to the requirements specified in this supplement.

SA1.2 The requirements in this supplement do not cover lampholders with switches or lampholders for use with high-pressure sodium lamps.

SA2 Glossary

SA2.1 For the purpose of this supplement, the following definitions apply.

SA2.2 NORMAL HAND TOOLS – Any standard American or metric wrench or screwdriver (straight or cross-point).

SA2.3 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.

CONSTRUCTION

SA3 General

SA3.1 A lampholder for use on Naval ships shall be constructed in accordance with Figures SA3.1 – SA3.10 as applicable, or the equivalent.

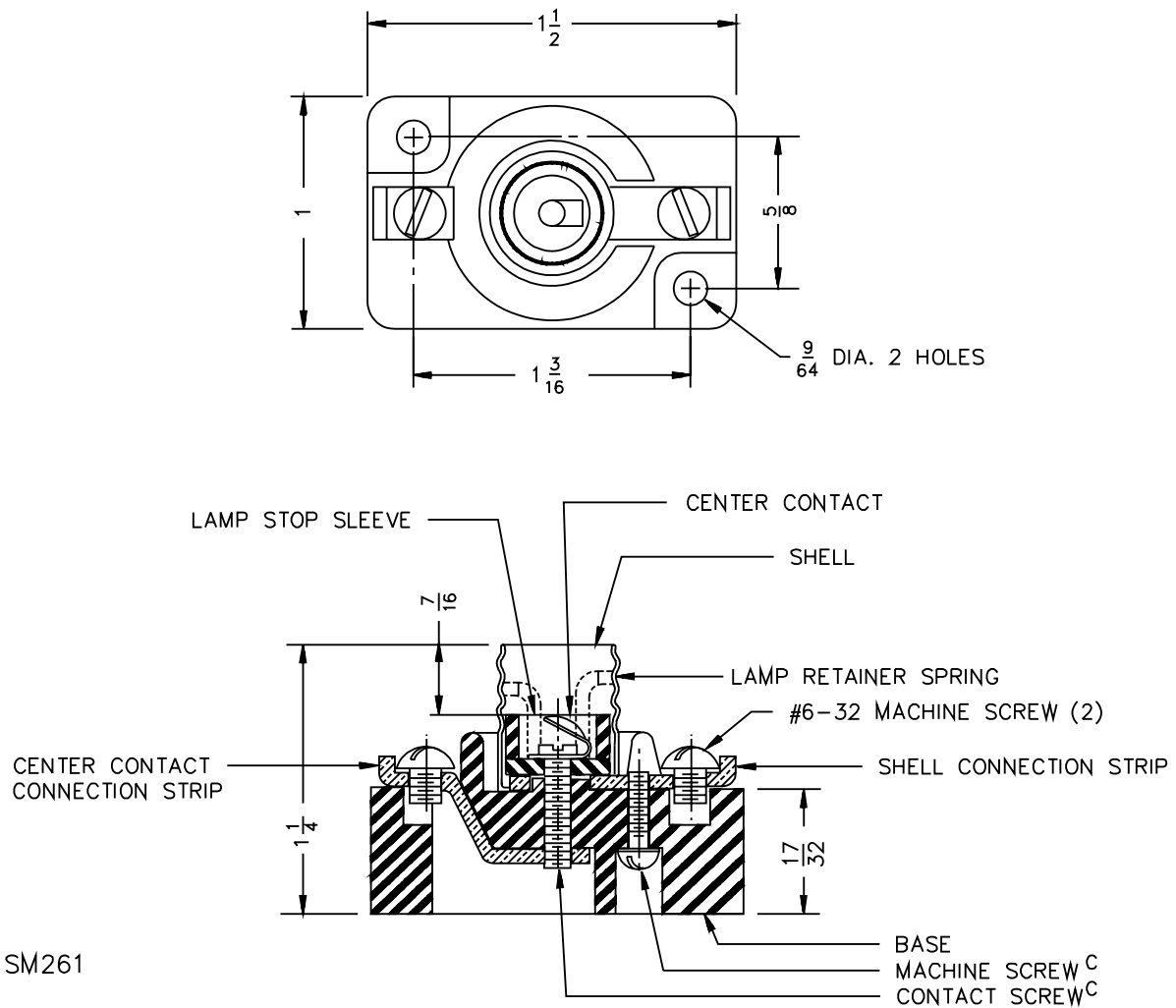
SA3.2 Self tapping screws and sheet metal screws shall not be used.

SA3.3 Molded-in metallic inserts, or the like, shall be provided for screw threads in polymeric material.

SA3.4 Provision shall be made for using normal hand tools for the connection of supply wires, and mounting the base. See SA2.2.

SA3.5 A screw, or the like, used to secure a contact strip shall be upset after assembly to reduce the likelihood of loosening.

Figure SA3.1
Base-mounted candelabra^{a,b,d,e,f}



^a All dimensions are in inches. Unless otherwise specified, tolerances for fractions are $\pm 1/64$ inch.

^b Alternative constructions may be investigated.

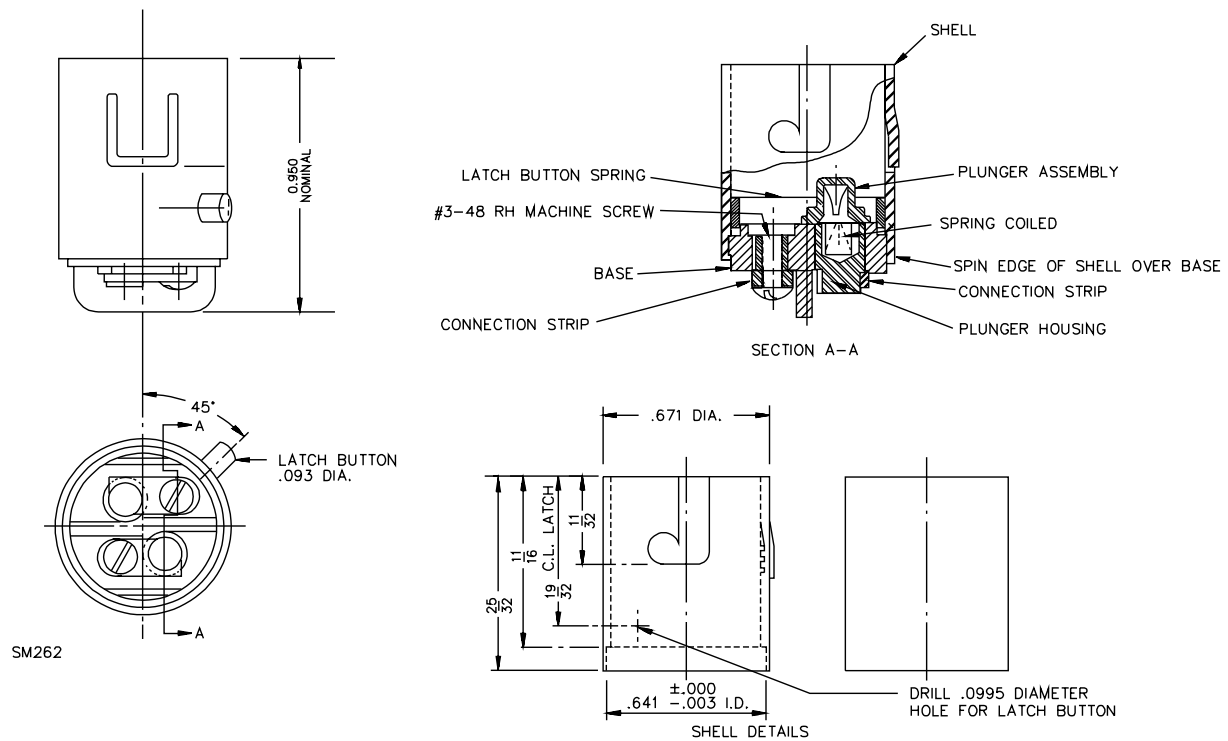
^c Upset after assembly.

^d 1 inch = 25.4 mm.

^e Requirements formerly covered under Military Standard MS16748, Drawing 9-S-2036-L, and MIL-L-970/1.

^f Screwshells shall be constructed in accordance with ANSI C81.62.

Figure SA3.2
Double-contact bayonet candelabra^{a,b,c,d,e}



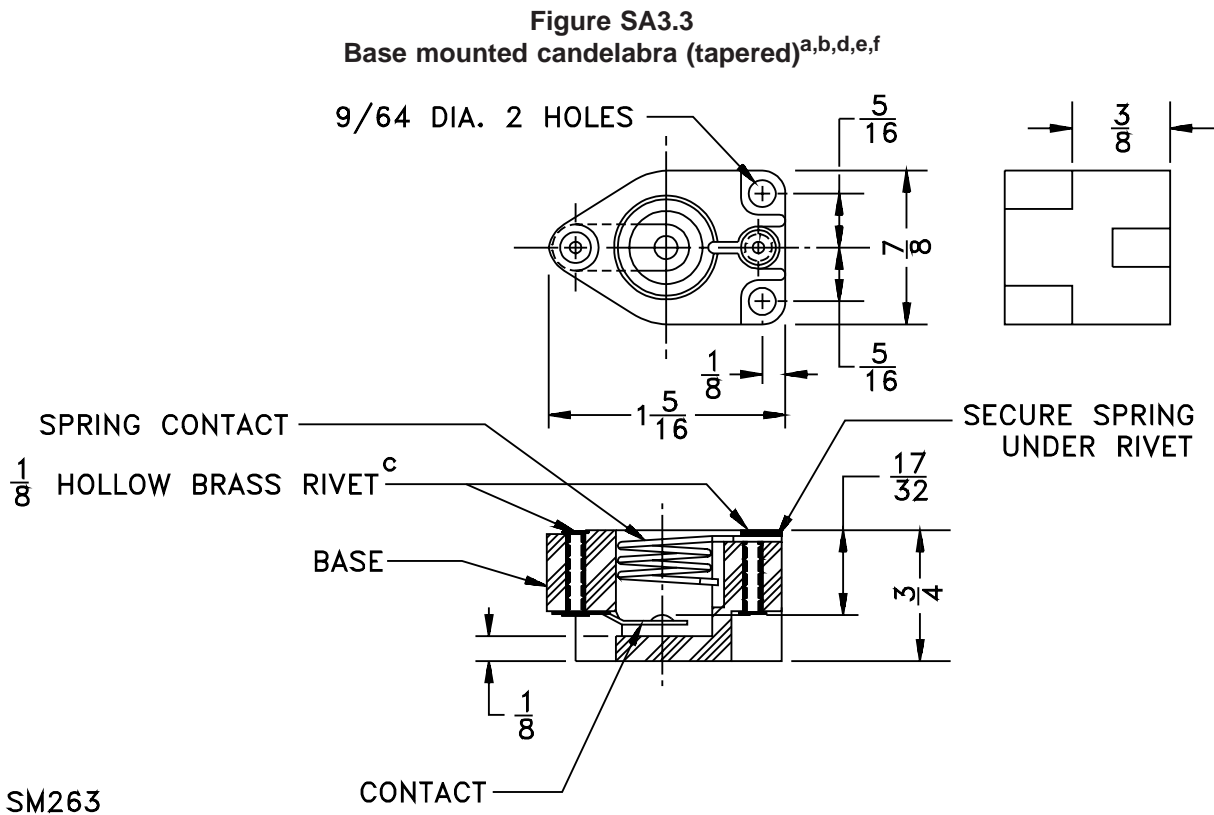
^a All dimensions are in inches. Unless otherwise specified, tolerances for fractions are $\pm 1/64$ inch, tolerances for decimals are ± 0.005 inch, tolerances for angles are $\pm 1/2$ degrees.

^b Alternative constructions may be investigated.

^c 1 inch = 25.4 mm.

^d Requirements formerly covered under Military Standard MS17077, Drawing 9000-S6401-74333, and MIL-L-970/2.

^e Lampholder dimensions shall be in accordance with ANSI C81.62.



^a All dimensions are in inches. Unless otherwise specified tolerances for fractions are $\pm 1/64$ inch.

^b Alternative constructions will be investigated.

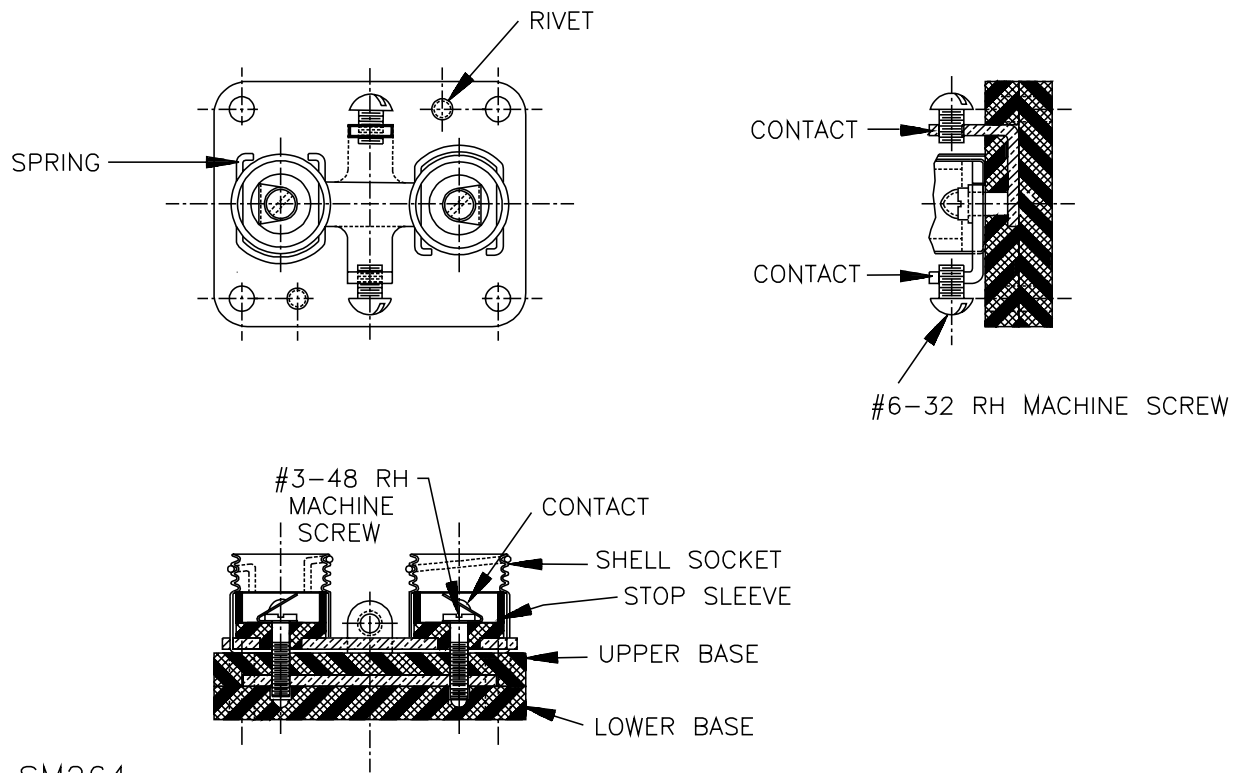
^c Upset after assembly.

^d 1 inch = 25.4 mm.

^e Requirements formerly covered under Military Standard MS16754, Drawing 9-S-5038-L, and MIL-L-970/3.

^f Lampholders shall be constructed in accordance with ANSI C81.62.

Figure SA3.4
Base-mounted candelabra (two lamp) single circuit^{a,b,c,d,e}



SM264

^a All dimensions are in inches. Unless otherwise specified, tolerances for fractions are $\pm 1/64$ inch.

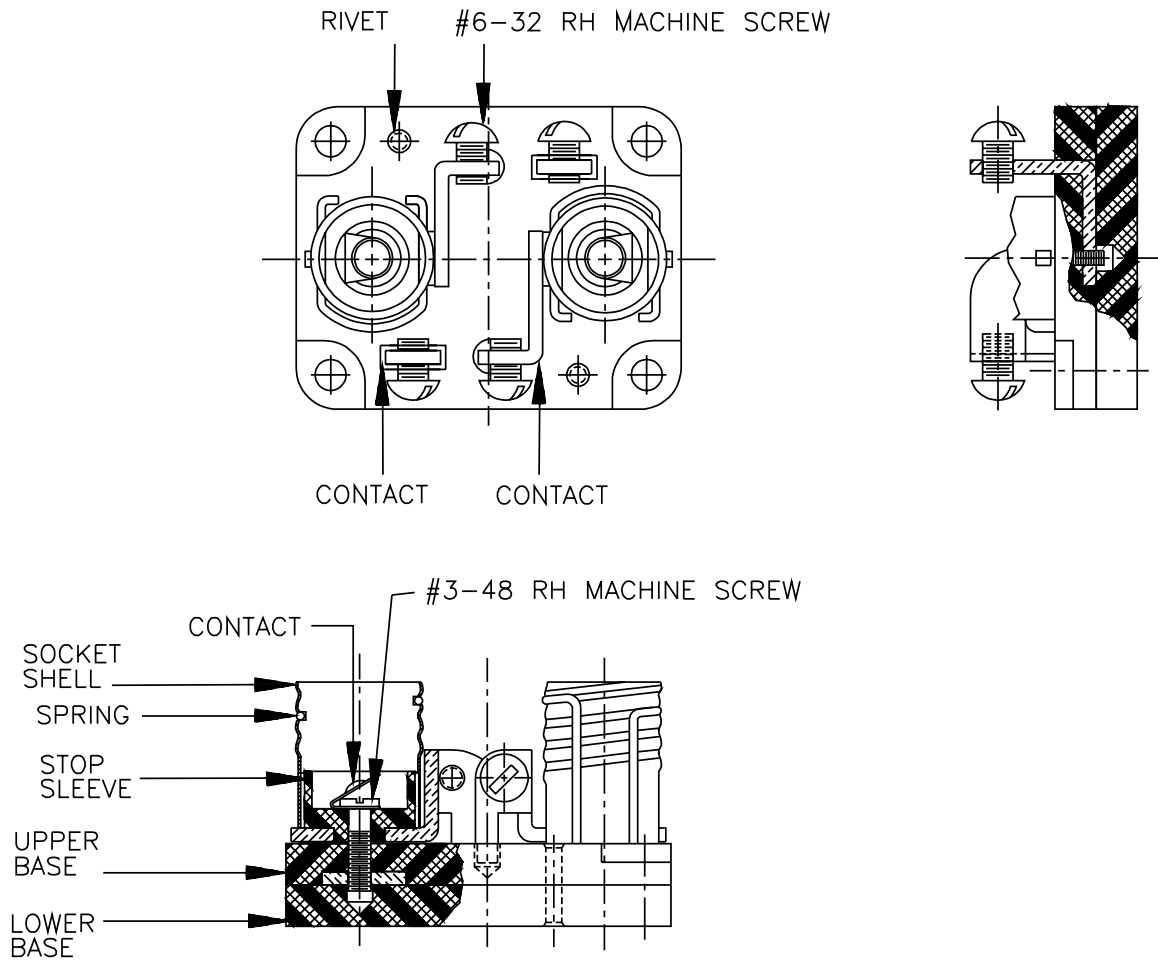
^b Alternative constructions will be investigated.

^c 1 inch = 25.4 mm.

^d Requirements formerly covered under Military Standard MS16750-1, Drawing 9000-S6405-73455, and MIL-L-970/4-1.

^e Screwshells shall be constructed in accordance with ANSI C81.62.

Figure SA3.5
Base-mounted candelabra (two lamp) double circuit^{a,b,c,d,e}



SM265

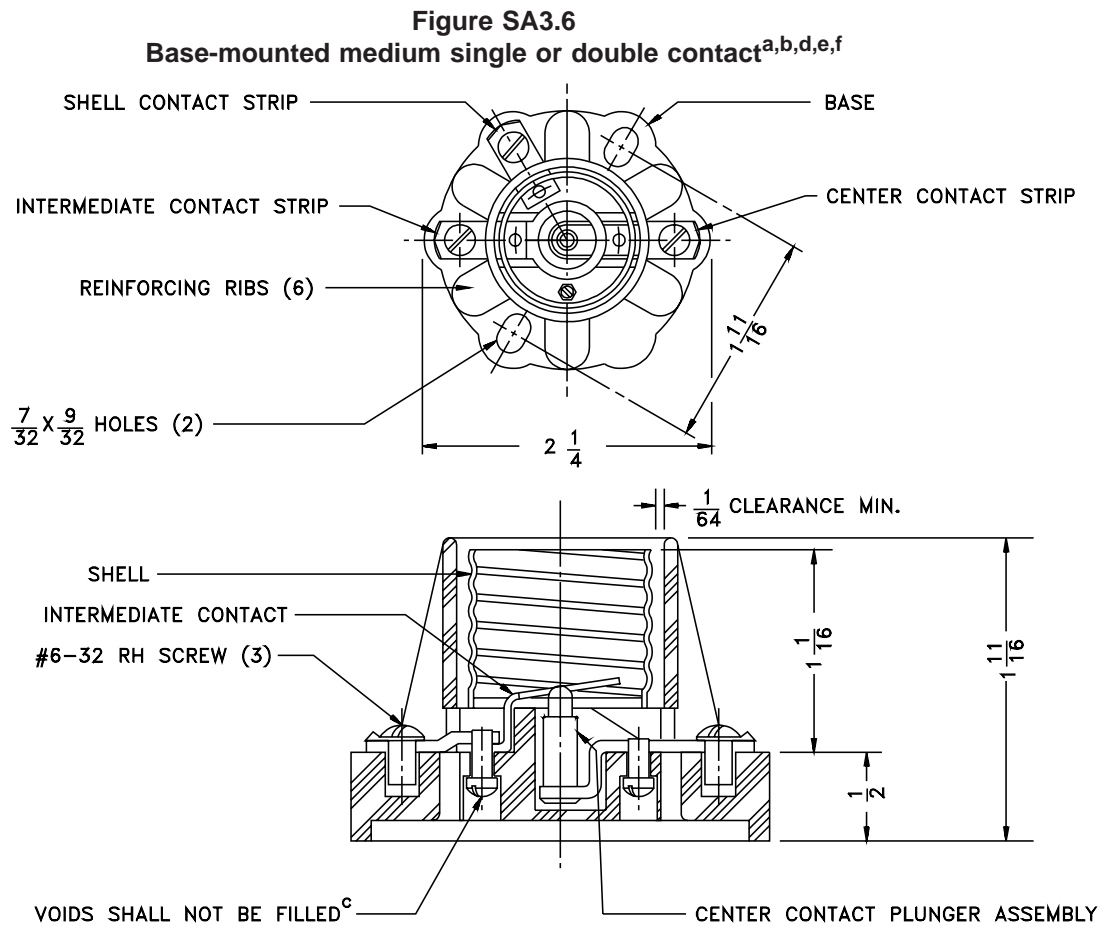
^a All dimensions are in inches. Unless otherwise specified, tolerances for fractions are $\pm 1/64$ inch.

^b Alternative constructions will be investigated.

^c 1 inch = 25.4 mm.

^d Requirements formerly covered under Military Standard MS16750-2, Drawing 9000-S6405, and MIL-L-970/4-2.

^e Screwshells shall be constructed in accordance with ANSI C81.62.



SM266

^a All dimensions are in inches. Unless otherwise specified, tolerances for fractions are $\pm 1/64$ inch.

^b Alternative constructions will be investigated.

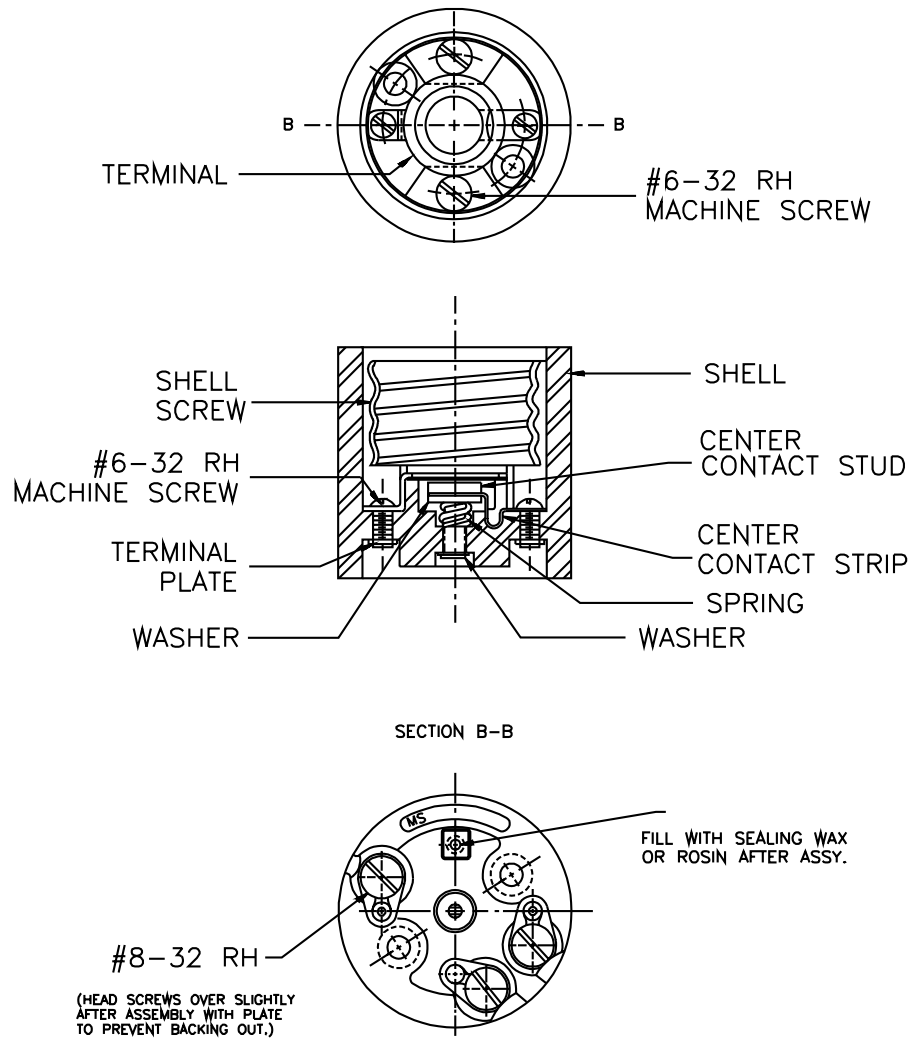
^c Upset after assembly.

^d 1 inch = 25.4 mm.

^e Requirements formerly covered under Military Standard MS16752, Drawing 9000-S6401-74400, and MIL-L-970/6.

^f Screwshells shall be constructed in accordance with ANSI C81.62.

Figure SA3.7
Double-contact mogul^{a,b,c,d,e}



SM267

^a All dimensions are in inches, tolerances are $\pm 1/64$ inch. Tolerances for angles are $\pm 1/2$ degrees.

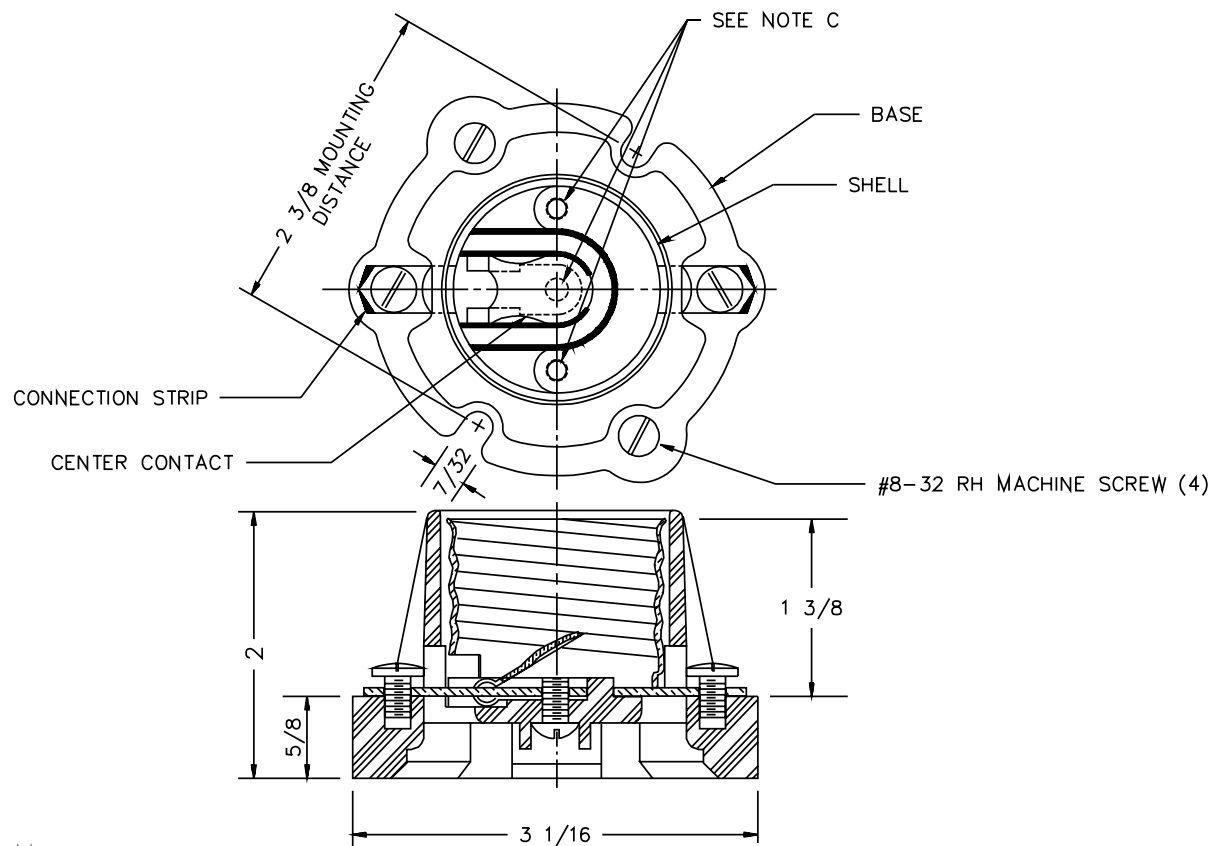
^b Alternative constructions will be investigated.

^c 1 inch = 25.4 mm.

^d Requirements formerly covered under Military Standard MS17228, Drawing 9-S-4779, and MIL-L-970/7.

^e Screwshells shall be constructed in accordance with ANSI C81.62.

Figure SA3.8
Base-mounted mogul^{a,b,d,e,f}



SM268

^a All dimensions are in inches. Unless otherwise specified, tolerances for fractions are $\pm 1/64$ inch.

^b Alternative constructions will be investigated.

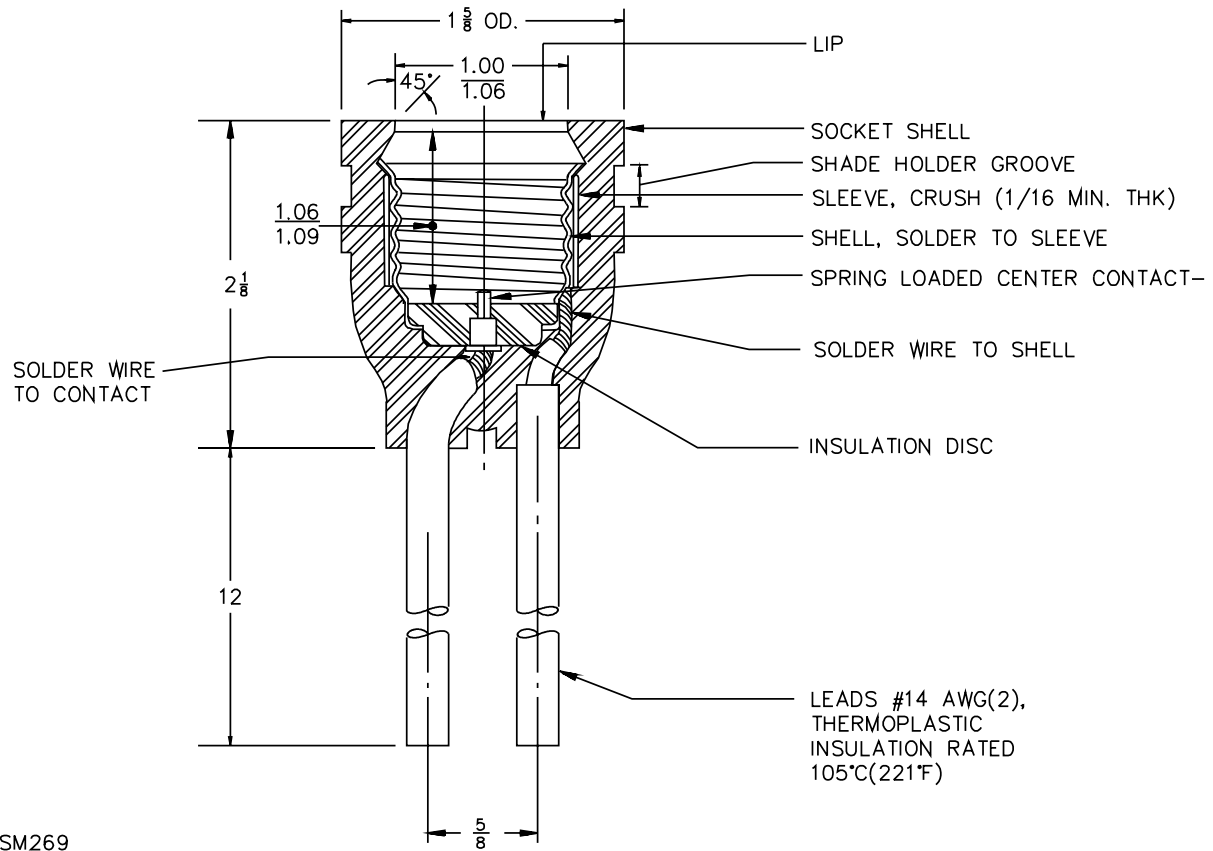
^c Upset after assembly.

^d 1 inch = 25.4 mm.

^e Requirements formerly covered under Military Standard MS16756, Drawing 9-S-4856-L, and MIL-L-970/8.

^f Screwshells shall be constructed in accordance with ANSI C81.62.

Figure SA3.9
Medium, weatherproof, molded rubber^{a,b,c,d,e}



SM269

^a All dimensions are in inches. Unless otherwise specified, tolerances for fractions are $\pm 1/64$, tolerances for decimals are ± 0.005 .

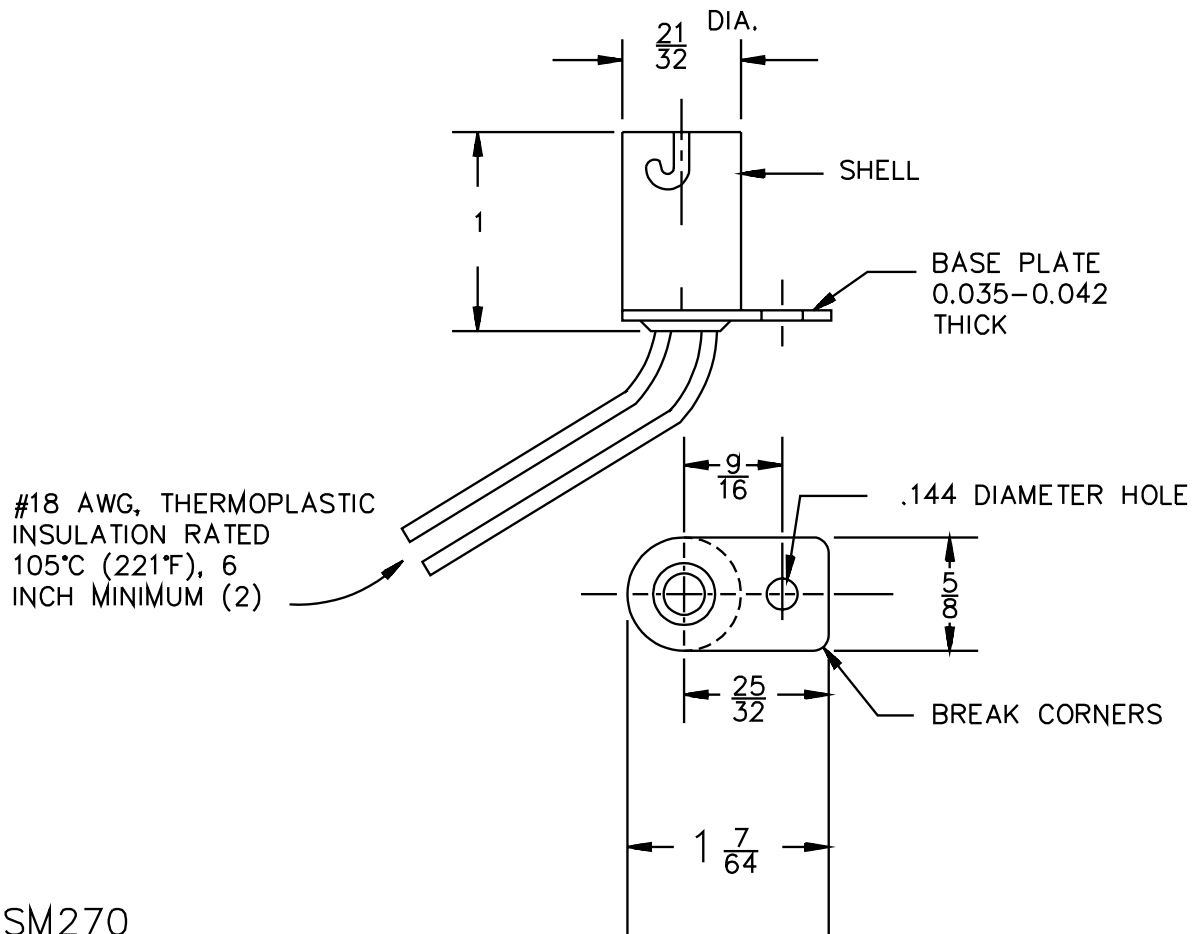
^b Alternative constructions will be investigated.

^c 1 inch = 25.4 mm.

^d Requirements formerly covered under Military Standard MS16749, Drawing 9-S-4778-L, and MIL-L-970/9.

^e Screws shall be constructed in accordance with ANSI C81.62.

Figure SA3.10
Bayonet candelabra double contact^{a,b,c,d,e}



SM270

^a All dimensions are in inches. Tolerances for fractions are $\pm 1/64$ inch, tolerances for decimals are ± 0.005 .

^b Alternative constructions will be investigated.

^c 1 inch = 25.4 mm.

^d Requirements formerly covered under MIL-L-970/14.

^e Screwshell dimensions shall be in accordance with ANSI C81.62.

SA4 Materials

SA4.1 Aluminum, aluminum alloys, and cadmium plating shall not be used.

SA4.2 Wire leads, (Figure SA3.9 only) shall be:

- a) No. 14 AWG,
- b) At least 12 inches (305 mm), and
- c) Stranded copper conductors rated for the application.

The wire insulation shall have a minimum flame spread rating of "VW-1" and shall have an outdoor use rating "W-A."

SA4.3 Metals shall be used in combinations that are galvanically compatible.

SA4.4 A lampholder shall consist of the materials specified in Table SA4.1, or the materials shall be equivalent to those specified in the table. Among the factors taken into consideration when judging an equivalent material are:

- a) Mechanical strength,
- b) Resistance to impact,
- c) Moisture-absorptive properties,
- d) Combustibility,
- e) Resistance to ignition from electrical sources,
- f) Resistance to corrosion, and
- g) Resistance to distortion at temperatures to which the material may be subjected under conditions of normal and abnormal use.

SA4.5 The screw shell material, contact screws, and connection strips shall be corrosion resistant brass or copper alloy.

SA4.6 The composition of metallic alloys shall provide corrosion resistance at least equivalent to AISI stainless steel 316. Also, see 11.2.1.

SA4.7 A spring loaded contact shall be phosphor bronze.

Table SA4.1
Lampholder material designations^a

Type	Base	Center contact	Ratings	Shipping container marking (military part identification number) (PIN)
Base-Mounted Candelabra	See Note ^b	Phosphor Bronze	125 V 75 W	"M970/1-1"
Bayonet Candelabra Double Contact	See Note ^c	Brass or Copper Alloy	125 V 75 W	"M970/2-1"
Base-Mounted Candelabra (Two Lamp)	See Note ^c	Phosphor Bronze	125 V 75 W	"M970/3-1"
Base-Mounted Candelabra (Tapered)	See Note ^c	Phosphor Bronze	125 V 75 W	"M970/4-1" single circuit; "M970/4-2" double circuit
Base-Mounted Medium Screw, Single or Double Contact	See Note ^d	Phosphor Bronze	250 V 660 W	"M970/6-1"
Mogul Double Contact	See Note ^d	Stud (Brass) Strip (Copper)	250 V 750 W	"M970/7-1"
Base-Mounted Mogul Weatherproof Medium	See Note ^d	Phosphor Bronze	600 V 1500 W	"M970/8-1"
Bayonet Candelabra (Double Contact)	See Note ^b	Brass	250 V 660 W	"M970/9-1"
	Insulating disc (laminated or molded plastic)	Brass	125 V 75 W	"M970/14-1"

^a Upon investigation, other materials not specified in this table may be acceptable for the application. See SA4.4.

^b Socket outer shell material shall be of molded rubber and shall have a durometer hardness of 60 – 65. The construction of the lip shall provide a watertight seal against the lamp. Socket shall have a minimum wall thickness of 3/16 inches (4.8 mm) and shall be molded to the rubber shell. The disc shall be of a phenolic resin molding compound, cellulose filled or of the mineral filled, glass-fiber reinforced polyester resin material specified in note ^c.

^c Mineral filled, glass-fiber reinforced, polyester resin molding compound or glass fiber-filled polyester resin with a minimum impact resistance of 3 foot-pounds per inch notch. Other physical properties include arc-resistance, flame resistance, heat resistance, and dielectric properties in accordance with Military Specification sheet MIL-M-14/4.

^d Long-glass fiber-filled diallyl ortho-phthalate resin compound with a minimum impact resistance of 3 foot-pounds per inch notch. Other physical properties include low shrinkage, moisture resistant, flame retardant, and dielectric properties in accordance with Military Specification Sheet MIL-M 14/4.

SA5 Current-Carrying Parts

SA5.1 A contact strip shall be constructed of corrosion resistant brass, copper, copper alloy, or other material acceptable for the application and shall be at least 0.060 inches (1.5 mm) thick.

PERFORMANCE**SA6 High Temperature Test**

SA6.1 There shall be no burning, charring, or deterioration of materials to the extent that the part is inoperable following 100 hours of exposure in an air oven maintained at $150 \pm 2^{\circ}\text{C}$ ($302 \pm 3.6^{\circ}\text{F}$). The sample is to be connected to a power supply of rated voltage during the conditioning and the highest wattage bulb, in accordance with the rating of the lampholder, is to be inserted in the lampholder. The lampholder is to be oriented in a manner which produces the worst case heating affect.

Exception: This test need not be conducted on lampholders designated M970/2-1, M970/3-1, M970/4-1, M970/9-1 and M970/14-1. See Table SA4.1.

SA7 Dielectric Voltage-Withstand Test

SA7.1 A lampholder shall withstand without breakdown the application of a 60-Hz essentially sinusoidal potential of 1000 volts plus 2 times the rated voltage of the product for 1 minute between live parts and dead metal parts.

SA7.2 The lampholder is to be tested by means of a 500 VA or larger capacity transformer whose output voltage is essentially sinusoidal and can be varied. The applied potential is to be increased from zero until the required test voltage is reached, and is to be held at that level for 1 minute. The increase in the applied potential is to be at a uniform rate and as rapid as is consistent with its value being correctly indicated by a voltmeter.

SA8 Security Tests of Screw Shell

SA8.1 The Security Tests of Screw Shells, Section 30, need not be conducted on lampholders designated M970/2-1 and M970/3-1.

MARKING**SA9 General**

SA9.1 The smallest container, box, or the like used to ship a naval lampholder shall additionally be marked with the applicable military part identification number (PIN) as specified in Table SA4.1.