

UL 763

Motor-Operated Commercial Food Preparing Machines



Underwriters Laboratories Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062-2096

UL Standard for Safety for Motor-Operated Commercial Food Preparing Machines, UL 763

Third Edition, Dated November 30, 2000

Revisions: This Standard contains revisions through and including December 19, 2007.

Summary of Topics

The revisions dated December 19, 2007 were issued to incorporate the following requirements:

- ***Deletion of Obsolete Asbestos- and Cotton-Insulated Wire Types.***

In addition, miscellaneous editorial revisions, considered to be non-substantive and not subject to UL's STP process have been made.

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Text that has been changed in any manner is marked with a vertical line in the margin. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

The revised requirements are substantially in accordance with UL's Proposal(s) on this subject dated October 19, 2007.

The revisions dated December 19, 2007 include a reprinted title page (page1) for this Standard.

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

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

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

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that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

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

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

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1	December 19, 2007
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6	March 30, 2006
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November 30, 2000

The most recent designation of ANSI/UL 763 as an American National Standard (ANSI) occurred on December 19, 2007. The ANSI approval for this standard does not include the Cover Page, transmittal pages, or Title Page.

This ANSI/UL Standard for Safety, which consists of the third edition with revisions through December 19, 2007, is under continuous maintenance, whereby each revision is ANSI approved upon publication.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc. and is not part of the ANSI standard.

The Department of Defense (DoD) has adopted UL 763 on October 3, 1994. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements. Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

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INTRODUCTION

1 Scope

1.1 These requirements cover commercial motor-operated food-preparing machines intended for use in accordance with the National Electrical Code.

1.2 These requirements do not cover machines rated more than 600 V; nor do they cover machines involving universal motors rated more than 250 V.

1.3 These requirements cover coffee grinders, vegetable cutters, food mixers, nonrefrigerated ice cube dispensers, and other motor-operated machines usually found in commercial kitchens, restaurants, food processing establishments, bakeries, or other business establishments where food is prepared or processed.

1.4 A machine that utilizes some other source of energy, such as gas or steam, in addition to electric energy will be investigated under these requirements and under such additional requirements as are applicable to the machine under consideration.

1.5 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.

2 Terminology

2.1 In the following text, a requirement that applies only to a specific type or types of commercial food-preparing machine is identified by a specific reference in the requirement to the type or types of machine involved. Absence of such a specific reference or use of the term machine indicates that the requirement applies to all of the types of equipment covered by this standard.

3 Glossary

3.1 For the purpose of this standard the following definitions apply.

3.2 AUTOMATICALLY CONTROLLED MACHINE – A machine is considered to be automatically controlled under any one or more of the following conditions if:

- a) The repeated starting of the machine, beyond one complete predetermined cycle of operation to the point where some form of limit switch opens the circuit, is independent of any manual control.
- b) During any single predetermined cycle of operation, the motor is caused to stop and restart one or more times.
- c) Upon energizing the machine, the initial starting of the motor may be intentionally delayed beyond normal, conventional starting.
- d) During any single predetermined cycle of operation, automatic changing of the mechanical load may reduce the motor speed sufficiently to reestablish starting-winding connections to the supply circuit.

3.3 ENCLOSURE – That part of the machine that:

- a) Renders inaccessible all or any parts of the equipment that involve a risk of electric shock or injury to persons, or
- b) Precludes propagation of flame initiated by electrical disturbances occurring within.

3.3.1 INDOOR LOCATION – Inside a building where not normally subjected to the effects of weathering.

Added 3.3.1 effective January 29, 2007

3.4 INTERLOCK – A device or arrangement by means of which the functioning of one part is controlled by the functioning of another, for safety purposes.

3.5 LINE-VOLTAGE CIRCUIT – A circuit involving a potential of not more than 600 V and having circuit characteristics in excess of those of a low-voltage circuit.

3.6 LOW-VOLTAGE CIRCUIT – A circuit involving a peak open-circuit potential of not more than 42.4 V supplied by a primary battery, by a Class 2 transformer, or by a combination of a transformer and a fixed impedance that, as a unit, complies with all performance requirements for a Class 2 transformer. A circuit derived from a line-voltage circuit by connecting a resistance in series with the supply circuit as a means of limiting the voltage and current, is not considered to be a low-voltage circuit.

3.6.1 OUTDOOR LOCATION – In the open and subjected to the full effects of weathering.

Added 3.6.1 effective January 29, 2007

3.6.2 PROTECTED LOCATION – In an area that is partially protected from the effects of weathering through the use of a roof, canopy, marquee, or similar structure.

Added 3.6.2 effective January 29, 2007

3.7 REMOTELY CONTROLLED MACHINE – A machine that is out of sight of the operator who is at the starting device.

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4 Components

4.1 Except as indicated in 4.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

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

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

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

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

5 Units of Measurement

5.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

6 References

6.1 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

7 Frame and Enclosure

7.1 A machine shall be formed and assembled so that it will have the strength and rigidity necessary to resist the abuses that it is likely to be subjected to, without increasing the likelihood of fire, electric shock, or injury to persons due to total or partial collapse with resulting reduction of spacings, loosening or displacement of parts, or other serious defects.

7.2 Cast- and sheet-metal portions of the enclosure shall not be thinner than indicated in Table 7.1 unless the enclosure is found to be acceptable when investigated under considerations such as are mentioned in 7.3 and 7.4.

Table 7.1
Minimum acceptable thickness of enclosure metal

Metal	At small flat, unreinforced surfaces and at surfaces that are reinforced by curving, ribbing, and the like (or are otherwise of a shape and/or size) to provide physical strength		At surfaces to which a wiring system is to be connected in the field		At relatively large unreinforced flat surfaces	
	inches	mm	inches	mm	inches	mm
Die-cast	3/64	1.2	–	–	5/64	2.0
Cast malleable iron	1/16	1.6	–	–	3/32	2.4
Other cast metal	3/32	2.4	–	–	1/8	3.2
Uncoated sheet steel	0.026 ^a	0.66 ^a	0.032	0.81	0.026	0.66
Galvanized sheet steel	0.029 ^a	0.74 ^a	0.034	0.86	0.029	0.74
Nonferrous sheet metal	0.036 ^a	0.91 ^a	0.045	1.14	0.036	0.91
^a Thinner sheet metal may be employed if found to be acceptable when the enclosure is investigated under considerations such as those mentioned in 7.4.						

7.3 In addition to being considered with reference to the factors mentioned in 7.4, an enclosure of sheet metal is to be investigated with respect to its size and shape, the thickness of metal and its acceptability for the particular application, considering the intended use of the machine.

7.4 Among the factors that are to be taken into consideration when determining the acceptability of an enclosure are:

- a) The mechanical strength,
- b) Resistance to impact,
- c) Moisture-absorptive properties,
- d) Combustibility, and
- e) Resistance to distortion at temperatures to which the material may be subjected under conditions of normal or abnormal usage.

7.5 The enclosure of a remotely or automatically controlled machine shall preclude molten metal, burning insulation, and flaming particles from falling on combustible materials, including the surface upon which the machine is supported.

7.6 The requirement in 7.5 will necessitate that an electrical component, such as, a switch, relay or solenoid, be individually and completely enclosed, except for terminals, unless it can be shown that malfunction of the component would not result in a risk of fire, or there are no openings in the bottom of the machine enclosure. It will also necessitate the use of a barrier of noncombustible material:

- a) Under a motor unless:

- 1) The structural parts of the motor or of the machine provide the equivalent of such a barrier;
- 2) The protection provided with the motor is such that no burning insulation or molten material falls to the surface that supports the machine when the motor is energized under each of the following fault conditions:
 - i) Open main winding,
 - ii) Open starting winding,
 - iii) Starting switch short-circuited, and
 - iv) Capacitor of permanent-split phase motor short circuited, the short-circuit is to be applied before the motor is energized and the rotor is to be locked;
- 3) The motor is provided with a thermal motor protector – a protective device that is sensitive to temperature and current – that will keep the temperature of the motor windings from exceeding 125°C (257°F) under the maximum load under which the motor will run without causing the protector to cycle and from exceeding 150°C (302°F) with the rotor of the motor locked; or
- 4) The motor complies with the requirements for impedance-protected motors, and the temperature of the motor winding will not exceed 150°C (302°F) during the first 72 hours of operation with the rotor of the motor locked.

b) Under wiring, unless it is neoprene- or thermoplastic-insulated.

7.7 The barrier mentioned in 7.6 shall be horizontal, shall be located as indicated in Figure 7.1, and shall not have an area less than that described in that illustration. Openings, such as drain holes and vent openings, may be employed in the barrier, provided such openings would keep molten metal and burning insulation from falling on combustible material.

7.8 A door or a cover of an enclosure that provides access to any overload-protective device that requires resetting or renewal shall be hinged or otherwise attached in an equivalent manner.

7.9 Means shall be provided for holding the door or cover over a fuseholder in a closed position, and the door or cover shall be tight-fitting.

7.10 If the deterioration of a polymeric liquid container or breakage of a glass liquid container provided as part of a machine would result in a risk of fire or electric shock, the container shall be of a material that is compatible with the liquid intended to be used therein. See 9.2 for metallic liquid containers. A machine provided with a liquid container shall comply with the construction requirements in Liquid Mixing and Blending Machine, Section 34, and Flooding of Live Parts Tests, Section 44.

Revised 7.10 effective November 30, 2003

7.11 A cord-connected machine intended for mounting on a wall shall comply with the Adequacy of Mounting Test, Section 54.

8 Mechanical Assembly

8.1 A machine shall be assembled such that it will not be adversely affected by the vibration of normal operation. Compliance shall be determined by physical inspection performed after completion of the Normal Temperature Test, Section 39. Brush caps shall be tightly threaded or otherwise designed to preclude loosening.

8.1 revised November 30, 2000

8.2 A switch other than a through-cord switch, a lampholder, an attachment-plug receptacle, a motor-attachment plug, or similar component shall be mounted securely and shall be kept from turning. See 8.4.

Exception No. 1: A switch need not be precluded from turning if all four of the following conditions are met:

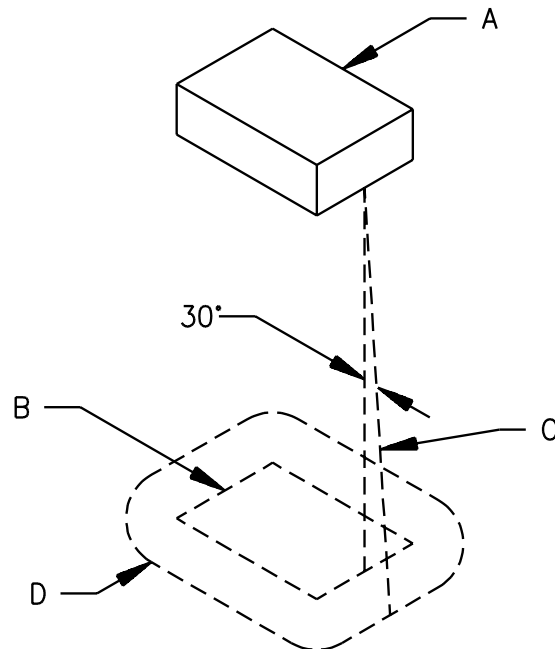
- a) The switch is of a plunger or other type that does not tend to rotate when operated. A toggle switch is considered to be subject to forces that tend to turn the switch during normal operation of the switch.*
- b) The means for mounting the switch makes it unlikely that operation of the switch will loosen it.*
- c) The spacings are not reduced below the minimum required values if the switch rotates.*
- d) The normal operation of the switch is by mechanical means rather than by direct contact by persons.*

Exception No. 2: A lampholder of the type in which the lamp cannot be replaced, such as a neon pilot or indicator light in which the lamp is sealed in a nonremovable jewel, need not be precluded from turning if rotation cannot reduce spacings below the minimum required values.

8.3 Uninsulated live parts shall be secured to the base or mounting surface so that they will be kept from turning or shifting in position, if such motion may result in a reduction of spacings below the minimum acceptable values.

8.4 The means for preventing the turning or shifting mentioned in 8.2 and 8.3 is to consist of more than friction between surfaces – for example, a properly applied lock washer is acceptable as the means for preventing a small stem-mounted switch, or other device having a single-hole mounting means, from turning.

Figure 7.1
Location and extent of barrier



NOTES:

A – Region to be shielded by barrier. This will consist of the entire component if it is not otherwise shielded and will consist of the unshielded portion of a component that is partially shielded by the component enclosure or equivalent.

B – Projection of outline of component on horizontal plane.

C – Inclined line that traces out minimum area of barrier. The line is always:

- a) Tangent to the component,
- b) Five degrees from the vertical, and
- c) So oriented that the area traced out on a horizontal plane is maximum.

D – Location (horizontal) and minimum area for barrier. The area is that included inside the line of intersection traced out by the inclined line C and the horizontal plane of the barrier.

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9 Protection Against Corrosion

9.1 Iron and steel parts shall be protected against corrosion by enameling, galvanizing, plating, or other equivalent means, if corrosion of such unprotected parts would be likely to result in a risk of fire, electric shock, or injury to persons.

Exception No. 1: Surfaces of sheet-steel and cast-iron parts within an enclosure are not required to be protected against corrosion if the oxidation of the metal due to the exposure to air and moisture is not likely to be appreciable. The thickness of metal and temperature are also to be considered.

Exception No. 2: Bearings, laminations, or minor parts of iron or steel, such as washers, screws, and the like need not comply with this requirement.

9.2 If deterioration of a liquid container provided as a part of a machine would result in a risk of fire or electric shock, the container shall be of a material that is resistant to corrosion by the liquid intended to be used therein. A machine provided with a liquid container shall comply with Liquid Mixing and Blending Machine, Section 34, and Flooding of Live Parts Tests, Section 44.

Revised 9.2 effective November 30, 2003

10 Accessibility of Live Parts

10.1 Electrical parts of a machine shall be located or enclosed so that protection against unintentional contact with uninsulated live parts is provided. Insulated brush caps do not require additional enclosure.

10.2 During the examination of a machine in connection with the requirements in 10.1, a part of the outer enclosure that may be removed without the use of tools by the user of the machine to permit the attachment of accessories, to allow access to means for making operating adjustments, or for another reason is to be disregarded – that is, it is not to be assumed that the part in question affords protection against the risk of electric shock.

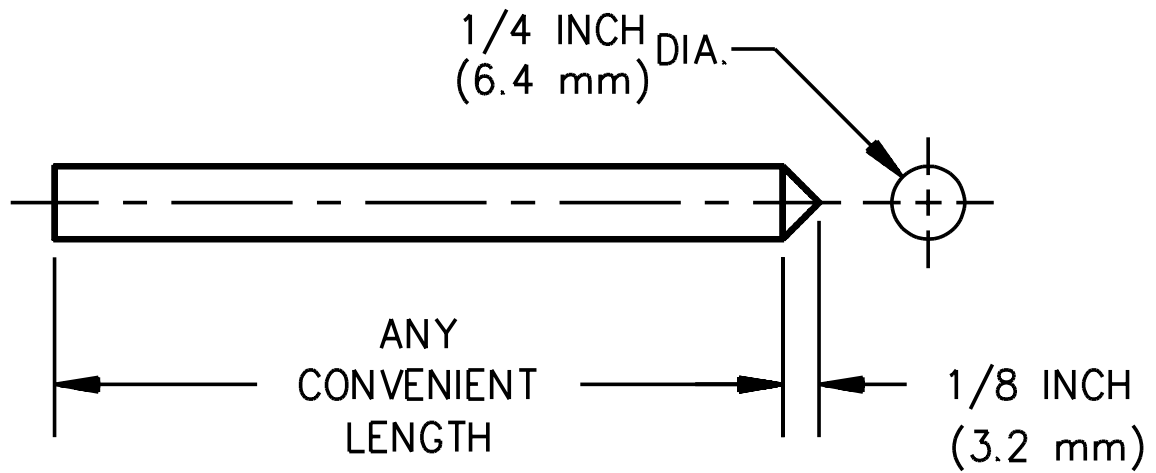
10.3 An opening anywhere in the enclosure of a hand-supported machine or in any portion of a machine hand-held in normal use is acceptable if a probe as illustrated in Figure 10.1, when inserted point first as far as possible into the opening:

- a) Does not enter the opening for a distance of more than 1/8 inch (3.2 mm), and
- b) Does not touch any uninsulated live part or film-coated magnet wire.

10.4 In the enclosure of a machine other than as described in 10.3 :

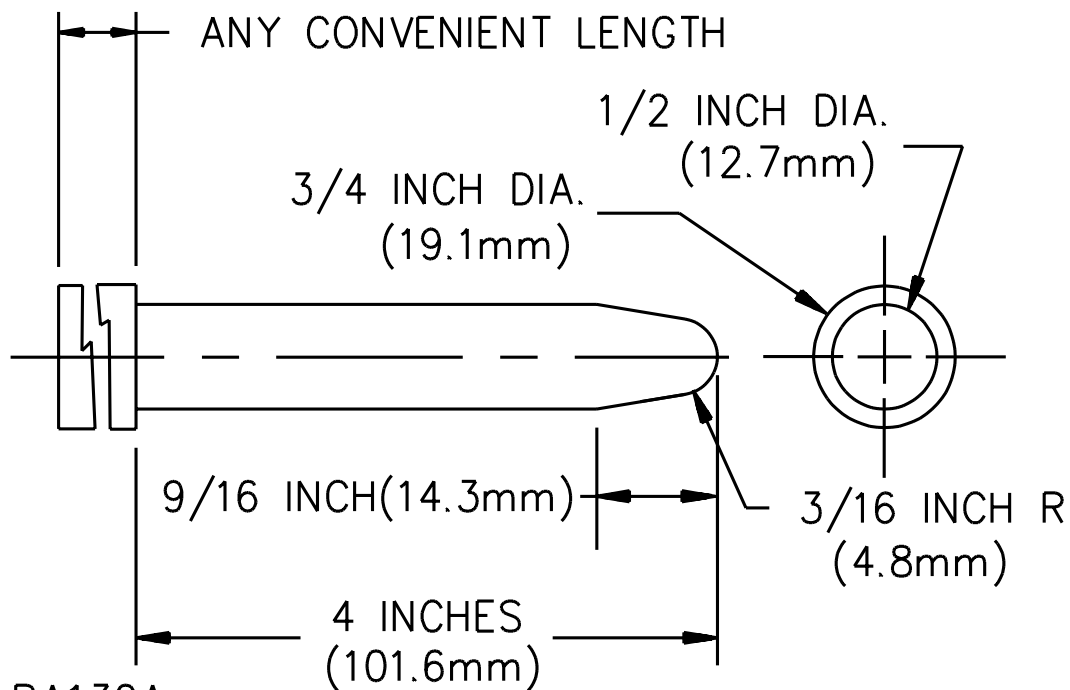
- a) An opening that a 3/4-inch (19.1-mm) diameter rod will not enter is acceptable if:
 - 1) A probe as illustrated in Figure 10.2 cannot be made to touch any uninsulated live part when inserted through the opening, and
 - 2) A probe as illustrated in Figure 10.3 cannot be made to touch film-coated magnet wire when inserted through the opening.
- b) An opening that a 3/4-inch (19.1-mm) diameter rod will enter is acceptable under the conditions described in 10.5 and Figure 10.4.

Figure 10.1
Probe for hand-supported enclosure



PA190

Figure 10.2
Probe for uninsulated live part



PA130A

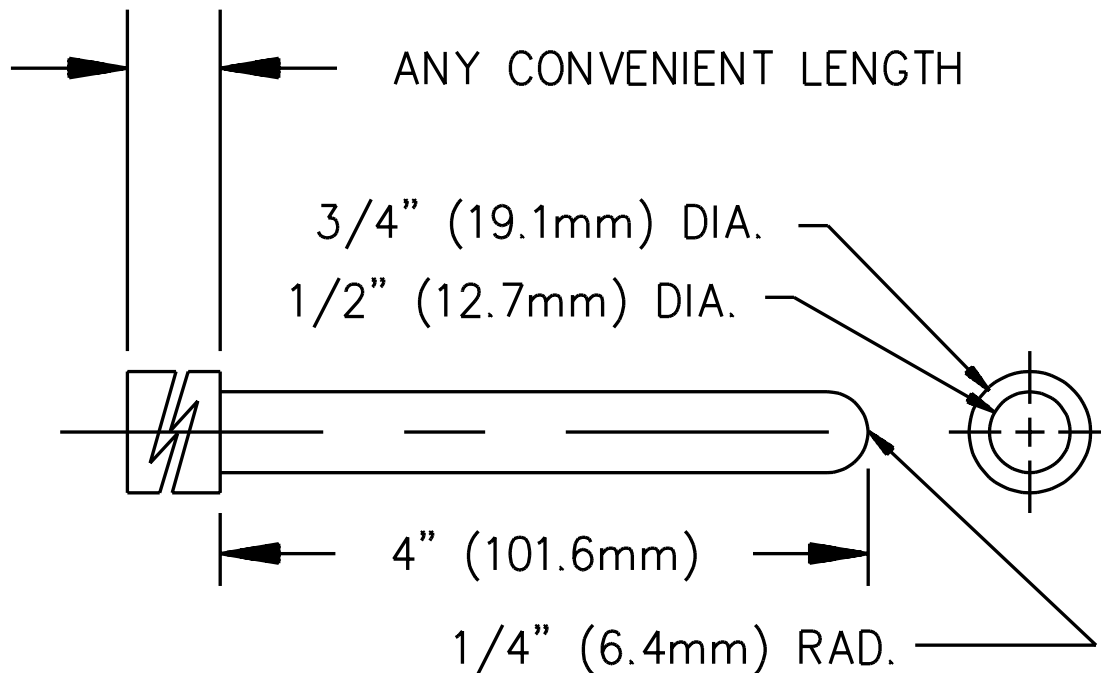
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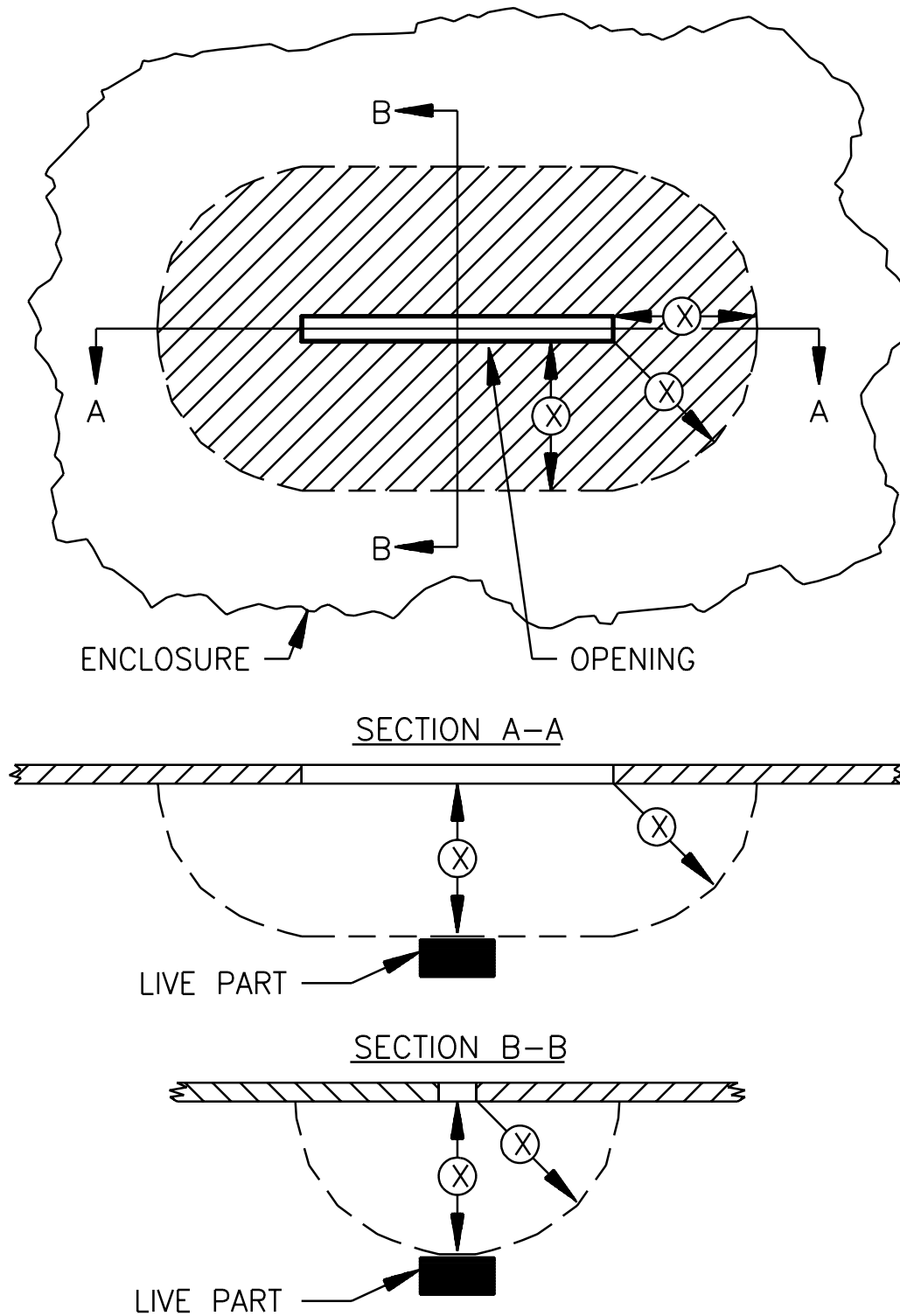
Figure 10.3
Probe for film-coated magnet wire



PA140A

10.5 The opening illustrated in Figure 10.4 is acceptable if, within the enclosure, there is no uninsulated live part or film-coated magnet wire less than X distance from the perimeter of the opening, as well as within the volume generated by projecting the perimeter distance X normal to its plane. X equals five times the diameter of the largest round rod that can be inserted through the opening, but not less than 4 inches (102 mm). In evaluating an opening, any barrier located within the volume is ignored unless it intersects the boundaries of the volume in a continuous, closed line.

Figure 10.4
Opening in enclosure



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11 Supply Connections

11.1 Cord-connected machines

11.1.1 General

11.1.1.1 A machine intended to be connected to the power-supply circuit by means of a flexible cord shall be provided with a flexible cord and an attachment plug for connection to the supply circuit.

11.1.1.2 The flexible cord shall have a voltage rating not less than the rated voltage of the machine, and shall have an ampacity that is not less than the current rating of the machine.

11.1.1.3 The flexible cord shall be:

- a) Type SJ or heavier cord,
- b) Not less than 5 feet (1.52 m) long, and
- c) Attached to the machine.

Exception: A machine that is not required to be provided with a grounding conductor may be provided with a separate detachable power-supply cord having means for connection to the machine and a length of not less than 5 feet (1.52 m).

11.1.1.4 A floor-supported machine intended to be installed in a dedicated location – that is one expected to be permanently wired – is acceptable if provided with not more than 8 feet (2.44 m) of Type S, SO, ST, or STO cord and an attachment plug for supply connection when there is a need to permit removal for maintenance and repair.

11.1.1.5 An oil-resistant cord is required if the machine is likely to be subjected to grease or oil.

11.1.1.6 The length of an attached flexible cord is to be measured from where it enters the machine to the face of the attachment plug. The length of a detachable power-supply cord includes the fittings.

11.1.1.7 The attachment plug shall have an ampacity that is not less than the current rating of the machine and a voltage rating equal to the rated voltage of the machine. If a machine is intended for use on two or more different values of voltage by field alteration of internal connections, the attachment plug provided with the machine shall be acceptable for the voltage for which the machine is connected when shipped from the factory. See 60.1.3.

11.1.1.8 If a machine incorporates a disconnecting means, such as a cord connector in the supply cord between the handle and the motor, the arrangement shall be such that no live parts will be exposed under normal conditions.

11.1.2 Strain relief

11.1.2.1 Strain relief shall be provided so that mechanical stress on a flexible cord will not be transmitted to terminals, splices, or interior wiring.

11.1.2.2 Push-back relief shall be provided to keep a flexible cord from being pushed into a machine through a cord-entry hole if such displacement may subject the cord to mechanical damage or to exposure to a temperature higher than that for which the cord is acceptable, or may reduce a spacing, such as to a metal strain-relief clamp, below the minimum acceptable value, or to cause movement of internal wiring at splices and terminals.

11.1.2.3 If a knot in a flexible cord serves as strain relief, a surface that the knot may contact shall be free from projections, burrs, fins, and other sharp edges that may cause abrasion of the insulation on the conductors.

11.1.2.4 The flexible cord shall be restrained from any rotation that will cause movement of internal wiring at splices and terminals.

11.1.3 Bushings

11.1.3.1 At a point where a flexible cord passes through an opening in a wall, barrier, or enclosing case, there shall be a bushing or the equivalent that shall be substantial, reliably secured in place, and shall have a smooth, well-rounded surface against which the cord may bear.

11.1.3.2 A vulcanized fiber bushing shall not be less than 3/64 inch (1.2 mm) thick and so formed and secured in place that it will not be adversely affected by conditions of ordinary moisture.

11.1.3.3 A separate soft-rubber, neoprene, or polyvinyl chloride bushing shall not be employed.

Exception No. 1: A separate soft-rubber, neoprene, or polyvinyl chloride bushing may be employed in the frame of a motor or in the enclosure of a capacitor attached to a motor provided that:

a) The bushing is not less than 3/64 inch (1.2 mm) thick, and

b) The bushing is located so that it will not be exposed to oil, grease, oily vapor, or other substances having a deleterious effect on the compound employed.

Exception No. 2: A bushing of one of these materials may be used, if the edges of the hole in which the bushing is mounted are smooth and free from burrs, fins, and other sharp edges.

11.1.3.4 At any point in a machine, a bushing of the same material as, and molded integrally with, the supply cord is acceptable if the built-up section is not less than 1/16 inch (1.6 mm) thick at the point where the cord passes through the enclosure.

11.1.4 Polarization

11.1.4.1 The attachment plug of the power-supply cord of a machine with a nominal 120-volt rating and provided with a manually operated, line-connected, single-pole switch for appliance on-off operation, or an Edison-base lampholder, shall be of the 2-wire polarized or 3-wire grounding type. The attachment plug of the power-supply cord of a machine provided with a 15- or 20-ampere general-use receptacle shall be of the 3-wire grounding type.

11.1.4.2 If a 3-wire grounding-type attachment plug or a 2-wire polarized attachment plug is provided, the attachment plug connections shall comply with Figure 11.1 and the polarity identification of the flexible cord shall comply with Table 11.1.

Table 11.1
Polarity identification of flexible cords

Table 11.1 revised January 29, 2004

Method of identification	Acceptable combinations	
	Conductor intended to be grounded ^a	All other conductors ^a
Color of braids on individual conductors	Solid white or grey – without tracer	Solid color other than white or grey – without tracer
	Color other than white or grey, with tracer in braid	Solid color other than white or grey – without tracer
Color of insulation on individual conductors	Solid white or grey ^b	Solid color other than white or grey ^b
	Light blue	Solid color other than light blue, white, or grey
Color of separators	White or grey	Color other than white or grey
^a A wire finished to show a green color with or without one or more yellow stripes or tracers is to be used only as an equipment grounding conductor.		
^b Only for cords having no braid on any individual conductor.		

11.1.4.3 A machine employing a polarized detachable power-supply cord shall not accommodate a non-polarized cord.

11.2 Permanently connected machines

11.2.1 General

11.2.1.1 A machine intended for permanent connection to the power supply shall have provision for connection of one of the wiring systems that would be acceptable for the machine.