

UL 1090

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Electric Snow Movers





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UL Standard for Safety for Electric Snow Movers, UL 1090

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Revisions: This Standard contains revisions through and including November 5, 2004.

Summary of Topics

These revisions to UL 1090 include a new requirement for a Switch for Hand-Supported Snow Mover, revised requirements for the Input Test, and other editorial revisions.

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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 new and revised requirements are substantially in accordance with UL's Bulletin(s) on this subject dated September 24, 2004. The bulletin(s) is now obsolete and may be discarded.

The revisions dated November 5, 2004 include a reprinted title page (page1) for this Standard.

The revisions dated November 16, 1999 were issued for editorial corrections. These corrections include any combination of the following: Updated Foreword (item D); Updated Scope; title changes to UL 489 and/or UL 1950; Withdrawn standards, UL 519 and UL 547, being replaced by UL 2111; Removal of the "94" flammability classification. These revisions may also include other miscellaneous editorial corrections.

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.

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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 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:

Page	Date
1-2B	November 5, 2004
3	November 16, 1999
4-6	November 5, 2004
6A-6B.....	November 16, 1999
7	March 4, 1998
8	June 1, 1994
9-11	November 16, 1999
12	June 1, 1994
13-14B.....	March 4, 1998
15-16	June 1, 1994
17-18A.....	November 16, 1999
18B	March 4, 1998
19-25	June 1, 1994
26.....	March 4, 1998
27-28B.....	November 5, 2004
29	June 1, 1994
30-30B.....	March 4, 1998
31	June 1, 1994
32-32B	November 5, 2004
33-35	June 1, 1994
36-36B	November 5, 2004
37-40	June 1, 1994
41-42B	November 5, 2004
43-44B.....	March 4, 1998
45	June 1, 1994
46-48	March 4, 1998
49-50B	November 5, 2004
51-54	June 1, 1994
55-57	March 4, 1998
58-60	June 1, 1994
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No Text on This Page



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1

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An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

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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.

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CONTENTS

INTRODUCTION

1 Scope	5
2 Glossary	5
3 Components	6
4 General	6
4.1 Units of measurement	6
4.2 Undated references	6
4A Units of Measurement	6

CONSTRUCTION

5 Frame and Enclosure	6A
5.1 General	6A
5.2 Metallic enclosures	7
5.3 Polymeric enclosures	7
5.4 Battery enclosures	8
5.5 Handles	8
6 Accessibility of Uninsulated Live Parts and Film-Coated Wire	9
7 Mechanical Assembly	15
8 Protection Against Corrosion	16
9 Supply Connections	17
9.1 General	17
9.2 Flexible cord	17
9.3 Attachment plug	17
9.4 Strain relief	18
9.5 Bushings	18
10 Battery Leads and Connectors	18
11 Batteries	18A
12 Live Parts	19
13 Internal Wiring	19
13.1 General	19
13.2 Insulation	20
13.3 Splices and connections	21
14 Electrical Insulation	21
15 Motors	22
16 Switches and Controls	22
17 Lampholders	22
18 Capacitors	23
19 Spacings	23
20 Grounding	26

PROTECTION AGAINST INJURY TO PERSONS

GENERAL

21 General	27
------------------	----

CONSTRUCTION

22 Enclosures and Guards	27
23 Rotating Parts	28
24 Switches and Controls	28

PERFORMANCE

25 Reliability of Parts	28A
-------------------------------	-----

PERFORMANCE

26 General	29
27 Leakage Current Test	29
28 Starting Current Test	31
29 Continuity of Ground Connection	32
30 Impeller Stopping Test	32
31 Input Test	32
32 Dielectric Voltage-Withstand Test	32A
33 Temperature Test	33
34 Resistance to Moisture Test	37
35 Abnormal Operation Test	40
36 Handle Tests	40
37 Strain Relief Test	41
37A Push-Back Relief Test	41
38 Switches and Controls	42
39 Attachment Plug Test	42A
40 Accelerated Aging Test	44A
41 Permanency of Marking	44A

POLYMERIC ENCLOSURES

42 General	45
43 Polymeric Materials as Covered by 43.1.1 – 43.4.7	45
43.1 Mold stress evaluation	45
43.2 Resistance to impact	46
43.3 Abnormal operation	47
43.4 Flame resistance	47
44 Polymeric Materials Classed HB	48
44.1 Mold stress evaluation	48
44.2 Resistance to impact	48
44.3 Overload	48
44.4 Flame test	49
44.5 Resistance to hot-wire ignition	49
44.6 Volume resistivity	49
44.7 High-current arc ignition	50

MANUFACTURING AND PRODUCTION TESTS

45 Dielectric Voltage-Withstand	50
46 Grounding Continuity	51

RATING

47 General	51
------------------	----

MARKING

48 General	52
48.1 General	52
48.2 Identification and rating	52
48.3 Fuses	53
48.4 Switches and controls	53
49 Cautionary	53
50 Instruction Manual	54
50.1 General	54
50.2 Safety instructions	54

DOUBLE-INSULATED SNOW MOVERS

51 General	57
52 Construction	58
53 Marking	58

APPENDIX A

Standards for Components.....	A1
-------------------------------	----

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INTRODUCTION

1 Scope

1.1 These requirements cover battery-powered snow movers, and cord-connected electrically operated snow movers rated 250 volts or less to be employed in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements do not cover riding-type snow movers or snow movers intended for commercial or industrial use or for use in hazardous locations as defined in the National Electrical Code, NFPA 70.

1.3 In addition to the requirements in this standard, a snow mover shall comply with, Sections 4.1, 4.2.1 – 4.2.3, 4.2.5, 5, 6, 9.1 – 9.6, 10.1, and 11 of the Safety Specifications for Snow Throwers, ANSI B71.3-1984.

Exception: Markings shall be considered durable and permanent if they comply with, Permanency of Marking, Section 41 of this standard.

1.4 Deleted November 5, 2004

2 Glossary

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

2.2 DIRECTLY ACCESSIBLE MOTOR – A motor that can be contacted without opening or removing any part, or that is located so as to be accessible to contact.

2.2 effective June 1, 1995

2.3 ENCLOSURE – That portion of the snow mover that:

a) Renders inaccessible all parts that may otherwise present a risk of electric shock or injury to persons, or

b) Prevents propagation of flame initiated by electrical disturbances occurring within, or both.

2.4 GROUND-SUPPORTED SNOW MOVER – A snow mover that, during normal operation, is supported entirely or in part by the ground.

2.5 HAND-SUPPORTED SNOW MOVER – A snow mover that, at some time during normal operation, is intended to be completely supported by the user.

2.6 INDIRECTLY ACCESSIBLE MOTOR – A motor that is accessible only by opening or removing a part of the outer enclosure, such as a guard or panel, that can be opened or removed without using a tool, or that is located at such a height or is otherwise guarded or enclosed so that it is unlikely to be contacted.

2.6 effective June 1, 1995

2.7 LEAKAGE CURRENT – All current or currents, including capacitively-coupled current, that may be conveyed between exposed conductive surfaces of a snow mover and ground or other exposed conductive surfaces of the snow mover.

2.8 LIVE PART – A part energized with respect to earth or energized with respect to some other part.

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. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

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

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

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

3.4 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.

4 General

4.1 Units of measurement

4.1.1 Revised and relocated as 4A.1 March 4, 1998

4.2 Undated references

4.2.1 Deleted March 4, 1998

4A Units of Measurement

4A.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4A.1 revised November 16, 1999

CONSTRUCTION

5 Frame and Enclosure

5.1 General

5.1.1 The frame and enclosure of a snow mover shall have the necessary strength and rigidity to resist the abuses likely to be encountered during routine service. The degree of resistance inherent in the snow mover shall preclude total or partial collapse with attendant reduction of spacings, loosening or displacement of parts, and other serious defects that alone or in combination constitute an increase in the risk of fire, electric shock, or injury to persons.

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5.1.2 Among the factors taken into consideration when a frame or enclosure is evaluated are:

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

A frame or enclosure that will be exposed to oil, acids, solvents, reagents, cleaning agents or ozone as part of the use or application of the snow mover shall not be adversely affected by these materials as determined by appropriate tests.

5.1.3 The enclosure of a snow mover shall be such as to prevent water from causing a risk of electric shock when the snow mover is subjected to a rain test or other test to simulate conditions that might occur during use. See 34.1 and 34.4 – 34.6.

5.2 Metallic enclosures

5.2.1 Cast- and sheet-metal portions of an enclosure shall not be thinner than specified in Table 5.1 unless the enclosure is found to be acceptable when evaluated under the considerations mentioned in 5.1.2.

Table 5.1
Minimum acceptable thickness of metal enclosure

Metal	Minimum thickness, inch (mm)			
	At small, flat, unreinforced surfaces and at surfaces that are reinforced by curving, ribbing, or the like		At relatively large unreinforced flat surfaces	
Die-cast metal	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	(0.66)	0.026	(0.66)
Galvanized sheet steel	0.029	(0.74)	0.029	(0.74)
Nonferrous sheet metal	0.036	(0.91)	0.036	(0.91)

5.3 Polymeric enclosures

5.3.1 A polymeric enclosure shall be of a material as defined by the tests in, Polymeric Materials as Covered by 43.1.1 – 43.5.7, Section 43, or of a material classed HB and as defined by the tests in, Polymeric Materials Classed HB, Section 44.

5.3.1 revised March 4, 1998

5.3.2 The material used as the enclosure shall be acceptable for use at the maximum temperature to which it is exposed during intended use. Material exposed to temperatures in excess of 80°C (176°F) shall be investigated with respect to aging to determine if it is acceptable for the purpose.

5.4 Battery enclosures

5.4.1 The battery of a battery-operated snow mover shall be acceptably housed or enclosed to prevent breakage of the battery case and the risk of an explosion.

5.4.2 The horizontal top surface of a battery enclosure shall have such strength and rigidity that, in conjunction with an air spacing provided between it and the battery terminals, the battery terminals will not be short-circuited when a 250-pound (1112-N) force is applied to the top surface. In place of the spacing, insulation designed to prevent short-circuiting of the battery terminals may be secured to the inner surface of a battery enclosure.

5.4.3 With reference to 5.4.2, the 250-pound (1112-N) force is to be applied through a 13-1/2-inch (343-mm) diameter rigid plate, regardless of the area of the cover.

5.5 Handles

5.5.1 A snow mover shall have a handle or handles that permit grasping the snow mover with two hands.

5.5.2 The requirements in 5.5.3 – 5.5.6 do not apply to battery-operated snow movers.

5.5.3 Other than as noted in 5.5.5, the handles or surfaces most likely to be grasped by the user during intended operation of a snow mover shall be of or covered with an insulating material that complies with the requirements in 5.5.6 and, Handle Tests, Section 36.

5.5.4 With reference to 5.5.3, examples of surfaces that are likely to be grasped by the user during intended operation include a lever, a handle, or a button for a switch or other operator control. Surfaces of a guard for a switch, or other operator control, are also included if located where likely to be grasped. Operator-handled controls that are remote from the handles of the snow mover are not included.

5.5.5 The outer surfaces of a handle or other area likely to be grasped during intended operation may be of electrically conductive material if:

a) Insulation complying with the requirement in 36.1(c) is interposed between the surfaces likely to be grasped and:

- 1) The snow moving member, and
- 2) Any metallic guard for the snow moving member; and

b) Surfaces likely to be grasped:

- 1) Are double-insulated from live parts, or
- 2) Do not enclose electrical components and are separated from all dead metal parts that enclose electrical components by insulation complying with the requirements in 36.1(c).

5.5.6 The insulating material mentioned in 5.5.3 shall be of a type and thickness that make it acceptable as the sole insulation between a live part and a dead metal part. If it overlies and is in intimate contact with dead metal, the nonconductive material shall not be less than 5/64 inch (2.0 mm) thick.

Exception: The thickness of the insulating material may be less than 5/64 inch if the material is found to be acceptable when judged under the considerations mentioned in 5.1.2.

5.5.7 An assembly screw in an area likely to be grasped that secures a covering of insulating material to a metal enclosure and threads into a metal enclosure containing electrical components or into a metal enclosure that contacts another metal enclosure containing live parts:

- a) Shall not be accessible to the probe illustrated in Figure 6.3 when inserted to a depth of 1 inch (25.4 mm), or
- b) Shall be recessed not less than 1/8 inch (3.2 mm) behind the outer surface of the insulating material if the opening will not admit a 3/8-inch (9.5-mm) diameter rod.

6 Accessibility of Uninsulated Live Parts and Film-Coated Wire

6.1 Electrical parts of a snow mover shall be located or enclosed to reduce the risk of unintentional contact with uninsulated live parts. Insulated brush caps do not require an additional enclosure.

6.1 effective June 1, 1995

6.2 The requirements specified in 6.3 – 6.11 do not apply to battery operated snow movers.

6.2 effective June 1, 1995

6.3 To reduce the likelihood of unintentional contact that may involve a risk of electric shock from an uninsulated live part or film-coated wire, an opening in an enclosure shall comply with either (a) or (b).

- a) For an opening that has a minor dimension (see 6.7) less than 1 inch (25.4 mm), such a part or wire shall not be contacted by the probe illustrated in Figure 6.1.
- b) For an opening that has a minor dimension of 1 inch or more, such a part or wire shall be spaced from the opening as specified in Table 6.1.

Exception: A motor other than one used in either a hand-held product or a hand-supported portion of a product need not comply with these requirements if it complies with the requirements in 6.4.

6.3 effective June 1, 1995

Figure 6.1
Articulate probe with web stop

Figure 6.1 effective June 1, 1995

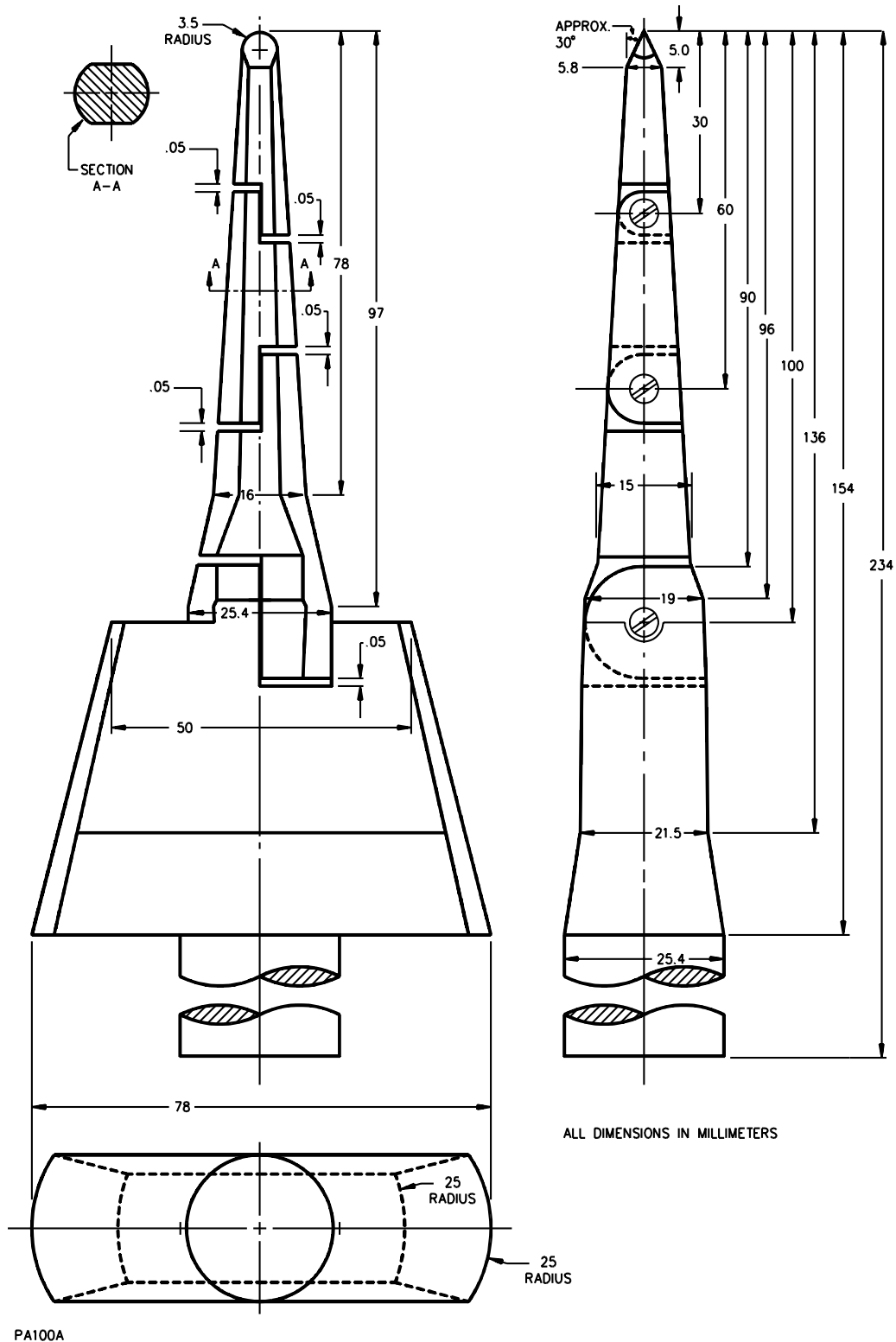


Table 6.1
Minimum acceptable distance from an opening to a part that may involve a risk of electric shock

Table 6.1 effective June 1, 1995

Minor dimension ^a of opening,		Minimum distance from opening to part,	
inches	(mm) ^b	inches	(mm) ^b
3/4 ^c	(19.1)	4-1/2	(114.0)
1 ^c	(25.4)	6-1/2	(165.0)
1-1/4	(31.8)	7-1/2	(190.0)
1-1/2	(38.1)	12-1/2	(318.0)
1-7/8	(47.6)	15-1/2	(394.0)
2-1/8	(54.0)	17-1/2	(444.0)
d		30	(762.0)
^a See 6.6. ^b Between 3/4 inch and 2-1/8 inches, interpolation is to be used to determine a value between values specified in the table. ^c A dimension less than 1 inch applies to a motor only. ^d More than 2-1/8 inches, but not more than 6 inches (152.0 mm).			

6.4 With reference to the Exception to 6.3, air openings in an integral enclosure of a motor shall comply with (a) or (b):

a) An opening that has a minor dimension (see 6.7) less than 3/4 inch (19.1 mm) is acceptable if:

- 1) Film-coated wire cannot be contacted by the probe illustrated in Figure 6.3;
- 2) In a directly accessible motor (see 2.2), an uninsulated live part cannot be contacted by the probe illustrated in Figure 6.4; and
- 3) In an indirectly accessible motor (see 2.6), an uninsulated live part cannot be contacted by the probe illustrated in Figure 6.2.

b) An opening that has a minor dimension of 3/4 inch or more is acceptable if a part or wire is spaced from the opening as specified in Table 6.1.

6.4 effective June 1, 1995

Figure 6.2
Probe for uninsulated live parts

Figure 6.2 effective June 1, 1994

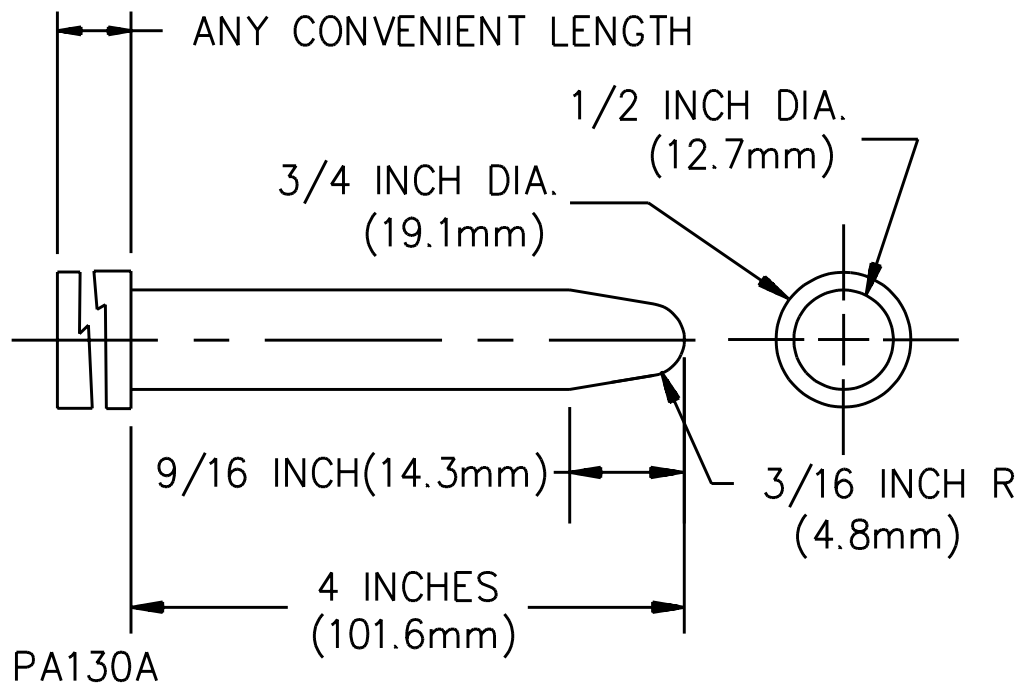
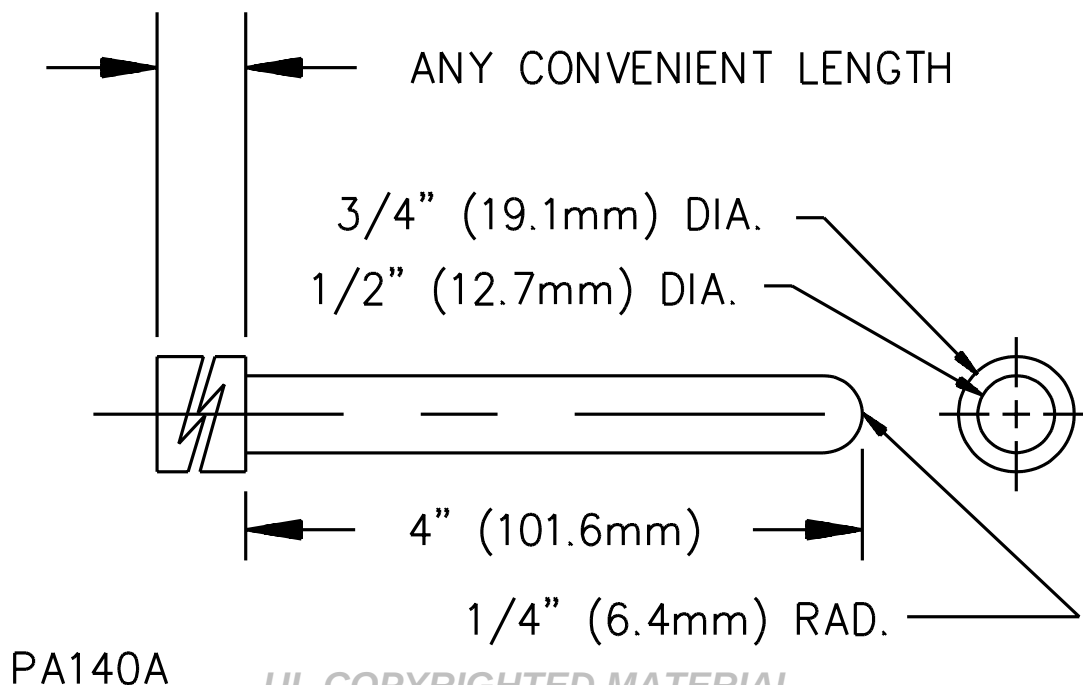


Figure 6.3
Probe for film-coated wire

Figure 6.3 effective June 1, 1994



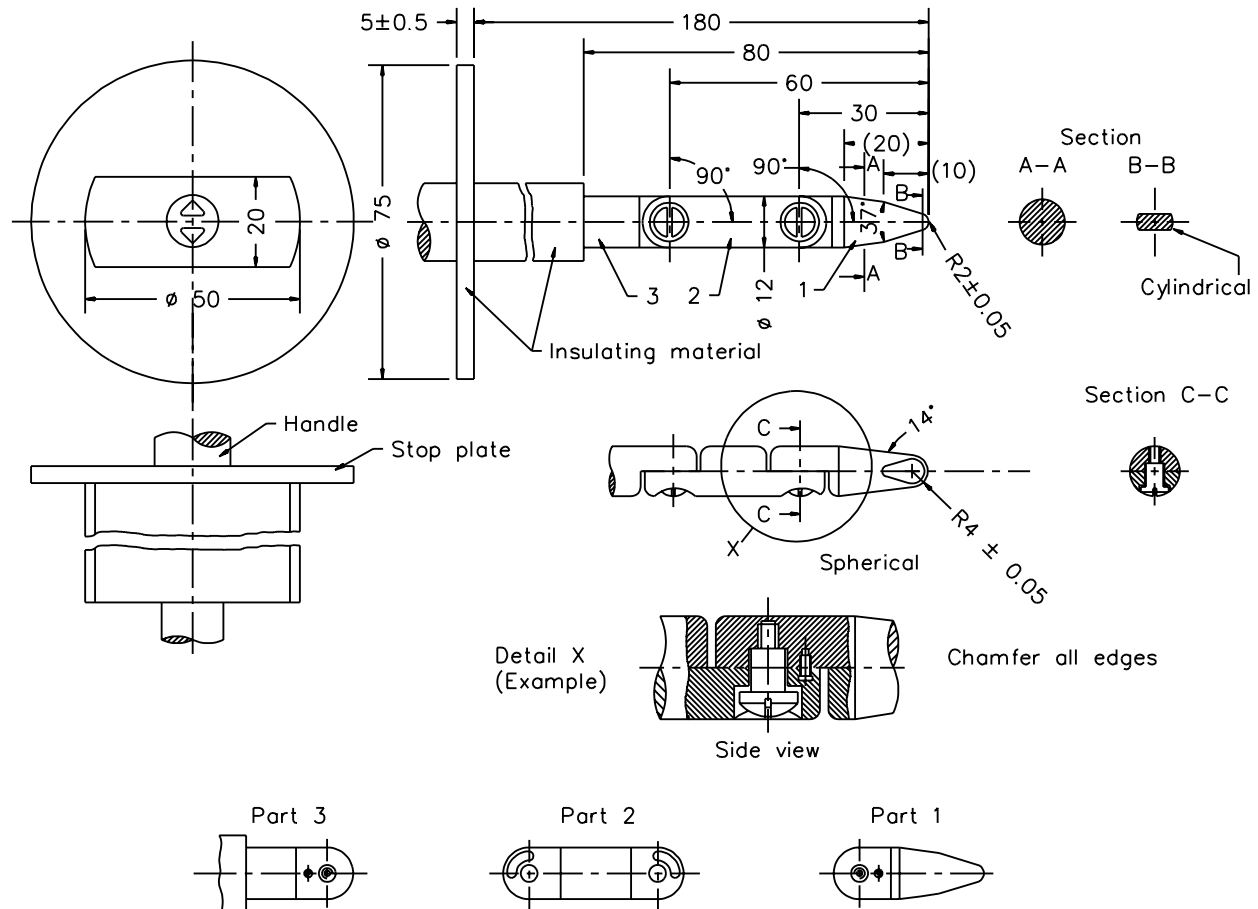
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Figure 6.4
International Electrotechnical Commission (IEC) articulate accessibility probe with stop plate
 (Courtesy of IEC)

Figure 6.4 revised March 4, 1998



SA1788A

6.5 The probes specified in 6.3 and 6.4 and illustrated in Figures 6.1 – 6.4 shall be applied to any depth that the opening will permit, and shall be rotated or angled before, during, and after insertion through the opening. The probes illustrated in Figures 6.1 and 6.4 shall be applied in any possible configuration; and if necessary, the configuration shall be changed after insertion through the opening.

6.5 effective June 1, 1995

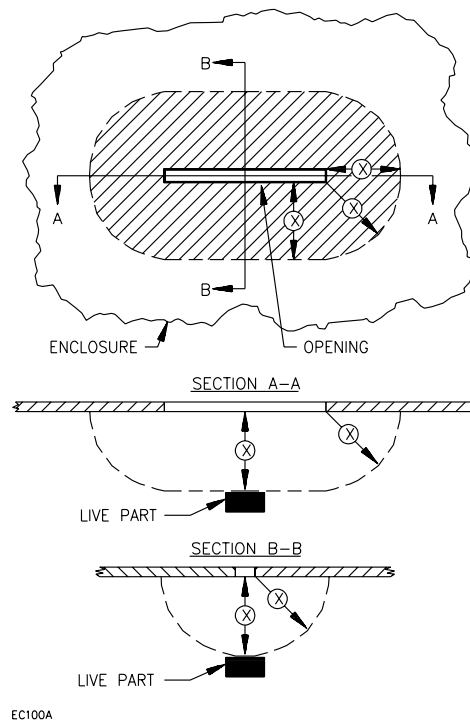
6.6 The probes illustrated in Figures 6.1 – 6.4 shall be used as measuring instruments to judge the accessibility provided by an opening, and not as instruments to judge the strength of a material; they shall be applied with the minimum force necessary to determine accessibility.

6.6 effective June 1, 1995

6.7 With reference to 6.3 and 6.4, the minor dimension of an opening is the diameter of the largest cylindrical probe having a hemispherical tip that can be inserted through the opening.

6.7 effective June 1, 1995

Figure 6.5
Opening in enclosure



6.8 During the examination of a product to determine compliance with 6.3 or 6.4, a part of the enclosure that may be opened or removed by the user without using a tool (to attach an accessory, to make an operating adjustment, or for other reasons) is to be opened or removed.

6.8 effective June 1, 1995

6.9 The opening illustrated in Figure 6.5 is acceptable if, within the enclosure, there is no uninsulated live part or film-coated wire:

- a) Less than X distance from the perimeter of the opening, and
- b) 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 usually is ignored unless it intersects the boundaries of the volume in a continuous, closed line.

6.10 During the examination of a snow mover in connection with the requirements in 6.1, a part of the outer enclosure that may be removed without the use of tools by the user of the snow mover – 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 will not be assumed that the part in question affords protection against electric shock unless marked in accordance with 49.4.

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6.11 A latch or a fastener that is intended to be opened by use of a coin or the like, is considered as being able to be opened without the use of a tool.

7 Mechanical Assembly

7.1 A snow mover shall be assembled so that the vibration that occurs during intended operation will not create a risk of fire, electric shock, or injury to persons.

7.2 A switch, a lampholder, an attachment-plug receptacle, a plug connector, or other component that is handled by the user shall be mounted securely and shall be prevented from turning by means other than friction between surfaces.

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

- a) The switch is of a plunger, slide, 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 of mounting the switch makes it unlikely that operation of the switch will loosen the switch.*
- c) Spacings are not reduced below the minimum acceptable values if the switch rotates.*
- d) 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 prevented from turning if rotation cannot reduce spacings below the minimum acceptable values.

7.3 With reference to the requirements in 7.2, a lock washer, properly applied, is acceptable as the means for preventing a small stem-mounted switch or other device having a single-hole mounting means from turning.

7.4 Other than as noted in 7.5, a snow mover shall be completely assembled before being shipped from the factory.

7.5 A snow mover may be shipped from the factory partially disassembled to facilitate packaging if:

- a) All parts that are necessary for operation of the product, such that the product complies with the requirements in this standard, are provided in one carton and are packaged so that no damage will occur in shipment that might result in a risk of fire, electric shock, or injury to persons;
- b) Assembly can be readily accomplished without introducing a risk of fire, electric shock, or injury to persons;
- c) Clear and detailed assembly instructions are provided;

- d) Internal electrical connections that must be made in the field are made by plug and receptacle only and do not require rearrangement of components of wiring;
- e) The product is marked as specified in 49.8; and
- f) An acceptable grounding means is provided and clearly explained in the assembly instructions.

Exception: A product that is battery powered or double insulated need not comply with (f).

7.6 With respect to the requirement in 7.5 (a) and (b), wiring and other components shall not be exposed to sharp edges, screw threads, sharp tools, or a risk of pinching, twisting, or other damage during shipment or assembly.

7.7 A snow mover shall be constructed so that user maintenance can be accomplished without pinching leads, reducing spacings, or mislocating or damaging:

- a) The means of accomplishing strain relief,
- b) A moving part, or
- c) A guard or other device that is relied upon to reduce the risk of fire, electric shock, or injury to persons.

7.8 User maintenance as mentioned in 7.7 is considered to consist of inspection and replacement of motor brushes or fuses and other service that is recommended in the instruction manual to be performed by the user. It does not include maintenance that is recommended in the instruction manual to be done by authorized service personnel.

7.9 Compliance with the requirement in 7.7 may be accomplished by routing of wires, provision of wire channels or locating wells for components, use of barriers or restraints, securing of components, and other means.

7.10 Routing as mentioned in 7.9 is acceptable if the construction is such that after the wire has been put into position preparatory to the reassembling of the snow mover, the reassembly procedure will not result in the wire contacting a moving part or being pinched. This does not mean that the wire must be of such length or so clamped that it cannot reach the pinch point or the moving part.

8 Protection Against Corrosion

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

Exception No. 1: In certain instances in which the oxidation of iron or steel due to the exposure of the metal to air and moisture is not likely to be appreciable – thickness of metal and temperature also being factors – surfaces of sheet steel and cast-iron parts within an enclosure may not be required to be protected against corrosion.

Exception No. 2: Bearings, laminations, or minor parts of iron or steel, such as washers, screws, and the like.