

UL 1028

Hair Clipping and Shaving Appliances



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Northbrook, IL 60062-2096

UL Standard for Safety for Hair Clipping and Shaving Appliances, UL 1028

Fifth Edition, Dated December 9, 2003

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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The revised requirements are substantially in accordance with UL's Proposal(s) on this subject dated October 26, 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.

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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that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.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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No Text on This Page



DECEMBER 9, 2003
(Title Page Reprinted: December 19, 2007)



ANSI/UL 1028-2007

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UL 1028

Standard for Hair Clipping and Shaving Appliances

First Edition – November, 1973
Second Edition – January, 1978
Third Edition – December, 1990
Fourth Edition – October, 1995

Fifth Edition

December 9, 2003

The most recent designation of ANSI/UL 1028 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 fifth 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.

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 hair clippers and shaving appliances to be employed in accordance with the National Electrical Code, NFPA 70.

1.2 These requirements cover appliances for household or commercial use on persons or animals, and appliances in which motion of an operating part is produced by electrical means.

1.3 An appliance that utilizes some other source of energy – such as gas or steam – in addition to electric energy is investigated under these requirements and under such additional requirements as are applicable to the appliance under consideration.

1.4 Motor-operated lather makers, lather makers incorporating heaters, barber shop vacuum cleaners for use on persons, and other types of hair clipping and shaving appliances not specifically mentioned are investigated under these requirements and under such additional requirements as are applicable to the appliance under consideration.

1.5 These requirements do not cover appliances rated more than 600 V, nor do they cover appliances involving universal motors rated more than 250 V.

1.6 These requirements do not cover manicure, pedicure, or personal grooming appliances used for similar purposes. However, hair clipping and shaving appliances provided with manicure, pedicure, or other similar attachments or accessories are investigated under these requirements and such additional requirements as are applicable to the appliance under consideration.

2 Glossary

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

2.2 AUTOMATICALLY CONTROLLED APPLIANCE – An appliance is considered to be automatically controlled under any one or more of the following conditions if:

- a) The repeated starting of the appliance, 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 appliance, 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.

2.3 CHARGER BASE – A cord connected unit intended to directly support the appliance while charging and provides a limited-energy primary circuit or a low-voltage circuit.

2.4 CORDLESS APPLIANCE – A rechargeable appliance that is not intended to be used while charging since typically the charging circuit does not supply enough power to operate a discharged appliance.

2.5 CORD/CORDLESS APPLIANCE – A rechargeable appliance that is operable either while still charging (cord) or after charging (cordless).

2.6 CORDED-ONLY APPLIANCE – A non-rechargeable appliance that is operable only while connected to its power-supply cord. Constructions with the power-supply cord permanently attached and constructions with a detachable power-supply cord are included.

2.7 DIRECT PLUG-IN APPLIANCE – An appliance that employs a blade assembly on the enclosure for connection to the branch circuit.

2.8 DIRECT PLUG-IN CHARGER UNIT – A unit that employs a blade assembly on the enclosure for connection to the branch circuit. The charger unit is intended to directly support the appliance while charging or is cord-connected to the appliance. The charger unit provides a limited-energy primary circuit or a low-voltage circuit.

2.9 DUAL-VOLTAGE APPLIANCE – An appliance rated for use at two voltages, such as 120 or 240 V, and provided with a means to change from one voltage to the other.

2.10 LIMITED-ENERGY PRIMARY CIRCUIT – A line-voltage circuit which incorporates a limiting impedance in series with the supply circuit so that:

- a) The circuit potential on the load side of the limiting impedance does not exceed 30 V rms (42.4 V peak) under operating conditions; and
- b) The maximum energy available at the load side of the limiting impedance circuit does not exceed 100 VA under any condition of operation, including abnormal operation.

2.11 LINE-VOLTAGE CIRCUIT – A circuit having a potential of not more than 600 V and having circuit characteristics in excess of those of a low-voltage circuit or a limited-energy primary circuit.

2.12 LOW-VOLTAGE CIRCUIT – A circuit supplied by a primary battery, by a Class 2 transformer, or by a combination of a transformer and fixed impedance which, as a unit, complies with all performance requirements for Class 2 transformers and does not have an open-circuit potential of more than 30 V rms (42.4 V peak).

2.13 REMOTELY CONTROLLED APPLIANCE – An appliance that is out of sight of the operator who is at the starting device.

2.14 WALL-HUNG APPLIANCE – A cord-connected appliance that is supplied with keyhole slots, notches, hanger holes, or similar features for hanging on a wall. Included is an appliance consisting of two interconnected units where one is intended to hang on the wall and the other is intended to be supported by the hand during use. Reference is to be made to the user manual of the appliance in establishing the intended functions of the appliance.

2.15 WASHABLE SHAVER – A shaving appliance, the hand-held part of which may be cleaned under water.

2.16 WET SHAVER – A shaving appliance, the hand-held part of which may be used in a bath or shower.

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 Units of Measurement

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

5 Undated 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.

6 Instructions Provided with the Appliance

6.1 A copy of the operating, user-maintenance, and other instructions intended to accompany an appliance as produced shall be used as a guide in the examination and test of the appliance. For this purpose, a final printed copy is not required.

6.2 The instructions shall include such directions and information as deemed by the organization responsible for the appliance to be necessary to cover the operation, intended use, and maintenance of the appliance, and shall comply with the requirements for instruction manuals in Sections 55 – 61.

CONSTRUCTION

7 General

7.1 An appliance shall employ materials that are acceptable for the application.

8 Adhesives Used to Secure Parts

8.1 An adhesive that is relied upon to reduce a risk of fire, electric shock, or injury to persons shall comply with the requirements for adhesives in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.

8.2 The requirement in 8.1 also applies to an adhesive used to secure a part, including a nameplate, that may, if loosened or dislodged:

- a) Make a live part accessible,
- b) Reduce spacings below the minimum acceptable values, or
- c) Expose a normally enclosed moving part that may present a risk of injury to persons.

9 Frame and Enclosure

9.1 An appliance shall be formed and assembled so that it will have the strength and rigidity necessary to resist the abuses to which it is likely to be subjected, without resulting in a risk 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.

9.2 Among the factors that shall be taken into consideration when judging the acceptability of a nonmetallic enclosure or an enclosure of magnesium are:

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

9.3 A polymeric enclosure shall comply with the applicable requirements in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C. Shavers and hair clippers provided with wall-hanging means are to be investigated as portable appliances, with regards to the requirements in UL 746C.

9.3 effective December 9, 2005

9.4 For unreinforced, flat surfaces in general, cast metal shall not be less than 1/8 in (3.2 mm) thick, except that malleable iron may be not less than 3/32 in (2.4 mm) and die-cast metal may be not less than 5/64 in (2.0 mm) thick. Corresponding thicknesses of not less than 3/32, 1/16 (1.6 mm), and 3/64 in (1.2 mm), respectively, may be acceptable if the surface under consideration is curved, ribbed, or otherwise reinforced, or if the shape or size, or both, of the surface is such that the necessary mechanical strength is provided.

9.5 An enclosure of sheet metal is judged with respect to its size, shape, thickness of metal, and its acceptability for the application, considering the intended use of the complete appliance. The use of sheet steel having a thickness of less than 0.026 in (0.66 mm) if uncoated or 0.029 in (0.74 mm) if galvanized, or of nonferrous sheet metal having a thickness of less than 0.036 in (0.91 mm) is not recommended, except for relatively small areas or for surfaces that are curved or otherwise reinforced.

9.6 Sheet metal to which a wiring system is to be connected in the field shall have a thickness not less than 0.032 in (0.81 mm) if uncoated steel, not less than 0.034 in (0.86 mm) if galvanized steel, and not less than 0.045 in (1.14 mm) if nonferrous.

9.7 The enclosure of a remotely or automatically controlled appliance shall prevent molten metal, burning insulation, flaming particles, or the like from falling on combustible materials, including the surface upon which the appliance is supported.

9.8 The requirement in 9.7 will necessitate that a switch, a relay, a solenoid, or the like be individually and completely enclosed, except for terminals, unless it can be shown that breakdown or malfunction of the component would not result in a risk of fire, or there are no openings in the bottom of the appliance enclosure. It will also necessitate the use of a barrier of noncombustible material:

a) Under a motor unless:

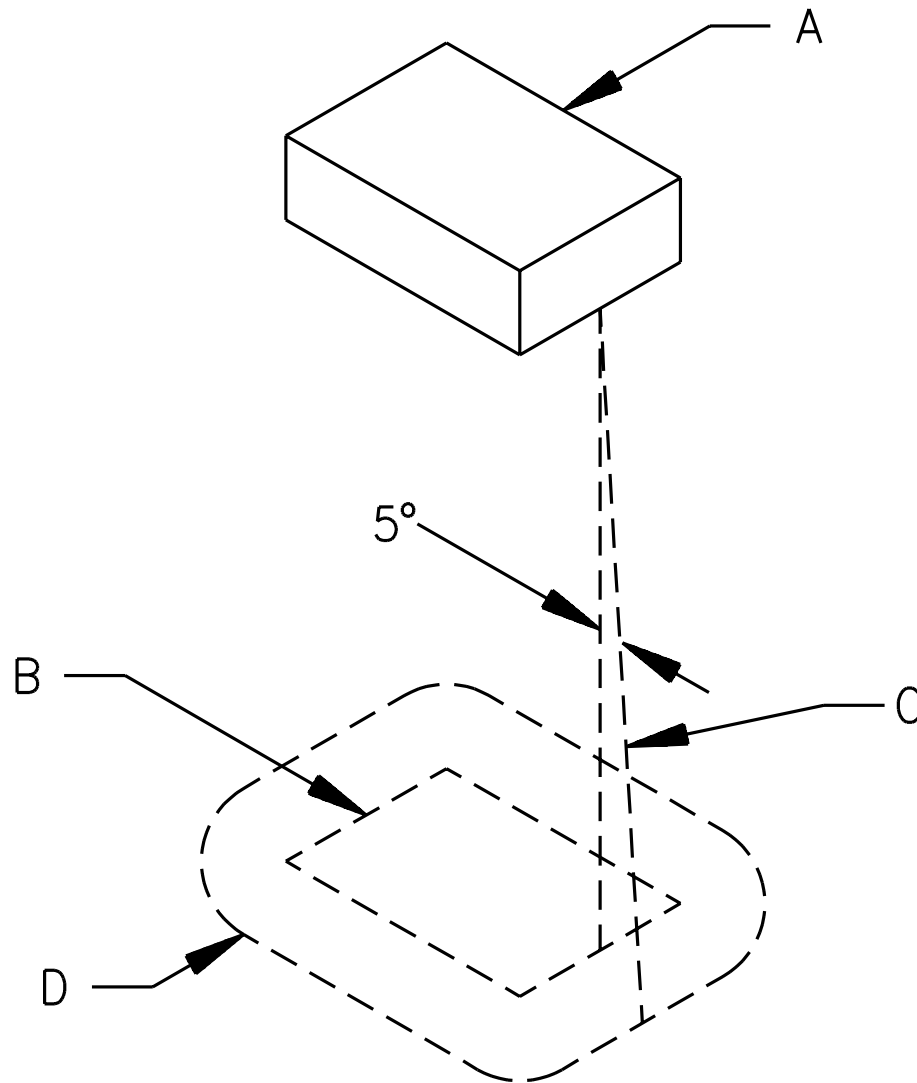
- 1) The structural parts of the motor or of the appliance provide the equivalent of such a barrier;
- 2) The protection provided with the motor is such that no burning insulation or molten material falls to the surface that supports the appliance when the motor is energized under each of the following fault conditions:
 - i) Open main winding,
 - ii) Open starting winding, and
 - iii) Starting switch short-circuited; or
- 3) The motor is provided with a thermal motor protector – a protective device that is sensitive to temperature and current – that will prevent 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.

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

9.9 The barrier mentioned in 9.8 shall be horizontal, shall be located as illustrated in Figure 9.1, and shall not have an area less than that described in that illustration. Openings for drainage, ventilation, and the like may be employed in the barrier, provided that such openings would not permit molten metal, burning insulation, or the like to fall on combustible material.

9.10 A door or cover of an enclosure that gives access to any overload-protective device shall be hinged or attached in an equivalent manner if the functioning of the device requires renewal, or if it is necessary to open the cover in connection with the operation of the protective device.

Figure 9.1
Location and extent of barrier



SA0604-1

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 which is partially shielded by the component enclosure or equivalent.

B – Projection of outline of component on horizontal plane.

C – Inclined line which traces out minimum area of barrier. When moving, the line is always (1) tangent to the component, (2) 5 degrees from the vertical, and (3) 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.

9.11 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.

10 Accessibility of Uninsulated Live Parts, Film-Coated Wire, and Moving Parts

10.1 To reduce the likelihood of unintentional contact that may involve a risk of electric shock from an uninsulated live part or film-coated wire or injury to persons from a moving part, an opening in an enclosure shall have a minor dimension less than 1 in (25.4 mm) and such a part or wire shall not be contacted by the probe illustrated in Figure 10.1.

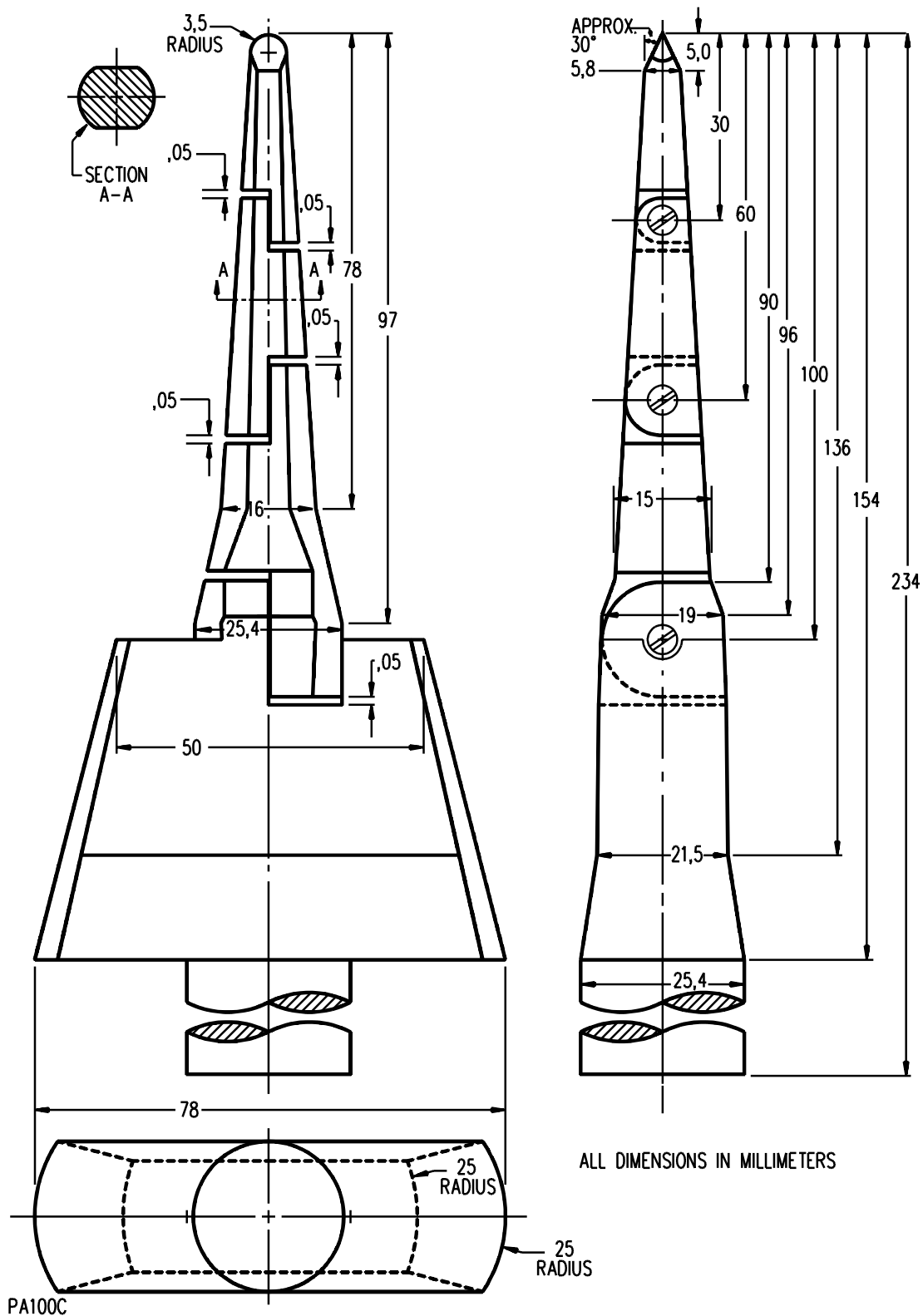
10.2 The probe shall be applied to any depth that the opening will permit, and shall be rotated or angled before, during, and after insertion through the opening to any position that is necessary to examine the enclosure. The probe shall be applied in any possible configuration; and, if necessary, the configuration shall be changed after insertion through the opening.

10.3 The probe shall be used as a measuring instrument to judge the accessibility provided by an opening, and not as an instrument to judge the strength of a material; it shall be applied with the minimum force necessary to determine accessibility.

10.4 With reference to the requirements in 10.1, 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.

10.5 During the examination of a product to determine whether it complies with the requirements in 10.1, 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.

Figure 10.1
Articulate probe with web stop



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10.6 With reference to the requirements in 10.1, insulated brush caps are not required to be additionally enclosed.

11 Mechanical Assembly

11.1 An appliance shall be assembled so that it will not be adversely affected by the vibration of normal operation. Brush caps shall be tightly threaded or otherwise designed to prevent loosening.

11.2 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 prevented from turning. See 11.4.

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

- a) The switch is 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 make 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; and*
- 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 prevented from turning if rotation cannot reduce spacings below the minimum acceptable values.

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

11.4 The means for preventing the turning mentioned in 11.2 and 11.3 is to consist of more than friction between surfaces – for example, 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.

12 Protection Against Corrosion

12.1 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 or cast-iron parts within an enclosure may not need to be protected against corrosion if oxidation of the 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.

Exception No. 2: A bearing, laminations, or a minor part of iron or steel, such as a washer, a screw, and the like need not be protected against corrosion.

12.2 If the corrosion of a liquid container provided as a part of an appliance would result in a risk of fire, electric shock, or injury to persons, the container shall be of a material that is resistant to corrosion by the liquid intended to be used therein.

13 Supply Connections

13.1 Cord-connected appliances

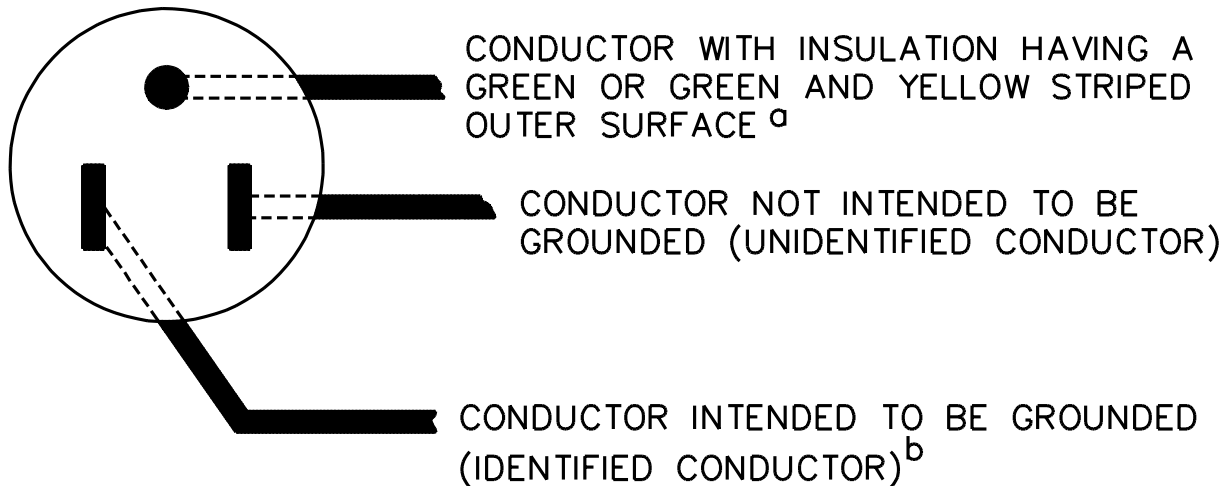
13.1.1 Cords and plugs

13.1.1.1 An appliance 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.

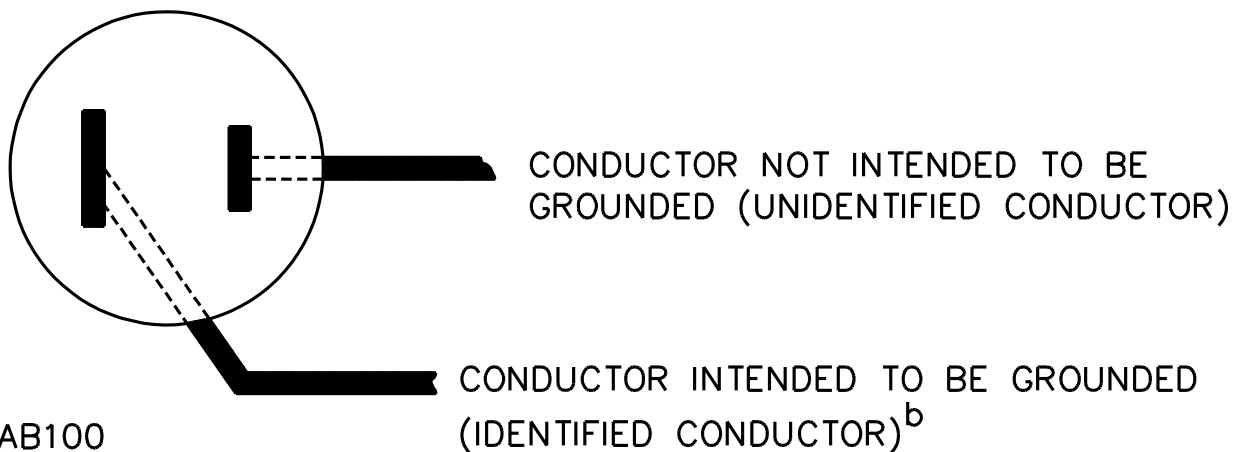
13.1.1.2 The attachment plug of a cord-connected appliance intended to be connected to a nominal 120-V circuit, and employing devices required to be connected to a specific supply conductor as specified in 17.2, 18.2, and 19.5 shall be a polarized type. The connections to the attachment plug shall be in accordance with Figure 13.1. The polarity identification of the supply cord shall be in accordance with Table 13.1. See 57.4.

Figure 13.1
Connections to attachment plugs

CONNECTIONS OF CORD CONDUCTORS TO GROUNDING – TYPE ATTACHMENT PLUG (FACE OF PLUG REPRESENTED)



CONNECTIONS OF CORD CONDUCTORS TO POLARIZED ATTACHMENT PLUG (FACE OF PLUG REPRESENTED)



NOTES –

^a A U-shape blade instead of a circular cross section blade is not prohibited for the blade to which the green conductor is connected.

^b Signifies a conductor identified in accordance with Table 13.1.

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Table 13.1
Polarity identification of flexible cords

Method of identification	Complying combinations	
	Conductor intended to be grounded ^a – or a conductor connected to the screw shells of lampholders	All other conductors ^a
Color of braids on individual conductors	Solid white or gray – without tracer	Solid color other than white or gray – without tracer
	Color other than white or gray – with tracer in braid	Solid color other than white or gray – without tracer
Color of insulation on individual conductors	Solid white or gray ^b	Solid color other than white or gray
	Light blue ^c	Color other than white, or gray
Color of separators	White or gray ^c	Color other than white, or gray
Other means	Tin or other white metal on all strands of the conductor ^d	No tin or other white metal on the strands of the conductor
	A stripe, ridge, or groove on the exterior surface of the cord ^d	
^a A conductor with insulation finished to show a green color with or without one or more yellow stripes or tracers shall be used only as an equipment-grounding conductor. See 14.1.5 and Figure 13.1. ^b Only for cords – other than Types SP-1, SP-2, SPT-1, SPT-2, or TPT – having no braid on any individual conductor. ^c For jacketed cords. ^d Only for Types SP-1, SP-2, SPT-1, SPT-2 and TPT cords.		

13.1.1.3 An appliance that is required to employ a polarized attachment plug as specified in 13.1.1.2, and that is supplied with a separate or detachable cord set as specified in 13.1.1.7 and 13.1.1.13 shall also employ an appliance connector of the polarized type to plug into the appliance.

13.1.1.4 A stationary appliance may be provided with a short length – not more than 8 ft (2.4 m) – of Type S, SE, SO, SOO, ST, STO, or STOO cord and an attachment plug for supply connection if the use of the appliance necessitates having it readily detachable from its source of supply by means of the plug.

13.1.1.5 The voltage and current ratings of the attachment plug shall not be less than those of the appliance. If the appliance can be adapted for use on two or more different values of voltage by field alteration of internal connections, the attachment plug provided with the appliance shall be acceptable for the voltage for which the appliance is connected when shipped from the factory. See 54.5.2.

13.1.1.6 The flexible cord shall have a voltage rating not less than the rated voltage of the appliance, and shall have an ampacity not less than the current rating of the appliance.

13.1.1.7 The flexible cord may be attached permanently to an appliance or, except as noted in 13.1.1.8, may be in the form of a separate cord set with means for connection to the appliance.

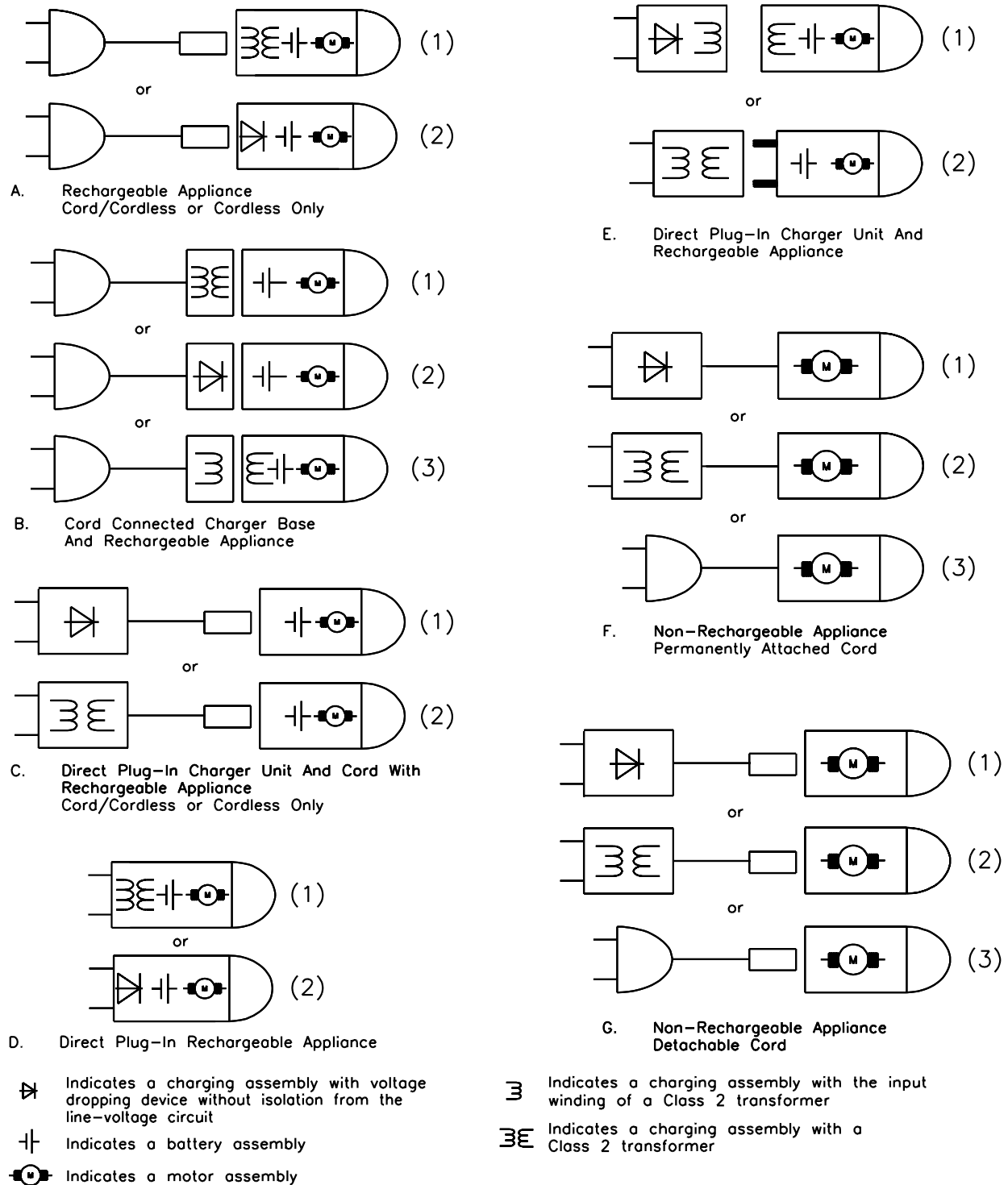
13.1.1.8 A cord-connected appliance that is required to be equipped with a grounding conductor shall be provided with flexible cord permanently attached to the appliance.

13.1.1.9 The length of a flexible cord for an appliance configuration shown in Figure 13.2 shall be as specified in Table 13.2.

Exception: A cord-connected appliance that is required to be equipped with a grounding conductor shall not be supplied with more than 18 in (457 mm) of permanently attached flexible cord or with a motor-attachment plug when:

- a) The usage of the appliance is such that it is required to connect it by means of an extension cord during normal operation, and the manufacturer makes an extension cord available for use with the appliance – see 54.2.2; or*
- b) The manufacturer furnishes a detachable cord set, 6 ft (1.83 m) or more in length, with the appliance.*

Figure 13.2
Appliance configurations



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13.1.1.10 The flexible cord for an appliance configuration shown in Figure 13.2 shall be of a Type as specified in Table 13.2 or shall have properties such that it is at least equally as serviceable for the application.

Table 13.2
Cords for appliances

Table 13.2 revised December 19, 2007

Application	Appliance configuration in Figure 13.2	Types of cord ^d	Minimum Length ^a	
			ft	(m)
Animal clippers: 50 W or less	A (cord/cordless), F (line voltage circuit), G (line voltage circuit)	SV, SVE, SVO, SVOO, SVT, TS ^b , TST ^b	6	(1.83)
	A (cordless only), B	SJ, SJE, SJT, SJO, SJOO	6	(1.83)
	Over 50 W	A, B, F (line voltage circuit), G (line voltage circuit)	6	(1.83)
Hair clippers: Household	A (cord/cordless), F (line voltage circuit), G (line voltage circuit)	TPT ^b , TS ^b , TST ^b , SP-1 ^c , SPE-1 ^c , SPT-1 ^c , SVT ^c	6	(1.83)
	A (cordless only), B	SP-2, SPE-2, SPT-2, SVT	4	(1.23)
	Commercial	A (cord/cordless), F (line voltage circuit), G (line voltage circuit)	6	(1.83)
		A (cordless only), B	4	(1.23)
Shavers: Household	A (cord/cordless), F (line voltage circuit), G (line voltage circuit)	TPT ^b , SP-1 ^c , SPE-1 ^c , SPT-1 ^c	5	(1.50)
	A (cordless only), B	SP-2, SPE-2, SPT-2	4	(1.23)
Either Hair Clipper or Shaver: Any application	C (cord/cordless), F (low voltage, limited energy), G (low voltage, limited energy)	Any	6	(1.83)
	C (cordless only)	Any	4	(1.23)

^a Minimum length includes the attachment plug, and for a cord set includes fittings.

^b See 13.1.1.12.

^c Cord having individual strands with a maximum diameter not greater than 36 AWG.

^d Counter supported appliances weighing 1/2 lb or less are able to use SP-1, SPE-1, or SPT-1 cord having individual strands with a maximum diameter not greater than 36 AWG. The weight of the appliance is to be determined without the power supply cord. Additionally, for a charger base unit, the weight of the appliance is determined without the clipper or shaver.

13.1.1.11 Where a tinsel cord is employed, the appliance and cord shall comply with the following conditions:

- a) The cord shall not be longer than 8 ft (2.4 m);