

UL 430

Waste Disposers

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UL Standard for Safety for Waste Disposers, UL 430

Sixth Edition, Dated August 11, 2004

Revisions: This Standard contains revisions through and including November 7, 2007.

Summary of Topics

These revisions to ANSI/UL 430 are being issued to address universal upkeep of UL Standards for Safety. These revisions are considered to be non-substantive and not subject to UL's STP process.

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 revisions dated November 7, 2007 include a reprinted title page (page1) for this Standard.

The revisions dated May 9, 2006 editorially replace all references to UL 1020 with the reference to UL 60691.

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/ul.com/ulforeword.html>

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that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.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

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August 11, 2004

The most recent designation of ANSI/UL 430 as an American National Standard (ANSI) occurred on February 27, 2006. The ANSI approval for this standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

This ANSI/UL Standard for Safety consists of the Sixth Edition including revisions through November 7, 2007.

The Department of Defense (DoD) has adopted UL 430 on August 5, 1994. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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 motor operated household and commercial disposers rated 600 V or less and intended to be used in accordance with the National Electrical Code, NFPA 70. These disposers are intended to convert organic types of waste material to a form that can be accommodated by plumbing systems. The requirements also cover field-installed control assemblies and accessories specifically intended for use with disposers covered by this standard.

1.2 These requirements do not cover an incinerator-type disposer or a disposer using a universal motor with a rating greater than 250 V.

2 Components

2.1 Except as indicated in 2.2, a component of a disposer 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 disposers covered by this standard.

2.2 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.

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

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

3 Units of Measurement

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

4 Undated References

4.1 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.

5 Glossary

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

5.2 BARRIER – A part of a disposer that functions to reduce the risk of access to current-carrying parts or internal wiring through openings in the enclosure that involves a risk of electric shock or injury to persons, or reduces the risk of fire or injury to persons as a result of molten metal or burning insulation being expelled through openings in the enclosure under abnormal conditions.

5.3 DECORATIVE PART – A part used for no function other than appearance.

5.4 ENCLOSURE – That portion of a disposer that:

- a) Renders inaccessible any part that presents a risk of electric shock or injury to persons,
- b) Reduces the risk of flame propagation initiated by electrical disturbances occurring within, or
- c) Both.

A grill, guard, panel, barrier, or similar part forms part of an enclosure if it reduces the risk of contact with an uninsulated current-carrying part or a part that presents a risk of injury to persons.

5.5 FUNCTIONAL PART – A part that is necessary for the intended operation of the disposer, the deterioration of which may result in a risk of fire, electric shock, or injury to persons.

5.6 HOPPER – A container that funnels material into the disposer prior to the reduction process.

CONSTRUCTION

6 Field-Installed Accessories and Assemblies

6.1 The requirements in 6.2 – 6.8 apply to accessories intended for installation on or attachment to a disposer in the field for the purpose of modifying or supplementing the functions of the disposer. The combination of the basic disposer and control assembly or other field-installed accessory shall comply with the applicable requirements in this standard.

6.2 A disposer intended for use with a field-installed control assembly or accessory that is not shipped with the disposer shall be marked in accordance with 59.10.

6.3 A field-installed control assembly or accessory identified for use with a disposer as specified in 59.10 shall comply with 17.10.

6.4 A disposer having provision for an accessory to be attached in the field shall be constructed so that use of the accessory does not introduce a risk of fire, electric shock, or injury to persons.

6.5 The means provided for attachment of an accessory by the operator shall be receptacles and plug-in connectors.

6.6 The use of wire connectors and existing terminals as a means of attaching an accessory by qualified personnel is acceptable.

6.7 A disposer shall not require rearrangement of components or wires, cutting or splicing wires, or soldering connections in the field.

6.8 An accessory shall be trial-installed and tested to determine whether:

- a) The accessory can be installed according to the instructions,
- b) The instructions are detailed and correct, and
- c) Use of the accessory after installation according to the instructions does not result in a risk of fire, electric shock, or injury to persons.

7 Enclosure

7.1 General

7.1.1 A disposer shall be formed and assembled so that it has the strength and rigidity necessary to resist the abuses to which it may 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 defects.

7.1.2 For an unreinforced flat surface, cast metal shall not be less than 1/8 in (3.2 mm) thick, malleable iron shall not be less than 3/32 in (2.4 mm) thick, and die-cast metal shall not be less than 5/64 in (2.0 mm) thick.

Exception No. 1: The use of thinner metal complies if:

- a) The metal is curved, ribbed, or otherwise reinforced to provide equivalent or better mechanical strength, or*
- b) The metal is of a size or shape that provides equivalent or better mechanical strength.*

In any case, the metal shall not be less than 3/32 in (mm) for cast metal, 1/16 in (1.6 mm) for malleable iron, or 3/64 in (1.2 mm) for die-cast metal.

Exception No. 2: Thinner metal meets the intent of the requirement if found acceptable when investigated with respect to the factors specified in 7.1.6.

7.1.3 In addition to being investigated with respect to the factors specified in 7.1.6, the effects of the following factors shall be investigated to determine compliance of a sheet-metal enclosure with 7.1.1:

- a) The size and shape of the disposer with respect to the intended use of the disposer,
- b) The thickness of metal with respect to the intended use of the disposer, and
- c) The application of the metal with respect to the intended use of the disposer.

7.1.4 Sheet metal used for other than relatively small areas or for surfaces that are curved or otherwise reinforced shall not be thinner than:

- a) 0.026 in (0.66 mm) if uncoated steel,
- b) 0.029 in (0.74 mm) if galvanized steel, or
- c) 0.029 in (0.74 mm) if of nonferrous sheet metal having a thickness less than 0.036 in (0.91 mm).

7.1.5 Sheet metal to which a wiring system is to be connected in the field shall not be thinner than:

- a) 0.032 in (0.81 mm) if uncoated steel,
- b) 0.034 in (0.86 mm) if galvanized steel, or
- c) 0.045 in (1.14 mm) if nonferrous sheet metal.

7.1.6 The effects of the following factors shall be determined for compliance with 7.1.1:

- a) Mechanical strength,
- b) Resistance to impact,
- c) Moisture-absorption properties,
- d) Combustibility,
- e) Resistance to corrosion, and
- f) Resistance to distortion at temperatures to which the enclosure is subjected under conditions of intended or unintended use.

These factors shall be investigated with respect to thermal aging if a nonmetallic enclosure is being investigated.

7.2 Barriers

7.2.1 The enclosure of a disposer shall reduce the likelihood of molten metal, burning insulation, flaming particles, or the like from falling on combustible materials, including surfaces located beneath the disposer.

7.2.2 Compliance with 7.2.1 requires that a switch, a relay, a solenoid, or similar component be completely enclosed (no openings), unless it is shown that malfunction of the component does not result in a risk of fire; or there are no openings in the bottom of the disposer enclosure. Compliance with 7.2.1 also requires the use of a barrier:

a) Under a motor, unless:

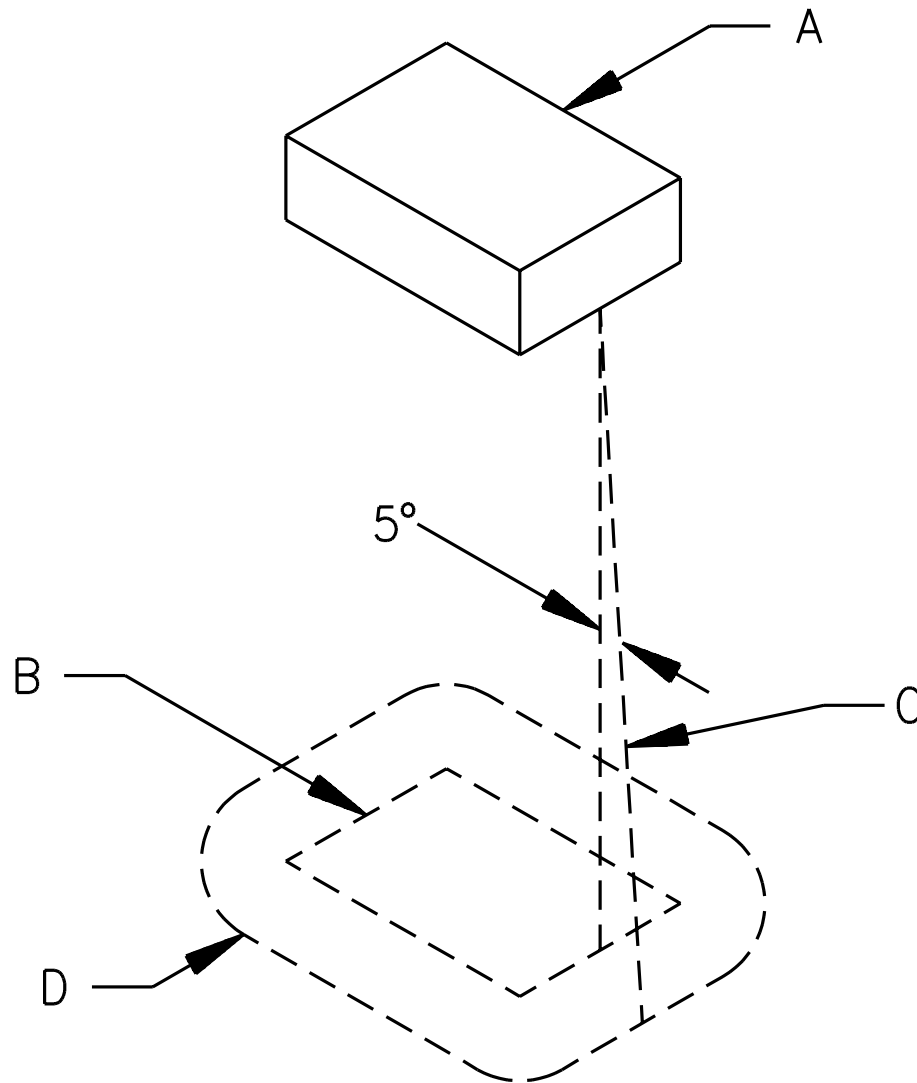
- 1) The structural parts of the motor or of the disposer provide the equivalent of such a barrier;
- 2) The protection provided with the motor is such that no burning insulation or molten material falls to surfaces located beneath the disposer when the motor is energized under each of the following fault conditions:
 - i) Open main winding,
 - ii) Open auxiliary winding,
 - iii) Starting switch short-circuited, and
 - iv) Capacitor of a permanent-split-capacitor 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 reduces the risk of the temperature of the motor windings from becoming greater than 125°C (257°F) under the maximum load under which the motor runs without causing the protector to cycle, and from becoming greater than 150°C (302°F) with the rotor of the motor locked; or
- 4) The motor complies with the requirements for impedance-protected motors in the Standard for Overheating Protection for Motors, UL 2111, and the temperature of the motor winding does not exceed 150°C (302°F) during the first 72 h of operation with the rotor of the motor locked.

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

7.2.3 The barrier specified in 7.2.2 shall:

- a) Be located as illustrated in Figure 7.1; and
- b) Have an area not less than that determined in accordance with Figure 7.1.

Figure 7.1
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 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. When moving, the line is always tangent to the component, five degrees from the vertical, and oriented so 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.

7.2.4 With reference to 7.2.3, an opening that is intended for drainage or ventilation shall be such that molten metal, burning insulation, or similar material does not fall onto combustible material.

7.3 Accessibility of uninsulated live parts and film-coated wire

7.3.1 To reduce the risk of unintentional contact with an uninsulated live part or film-coated wire that involves a risk of electric shock, an opening in an enclosure shall comply with (a) or (b).

- a) For an opening that has a minor dimension (see 7.3.5) less than 1 in (25.4 mm), such a part or wire shall not be contacted by the probe illustrated in Figure 7.2.
- b) For an opening that has a minor dimension of 1 in or greater, such a part or wire shall be spaced from the opening as specified in Table 7.1.

Exception: An integral enclosure of a motor is not required to comply with these requirements if it complies with 7.3.2.

Table 7.1
Minimum acceptable distance from an opening to a part that may involve a risk of electric shock

Minor dimension ^a of opening		Minimum distance from opening to part	
in ^b	(mm)	in ^b	(mm)
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 7.3.5. ^b Between 3/4 in and 2-1/8 in, interpolation is to be used to determine a value between values specified in the table. ^c Any dimension less than 1 in applies to a motor only. ^d Greater than 2-1/8 in, but not greater than 6 in (152.0 mm).			

7.3.2 With reference to the Exception to 7.3.1, an opening in an integral enclosure of a motor shall comply with (a) or (b).

a) For an opening that has a minor dimension (see 7.3.5) less than 3/4 in (19.1 mm):

- 1) Film-coated wire shall not be contacted by the probe illustrated in Figure 7.3, and
- 2) In a directly accessible motor (see 7.3.6), an uninsulated live part shall not be contacted by the probe illustrated in Figure 7.4.

b) For an opening that has a minor dimension of 3/4 in or greater, a part or wire shall be spaced from the opening as specified in Table 7.1.

Figure 7.3
Probe for internal wiring and film-coated wire

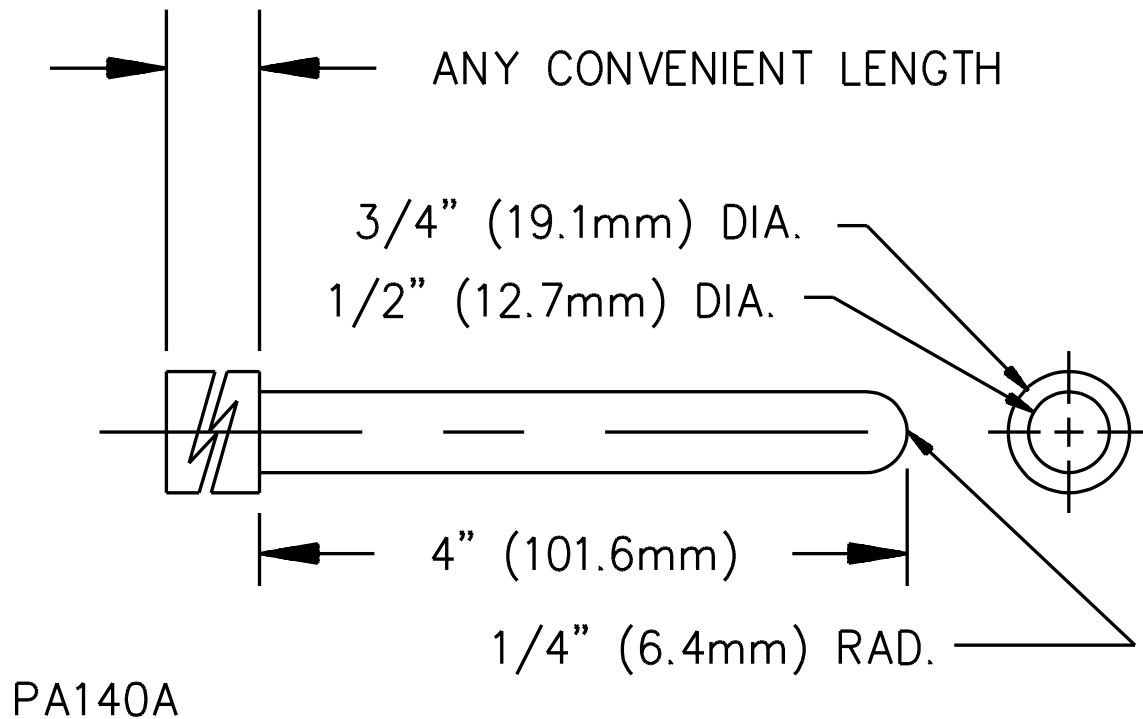
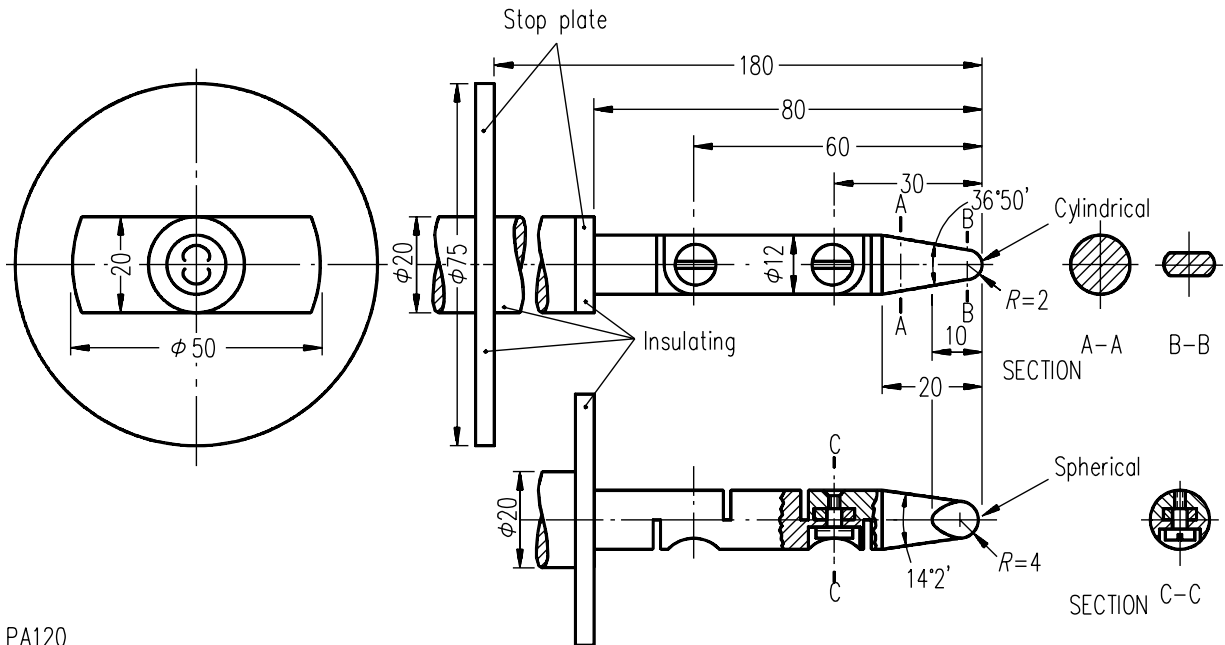


Figure 7.4
International Electrotechnical Commission (IEC) articulate accessibility probe with stop plate
 Courtesy of IEC
 Dimensions in millimeters



PA120

7.3.3 The probes specified in 7.3.1 and 7.3.2 and illustrated in Figures 7.2 – 7.4 shall be applied to any depth that the opening permits, 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 probes illustrated in Figures 7.2 and 7.4 shall be applied in any possible configuration, and, if necessary, the configuration shall be changed after insertion through the opening.

7.3.4 The probes specified in 7.3.3 and 7.3.5 shall be used as measuring instruments to determine the accessibility provided by an opening, and not as instruments to determine the strength of a material. The probes shall be applied with the minimum force necessary to determine compliance.

7.3.5 With reference to 7.3.1 and 7.3.2, 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.

7.3.6 With reference to 7.3.2, a directly accessible motor is a motor:

- a) That can be contacted without opening or removing any part, or
- b) That is located so as to be accessible to contact.

7.3.7 During the examination of a disposer to determine compliance with 7.3.1 or 7.3.2, a part of the enclosure that can 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.

7.3.8 With reference to 7.3.1 and 7.3.2, insulated brush caps are not required to be additionally enclosed.

8 Polymeric Materials

8.1 A polymeric material used as a part of a disposer shall comply with the applicable requirements in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, and with the requirements for polymeric materials specified in Sections 44 – 54.

Exception: A material need not comply with the requirements for enclosures, direct contact with current-carrying parts, or other requirements for functional parts if a complete or partial deterioration or breakage of the part does not adversely affect compliance with any other requirement in this standard. In such cases, the material shall comply with the requirements applicable to decorative parts.

8.2 When determining compliance with 8.1, a disposer shall be investigated as:

- a) A fixed appliance if it is intended to be permanently connected electrically or sink-mounted, or
- b) A stationary appliance if it is cord-connected and intended to be fastened in place or located in a dedicated space.

8.3 A material used in a part that contacts water or food waste during normal operation, including water and food waste from a dishwasher, shall be investigated on the basis of operating at temperatures not less than 82°C (180°F) unless measured temperatures on a polymeric part, obtained in accordance with the method described in 8.3.1, are less.

8.3 revised March 13, 2006

8.3.1 The disposer is to be connected to a power supply as specified in 29.2. Thermocouples are to be placed on the outside of the polymeric parts that contact water or food waste during normal operation. The disposer is to be operated while water is run through the top of the disposer for 20 minutes. The water is to be at a temperature of 180°F (82°C) and run at a rate of 2.2 gal/min (8.3 L/min). See 35.3 – 35.5.

8.3.1 added March 13, 2006

8.4 A material that attains temperatures greater than 50°C (122°F) during the Temperature Test, Section 35, including those described in 8.3, shall have a relative thermal index or other temperature rating for the application in accordance with the Standard for Polymeric Materials – Long Term Property Evaluations, UL 746B.

8.5 A polymeric material of a disposer shall be resistant to thermal degradation at the maximum temperature to which it is exposed during intended use and shall comply with Thermal-Aging Test, Section 52.

8.6 If the deterioration of a polymeric material results in a risk of fire, electric shock, or injury to persons, the material shall be resistant to solutions to which it is exposed during intended use and shall comply with Long Term Exposure Tests, Section 53.

9 Mechanical Assembly

9.1 A disposer shall be assembled so that its functioning is not impacted by the vibration produced during intended operation. Brush caps shall be tightly threaded or otherwise constructed so that the caps do not loosen.

9.2 A switch, attachment-plug receptacle, motor-attachment plug, or similar component shall be mounted securely, and shall not rotate. Friction between surfaces shall not be used as the only means to prevent rotation. Using a lock washer to prevent rotation of a stem-mounted switch or other device having a single-hole mounting means is acceptable.

Exception: This requirement does not apply to a switch if:

- a) The switch is of a plunger or other type that does not tend to rotate when operated - a toggle switch does not comply with this requirement,*
- b) The risk of the switch loosening from its mounting means due to operation is remote,*
- c) The spacings are not reduced below the minimum required values if the switch rotates, and*
- d) Normal operation of the switch is by mechanical means rather than direct contact by persons.*

10 Corrosion Protection

10.1 All surfaces of an iron or a steel part shall be enameled, galvanized, plated, or similarly treated to reduce the risk of corrosion.

Exception No. 1: Corrosion protection is not required for a bearing, balance weight, lamination, or a minor part such as a screw or washer.

Exception No. 2: Corrosion protection is not required for an iron or steel part where corrosion of the part does not result in a risk of fire, electric shock, or injury to persons.

11 Power-Supply Connections

11.1 Cord-connected disposers

11.1.1 Cords and plugs

11.1.1.1 A power-supply cord – a length of flexible cord and an attachment plug – is acceptable on a household appliance, but not on a commercial appliance.

11.1.1.2 For a portable disposer:

- a) The flexible cord shall be S, SE, SEO, SEOO, SJ, SJE, SJEO, SJEOO, SJO, SJT, SJTO, SJTOO, SO, SOO, ST, STO, or STOO, and
- b) The length of the flexible cord shall not be less than 5 ft (1.52 m).

11.1.1.3 For a household disposer intended for attachment to a sink:

- a) The flexible cord shall be Type S, SE, SEO, SEOO, SJ, SJE, SJEO, SJEOO, SJO, SJT, SJTO, SJTOO, SP-3, SPE-3, SO, SOO, SPT-3, ST, STO, or STOO, and
- b) The length of the flexible cord shall not be less than 1-1/2 ft (457 mm) and not greater than 3 ft (914 mm).

11.1.1.4 The flexible cord shall be rated for a voltage not less than the rated voltage of the disposer. The ampacity of the cord shall not be less than the current rating of the disposer. The attachment plug shall be rated for use with a current not less than 125 percent of the current rating of the disposer, and at a voltage equal to the voltage rating of the disposer.

11.1.1.5 If a disposer is adaptable for use on two or more different values of voltage by field alteration of internal connections, the attachment plug shall be rated for the voltage for which the appliance is connected when shipped from the factory. See 59.11.

11.1.1.6 A 3-wire to 2-wire, grounding adapter shall not be provided with an appliance.

11.1.1.7 Means shall be provided to reduce the risk of the flexible cord being pushed into the disposer through the cord-entry hole when such displacement results in a risk of:

- a) Subjecting the cord to mechanical damage,
- b) Exposing the cord to a temperature higher than that for which it is rated,
- c) Reducing spacings, such as to a metal strain-relief clamp, below the minimum required values, or
- d) Damaging internal connections or components.

To determine compliance, the cord shall be tested in accordance with Push-Back Relief Test, Section 42.

11.1.2 Strain relief

11.1.2.1 Strain relief means shall be provided for a permanently attached power-supply cord so that mechanical stress on the flexible cord is not transmitted to terminals, splices, or interior wiring. The strain relief shall comply with Strain Relief Test, Section 41.

11.1.2.2 For a knot in a flexible cord serving as strain relief, the surfaces that the knot contacts shall be smooth and free from projections, sharp edges, burrs, or fins.

11.1.2.3 The flexible cord of a portable household disposer shall:

- a) Enter the enclosure through a watertight fitting or be otherwise sealed in place, and
- b) Be provided with strain relief that is independent of the seal, and the strain relief means shall reduce the risk of flexing or movement of the seal.