



UL 474

Underwriters Laboratories Inc. Standard for Safety

Dehumidifiers



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UL Standard for Safety for Dehumidifiers, UL 474

Ninth Edition, Dated July 8, 2009

Summary of Topics

This New Edition of ANSI/UL 474 includes the following:

- 1. Revisions to allow 20 and 22 AWG internal wiring and corresponding revisions to the Limited Short Circuit test***
- 2. Addition of an exception to paragraph 32.2.1 that allows components to be evaluated to UL 60730-1A and UL 60730-2-9***
- 3. Addition of requirements addressing the length of the supply cord for dehumidifiers used for water damage restoration***

The following table lists the future effective dates with the corresponding item.

Future Effective Date	References
January 9, 2012	Paragraphs 7.4, 7.6, 43.11, and 43.12

The new and revised requirements are substantially in accordance with UL's Proposal(s) on this subject dated August 8, 2008, October 24, 2008, and November 14, 2008.

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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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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Standard for Dehumidifiers

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Second Edition – November, 1969
Third Edition – June, 1973
Fourth Edition – September, 1978
Fifth Edition – July, 1981
Sixth Edition – August, 1987
Seventh Edition – June, 1993
Eighth Edition – July, 2004

Ninth Edition

July 8, 2009

This ANSI/UL Standard for Safety consists of the Ninth Edition.

The most recent designation of ANSI/UL 474 as an American National Standard (ANSI) occurred on July 7, 2009. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

The Department of Defense (DoD) has adopted UL 474 on January 18, 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 movable, household, self-contained dehumidifiers employing hermetic refrigerant motor-compressors and intended for connection to single-phase, alternating-current (ac) circuits rated not more than 20 amperes, 125 volts or 15 amperes, 208 or 230 volts. The requirements also cover dehumidifiers which incorporate electric air heaters.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a value 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 valves covered by this standard.

2.1.2 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.

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

2.1.4 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.

2.2 Units of measurement

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

2.3 Undated references

2.3.1 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

3 General

3.1 Ferrous metal parts used to support or retain electrical components in position shall be protected against corrosion by metallic or nonmetallic coatings, such as plating or painting.

Exception: This requirement does not apply to parts, such as washers, screws, bolts, and the like, where corrosion of such unprotected parts would not affect compliance with the requirements of this standard.

4 Assembly

4.1 Opening in the enclosure of a dehumidifier shall be designed and located to reduce the risk of unintentional contact with:

- a) Uninsulated live parts,
- b) Parts which may cause injury to persons, such as fan blades and blower wheels, and
- c) Electric heater elements.

The minor dimension of such openings shall not permit passage of a 1 inch (25.4 mm) diameter hemispherically-tipped rod, applied with a force of 2.5 pounds (11.1 N). In evaluating openings, parts of the enclosure, such as covers, panels, and grilles are to be removed unless tools are required for their removal or when exposed, a moving part is made inoperative or an uninsulated electrical part is de-energized through the use of interlocking devices.

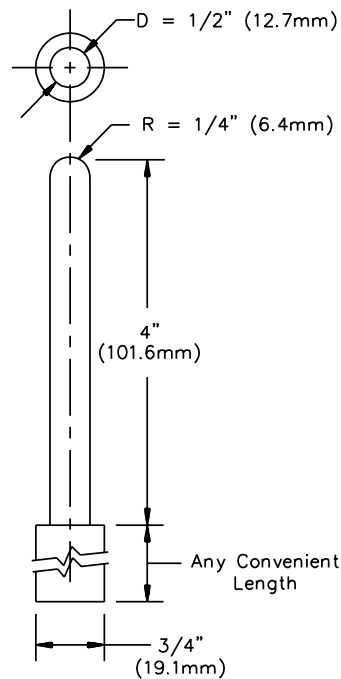
4.2 An opening is acceptable if the probe illustrated in Figure 4.1 cannot contact uninsulated live parts, film coated wire, moving parts, and heater elements. The probe is to be applied:

- a) With a force of 2.5 pounds (11.1 N) and
- b) In any possible configuration and to any depth that the size of an opening will permit.

The probe is to be rotated or angled to any possible position before, during, or after insertion through the opening; and, if necessary, the configuration of the probe may be changed after the probe has been inserted through the opening.

Exception: For film-coated wire, an opening in the motor enclosure of 3/4 inch (19.0 mm) or less is acceptable if the probe illustrated in Figure 4.2 cannot contact the wire.

Figure 4.2
Probe



PA170B

4.3 In addition to the requirements of 4.1 and 4.2, uninsulated live parts inside the enclosure which are likely to be contacted by persons performing operations, such as adjusting controls or oiling motors, shall be located, guarded, or enclosed to reduce the risk of unintentional contact. See 43.8.

4.4 Electrical components shall be located or enclosed so that water will not impinge on uninsulated live parts as a result of splashing, leakage, or condensation. See Leakage Current Test, Section 23, and Dielectric Voltage Withstand Test, Section 27, conducted following the Temperature and Pressure Test, Section 25.

4.5 A condensate drain pan and a condensate receptacle shall be constructed and located so that overflow will not wet uninsulated live parts or film-coated wire. An Overflow Test, Section 30, is to be conducted if it is not evident that the dehumidifier complies with this requirement.

4.6 A switch, lampholder, receptacle, plug connector, or other electrical component shall be secured in position and prevented from turning. See 4.7.

Exception No. 1: The requirement that a switch be prevented from turning will be waived if all 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 operation of the switch.*
- b) Means of mounting the switch make it unlikely that intended operation of the switch will loosen it.*
- c) Electrical spacings are not reduced below the required values if the switch rotates.*

d) Operation of the switch is by mechanical means rather than direct contact by persons.

Exception No. 2: A lampholder of a 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 electrical spacings below the minimum acceptable values.

4.7 The means for preventing rotation mentioned in 4.6 is to consist of more than friction between surfaces. A toothed lock washer that provides both spring take-up and an interference lock is acceptable as means for preventing a small stem-mounted switch or other device having a single-hole mounting means from turning.

4.8 Uninsulated live parts shall be secured to the mounting surface so that they will be prevented from turning or shifting in position if such motion may result in a reduction of electrical spacings below the minimum acceptable values. Friction between surfaces is not acceptable as a means to prevent shifting or turning of live parts but a lock washer as described in 4.7 is acceptable.

4.9 Flammable or electrically conductive thermal or acoustical insulation shall not contact uninsulated live parts. See 34.2.1.

4.10 Exposed unimpregnated asbestos material shall not be used in an air handling compartment. The unprotected edge of a gasket sandwiched between two parts is considered to be exposed.

5 Enclosures

5.1 A dehumidifier enclosure shall be formed and assembled so that it will have the strength and rigidity necessary to resist the abuses to which it may be subjected without total or partial collapse resulting in reduction of electrical spacings below those specified in Section 16, or exposure of moving parts or uninsulated live parts as judged by the requirements of Assembly, Section 4. An enclosure complying with the requirements of the Static Load Test, Section 31, is considered to comply with this requirement. For polymeric enclosures, see Polymeric Materials – Application, Section 6.

5.2 Enclosures for individual electrical components, outer enclosures, and combinations of the two are to be considered in determining compliance with the requirement of 5.1.

5.3 Openings in the bottom of a dehumidifier shall be located or provided with barriers or baffles to reduce the risk of burning insulation, flaming particles, molten metal, and the like, from falling out of the unit. Also see 14.8 – 14.10.

5.4 Steel enclosures shall be protected against corrosion by metallic or nonmetallic coatings, such as plating or painting.

6 Polymeric Materials – Application

6.1 The requirements in 6.2 – 6.6 cover parts made of polymeric materials for use in dehumidifiers. These requirements do not apply to materials used as electrical insulation, sole support of current-carrying parts, nor to small parts, such as control knobs, buttons, insulating bushings, resilient mounts, clamps, and wiring straps.

6.2 Among the factors that shall be taken into consideration when judging the acceptability of nonmetallic material are resistance to:

- a) Mechanical damage,
- b) Impact,
- c) Moisture absorption,
- d) Combustion, and
- e) Distortion at temperatures to which the material may be subjected under conditions of normal or abnormal use.

6.3 A polymeric material enclosure of electrical parts shall comply with the requirements in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, as applicable to polymeric enclosures.

Exception No. 1: A minimum impact of 5 foot-pounds (6.8 J) shall apply to all dehumidifiers when determining the impact resistance of a polymeric material enclosure of live parts.

Exception No. 2: A minimum impact of 1.5 foot-pounds (2.0 J) shall apply to all dehumidifiers when determining the impact resistance of a polymeric material enclosure of hazardous moving parts.

Exception No. 3: An enclosure of Class 2 circuits shall be treated as a decorative part. See 6.5.

6.4 When determining compliance with the enclosure requirements of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C:

- a) A dehumidifier is to be considered an unattended appliance.
- b) The portable enclosure requirements shall apply to all cord-connected dehumidifiers not intended to be fastened to the building structure or other equipment.
- c) A dehumidifier shall be considered subject to normal room temperature environmental conditions.

6.5 Decorative parts constructed of polymeric materials shall comply with the flammability requirements in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, as applicable to decorative parts of enclosures.

6.6 Except where superseded by other requirements in this standard or UL 746C, polymeric materials shall have a flammability classification of HB minimum, when tested in accordance with the Standard for Tests for Flammability of Plastic Materials for Parts in Devices or Appliances, UL 94.

Exception No. 1: A higher level of flammability may be required due to the alternate path of enclosure requirements in Section 5 of UL 746C.

Exception No. 2: Parts of a portable dehumidifier are not required to be made of a material classed HB, minimum, provided the part does not occupy a volume greater than 0.122 in³ (2 cm³), does not have any dimension greater than 2.4 in (60.1 mm), and is located so it cannot propagate flame from one area to another or bridge between a possible source of ignition and other ignitable parts.

6.7 Polymeric materials that serve as direct or indirect support of live parts, or an electrical or mechanical barrier shall comply with the requirements for electric insulation in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.

7 Supply Connections

7.1 A dehumidifier shall be equipped with a flexible power-supply cord having an equipment grounding conductor and with a grounding-type attachment plug.

7.2 A dehumidifier shall employ a grounding-type attachment plug that complies with the American National Standards designated in Table 7.1. The marked ampere rating of a dehumidifier shall not exceed 80 percent of the ampere rating of the attachment plug.

Table 7.1
Attachment plug rating

Amperes, volts		ANSI designation ^a
15	125	5 – 15P
20	125	5 – 20P
15	250	6 – 15P

^a Standard for Wiring Devices – Dimensional Requirements, ANSI/NEMA WD6.

7.3 A dehumidifier shall employ a Type S, SO, ST, STO, SJ, SJO, SJT, SJTO, SE, SEO, SEOO, SOO, STOO, SJE, SJEO, SJEOO, SJOO, or SJTOO power supply cord rated for use at a voltage not less than the rated voltage of the dehumidifier. The ampacity of the cord as given in the National Electrical Code, ANSI/NFPA 70, shall be not less than that required by the ampere input measured during the Temperature and Pressure Test, Section 25, and during the Temperature Test – Electric Heat, Section 26.

7.4 A dehumidifier intended for use for water damage restoration of commercial/household properties shall employ an outdoor-use power-supply cord. The flexible cord shall be Type SOW, SOOW, STW, STOW, STOOW, SEW, SEOW, SEOOW, SJOW, SJOOW, SJTW, SJTOW, SJTOOW, SJEW, SJEOW, or SJEOWW.

7.4 effective January 9, 2012

7.5 The grounding conductor of a power supply cord shall be finished a continuous green color or a continuous green color with one or more yellow stripes, and no other conductor of the power supply cord shall be so identified. The grounding conductor shall be secured to the frame or enclosure of the dehumidifier by a positive means (see 9.4) that is not likely to be removed during any servicing operation not involving the power supply cord. The grounding conductor shall be connected to the grounding pin of the attachment plug cap.

7.6 The length of the power supply cord shall be not less than 6 feet (1.83 m) nor more than 10 feet (3.0 m). The length is to be measured between the attachment plug and the point at which the cord exits the dehumidifier cabinet.

Exception: A dehumidifier intended for use for water damage restoration of commercial/household properties shall have a power supply cord not less than 6 feet (1.83 m) nor more than 25 feet (7.6 m).

7.6 effective January 9, 2012

7.7 The power supply cord shall be provided with strain relief means so that a stress on the cord will not be transmitted to terminals, splices, or internal wiring. If a metallic strain relief means is provided, it shall not contact uninsulated live parts or reduce electrical spacings within the enclosure if the cord is moved inward.

7.8 To determine the acceptability of the strain relief means required by 7.7, a 35 pounds-mass (15.9 kg) weight is to be suspended from the cord and supported by the dehumidifier so that the strain relief means will be stressed from any angle which the design of the dehumidifier permits. The load is to be applied for 1 minute. The strain relief is not acceptable if there is such movement of the cord as to indicate that stress would have resulted on the connections.

7.9 The edges of the entry hole for the power supply cord, including the cord entry hole in a bushing, shall be smooth and rounded without burrs, fins, or sharp edges which might damage the cord insulation. Within the dehumidifier, the power supply cord shall be routed to prevent damage to the cord insulation.

7.10 Means shall be provided to prevent a flexible cord from being pushed into the product through the cord-entry hole when such displacement results in:

- a) Subjecting the cord to mechanical damage,
- b) Exposing the cord to a temperature higher than that for which the cord 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.

The cord shall comply with the Push-Back Relief Test, Section 39.

8 Internal Wiring

8.1 All wires and cords used in a dehumidifier shall be routed and supported to reduce the risk of damage due to:

- a) Sharp edges,
- b) Surfaces and parts which operate at temperatures in excess of that for which the wire insulation is rated,
- c) Moving parts, and
- d) Parts which can be expected to vibrate, such as motors, motor-compressors, refrigerant lines, and the like. Clamping means shall have smooth, rounded surfaces.

Exception: Wires and cords may contact a vibrating part provided:

- a) The wiring is securely fastened to the part at the point of contact so as to restrict movement,*
- b) The part does not have burrs, fins, or sharp edges which might abrade the insulation, and*
- c) Vibration does not place a stress on the wiring or wiring connections.*

8.2 All wires and cords shall be routed and supported so that they will not be immersed in water unless the insulation is specifically intended for this purpose. The wiring arrangement shall prevent water caused by condensation from entering wiring enclosures and electrical enclosures.

8.3 All splices and connections shall be mechanically secured and electrically bonded. A soldered connection shall be made mechanically secure before being soldered.

8.4 Splices shall:

- a) Be secured in position and located within the confines of the dehumidifier enclosure or
- b) Located in a separate enclosure so that they are not subject to flexing, motion, or vibration due to air movement.

Strain relief shall be provided on the conductors if the wiring is likely to be moved during routine service operations, such as oiling motors.

8.5 In determining compliance with 8.4, grilles, covers, panels, and the like, which may be removed without the use of tools are not considered as forming part of the splice enclosure.

8.6 A splice shall be provided with electrical insulation equivalent to that of the wires involved. Thermoplastic tape wrapped over sharp ends of conductors is not acceptable. Splicing devices, such as pressure wire connectors, may be employed if they comply with the Standard for Wire Connectors, UL 486A-UL 486B.