



TEST REPORT
UL 507
Standard for Safety
Electric Fans

Report Number: HK2107050723-SR

Date of issue: 2021-07-12

Total number of pages.....: 104 pages

Testing Laboratory.....: Shenzhen HUAK Testing Technology Co., Ltd.

Testing location.....: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Applicant's name.....: Bote electric appliance (Guangdong) Co., Ltd.

Address: 5th floor, No.28, area 1, Sanlian Industrial Zone, Gulao Town, Heshan City, Jiangmen, Guangdong, China

Test specification:

Standard.....: UL 507:2020

Test procedure: Verification report

Non-standard test method.....: N/A

Test Report Form No.....: UL507A

Test Report Form(s) Originator: HUAK

Master TRF.....: Dated 2021-03

Test item description.....: FLOOR FAN

Trade Mark: HealSmart

Manufacturer.....: Same as applicant

Model/Type reference: HIFANXFLOOR18, HIFANXFLOOR12, HIFANXFLOOR20, HIFANXDRUM24, HIFANXDRUM30, HIFANXWALLDIGIT16, HIFANXWALLBASIC16, HIFANXVENTIL14THEMOT, HIFANXVENTIL16THEMOT, HIFANXVENTIL20THEMOT

Ratings: Input: 120V~, 60Hz, 110W



TRF No. UL507A

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Testing procedure and testing location:		
<input checked="" type="checkbox"/>	Testing Laboratory:	Shenzhen HUAKE Testing Technology Co., Ltd.
Testing location/ address		1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<input type="checkbox"/>	Associated Laboratory:	
Testing location/ address		
	Tested by (name + signature).....:	Kevin Yao 
	Approved by (+ signature).....:	Dendi Wei 
<input type="checkbox"/>	Testing procedure: TMP	
Testing location/ address		
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	Approved by (+ signature)	
<input type="checkbox"/>	Testing procedure: WMT	
Testing location/ address		
	Tested by (name + signature)	
	Witnessed by (+ signature)	
	Approved by (+ signature)	
<input type="checkbox"/>	Testing procedure: SMT	
Testing location/ address		
	Tested by (name + signature)	
	Approved by (name + signature) :	
	Supervised by (name + signature)	
<input type="checkbox"/>	Testing procedure: RMT	
Testing location/ address		
	Tested by (name + signature)	
	Approved by (name + signature) :	
	Supervised by (name + signature):	

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List of Attachments (including a total number of pages in each attachment):

1, Photo attachments.(4 pages)

Copy of marking plate

The artwork below may be only a draft.

HealSmart
FLOOR FAN
Model: HIFANXFLOOR18
Input: 120V~, 60Hz, 110W
Made in China

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Test item particulars	FLOOR FAN
Possible test case verdicts:	
- test case does not apply to the test object.....	: N/A
- test object does meet the requirement	: P (Pass)
- test object does not meet the requirement.....	: F (Fail)
Testing	
Date of receipt of test item	: Jul. 05, 2021
Date (s) of performance of tests	: Jul. 05, 2021 to Jul. 12, 2021
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
Name and address of factory (ies)	: Same as applicant
General product information:	
<p>The product covered in this report is FLOOR FAN. All models are identical, only different in the model name, so the model HIFANXFLOOR18 is selected as representative model for full tests.</p>	

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict

6	Components		P
6.1	General		P
6.2	Attachment plugs, receptacles, connectors, and terminals		P
6.3	Boxes and raceways		N/A
6.4	Cords, cables, and internal wiring		P
6.5	Cord reels		N/A
6.6	Light sources and associated components		N/A
6.7	Overcurrent protection		P
6.8	Power supplies		P
6.9	Supplemental insulation, insulating bushings, and assembly aids		P
7	Frame and Enclosures		P
7.1	General		P
7.1.2	A cast- or sheet-metal section of the enclosure shall not be thinner than the applicable value specified in Table 7.1.		P
	a)Mechanical strength and impact resistance with regard to intended use and location of the appliance;		P
	b)Resistance to corrosion;		P
	c)Size and shape; and		P
	d)Location on the appliance.		P
7.1.3	A fan having features intended to be attractive to children or to have play value or an appearance of play value shall:		N/A
	a)Be provided with a marking that warns against use as a toy as described in 81.6; and		N/A
	b)Not have any portion of the fan intended to be removed and utilized as an item with play value.		N/A
7.1.4	The enclosure of an appliance shall prevent molten metal, burning insulation, flaming particles, and other ignited material from falling onto flam		P
7.1.5	The requirements in 7.1.4 necessitate the use of a metal barrier or a non-metallic barrier of a material having a zero flame spread rating when tested as described in the Standard for Tests for Surface Burning Characteristics of Building Materials, UL 723:		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.6	A ventilating opening provided in the enclosure of an appliance or an externally mounted component of an appliance where the appliance is intended to be recessed into a wall or false ceiling shall not vent into a concealed space where the spread of a fire occurs undetected.		P
7.2	Wood enclosure parts		N/A
7.2.1	Wood shall not be employed as an appliance enclosure unless:		N/A
	a)The enclosure is not intended for use in a cooking area, a bathroom, a damp location, or outdoors; and		N/A
	b)The enclosure is in accordance with the Temperature Test requirements in Table 46.1, as applicable to wood.		N/A
7.2.2	A wood enclosure serving as an enclosure of uninsulated live parts shall be subjected to flammability testing and resistance to impact testing (5 ft-lbs) in accordance with the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.		N/A
7.3	Non-metallic enclosures		P
7.3.1	A non-metallic enclosure shall comply with the applicable mechanical and electrical property considerations, flammability, and thermal requirements as specified in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C. A 6.8 J (5 ft·lbf) impact value shall apply to all appliances when determining the impact resistance of polymeric enclosures in the as-received condition. This impact value shall also be used for cold impact testing of appliances intended to be used in cold environments, such as fans mounted in the crawl space or attic and outdoor use products.		P

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7.3.2	Section 5 of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, includes an additional set of requirements for Portable Unattended Household Equipment that may be applied to portable fans. Figure 7.1 depicts figuratively the construction requirements for these products. In addition, products evaluated to this set of requirements shall comply with the Severe Conditions Test in accordance with 28.1, Mold Stress Relief Distortion Test, in accordance with Subsection 29.1 (utilizing conditioning guidelines as outlined in Subsection 61.2) and Input to Motor (after Mold-Stress Relief Distortion) in accordance with Subsection 30.1 of UL 746C.		P
7.3.3	When conducting the Severe Conditions Test in accordance with 28.1 of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, motor protection in accordance with 23.1 (a) and (c) may be retained in the circuit.		N/A
7.3.4	Among the factors to be considered when judging a non-metallic enclosure, other than of polymeric material, or a magnesium enclosure shall be:		P
	a) Mechanical strength;		P
	b) Resistance to impact;		P
	c) Moisture-absorptive properties;		P
	d) Combustibility;		P
	e) Resistance to arcing; and		P
	f) Resistance to distortion at temperatures to which the enclosure is subjected under conditions of normal or abnormal use.		P
7.3.5	Metallized or painted polymeric parts or enclosures shall comply with the applicable requirements of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C. This requirement is not applicable to exterior surfaces of polymeric enclosure materials or parts provided that the metallized coating or paint does not offer a continuous path for an internal flame to propagate externally.		P
7.3.6	A non-metallic enclosure of a fan employing a fluorescent light shall comply with the requirements of 167.3, Exposure to sunlight (ultraviolet radiation).		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.7	A wall or ceiling insert fan or ceiling insert fan/light combination that is provided with a polymeric housing shall be marked not for use in fire rated installations and for use in one- and two-family dwellings only, in accordance with 80.5.7 and 80.5.8.		N/A
7.4	Non-metallic parts other than enclosures		P
7.4.1	Polymeric material used to enclose a metal housing that encloses insulated or uninsulated live parts, or used as a decorative part, shall be classed either 5VA, 5VB, V-0, V-1, V-2, or HB by the burning tests described in the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94.		P
7.4.2	An impeller of polymeric material outside a motor shall not be located within 25.4 mm (1 inch) of an opening in the motor housing.		P
7.4.3	A polymeric impeller for a fan intended to be installed in an area exposed to temperatures higher than 40°C (104°F), such as an attic fan or a fan intended for use in cooking areas, shall be molded from polymeric material having:		P
	a)A heat deflection temperature under a minimum 455.07 kPa (66 psi) load of at least 75° C (167° F), determined as specified in the Standard for Polymeric Materials – Short Term Property Evaluations, UL 746A; and		N/A
	b)A relative mechanical temperature index without impact of at least 60°C (140°F) determined as specified in the Standard for Polymeric Materials – Long Term Property Evaluations, UL 746B.		N/A
7.4.4	Foamed thermoplastic shall be classed HF-2 or HF-1.		N/A
7.4.5	A thermoplastic damper shall be classed HB, V-2, V-1, V-0, or 5V.		P
8	Flame Spread and Smoke Developed Requirements for Non-Metallic Enclosures and Other Parts of Permanently Connected Equipment		P
8.1	A non-metallic enclosure or part that provides a barrier between a building cavity and internal parts of a fan that is intended to be permanently connected electrically, shall have a flame spread rating of zero in accordance with the Standard for Test for Surface Burning Characteristics of Building Materials, UL 723.		P

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8.2	Compliance with the Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces, UL 2043, is considered to meet the flame spread requirement of 8.1.		P
9	Accessibility of Moving Parts		P
9.1	General		P
9.1.1	The rotor of a motor, a pulley, a belt, a gear, an impeller, or other moving parts shall be enclosed, guarded, or installed at a sufficient height per 9.2, Portable fans and window fans, or 9.3, Stationary fans and permanently connected fans, as applicable, to reduce the risk of injury to persons.		P
9.1.2	An impeller shall be constructed of a material and in such a manner to reduce the risk of its breakage or its release of parts that could cause a risk of injury to persons.		P
9.1.3	Polymeric guards which are used for protecting the impeller, and also function as an electrical enclosure, shall be subjected to the following tests as applicable:		P
	a)For a guard of un-insulated live parts, the guard shall comply with the Resistance to Impact Test of the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, in the as-received condition. The impact used is to be 6.8 J (5 ft·lbf). Appliances intended to be used in cold environments, such as fans mounted in the crawl space or attic, and outdoor use products shall also be subjected to the Resistance to Impact Test of UL 746C in the cold condition.		N/A
	b)For a guard of insulated live parts which have an insulation thickness of 0.71 mm (0.028 inch) or greater, the guard shall comply with Section 61, Impact Test on Guards, and Section 62, Static Force Test on Guards, in the as-received condition. Appliances intended to be used in cold environments, such as fans mounted in the crawl space or attic, and outdoor use products shall also be subjected to the Impact Test on Guards, 61.2, in the cold condition.		P

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UL 507			
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9.1.4	An impeller shall be secured to the shaft, with consideration given to such factors as the size and weight of the impeller, motor power, mounted position, thrust direction, and the risk of injury to persons if breakage occurs. A reversible fan shall not rely solely on friction between the impeller and a nut turned onto a threaded shaft.		P
9.2	Portable fans and window fans		P
9.2.1	Other than as described in 9.2.2, a moving part that causes a risk of injury to persons shall be guarded or enclosed.		P
9.2.2	A moving part such as a rotating grille, rotating air deflector driven by an airstream, or an impeller is not required to be guarded when the moving part complies with all of the following applicable requirements:		P
	a)When motor driven, the impeller:		P
	b)When driven by an airstream, the moving part:		P
	c)The moving part:		P
	d)The output power of the motor driving the part is not more than 35 watts (0.047 horsepower).		P
	e)The "K" factor of the moving part determined as specified in 9.2.5 is less than 732.		N/A
9.2.3	An unguarded impeller that complies with Exception No. 1 to 9.2.2 shall produce an impact force of 175 N (39.34 pounds) or less.		N/A
9.2.4	Factors to be considered when judging whether a moving part or a portion of a part is likely to cause a risk of injury to persons shall include, but are not limited to:		N/A
	a)The portion of the blade being contacted – trailing edge, leading edge, or periphery;		N/A
	b)The blade material and angle, and type and sharpness of exposed edge; and		N/A
	c)The energy available.		N/A
9.2.5	Conventional designs of impellers meet the requirement of being guarded when:		N/A
	a)The relationship between mass (W) in kg, radius (r) in mm, and speed (N) in revolutions per minute is such that K in the following equation is less than 29264: $K = 6 \times 10^{-7} (Wr^2N^2)$		N/A

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UL 507			
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	b)The guarding is such that the probe illustrated in Figure 9.1 cannot touch the leading edge of the blade and hub when inserted as described in 9.2.6. For a reversible fan, both edges of the blade are considered leading edges. When K is greater than 29264, the probe shall not touch any part of the impeller.		N/A
9.2.6	The portion of an impeller that entails a risk of injury to persons shall be guarded so that the probe illustrated in Figure 9.1 does not touch the part when inserted with a force of 4.45 N (1 pound) for a maximum of 5 seconds through any opening in the guard.		N/A
9.2.7	During an examination to determine whether an appliance complies with the requirements specified in 9.2.6, the guards and impellers of desk and stand fans are not to be removed before examination.		P
9.2.8	When a part used to comply with the requirement in 9.2.6 is made of a polymeric material, a sample is to be exposed for 7 hours to air at 70°C (158°F). While in the oven, the part is to be assembled to the fan and the fan is to be in its intended operating position. After the sample has cooled to room temperature, the probe illustrated in Figure 9.1 is to be inserted through each opening in the guard. The probe shall not be able to touch any portion of an impeller that can cause a risk of injury to persons.		P
9.2.9	A guard employed to comply with the requirement in 9.2.6 shall be attached to the fan in any of the following ways:		N/A
	a)Permanently;		N/A
	b)By means requiring the use of a tool or tools for removal; or		N/A
	c)By means not requiring the use of a tool or tools for removal provided that the securing means remain attached to the front or rear guard; and		N/A
9.2.10	The removal force specified in 9.2.9(c)(2) is to be measured after conditioning the holding means by removing and replacing the guard ten times in the intended manner.		P
9.2.11	An enclosure, a frame, a guard, a handle, or other part of the fan that is exposed to contact during intended operation shall not be sufficiently sharp to constitute a risk of injury to persons.		P

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Clause	Requirement + Test	Result - Remark	Verdict
9.2.12	Non-metallic impellers on portable fans and window fans shall comply with Section 63, Impeller Test for Portable Fans.		P
9.3	Stationary fans and permanently connected fans		P
9.3.1	In accordance with 9.1.1, the design and intended use of a stationary fan or of a fan intended to be permanently connected electrically is to be considered when evaluating an enclosure or guard.		P
9.3.2	The impeller of a stationary or permanently connected fan shall be constructed so that it cannot be contacted by the probe illustrated in Figure 9.2.		P
9.3.3	A stationary or permanently connected fan shall be constructed so that any moving parts, other than the impeller, that cause a risk of injury to persons cannot be contacted by the probe illustrated in Figure 9.2.		P
9.3.4	The 25.4-mm (1-inch) diameter probe as illustrated in Figure 9.2, when inserted through an opening on the air-inlet side of a wall- or ceiling-insert fan, shall not contact a moving part that presents a risk of injury to a person.		P
9.3.5	The unobstructed distance of an opening on the exhaust side of a wall-insert fan to a moving part capable of causing injury to persons shall be not less than 25.4 mm (1 inch) for an opening on the exhaust side of a wall- insert fan. When the unobstructed distance to such a part is 25.4 mm or more, the requirements of Table 9.1 apply.		P
9.3.6	A guard is not required on the side of an attic-mounted or roof-mounted fan intended to face an unoccupied space only when the installation instructions or a marking on the fan indicate that the fan is intended for use facing an unoccupied space only. See 80.6.1.		N/A
9.3.7	A guard is not required on the inlet side of a power attic or whole house ventilator when:		N/A
	a) Louvers or a grill is provided in the box with the product; or		N/A
	b) The installation instructions or marking on the attic-mounted or roof-mounted fan indicate that louvers or grilles are to be attached when the fan is installed as intended. See 80.6.2.		N/A
9.3.8	A guard is not required to be provided on the discharge side of a duct connected fan intended for connection to an exhaust duct.		P

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Clause	Requirement + Test	Result - Remark	Verdict
10	Accessibility of Live Parts		P
10.1	General		P
10.1.1	To reduce the risk of unintentional contact that involves a risk of electric shock from uninsulated live parts and film-coated wire, an opening in an enclosure of an appliance or in a motor shall comply with 10.2.1 – 10.3.1 and Table 10.1.		P
10.2	Application of probes		P
10.2.1	The probes referenced in Table 10.1 and illustrated in Figure 10.1 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 try to contact an uninsulated live part or film-coated wire. If necessary, the configuration shall be changed after insertion through the opening. Configuration refers to positioning of the jointed portions of the probes.		P
10.2.2	The probes referenced in Table 10.1 and illustrated in Figure 10.1 shall be used as measuring instruments to judge the accessibility to uninsulated live parts and film-coated wire provided by openings and not as instruments to judge the strength of a material. Force is not to be applied to the probe when judging accessibility.		P
10.3	Removal of parts		N/A
10.3.1	During an examination to determine whether an appliance complies with the requirements specified in 10.1.1, 10.2.1, 10.2.2 and Table 10.1, a part intended to be removed by the user without the use of a tool, including the grille of a ceiling-insert or wall-insert fan and the filter of a rangehood, is to be removed before the examination.		N/A
10.3.2	With reference to 10.3.1, the filter or filters of an air-filtering appliance are to be removed, even if it is necessary to use tools to do so, when the appliance is being examined with reference to exposure of uninsulated live parts.		N/A
10.3.3	With reference to the requirements specified in 10.1.1, 10.2.1, 10.2.2, and Table 10.1, insulated brush caps are not required to be additionally enclosed.		N/A
10.4	Disconnection means		P

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Clause	Requirement + Test	Result - Remark	Verdict
	10.4.1 A means of disconnection – such as a cord connector in conductors between the motor and the base of an oscillating fan – shall be such that live parts are not exposed under intended conditions.		P
11	Mechanical Assembly		P
11.1	An appliance shall be assembled so as not to increase the risk of injury to persons. Brush caps shall be tightly threaded or otherwise constructed to prevent loosening.		P
11.2	A switch, a lampholder, an attachment-plug receptacle, a motor-attachment plug, or similar component shall be mounted securely, and shall be prevented from turning or shifting. See 11.3.		N/A
11.3	The means for preventing turning, as required by 11.2, shall consist of more than friction between surfaces. For example, a toothed lock washer that provides spring take-up, applied as intended, is an acceptable means for preventing a small stem-mounted switch or other device having a single-hole mounting means from turning.		N/A
11.4	Internal connections that must be made in the field in a cord-connected appliance that is shipped partially disassembled shall be made by plug and receptacle connections. Internal connections that must be made in the field in an appliance intended for permanent connection to the power supply and shipped partially disassembled shall be made with means that comply with requirements for field wiring in accordance with 14.3.5 or by plug and receptacle connection.		P
11.5	Unless the intended method of assembly is obvious, an appliance that is shipped from the factory partially disassembled shall be provided with clear and detailed assembly instructions.		P
11.6	An appliance that is shipped from the factory partially disassembled and is not marked in accordance with 80.4.1 shall be shipped in a single shipping container.		P
11.7	Uninsulated live parts of a thermostat provided with a welded stop shall not contact a dead metal part or parts of opposite polarity when breakage of the welded stop permits the thermostat to rotate.		P
12	Mounting Means		P
12.1	General		P
12.1.1	An appliance, other than as noted in 12.2.1 – 12.2.3, is to be mounted in accordance with the mounting requirements specified in the appropriate section of this Standard.		P

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Clause	Requirement + Test	Result - Remark	Verdict
12.2	Cord-connected wall-mounted appliances		N/A
12.2.1	Mounting brackets and any necessary hardware required to install a cord-connected, wall surface-mounted appliance shall be provided with the appliance or shall be available from the appliance manufacturer.		N/A
12.2.2	With reference to 12.2.1, means shall be provided to reduce the likelihood that an appliance is dislodged from the wall. When the construction of the appliance or the mounting means permits the bottom		N/A
12.2.3	An opening provided for hanging or mounting an appliance shall be located or guarded so that a nail, hook, or the like does not displace a part that creates a risk of fire, electric shock, or injury to persons and does not contact one of the following:		N/A
	a)An uninsulated live part;		N/A
	b)Film-coated wire;		N/A
	c)Internal wiring; or		N/A
	d)Moving parts.		N/A
13	Protection Against Corrosion		P
13.1	Iron and steel parts shall be protected against corrosion by enameling, galvanizing, plating, or an equivalent means.		P
14	Power Supply Connections – Permanently-Connected Appliances		N/A
14.1	General		N/A
14.1.1	An appliance intended for permanent connection to the power supply shall be constructed so that it may be permanently connected electrically to one of the wiring systems that is acceptable for the appliance in accordance with the National Electrical Code, ANSI/NFPA 70.		N/A
14.1.2	With reference to the requirement specified in 14.1.1, the following types of appliances shall be provided with means for permanent electrical connection to the power supply:		N/A
	a)An attic fan;		N/A
	b)An appliance intended for permanent attachment to a building structure;		N/A
	c)A duct-connected appliance; or		N/A
	d)A range hood.		N/A

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14.1.3	Power supply terminal or leads identified for connection to Class 2 wiring shall comply with Class 2 circuit requirements, 31.3.		N/A
14.2	Knockouts and openings		N/A
14.2.1	A knockout in a sheet-metal enclosure provided for connection of the appliance to a wiring system installed in accordance with the National Electrical Code, ANSI/NFPA 70, shall be securely attached and removable without deformation that would impair the intended performance of the enclosure. The thickness of the knockout shall be in accordance with the thicknesses specified in Table 7.1.		N/A
14.2.2	There shall be a flat surface surrounding a knockout or opening of sufficient area to permit the attachment of a length of standard rigid metallic conduit of a size corresponding to the size of the knockout or opening. The flat area shall have a minimum diameter in accordance with Table 14.1.		N/A
14.2.3	A knockout or opening shall be surrounded on both the inside and outside surfaces by a flat surface to permit proper installation of a locknut. The flat surface shall extend in all directions beyond the edge of the knockout for a distance not less than that specified in Table 14.1.		N/A
14.3	Field-wiring compartments		P
14.3.1	A field-wiring compartment in which power-supply connections are made shall be located so that the connections are able to be readily inspected after the appliance is installed as intended.		P
14.3.2	Accessibility of field-installed wiring and inspection of splices is to be judged by:		P
	a) A trial installation following any instructions provided by the manufacturer; or		P
	b) Using any wiring system permitted by the National Electrical Code, ANSI/NFPA 70, if no instructions are provided.		P
14.3.3	The minimum usable volume of an outlet box or terminal compartment in which field-installed wiring connections to the power supply are to be made shall be as specified in Table 14.2.		N/A
14.3.5	An electrical component shall not be mounted on a part, such as the cover of a wiring-terminal compartment, that is removed to permit field-wiring connections or inspections.		P
14.3.6	A field-wiring compartment intended for connection of a supply raceway and mounted integrally with the appliance shall be attached so as to be prevented from turning with respect to the appliance.		P

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Clause	Requirement + Test	Result - Remark	Verdict
14.3.7	When the constructional features of an appliance permit field-wiring connections to be made in the motor terminal compartment, the compartment shall comply with the applicable requirements for electric motors.		N/A
14.3.8	An opening in a roof-mounted appliance for a power-supply or external control-circuit connection shall be threaded unless:		N/A
	a)It is located entirely below the lowest uninsulated live part within the enclosure; or		N/A
	b)Its location prevents drainage into the enclosure.		N/A
14.4	Wiring terminals and leads		P
14.4.1	A field-wiring terminal is a terminal to which a wire is connected in the field, unless the wire and a means of making the connection – a pressure terminal connector, soldered loop, crimped eyelet, or the like – factory-assembled to the wire, are provided as part of the appliance.		P
14.4.2	A fan intended to be permanently connected electrically and rated 12 Amps or less shall be provided with wiring terminals, including an equipment grounding terminal,When the fan rating exceeds 12 Amps, terminals shall be suitable for 125 percent of the current rating of the fan.		P
14.4.3	A wiring terminal shall be provided with an acceptable pressure terminal connector securely fastened in place – for example, firmly bolted or held by a screw.		P
14.4.4	A wiring terminal shall be prevented from turning or shifting in position.		P
14.4.5	A wire-binding screw at a field-wiring terminal shall not be smaller than No. 10 (4.8 mm diameter).		P
14.4.6	It should be noted that 14 AWG (2.1 mm ²) is the smallest conductor that shall be used for branch-circuit wiring, and thus is the smallest conductor that shall be anticipated at a terminal for connection of a power-supply wire.		P
14.4.7	A terminal plate tapped for a wire-binding screw shall be of metal not less than 1.27 mm (0.050 inch) thick. There shall be two or more full threads in the metal, which may be extruded if necessary to provide the threads.		P
14.4.8	Upturned lugs, a cupped washer, or the equivalent shall be capable of retaining a conductor of the size specified in 14.4.2 under the head of a screw or washer.		P

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Clause	Requirement + Test	Result - Remark	Verdict
14.4.9	The free length of a lead inside an outlet box or wiring compartment shall be 152.4 mm (6 inches) or more when the lead is intended for field connection to an external circuit.		P
14.4.10	A screw used to secure an equipment grounding lead to an enclosure shall engage at least two full threads in the metal, which is not prohibited from being extruded to provide the threads.		P
14.5	Identification		P
14.5.1	A permanently connected appliance rated 125 volts or 125/250 volts (3-wire) or less, and employing a lamp- or element-holder of the Edison screw-shell type, or a single-pole switch or overcurrent-protective device other than an automatic control without a marked "off" position shall have element-holder but to which shall not be connected a single-pole switch or single-pole overcurrent- protective device, other than an automatic control without a marked "off" position.		P
14.5.2	With reference to 14.5.1, if leads from the motor or other component terminate in an attachment plug intended for insertion in a receptacle that is:		P
	a) Provided as part of the appliance; and		P
	b) Intended for connection of the branch-circuit power-supply conductors.		P
14.5.3	A terminal intended for connection of a grounded power-supply conductor shall be made of or plated with metal substantially white in color and shall be readily distinguishable from the other terminals; or identification of that terminal shall be clearly shown in some other manner, such as on an attached wiring diagram.		P
14.5.4	The surface of a lead intended for the connection of a grounded power-supply conductor shall have a white or gray color and shall be readily distinguishable from the other leads.		P
14.5.5	The surface of a lead intended for connection of an equipment-grounding conductor shall be green with or without one or more yellow stripes, and no other lead shall be so identified.		P
	14.5.6A terminal intended for the connection of an equipment-grounding conductor shall be identified by:		P
	a) Use of a wire-binding screw with a green-colored head that is slotted or hexagonal, or both;		P
	b) Use of a threaded stud with a green-colored hexagonal nut;		P
	c) Use of a green-colored pressure-terminal connector;		P

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Clause	Requirement + Test	Result - Remark	Verdict
	d)Being marked "G," "GR," "GND," "Ground," "Grounding," the grounding symbol, , or the like; or		P
15	e)A marking on a wiring diagram provided on the appliance.		N/A
	Power Supply Connections – Cord-Connected Appliances		P
15.1	Cords and plugs		P
15.1.1	A portable appliance shall be provided with a flexible cord in accordance with Table 15.1 and an attachment plug for connection to the power-supply circuit. The length of cord external to the appliance shall be measured from the face of the attachment plug to the point of attachment or entry into the enclosure.		P
15.1.2	A product as describe in Table 15.1 rows 1and 2,but intended for commercial or industrial usr,shall employ a cord as described Table 15.1, row 3, and be marked in accordance with 80.1.10.		P
15.1.3	The flexible cord shall be rated for use at a voltage not less than the rated voltage of the appliance, and shall have an ampacity not less than the current rating of the appliance.		P
15.1.4	The flexible cord for products as described in rows 1 and 2 of Table 15.1 shall be attached permanently to the appliance or be in the form of a separate cord set with acceptable means for permanent connection to the appliance.		P
15.1.4.1	An appliance intended for use with a detachable cord set shall not be provided with terminal pins that accommodate a standard flatiron or appliance plug.		N/A
15.1.5	The voltage rating of the attachment plug shall not be less than that of the appliance. When an appliance can be adapted 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 80.2.2.		P
15.1.6	The current rating of the attachment plug for an appliance rated 12 amperes or less shall not be less than the current rating of the appliance. For an appliance rated more than 12 amperes, the current rating of the attachment plugs shall not be less than 125 percent of the current rating of the appliance.		P

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Clause	Requirement + Test	Result - Remark	Verdict
15.1.7	power supply cord of all other appliances not required to be grounded shall be polarized or of the grounding type.		P
15.1.8	When a 3-wire grounding-type attachment plug or a 2-wire polarized attachment plug is provided, the attachment plug connections shall comply with Figure 15.1, and the polarity identification of the flexible cord shall comply with Table 15.2.		P
15.1.9	The conductor of the power supply cord that is intended to be grounded shall have the following items connected to it:		P
	a)The screw shell of an Edison-base lampholder; and		N/A
	b)The terminal or lead receptacle intended to be grounded. Table 15.2 identifies the supply cord conductor intended to be grounded.		P
15.1.10	A flexible power supply cord shall not be smaller than 18 AWG (0.82 mm ²).		P
15.1.11	The ampacity of a flexible power supply cord shall be as specified in Table 400.5 (A) of the National Electrical Code, ANSI/NFPA 70. For reference purposes, an abbreviated table showing the ampacities for flexible cord with two current carrying copper conductors is shown in Table 15.3.		P
15.2	Strain relief		P
15.2.1	Strain relief shall be provided so that the mechanical stress on the flexible cord is not transmitted to terminals, splices, or internal wiring. See 54.1.		P
15.2.2	A metal strain-relief clamp or metal band is acceptable without supplementary protection on a Type SJ, SJO, SJT, SJTO, S, SO, ST, STO, SV, or SVO cord.		P
15.2.3	A metal strain-relief clamp or metal band shall not be used on Type SP-2 or lighter rubber- insulated cord or on Type SPT-1, SPT-2, SVT, or SVTO cord unless such a cord is protected by varnished cloth tubing or the equivalent under the clamp, and the construction complies with the requirements specified in 54.5.		P
15.2.4	Means shall be provided to prevent the supply cord or lead from being pushed into the enclosure of an appliance through the cord-entry hole when such displacement results in:		P

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	a)Subjecting the supply cord or lead to mechanical damage; b)Exposing the supply cord or lead 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.		P
15.2.5	When a knot in a flexible cord serves as the strain relief, the surfaces that the knot touches shall be free from projections, sharp edges, burrs, fins, or similar edges that damage the conductors.		P
15.3	Bushings		P
15.3.1	A bushing or the equivalent shall be provided at a point where a flexible cord passes through an opening in a wall, barrier, or enclosing case. The bushing shall be substantial, secured in place, and shall have a smooth, well-rounded surface against which the cord may bear. An insulating bushing shall be provided when:		P
	a)The cord is Type SP-1, SPT-1, SP-2, or SPT-2, or other type lighter than Type SV; b)The wall or barrier is of metal; and c)The construction is such that the cord is subjected to stress or motion.		P
15.3.2	Ceramic materials and some molded compositions are acceptable for insulating bushings.		N/A
15.3.3	Vulcanized fiber is not prohibited from being employed if the bushing is not less than 1.2 mm (3/64 inch) thick, and if formed and secured in place so that it is not damaged by conditions of ordinary moisture.		P
15.3.4	A separate soft-rubber, neoprene, or polyvinyl chloride bushing is not prohibited from being employed in a fan, or in the frame of a motor, or in the enclosure of a capacitor attached to a motor of an evaporative cooler, or a room-type filter unit if the bushing is:		P
	Located so that it is not exposed to oil, grease, oily vapor, or other substances that deteriorate the compound employed.		P

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15.3.5	A bushing of a material mentioned in 15.3.4 shall not be employed in an appliance unless used in conjunction with a type of cord for which an insulating bushing is not required.		P
15.3.6	When a bushing of a material mentioned in 15.3.4 is used, the hole in which the bushing is mounted shall be smooth and free from sharp edges.		P
15.3.7	A bushing of the same material as, and molded integrally with, the supply cord is acceptable on a Type SP-1 or heavier cord, only when the built-up section is not less than 1.6 mm (1/16 inch) thick at the point where the cord passes through the enclosure.		P
15.3.8	An insulated metal grommet is acceptable in place of an insulating bushing if the insulating material is not less than 0.8 mm (1/32 inch) thick and completely fills the space between the grommet and the metal in which it is mounted.		N/A
16	Supply Cord Overcurrent Protection		P
16.1	An appliance described by rows 1 and 2 of Table 15.1 shall be provided with integral overcurrent protection.		P
16.2	A fuse provided for overcurrent protection shall comply with the Standard for Low-Voltage Fuses - Part 1: General Requirements, UL 248-1, the Standard for Low-Voltage Fuses - Part 14: Supplemental Fuses, UL 248-14, and Section 24.		P
16.3	A supplementary protector provided for overcurrent protection shall comply with the Standard for Supplementary Protectors for Use in Electrical Equipment, UL 1077. The supplementary overcurrent protection device shall comply with the Overload Test in UL 1077, tested at 1.5 or 6 times the AC full load current rating. The overload test current and power factor shall be determined based upon the motor locked rotor current and power factor.		N/A
16.4T	The overcurrent protection shall be either an integral part of the attachment plug, or of a through- cord design (in-line fuseholder) located so that there is no more than 152 mm (6 inches) between the face of the attachment plug and the side of the fuseholder furthest from the attachment plug.		P
16.5	The rating of the overcurrent protection shall be a maximum of 5A.		P

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16.6	The overcurrent protection shall be connected to the ungrounded conductor of the power supply.		P
17	Special Protection Devices		N/A
17.1	Ground-fault circuit-interrupters (GFCI) for protection against electrical shock shall comply with the Standard for Ground-Fault Circuit-Interrupters, UL 943. The following statement, or equivalent, shall be included as a marking near the GFCI, or as an instruction in the manual: "Press the TEST button (then RESET button) every month to assure proper operation."		N/A
17.2	Note - An ALCI is not considered an acceptable substitute for a GFCI when the National Electrical Code, ANSI/NFPA 70, requires a GFCI.		N/A
17.3	Equipment ground-fault protective devices shall comply with the Standard for Ground-Fault Sensing and Relaying Equipment, UL 1053, and the applicable requirements of the Standard for Ground-Fault Circuit-Interrupters, UL 943.		N/A
17.5	The AFCI or LCDI shall be installed as an integral part of the attachment plug or located in the supply cord within 102 mm (4 inches) of the attachment plug.		N/A
17.6	Arc fault detection testing shall include the following, as applicable: a)Carbonized path arc clearing time test; b)Point contact arc test; c)Unwanted tripping test - Load Condition I; d)Unwanted tripping test - Load Condition II - Condition C and D; e)Unwanted tripping test - Load Condition III - Condition A; and f)Masking.		N/A
17.7	An AFCI or LCDI provided as part of an appliance intended for outdoor use shall comply with the applicable requirements of Sections 165 - 167.		N/A
18	Live Parts		P

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18.1	A current-carrying part shall be silver, copper, a copper alloy, or other material acceptable for the application.		P
18.2	Ordinary iron or steel that is provided with a corrosion-resistant coating is not prohibited from being used as a current-carrying part in accordance with the following:		P
	a)When acceptable in accordance with 6.1.1; or b)Within a motor or associated governor, but the use of ordinary iron or steel for current-carrying parts elsewhere in the appliance is not acceptable.		P
18.3	An uninsulated live part shall be secured to the surface on which it is mounted, and supporting insulating materials shall be secured in place, so that the part is prevented from turning or shifting in position when spacings are reduced below the minimum values specified in Spacings, Section 30.		P
18.4	Friction between surfaces is not acceptable as a means to prevent shifting or turning of a live part. A toothed lock washer with spring take-up, applied as intended, is acceptable.		P
19	Internal Wiring - Electrical Connections		P
19.1	The internal wiring and connections between parts of an appliance shall be protected or enclosed in accordance with 19.2.		P
19.2	Internal wiring, consisting of individual insulated conductors either separate or in a harness, and electrical connections are considered to be acceptably protected when either of the following apply: a)When judged as though it were film-coated wire, the wiring complies with 10.1.1; or b)Even though it could be touched by the probe specified in 10.1.1, the wiring is secured so that it cannot be grasped or hooked in such manner that it or related electrical connections are subjected to undue stress.		P

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19.3	<p>The internal wiring and connections of an appliance shall consist of components of a type or types that are acceptable for the particular application, when considered with respect to:</p> <p>a)The temperature and voltage to which they are likely to be subjected;</p> <p>b)Exposure to oil, grease, or moisture; and</p> <p>c)To other conditions of service to which they are likely to be subjected.</p>		P
19.4	<p>Wiring shall be protected from sharp edges including male screw threads, burrs, moving parts, and other agents that might cause abrasion of the insulation on conductors.</p>		P
19.5	<p>A flexible cord used for external interconnection as mentioned in 19.1 shall be provided with bushings and strain relief that comply with Section 54, Strain Relief Test.</p>		P
19.6	<p>Insulated conductors that pass through an opening in a sheet-metal wall that is not more than 1.07 mm (0.042 inch) thick shall be:</p> <p>a)Securely held away from the edges of the opening;</p> <p>b)Protected by a bushing, metal grommet, eyelet, or the equivalent; or</p> <p>c)Protected by rolling the edge of the metal opening at least 120 degrees.</p>		P
19.7	<p>A non-metallic bushing as mentioned in 19.6(b) shall:</p> <p>a)Be securely held in place; and</p> <p>b)Have a minimum wall thickness of 1.2 mm (3/64 inch).</p>		P

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19.8	A grill, louver, or the like, regardless of how secured in place, is not to be removed when the exposure of internal wiring is being judged, but a filter, or other device provided in lieu of a filter, on a fan intended for use in a cooking area is to be removed during the examination. The location in which the appliance is intended to be mounted when in service is also to be taken into consideration in determining compliance with this requirement – that is, a relatively greater degree of exposure of internal wiring is acceptable if the appliance is likely to be installed in a location, such as an attic, where it will be remote from persons.		N/A
19.9	Insulated wires are not prohibited from being bunched and passed through a single opening in a metal wall within the enclosure.		N/A
19.10	All splices and connections shall be mechanically secure and shall maintain electrical contact.		N/A
19.11	A soldered connection shall be made mechanically secure before being soldered when breaking or loosening of the connection causes a risk of fire, electric shock, or injury to persons.		N/A
19.12	With reference to 19.11, a lead is considered to be mechanically secure when one or more of the following are provided: a)At least one full wrap around a terminal; b)The lead is passed through an eyelet or opening; c)The lead is twisted together with another conductor.		N/A
	19.13A splice shall be provided with adequate insulation equivalent to that on the wires involved when permanence of spacing between the splice and other metal parts is not maintained.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
19.14	Insulation consisting of two layers of friction tape, two layers of thermoplastic tape, or of one layer of friction tape wrapped over one layer of rubber tape, is acceptable on a splice when the voltage involved is less than 250 volts. In determining if splice insulation consisting of coated-fabric, thermoplastic, or other tubing is acceptable, consideration is to be given to such factors as dielectric properties, heat-resistant and moisture-resistant characteristics, and the like. Thermoplastic tape wrapped over a sharp edge is not acceptable.		N/A
19.15	The means of connecting stranded internal wiring to a wire-binding screw shall be such that loose strands of wire are prevented from contacting other live parts not of the same polarity as the wire and from contacting dead-metal parts. This shall be accomplished by using pressure terminal connectors, crimped eyelets, soldering all strands of the wire together, or equivalent means.		N/A
19.16	Wiring that connects the motor and the base of an oscillating fan shall: a)Have conductors with individual strands not larger than 34 AWG (0.02 mm ²); b)Have rubber or other insulation not less than 0.4 mm (1/64 inch) thick on each conductor; and c)Not be of such length and location that results in damage by intended operation.		N/A
19.17	Internal connections from the motor or light in a wall-insert fan, a ceiling-insert fan, or a ceiling-insert fan/light combination to the fan shall be made by a plug and receptacle connection.		P
19.18	The cord or wiring employed for receptacle/motor or light interconnection or other interconnection purposes within a wall-insert fan, ceiling insert fan, or a ceiling-insert fan/light combination shall comply with the strain relief test requirements for Interconnecting Cords and Leads, Section 55.		N/A
20	Insulating Material		P

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Clause	Requirement + Test	Result - Remark	Verdict
20.1	Insulating material employed in an appliance is to be judged with respect to its acceptability for the particular application. Materials such as mica and certain refractory materials are acceptable for use as the sole support of live parts. Other materials not acceptable for general use, such as magnesium oxide, may be acceptable if used in conjunction with other insulating materials, or if so located and protected that the risk of mechanical damage .		P
20.2	Vulcanized fiber is not prohibited from being used for an insulating bushing, washer, separator, or barrier and shall not be used as support for uninsulated live parts.		P
20.3	A molded part shall have mechanical strength and rigidity to withstand the stresses of intended service. Brush caps shall be secured or located so as to be protected from mechanical damage that occurs during intended use.		P
21	Receptacles		N/A
21.1	A 15- or 20-ampere attachment-plug receptacle intended for general use as a convenience receptacle in a fan shall be of the grounding type, and shall comply with the Standard for Attachment Plugs and Receptacles, UL 498.		N/A
21.2	A fan shall not be provided with more than two single or one duplex convenience receptacles.		N/A
21.3	A general use convenience receptacle provided on a fan shall be wired so that it provides the same polarized supply as the attachment plug of the fan.		N/A
21.4	The minimum power supply cord size for a portable fan shall be in accordance with Table 21.1.		N/A
21.5	The power supply cord of a portable fan employing a general use convenience receptacle shall not employ a through cord switch.		N/A
21.6	A detachable power supply cord shall not be used with a portable fan employing a general use convenience receptacle.		N/A
21.7	A general use convenience receptacle shall not be provided on any fan intended to be installed in a cooking area.		N/A
21.8i	Internal wiring for a general use convenience receptacle shall be in accordance with Table 21.2.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
21.9	When the face of a general use convenience receptacle is less than 15.9 mm (5/8 inch) wide or less than 22.2 mm (7/8 inch) long, the face of the receptacle shall project not more than 4.8 mm (3/16 inch) from the part of the mounting surface that is within a rectangle 22.2 mm (7/8 inch) long and 15.9 mm (5/8 inch) wide symmetrically located about the receptacle contacts; and when the mounting surface is conductive, the face of the receptacle shall project not less than 2.4 mm (3/32 inch) from that part of the mounting surface.		N/A
21.10	The area surrounding a general use convenience receptacle shall be free of any projection that prevents full insertion of the blades of an attachment plug having a face diameter of 49.2 mm (1-15/16 inches) and rectangular attachment plug having a face of 38.1 by 41.3 mm (1-1/2 by 1-5/8 inch).		N/A
21.11	The location of the convenience receptacle must be such that it is not possible to bypass the grounding blade during insertion.		N/A
21.12	A Class A ground-fault circuit interrupter (GFCI) with open neutral protection shall be provided for general use convenience receptacles that are part of a fan intended to be used outdoors or in wet or damp locations. The convenience receptacle shall be located so that it is not wetted. See Sections 165 - 169 and 195.		N/A
21.13	A fan provided with a general use convenience receptacle intended for use in an outdoor location with the receptacle cover closed shall be provided with a self-closing cover and shall be marked in accordance with 81.10.		N/A
21.14	Supplementary overcurrent protection shall be provided for each general use convenience receptacle and shall be connected between the power supply cord and the receptacles. The overcurrent protective device shall comply with the requirements in the Standard for Supplementary Protectors for Use in Electrical Equipment, UL 1077, for use with motor loads. The supplementary overcurrent protection device shall have been subjected to the Overload Test in the Standard for Supplementary Protectors for Use in Electrical Equipment, UL 1077, tested for motor starting at 6 times the AC full load current rating.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
21.15	A single-pole supplementary protection device shall be connected in the ungrounded (line) conductor of the supply circuit only. A double-pole device shall be connected on both the ungrounded and grounded (neutral) conductors such that when it operates, it opens both ungrounded and grounded conductors.		N/A
21.16	A supplementary protection device shall not be connected to the grounding conductor.		N/A
21.17	The ampere rating of the overcurrent protective device shall not be greater than 80 percent of the minimum anticipated branch circuit minus the fan rating.		N/A
21.18	A supplementary protection device shall not open during the Temperature Test, Section 46.		N/A
21.19	When a single overcurrent protective device does not protect all receptacle outlets, more than one overcurrent protective device shall be used, and each receptacle outlet shall be marked to indicate the rating of the overcurrent protective device connected to it. The total of the receptacle markings plus the fan rating shall not exceed 80 percent of the minimum anticipated branch circuit rating.		N/A
21.20	A fan employing a receptacle having a fuse that is intended to be replaced in the field shall be marked as specified in 81.8.		N/A
21.21	A product employing a convenience receptacle shall be marked with the rating of the receptacle. The rating shall correspond to the rating of the overcurrent protective device connected to it. See 80.1.8.		N/A
22	Motors		P
22.1	A motor shall comply with the construction requirements of the Standard for Rotating Electrical Machines - General Requirements, UL 1004-1.		P
22.2	The Standard for Rotating Electrical Machines - General Requirements, UL 1004-1, shall be amended in accordance with Table 22.1 for motors not enclosed, or partially enclosed, by the end product enclosure.		P
22.3	The Standard for Rotating Electrical Machines - General Requirements, UL 1004-1, shall be amended in accordance with Table 22.2.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
22.4	A motor shall be acceptable for the particular application, and shall be capable of handling the maximum normal load of the appliance without resulting in a risk of fire, electric shock, or injury to persons.		P
22.5	A motor winding shall resist the absorption of moisture as evaluated by the Humidity Conditioning Test, Section 53.		P
22.6	With reference to 22.5, film-coated wire and wire employing cotton over film coating are not required to be additionally treated to prevent absorption of moisture in an appliance not intended to be exposed to the weather - see 48.3.1 - 48.3.3. A treatment of the winding is required when the appliance is to comply with the requirements in 48.1.1, 48.1.2, and 48.3.1 - 48.3.3.		P
22.7	A brush holder assembly shall be constructed so that when a brush is worn out - no longer capable of performing its function - the brush, spring, and other part of the assembly is retained to the degree which does not result in: a)An accessible dead-metal part becoming energized; and b)A live part becoming accessible.		P
22.8	Motors for use in unattended areas shall be tested in accordance with Section 178, General, and Section 179Ai, Performance.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
22.9	<p>A bobbin-wound skeleton motor used in a ceiling-insert fan, wall-insert fan, or rangehood must comply with the following requirements:</p> <p>a)The motor is to be provided with a coil wrap meeting the 5VA flammability requirements as defined by the Standard for Polymeric Materials - Use in Electrical Equipment Evaluations, UL 746C;</p> <p>b)The coil is to be completely wrapped with insulation at least 0.8 mm (1/32 inch) thick. This wrap is to employ at least two layers of insulation of minimum 0.4 mm (1/64 inch) thick;</p> <p>c)The adhesive used to secure the coil wrap shall comply with the requirements for adhesives in the Standard for Polymeric Materials - Use in Electrical Equipment Evaluations, UL 746C, as follows:</p>		P
23	Motor Protection		P
23.1	<p>Over-temperature protection shall be provided for the motor of an appliance by one of the following:</p> <p>a)Thermal protection complying with the applicable requirements in the Standard for Thermally Protected Motors, UL 1004-3. The Running Heating Temperature Test shall be applied to belt-driven fan motors.</p> <p>b)Impedance protection complying with the Standard for Impedance Protected Motors, UL 1004-2.</p> <p>c)Electronic Protection complying with the Standard for Electronically Protected Motors, UL 1004-</p> <p>7.The Running Heating Temperature Test shall be applied to belt-driven fan motors.</p>		P
23.2	When a multispeed motor is provided with protection in accordance with these requirements, the protection shall accomplish the intended result at each setting of the speed-control device.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
23.3	When a multispeed motor is not provided with protection in accordance with these requirements, and when the protection with which the appliance is provided upon installation does not function to protect the motor for one or more settings of the speed-control device, protection at each setting shall be provided as part of the appliance.		N/A
23.4	<p>The control circuitry of a motor investigated in accordance with Exception No. 1 to 23.1(c) shall be considered an operating control, and shall comply with the applicable requirements of the:</p> <p>a)Standard for Solid-State Fan Speed Controls, UL 1917,</p> <p>b)Deleted</p> <p>c)Standard for Industrial Control Equipment, UL 508,</p> <p>d)Standard for Power Conversion Equipment, UL 508C,</p> <p>e)Standard for Automatic Electronic Controls – Part 1: General Requirements, UL 60730-1 (see 23.5), or</p> <p>f)Standard for Low-Voltage Switchgear and Controlgear – Part 1: General Rules, UL 60947-1, and the Standard for Low-Voltage Switchgear and Controlgear – Part 4-2: Contactors and Motor-Starters – AC Semiconductor Motor Controllers and Starters, UL 60947-4-2, or</p> <p>g)Other equivalent standard intended to investigate the inherent electrical safety of controls and appropriate for the end-use environment.</p>		N/A
23.5	Operating controls in accordance with 23.4 shall possess a minimum declared endurance cycling value of 6000. The minimum declared pollution degree shall be as described in 30.9.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
23.6	When the running heating test is conducted with the motor installed within the appliance, testing shall be repeated under any operating condition that may reduce the cooling effect to the motor under test. Operating conditions include, but are not limited to, the type of impeller, variations in the impeller (such as number of blades, pitch, length) and enclosure variations (such as reduced volume/area, location and size of baffles).		N/A
24	Protective Devices		P
24.1	A protective device, the intended functioning of which requires replacement or resetting, shall be in a readily accessible location		P
24.2	A protective device shall be inaccessible from outside the appliance without opening a door or cover.		P
24.3	A door or cover of an enclosure shall be hinged or attached in an equivalent manner when it gives access to any overload-protective device, the intended functioning of which requires renewal, or if it is necessary to open the cover in connection with the intended operation of the protective device.		P
24.4	A protective device shall not open the circuit during intended operation of the appliance.		P
24.5	In an automatic appliance, when breakdown of a capacitor that is not part of a permanent-split-capacitor motor or a part of a capacitor-start motor results in a risk of fire or electric shock, thermal or overcurrent protection shall be provided in the appliance.		P
25	Fuseholders and Fused Attachment Plugs		N/A
25.1	In addition to the applicable requirements in this standard, a fuseholder located in the enclosure of a unit shall comply with the Standard for Fuseholders – Part 1: General Requirements, UL 4248-1, and the applicable Part 2 (e. g. UL 4248-9), and a fused attachment plug shall comply with the Standard for Attachment Plugs and Receptacles, UL 498, or the Standard for Cord Sets and Power-Supply Cords, UL 817.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
25.2	The fused attachment plug, fuseholder, or in-line fuseholder shall be constructed such that there shall not be exposure of live parts during removal or replacement of the fuse(s). In addition, for a fused attachment plug, there shall not be exposure of live parts with the fuse cover partially open during 2.03 mm (0.08 inch) insertion into a receptacle. Exposure of live parts shall be determined by contact with the accessibility probe illustrated in Figure 10.1.		N/A
25.3	The fuse cover of a fuseholder, in-line fuseholder, or fused attachment plug or current tap shall not be detachable from the device as determined by the Fuseholder Cover Test, Section 66.		N/A
25.4	A fuseholder shall not employ insulation-piercing terminals.		N/A
26	Motor Overload Protection		P
26.1	As referenced in the Exception to 23.1, integral thermal protection is not required when the protection is provided by a separate device that is responsive to motor current and is rated or set to trip at not more than the percentages of the motor nameplate full-load current rating specified in Column A of Table 26.1.		P
26.2	When the overload device, selected in accordance with Column A of Table 26.1, is not sufficient to start the motor or to carry the load, the next higher size device shall be permitted to be used when the trip current of the overload device does not exceed the percentage values specified in Column B of Table 26.1.		P
26.3	A three phase motor shall be provided with overload protection as follows: a)Three overcurrent units; or b)Thermal protectors as described in 23.1(a), a combination of thermal protectors and overcurrent units, or another method of protection, where the specific protective arrangement has been investigated and found to provide protection under primary, single-phase failure conditions when power is supplied from transformers connected wye-delta or delta-wye.		P

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Clause	Requirement + Test	Result - Remark	Verdict
26.4	<p>The overload protection specified in 26.1 – 26.3 is not required to be provided as part of the unit when all of the following conditions exist:</p> <p>a)The motor is to be field-wired to a separate circuit that does not supply any other loads within the unit;</p> <p>b)The motor overload protection is part of a separate, field-provided motor controller that does not require wiring interconnection to the unit, except for the motor circuit; and</p> <p>c)The product is marked in accordance with 80.2.6.</p>		P
26.5	Fuses shall not be used as motor-overload protective devices unless the motor is protected by the fuse of the highest current rating that can be inserted in the fuseholder.		P
27	Switches, Including Motor Controllers		P
27.1	<p>A switch or other control device shall:</p> <p>a)Be acceptable for the application;</p> <p>Exception: A switch or other device that controls a motor that has not been previously investigated for its suitability of controlling a motor shall be subjected to the Tests of Switches and Controls, Section 59.</p> <p>b)Have a current and voltage rating not less than that of the load that it controls; and</p> <p>c)Be located within the confines of the frame or enclosure of the appliance or be additionally protected so as to reduce the likelihood of contact by external objects.</p>		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
27.2	<p>A control, other than as specified in 27.4, shall comply with the:</p> <p>a)Standard for Fan Speed Controls, UL 1917;</p> <p>b)Standard for Industrial Control Equipment, UL 508;</p> <p>c)Standard for Power Conversion Equipment, UL 508C;</p> <p>d)Standard for Automatic Electrical Controls – Part 1: General Requirements, UL 60730-1;</p>		P
27.3	<p>Switches shall comply with one of the following, as applicable:</p> <p>a)Standard for Switches for Appliances – Part 1: General Requirements, UL 61058-1, with minimum 6000 cycles of endurance rating;</p> <p>b)Standard for General-Use Snap Switches, UL 20; or</p> <p>c)Standard for Nonindustrial Photoelectric Switches for Lighting Control, UL 773A.</p>		P
27.4	<p>A switch or control intended to be located between the branch circuit and the appliance must comply with one of the following:</p> <p>a)The Standard for General-Use Snap Switches,UL 20;</p> <p>b)The Standard for Solid-State Fan Speed Controls, UL 1917; or</p> <p>c)Other equivalent standards intended to determine compliance of the switches or controls for branch circuit installation.</p>		P

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Clause	Requirement + Test	Result - Remark	Verdict
27.5	The device box within which a switch as described in 27.4 is installed, and the accompanying coverplate, shall comply with the applicable standards within the UL 514 series: Metallic Outlet Boxes, UL 514A; Conduit, Tubing, and Cable Fittings, UL 514B; Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers, UL 514C; Cover Plates for Flush-Mounted Wiring Devices, UL 514D.		P
27.6	With reference to the requirement in 27.1, the current rating of a switch that controls an inductive load, other than a motor, such as a transformer or a fluorescent-lamp ballast, shall not be less than twice the rated full-load current of the transformer or ballast, unless the switch is known to be acceptable for the particular application.		P
27.7	A manually operated, line-connected, single pole switch for appliance on-off operation shall not be connected to the conductor of the power supply cord intended to be grounded. Table 15.2 specifies the identification of the power supply cord conductor intended to be grounded.		P
27.8	A switch is considered to be acceptable for controlling a tungsten-filament lamp load when: a)It has a T or L rating and a current rating at least equal to the tungsten-filament lamp load; or b)It has an alternating-current rating at least six times, or a direct-current rating at least ten times that of the tungsten-filament lamp load.		N/A
27.9	A switch provided for the control of a fluorescent lamp and not integral with the lampholder shall have a current rating at least twice the primary rating of the ballast. Each ballast is to be considered as requiring its rated input current.		N/A
27.10	When an appliance provided with a direct-plug in power-supply cord and an attachment plug		N/A
27.11	A speed-control switch shall be provided with an appliance that employs a multispeed motor – a motor with a winding capable of various pole groupings.		P
27.12	The construction of a switch shall be such that only one circuit can be energized at a time.		P

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Clause	Requirement + Test	Result - Remark	Verdict
27.13	When a fan is provided with a timing or temperature device that automatically starts the fan, the automatic restarting of moving parts shall not result in a risk of injury to persons. See 81.2.		N/A
27.14	Automatic restarting of a fan provided with an automatically reset thermally actuated device, such as a room thermostat or a motor thermal protector, shall not result in a risk of injury to persons. See 81.2.		N/A
27.15	A permanently connected fan employing a factory wired component solid-state speed control shall include a positive marked "off" position provided by an air-gap-type switch that complies with the applicable requirements in the Standard for General-Use Snap Switches, UL 20, the Standard for Switches for Appliances – Part 1: General Requirements, UL 61058-1, or the equivalent. This marking shall be represented by the word "off", the symbol "O", or a visual indicator.		N/A
28	Interlocks		P
28.1	A moving part that could cause injury to a person is considered to be guarded if protected by a cover with an interlock that complies with one of the following conditions: a)The part stops moving within 3 seconds after the cover is opened; or b)The interlock prevents the cover from being opened until the part stops moving.		P
28.2	Operation of an interlock in normal use shall not inconvenience the operator so as to encourage deliberate defeat of the interlock.		P
28.3	An interlock shall be located so that unintentional operation is unlikely. The interlock shall not be readily defeatable without damaging the product, or without making wiring connections or alterations.		P
28.4	An interlock that is required to reduce a risk of electric shock or injury to persons shall withstand 100,000 cycles of operation controlling a load not less than that controlled in the air cleaner, and shall function normally upon completion of the test.		N/A

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28.5	If an electronic control provides the functionality required for safety interlocks as defined by 28.1, the circuit providing the required safety functionality shall be additionally evaluated as a protective control in accordance with the Standard for Automatic Electric Controls – Part 1: General Requirements, UL 60730-1. See Table 28.1.		N/A
29	Capacitors		P
29.1	A motor start or run capacitor shall comply with the construction requirements in the standard for capacitors UL 810.		P
29.2	A capacitor, mounted in an application not intended to be totally enclosed, shall be housed within an enclosure that protects the capacitor against mechanical damage and prevents the emission of flame or molten material resulting from malfunction or breakdown of the capacitor. The enclosure shall comply with the requirements in Section 7, Frame and Enclosure.		P
29.3	Except for a cord-connected appliance rated for a nominal 120-volt supply – see 41.1 – the total capacitance of capacitors connected from one side of the line to the frame or enclosure of an appliance shall not result in the flow of more than 5 milliamperes in the grounding conductor when the frame or enclosure is connected to ground.		N/A
29.4	Capacitors connected across-the-line or line to ground in other than a secondary circuit shall comply with Section 47, Dielectric Voltage Withstand Test.		N/A
29.5	A capacitor connected between two line conductors in a primary circuit, or between one line conductor and the neutral conductor or between primary and accessible secondary circuits or between the primary circuit and protective earth (equipment grounding conductor connection) shall comply with one of the subclasses of the Standard for Fixed Capacitors for Use in Electronic Equipment – Part 14: Sectional Specification: Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains, UL 60384-14, and shall be used in accordance with its rating. Details for damp heat, steady state test can be found in 4.12 of UL 60384-14.		P

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29.6	<p>A motor starting or running capacitor shall be rated for the appropriate voltage. The maximum available fault current (AFC) to which it can be subjected shall comply with one of the following as applicable:</p> <p>a) A value of 5,000 A minimum when connected directly across the line;</p> <p>b) For capacitors connected in series with a motor coil, the maximum current available to a short-circuited capacitor, when connected in series with the motor coil energized under locked rotor conditions;</p> <p>c) For a dry metallized-polypropylene film capacitor operating at less than or equal to 330 VRMS, a maximum AFC rating is not required; or</p> <p>d) For electrolytic type capacitor, a maximum AFC rating is not required.</p>		N/A
30	Spacings		P
30.1	The spacings between field-wiring terminals of opposite polarity, and between a wiring terminal and any other uninsulated metal part (dead or live) not of the same polarity, shall not be less than that specified in Table 30.1. See 14.4.1.		P
30.2	Spacings, other than at field-wiring terminals, between uninsulated live parts of opposite polarity, and between an uninsulated live part and a dead-metal part, shall not be less than the applicable value specified in Table 30.2. When an uninsulated live part is not rigidly fixed in position by means other than friction between surfaces, or when a movable dead-metal part is in proximity to an uninsulated live part, the construction shall be such that the minimum acceptable spacing will be maintained.		P
30.3	An uninsulated conductor of a rotor circuit shall be regarded as a dead-metal part with respect to the stator circuit, and the required spacing shall be provided between uninsulated stator and rotor conductors.		N/A

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30.4	In the application of 30.2, 47.1, and Table 30.2 to an appliance employing a motor not rated in watts, Tables 430.147 through 430.150 of the National Electrical Code, ANSI/NFPA 70, are to be used as applicable to determine the relationships between watts and full-load current for motors.		N/A
30.5	At terminal screws and studs to which connections are made in the field by wire connectors, eyelets, or the like described in 14.4.1, spacings shall not be less than those specified in Table 30.2 with the connectors, eyelets, or the like, in such position that minimum spacings – opposite polarity and to dead metal – exist.		P
30.6	A barrier or liner of vulcanized fiber or similar material employed in lieu of spacings shall be of a material acceptable for the application and shall not be less than 0.8 mm (1/32 inch) thick.		P
30.7	Motor spacings shall comply with the spacing requirements in the Standard for Rotating Electrical Machines – General Requirements, UL 1004-1.		P
30.8	Spacings on a printed wiring board assembly that are less than indicated in Table 30.2: a) Shall be provided with a coating and spacings as specified in Table 30.3; or		P
	b) Shall comply with the requirements for creepages and clearances as defined by the Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, UL 840.		N/A

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30.9	<p>The spacing requirements in the Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, UL 840, shall be amended as follows:</p> <p>a) For indoor only appliances, the Pollution Degree shall be 2;</p> <p>Exception: For air-filtering appliances the Pollution Degree shall be 3;</p> <p>b) For indoor/outdoor fans and printed wiring boards in the airstream of a cooking area, ceiling insert, or wall-insert fan, the Pollution Degree shall be 3.</p> <p>c) Hermetically sealed or encapsulated enclosures, or conformally-coated printed-wiring boards are identified as Pollution Degree 1;</p>		P
30.10	<p>The overcurrent protective device mentioned in 31.4.4 or 31.5.4 shall:</p> <p>a) Not be of the automatic reset type;</p> <p>b) Be trip-free from the reclosing mechanism when of the manual reset type; and</p> <p>c) Not be interchangeable with one of a larger current rating when it is a renewable device.</p>		P
31	Secondary Circuits		N/A
31.1	General		N/A

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31.1.1	<p>A secondary circuit shall comply with the requirements for one of the following types of secondary circuits:</p> <p>a) A Class 2 circuit;</p> <p>b) A limited voltage/current circuit;</p> <p>c) A limited energy circuit;</p> <p>d) A limiting impedance circuit; or</p> <p>e) The requirements for electronic circuits in Supplement SB.</p>		N/A
31.1.2	<p>An optical isolator that is relied upon to provide isolation between primary and secondary circuits or between other circuits as required by this Standard shall be constructed in accordance with the Standard for optical Isolators, UL 1577 and shall be able to withstand for minute, without breakdown, an ac dielectric voltage withstand potential equal to 1000 V plus twice rated voltage between the input and output circuits.</p>		N/A
31.1.3	<p>A power switching semiconductor device that is relied upon to provide isolation to ground shall be constructed in accordance with the Standard for Electrically Isolated Semiconductor Devices, UL 1557. The dielectric voltage withstand tests required by UL 1557 shall be conducted at a dielectric potential of 1000 V plus twice rated voltage for 1 minute.</p>		N/A
31.2	<p>Difference between the level of evaluation required within each type of secondary circuit</p>		N/A

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31.2.1	<p>The following applies to secondary circuits that comply with the Class 2 requirements of 31.3.1 or the limited voltage/current requirements of 31.4.1 – 31.4.7:</p> <p>a)Components located within these circuits are not required to be evaluated.</p> <p>b)Spacings located within these circuits and from these circuits to earth ground or to the enclosure are not required to be evaluated. However, spacings from these circuits to other circuits shall be in accordance with Spacings, Section 30.</p> <p>c)These circuits are not prohibited from being accessible from outside the enclosure.</p>		N/A
31.2.2	<p>The following applies to secondary circuits that comply with the limited energy requirements of 31.5.1 – 31.5.4 circuit requirements and that involve open circuit potentials less than or equal to 30 V ac or 42.4V peak:</p>		N/A
	a)Components located within these circuits are not required to be evaluated.		N/A
	b)Spacings located within these circuits and from these circuits to earth ground or to the enclosure are not required to be evaluated. However, spacings from these circuits to other circuits shall be in accordance with Section 30, Spacings.		N/A
	c)These circuits shall not be accessible from outside the enclosure. Therefore, when these circuits provide power to components that extend through the enclosure, the ability of these components to serve as an enclosure shall be evaluated.		N/A
31.2.3	<p>The following applies to secondary circuits that comply with the limited energy requirements of 31.5.1– 31.5.4 and that involve open circuit potentials in excess of 30 V ac or 42.4 V peak:</p>		N/A
	a)Components located within these circuits are not required to be evaluated.		N/A
	b)Spacings located within these circuits are not required to be evaluated. However, spacings from these circuits to earth ground or to the enclosure and spacings from these circuits to other circuits shall be in accordance with Spacings, Section 30.		N/A

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31.2.4	The following applies to secondary circuits that comply with the limiting impedance requirements of 31.6.1 – 31.6.2:		N/A
	a)Components located within these circuits are not required to be evaluated. b)Spacings located within these circuits and from these circuits to earth ground or to the enclosure are not required to be evaluated. However, spacings from these circuits to other circuits shall be in accordance with Section 30, Spacings. c)These circuits are not prohibited from being accessible from outside the enclosure.		N/A
31.3	Class 2 circuit requirements		N/A
31.3.1	A Class 2 circuit shall be supplied by an isolating source that complies with the requirements in the Standard for Class 2 Power Units, UL 1310, or the requirements in the Standards for Low Voltage Transformers – Part 1: General Requirements, UL 5085-1 and Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers, UL 5085-3.		N/A
31.4	Limited voltage/current circuit requirements		N/A
31.4.1	A limited voltage/current circuit shall be supplied by an isolating source such that the maximum open circuit voltage potential available to the circuit is not more than 30 V ac or 42.4 V peak and the current available is limited to a value not exceeding 8 amperes measured after 1 minute of operation. The secondary winding of an isolating type transformer meets the intent of compliance with this requirement. The transformer shall comply with the requirements in the appropriate UL Standards for Transformers.		N/A
31.4.2	With reference to these secondary voltage and current limits, these measurements are to be made as follows:		N/A

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	<p>a)The input to the source of that secondary is to be connected as intended;</p> <p>b)The maximum open circuit voltage potential available to the secondary circuit under consideration is to be measured across the source of that secondary; and</p> <p>c)The current available to the secondary circuit under consideration is to be measured by connecting a variable resistive load across the source of that secondary and then varying the load until an available current of 8 amperes is obtained for 1 minute of operation. When an available current of 8 amperes is not obtained under any condition of loading, up to and including a short circuit, then the test is to be discontinued for that circuit.</p>		N/A
31.4.3	For a transformer, only one secondary circuit of a multiple secondary transformer is to be tested at a time and all other secondaries not under test are to be loaded as intended. The voltage and current measurements are to be made directly across the secondary output terminals of the transformer. When a tapped transformer winding is used to supply a full-wave rectifier, the measurements are to be made from either end of the winding to the tap. When the transformer is used as part of a switching-type power supply, the voltage and current measurements are to be made after the transformer secondary winding rectification means.		N/A
31.4.4	A secondary fuse or other such secondary circuit protective device used to limit the available current in accordance with 31.4.1, shall be rated at not more than the values specified in Table 31.1. See		N/A
31.4.5	The secondary circuit protective device referenced in 31.4.4 is not prohibited from also being provided in the primary circuit. When provided in the primary circuit, there are no restrictions on the current rating of the protective device as long as it limits the available secondary current in accordance with Table 31.1.		N/A

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31.4.6	When a protective device is used as specified in 31.4.4 or 31.4.5, this protective device shall comply with the requirements in Section 30, Spacings, and shall be provided with an adjacent replacement marking and replacement instructions that include the required voltage and current rating. The printed wiring board, wiring, and spacings prior to the point at which the voltage and current are suitably limited shall comply with the requirements of this Standard.		N/A
31.4.7	A fixed impedance (such as a component or grouping of components in the same circuit) or a regulating network (such as used in a switching type power supply) meets the intent of limiting the voltage and/or the available current in accordance with 31.4.1. Such a fixed impedance or regulating network shall be able to function under single component fault conditions.		N/A
31.5	Limited energy circuit requirements		N/A
31.5.1	A limited energy circuit shall be supplied by an isolating source such that the maximum volt-ampere capacity available to the circuit is 200 volt-amperes or less at a maximum open circuit voltage potential of 100 V ac. The secondary winding of an isolating type transformer meets the intent of compliance with this requirement. The transformer shall comply with the requirements in the appropriate UL Standard for Transformers.		N/A

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31.5.2	<p>With reference to the secondary voltage and volt-ampere capacity limits, the measurements are to be made as follows:</p> <p>a)The input to the source of that secondary is to be connected as intended;</p> <p>b)The maximum open circuit voltage potential available to the secondary circuit under consideration is to be measured across the source of that secondary; and</p> <p>c)The maximum volt-ampere capacity available to the secondary circuit under consideration is to be measured by connecting a variable resistive load across the source of that secondary and then measuring the voltage and current while varying the resistive load from open circuit to short circuit in 1-1/2 to 2-1/2 minutes. The maximum available volt-ampere capacity is then calculated by multiplying the simultaneously measured values of secondary voltage and secondary current.</p>		N/A
31.5.3	<p>For a transformer, only one secondary circuit of a multiple secondary transformer is to be tested at a time and all other secondaries not under test are to be loaded as intended. The voltage and volt-ampere capacity measurements are to be made directly across the secondary output terminals of the transformer. When a tapped transformer winding is used to supply a full-wave rectifier, the measurements are to be made from either end of the winding to the tap. When the transformer is used as part of a switching-type power supply, the voltage and volt-ampere capacity measurements are to be made after the transformer secondary winding rectification means</p>		N/A

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	31.5.4A primary or secondary circuit fuse or other such circuit protective device meets the intent of limiting the maximum available volt-ampere capacity in accordance with 31.5.1. While there are no restrictions on the current rating of this protective device as long as it limits the available secondary volt- ampere limit in accordance with 31.5.2, the protective device shall comply with the requirements of this Standard and shall be provided with an adjacent replacement marking or replacement instructions that includes the required voltage and current rating. The printed wiring board, wiring, and spacings prior to the point at which the voltage and volt-ampere capacity are suitably limited shall comply with the requirements of this Standard.		N/A
31.6	Limiting impedance circuit requirements		N/A
31.6.1	A limiting impedance circuit shall be supplied by an impedance that complies with the following: a)The calculated power dissipation of the impedance, as the result of a direct short applied across the circuit downstream of the impedance, does not exceed the power rating of the impedance; b)The power dissipation of the impedance is not greater than 15 Watts; and c)There does not exist a risk of shock, as defined in 2.3.16, downstream of the impedance.		N/A
31.6.2	The limiting impedance referred to in 31.6.1 shall be able to function under single component fault conditions.		N/A
32	Printed-Wiring Boards	V-0 used	P
32.1	A printed-wiring board shall comply with the requirements in the Standard for Printed-Wiring Boards, UL 796, including direct support criteria, and shall be classed V-0, V-1, or V-2 in accordance with the requirements in the Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances, UL 94.		P

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32.2	A resistor, capacitor, inductor, or other part that is mounted on a printed-wiring board to form a printed-wiring assembly shall be secured so that it is not displaced to result in a risk of electric shock or fire by a force typically exerted during assembly, normal operation, or servicing of the fan.		P
32.3	Consideration is to be given to a barrier or a partition that is part of the device and that provides mechanical protection and electrical insulation of a component connected to the printed-wiring board.		N/A
33	General Purpose Transformer – Insulation Systems		N/A
33.1	Class A insulation systems shall consist of a combination of magnet wire and major component insulation materials evaluated and found to operate as intended in its end use. Thermoset materials and materials in Table 33.1 at the thicknesses specified are permitted to be used without further evaluation.		N/A
33.2	For Class A insulation systems employing other materials or thinner materials than those indicated in Table 33.1 or a combination of materials, the materials, whether polymeric or not polymeric (treated cloth, for example), shall comply with the requirements in 33.3.		N/A
33.3	A polymeric material employed in a Class 105 (A) insulation system that isolates the windings from dead metal parts shall be unfilled or glass-reinforced nylon, polycarbonate, polybutylene terephthalate, polyethylene terephthalate, phenolic or acetal, and shall have a relative or generic thermal index for electrical properties of 105°C minimum. Leads shall be rated 90°C minimum.		N/A
33.4	Materials used in an insulation system that operates above Class 105 (A) temperatures shall comply with the Standard for Systems of Insulating Materials – General, UL 1446.		N/A
33.5	All insulation systems employing integral ground insulation shall comply with the requirements specified in the Standard for Systems of Insulating Materials – General, UL 1446.		N/A
34	Electronic Circuits		P

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34.1	Malfun­ction of a component such as a diode, a transistor, a thyristor, an electrolytic capacitor, an integrated circuit, an optical isolator, or other solid-state device (any device whose operation is dependent upon any combination of optical, electrical, or magnetic phenomena within a solid) that has not been investigated for reliability and determined to be reliable shall not result in a risk of fire, electric shock or injury to persons when subjected to the Component Breakdown Test in Section 65.		P
34.1	Compliance with 34.1 requires an analysis of the circuit to determine whether malfunction of a component results in a risk of fire, electric shock or injury to persons. This analysis requires the opening and short circuiting of a component (electrolytic capacitor, transistor junction, and the like) and observation of the ultimate results of the simulated malfunction or breakdown. Only one condition of simulated malfunction or breakdown is to be imposed at a time.		P
35	Grounding		P
35.1	General		P
35.1.1	In addition to the requirements specified in 35.1 – 35.3, an appliance shall comply with the applicable requirements in 14.4.1 – 14.4.10, 14.5.5, and 14.5.6.		P
35.1.2	Electrical continuity shall be provided between all exposed dead-metal parts and all dead-metal parts within the enclosure that are exposed to contact during any user-servicing operation and that can become energized and:		P
	a)The equipment grounding terminal or lead, and to the metal surrounding the knockout, hole, bushing, or metallic fitting (at the end of flexible armored cable for attachment to a field-provided metallic outlet box) provided for field power-supply connection for an appliance intended for permanent electrical connection; or		P
	b)The point of connection of the grounding conductor of the power-supply cord of an appliance equipped with a power-supply cord of the grounding type. See 35.3.1.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
35.1.3	With reference to the requirement in 35.1.2, two pieces of enameled or painted sheet metal are not considered to be adequately bonded together unless measures are taken to penetrate the enamel or paint at points of bonding.		P
35.1.4	Field connection of equipment grounding conductors to an enclosure; and; Connection of a factory-provided grounding lead to an enclosure.		P
35.1.5	Removal of a motor or light in a wall-insert fan, a ceiling-insert fan, or a ceiling-insert fan/light combination shall not result in disconnection of the field wired equipment grounding conductor or internal bonding jumper.		P
35.1.6	The means for grounding continuity shall be constructed so that contact pressure is not transmitted through insulating material which is liable to shrink or to distort unless there is sufficient resiliency in the metallic parts to compensate for any possible shrinkage or distortion of the insulating material.		P
35.1.7	The grounding means shall not be used for any other purpose than to provide a grounding conductor path.		P
35.2	Permanently connected appliances		P
35.2.1	An equipment-grounding connection, a grounding conductor, an enclosure, a frame, a component-mounting panel, or any other part connected to earth ground shall not carry current except during an electrical fault.		P
35.2.2	The equipment-grounding terminal shall secure an equipment grounding conductor of a size acceptable for the application in accordance with the National Electrical Code, ANSI/NFPA 70. The terminal shall not be smaller than No. 10 (4.8 mm diameter).		P
35.2.3	A pressure wire connector provided for an equipment-grounding conductor shall comply with the applicable requirements in the Standard for Wire Connectors, UL 486A-486B. A connector not covered by UL 486A-486B shall exhibit, upon investigation, performance equivalent to that specified in that standard.		P

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35.2.4	A product intended for mounting in a flush-device box shall be so constructed such that electrical continuity is provided between a metal faceplate and the equipment grounding means in the box when the device and the faceplate are installed in the intended manner.		N/A
35.3	Cord-connected appliances		N/A
35.3.1	A power-supply cord of an appliance intended for use on a circuit operating at a potential of more than 150 volts to ground shall include an equipment-grounding conductor.		N/A
35.3.2	A cord-connected appliance provided with double insulation in accordance with the Standard for Double Insulation Systems for Use in Electrical Equipment, UL 1097, is not required to be provided with an equipment-grounding conductor. Also see 15.1.7.		N/A
35.3.3	A power-supply cord of an evaporative cooler, a stationary fan, or a fan intended to be used, or that may be used, outdoors in accordance with the literature provided with the fan shall include an equipment-grounding conductor.		N/A
35.3.4	An equipment-grounding conductor of a flexible cord shall be:		P
	a)Finished to show a green color with or without one or more yellow stripes;		P
	b)Connected to the grounding member of an attachment plug of the grounding type; and		P
	c)Connected to the dead-metal parts mentioned in 35.1.2 by a screw or other means that is not removed during servicing. Solder alone shall not be used for making this connection.		P
35.3.5	The screw mentioned in 35.3.4 (c) shall be of corrosion-resistant metal, or shall be adequately protected against corrosion, and shall not be smaller than No. 10 (4.8 mm diameter). A lock washer or equivalent means shall be employed to prevent the screw from becoming loosened by vibration.		P

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35.3.6	A pressure wire connector intended solely for the connection of an equipment-grounding conductor shall be identified by being colored green, marked "G," "GR," "Ground," "Grounding," the grounding symbol illustrated in Figure 35.1, or the like, or by a marking on a wiring diagram provided on the fan. The pressure wire connector shall be located so that it is not removed during intended servicing of the fan.		P
35.4	Grounding for low-voltage power-limited circuits		N/A
35.4.1	The circuit grounding conductor shall not be smaller than the transformer output conductors, and in no case smaller than 14 AWG copper. The conductor shall be bare or insulated with green (or green with one or more yellow stripes) insulation.		N/A
35.5	Fans employing convenience receptacles		N/A
35.5.1	A metallic enclosure and other dead metal parts of a fan employing a convenience receptacle that are exposed to contact by persons shall be conductively connected to the grounding conductor of the power-supply cord.		N/A
35.5.2	The conductive connection of parts required by 35.5.1 shall be made by a clamp, bolt, screw, braze, weld, or an equivalent positive means that cannot be loosened from the outside and is not prohibited from including a corrosion resistant strap or jumper. Mechanical connections shall be secured. A solder connection is not prohibited from being used when the power supply cord grounding lead is mechanically secure to the enclosure in accordance with 19.12. A push-in (screwless), quick-connect, or similar friction-fit connector shall not be used for this connection.		N/A
35.5.3	Connections in the equipment grounding conductor path from the convenience receptacle grounding contact to the equipment grounding conductor of the power supply cord shall be welded, bolted, mechanically secured and soldered, or made by equivalent positive means. A quick-connect, or similar friction-fit connector, shall not be used in the grounding conductor path.		N/A
35.5.4	The yoke or faceplate mounting screws of the convenience receptacle shall not be used to provide or maintain the grounding means of the convenience receptacle.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
35.5.5	When a convenience receptacle used on a fan is provided with a grounding screw, this screw shall be used to provide the ground connection to the convenience receptacle.		N/A
36	Filters		N/A
36.1	A fan intended for connection to a duct and employing one or more filters that have not been determined to be acceptable, with or without one or more acceptable filters, is acceptable if, when tested, the filter in a single filter fan or the assembly of filters in a multifilter fan is found to be equivalent in performance to the filter specified for that fan in 36.2. A test on an assembly of filters is to be conducted with the filters mounted in the intended manner.		N/A
36.2	A filter provided with an air filtering appliance intended for connection to a duct shall comply with the Standard for Air Filter Units, UL 900.		N/A
36.3	When used with reference to an evaporative cooler, the term filter signifies a moisture-bearing evaporator or wick for introducing moisture into the air stream.		N/A
37	Accessories		P
37.1	Use of an accessory that is furnished with a fan shall not cause a risk of fire, electric shock, or injury to persons		P
38	Button or Coin Cell Batteries of Lithium Technologies		N/A
38.1	The battery compartment of an appliance or any accessory, such as a wireless control, incorporating one or more coin cell batteries of lithium technologies shall comply with the Standard for Products Incorporating Button or Coin Cell Batteries of Lithium Technologies, UL 4200A, if the appliance or any accessory:		N/A
	a)Is intended for use with one or more single cell batteries having a diameter of 32 mm (1.25 in) maximum with a diameter greater than its height; and		N/A
	b)The appliance is intended for household use.		N/A
39	Lasers		N/A
39.1	A product employing a laser falling within the scope of the Code of Federal Regulations (CFR), Title 21, Part 1040 shall be compliant with the regulation.		N/A

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39.2	With reference to 39.1, compliance of laser products with the Code of Federal Regulations (CFR), Title 21, Part 1040, shall be determined by:		N/A
	a)Determining the Class of the laser product and the Class of the radiation emitted by the laser product (as defined in the CFR) from the manufacturer's Center for Devices and Radiological Health (CDRH) product report;		N/A
	b)Verifying that the manufacturer's markings and labels having the information specified in the CFR are affixed on the laser product (as defined in the CFR);		N/A
	c)Determining that the corresponding construction features, such as protective housing, interlocks, and similar features, are provided in accordance with the CFR;		N/A
	d)Determining that the resulting construction complies with the construction requirements of this standard; and		N/A
40	Test Voltages	120V~	P
40.1	Unless otherwise specified, products shall be tested at a potential in accordance with Table 40.1 for each test described.		P
41	Leakage Current Test		P
41.1	A cord-connected product rated for a nominal 240-volt or less supply shall be tested in accordance with 41.3 – 41.6. Leakage current shall not exceed:		P
	a)0.5 milliamperere for an ungrounded 2-wire product;	0.31mA< 0.75mA	P
	b)0.5 milliamperere for a grounded, 3-wire, portable product; and		
	c)0.75 milliamperere for a grounded, 3-wire, product:		
	41.2Leakage current refers to all currents, including capacitively coupled currents, that are conveyed between exposed conductive surfaces of an appliance and ground or other exposed conductive surfaces of an appliance.		P

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41.3	All exposed conductive surfaces are to be tested for leakage currents. The leakage currents from these surfaces are to be measured to the grounded supply conductor individually as well as collectively where simultaneously accessible. Parts are considered to be exposed surfaces unless guarded by an enclosure determined to reduce the risk of electric shock as defined in 10.1 – 10.3. Surfaces are considered to be simultaneously accessible when they can be readily contacted by one or both hands of a person at the same time. These measurements do not apply to terminals operating at voltages that are not considered to involve a risk of electric shock. When all accessible surfaces are bonded together and connected to the grounding conductor of the power-supply cord, the leakage current can be measured between the grounding conductor and the grounded supply conductor.		P
41.4	When a polymeric material or conductive surface other than metal is used for the enclosure or part of the enclosure, the leakage current is to be measured using metal foil having an area of 10 by 20 centimeters (3.9 by 7.9 inches) in contact with the surface. When the surface has an area of less than 10 by 20 centimeters (3.9 by 7.9 inches), the metal foil is to be the same size as the surface. The metal foil is not to remain in place long enough to affect the temperature of the appliance.		N/A
41.5	The measurement circuit for leakage current is to be as illustrated in Figure 41.1. The measurement instrument is defined in (a) – (d). The meter that is actually used for a measurement need not only indicate the same numerical value for a particular measurement as would the defined instrument. The meter used is not required to have all the attributes of the defined instrument:		P
	a)The meter is to indicate 1.11 times the average of the full-wave rectified composite waveform of the voltage across the resistor or current through the resistor.		P
	b)Over a frequency range of 0 – 100 kilohertz, the measurement circuitry is to have a frequency response – ratio of indicated to actual value of current – equal to the ratio of the impedance of a 1500-ohm resistor shunted by a 0.15-microfarad capacitor to 1500 ohms. At an indication of 0.5 milliampere, the measurement is not to have an error of more than 5 percent at 60 hertz.		P

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	c)Unless the meter is being used to measure leakage from one part of an appliance to another, the meter is to be connected between the accessible parts and the grounded supply conductor.		P
41.6	A sample of the appliance is to be tested for leakage current in the as-received condition, without prior energization except as occurs as part of the production line testing, but with the grounding conductor open at the attachment plug. The supply voltage is to be adjusted to the values specified in 46.1.10. The test sequence, with reference to the measuring circuit, Figure 41.1, is to be as follows:		P
	a)With the switch S1 open, the appliance is to be connected to the measuring circuit. Leakage current is to be measured using both positions of switch S2, and with the appliance switching devices in all their normal operating positions.		P
	b)Switch S1 is then to be closed, energizing the appliance, and within 5 seconds, the leakage current is to be measured using both positions of switch S2 and with the appliance switching devices in all their normal operating positions.		P
	c)The leakage current is to be monitored until thermal stabilization. Both positions of switch S2 are to be used in determining this measurement. Thermal stabilization is to be obtained by operation as in the normal temperature test.		P
41.7	Normally the complete leakage current test, as described in 41.6, is to be conducted without interruption for other tests. However, with the concurrence of those concerned, the leakage current test is not prohibited from being interrupted to conduct other nondestructive tests.		P
42	Continuity of Grounding Circuit Test		P
42.1	The resistance shall be not more than 0.1 ohm between any point required to be grounded, as specified in 35.1.2, and:	0.02Ω<0.1Ω	P
	a)For an appliance intended for permanent electrical connection, the point on the enclosure at which the power-supply system is connected.		P
	b)For a cord-connected appliance employing a grounding conductor in the cord, the point to which the grounding conductor of the power-supply cord is connected.		P

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42.2	The resistance shall be determined by any convenient method. When unacceptable results are obtained, either a direct or alternating current equal to the current rating of the maximum-current-rated branch-circuit overcurrent-protective device that is employed with the appliance is to be passed from the equipment grounding terminal or the point of attachment of the wiring system to the dead metal part, and the resulting drop in potential is to be measured between these two points. The resistance in ohms is determined by dividing the drop in potential in volts by the current in amperes passing between the two points.		P
43	Limited Short-Circuit Test		P
43.1	A knockout construction as described in the Exception to 14.2.3 shall maintain its integrity, no melting or otherwise opening of the knockout connection, when subjected to the limited short-circuit test described in 43.2 and 43.3.		P
43.2	Three samples of the enclosure/conduit construction are to be subjected to the test. The current is to be as specified in Table 43.1. The test circuit is to have a power factor of 0.9 – 1.0 and is to be limited to the current specified in Table 43.1. The open-circuit voltage of the test circuit is to be 100 – 105 percent of the rated voltage of the equipment.		P
43.3	The enclosure is to be connected to the circuit through appropriately sized 6 inch-length of flexible metal conduit and a ground terminal suitable for connection of 3/0 AWG copper conductors is to be installed as close as possible to the internal conduit locknut. The free ends of each 4 foot-length of 3/0 AWG copper conductor are connected to each the supply as described in 43.2 through a series connected nonrenewable fuse that does not open in less than 12 seconds when carrying twice its rated current.		P
44	Starting Current Test		P
44.1	When operated as described in 44.3, an appliance shall start and operate normally without:		P
	a) Tripping an overload protector provided as part of the appliance; or b) Opening the fuse, when connected to a circuit protected by a fuse as described in 44.2.		N/A

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44.2	The fuse mentioned in 44.1(b) is to be other than a time-delay type. The current rating of the fuse is to be equal to the current rating of the supply circuit of the lowest rating to which the appliance is intended to be connected.		P
44.3	To determine whether an appliance complies with the requirements in 44.1, the appliance is to be connected to a power-supply circuit protected by a fuse as specified in 44.2 or in the exception to 44.2, whichever applies. The appliance is to be at room temperature at the beginning of the test. The appliance is to be started three times without tripping an overload protector provided as part of the appliance, or opening the fuse protecting the supply circuit. Each start of the appliance is to be made under conditions representing the beginning of normal operation – the beginning of the normal operating cycle in the case of an automatic appliance. The motor of the appliance is to be allowed to come to full speed after each start, and to come to rest between successive starts.		P
44.4	An appliance employing a general use receptacle shall be loaded to the marked rating of the receptacle outlet. See 21.19.		N/A
45	Input Test		P
45.1	The current input to an appliance shall be not more than 110 percent of the rated value when the appliance is operated under conditions of intended service, when connected to a power-supply circuit at the test voltage shown in Table 40.1 rated frequency		P
46	Temperature Test		P
46.1	All fans		P
46.1.1	When tested as described in 46.1.3 – 46.2.2, an appliance shall not:		P
	a) Attain constant temperatures at any point on the fan sufficiently high to result in a risk of fire;		P
	b) Cause deterioration of any materials employed in the appliance; or		P
	c) Have constant temperature rises at specific points (particularly those surfaces that may be contacted by the user with the fan operating as intended) more than those specified in Table 46.1. (See 46.1.12.)		P

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46.1.2	A thermal protective device shall not operate during the temperature test. See 24.4.		P
46.1.3	Coil and winding temperatures are to be measured by the change-in-resistance method or by a minimum of four thermocouples located on exposed surfaces of the coil windings, except the change-in-resistance method is to be used for a coil that is inaccessible for mounting of thermocouples, such as a coil:		P
	a) Immersed in sealing compound;		N/A
	b) Wrapped with more than two layers of material such as cotton, paper, or rayon having a total thickness of more than 0.8 mm (1/32 inch).		P
46.1.4	Thermocouples are to consist of wires not larger than 24 AWG. When thermocouples are used in the determination of temperatures in connection with the heating of electrical devices, it is common practice to employ thermocouples consisting of 30 AWG iron and constantan wires and a potentiometer-type indicating instrument; and such equipment is to be used whenever referee temperature measurements by thermocouples are necessary.		P
46.1.5	When the change-in-resistance method is used, determination of the temperature rise of a winding is to be calculated by the following formula: $\Delta t = \frac{R_2}{\alpha_1} (K + t) - (K + t)$		N/A
46.1.6	When necessary, the value of R at shutdown is to be determined by taking several resistance measurements at short intervals, beginning as quickly as possible after shutdown. A curve of the resistance values and the time is to be plotted and extrapolated to give the value of R at shutdown.		P
46.1.7	The temperatures specified in Table 46.1 are based on an assumed ambient temperature of 25°C (77°F). However, tests are to be conducted at any ambient temperature within the range of 10 – 40°C (50– 104°F).		P
46.1.8	If the temperature test is conducted at an ambient other than 25° C (77° F), an observed temperature is to be corrected as described in 46.1.9.		N/A

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46.1.9	An observed temperature is to be corrected by addition [if the ambient temperature is lower than 25° C (77° F)] or subtraction (if the ambient temperature is higher than 25° C) of the difference between 25°C and the ambient temperature. If a corrected temperature exceeds the limit specified in Table 46.1, at the request of the manufacturer, the test may be repeated at a temperature closer to the rated operating ambient.		N/A
46.1.10	For the temperature test, the test voltage for an appliance is to be as specified in Table 40.1. When the appliance has a single frequency rating, the test is to be conducted at that frequency.		P
46.1.11	The appliance is to be operated under each condition of normal service. For a multispeed appliance, this includes operation at each speed and, for a reversible appliance, it includes operation in each direction of rotation. When a reversible appliance continues to rotate in the same direction, but at a slower speed, when the reversing switch is thrown, the requirement applies at the lower speed as well as at the normal speed. The test is to be continued until temperatures have become constant.		P
46.1.12	A temperature is considered to be constant when three successive readings taken at intervals of 10 percent of the previously elapsed duration of the test, but not less than 5 minutes, indicate no further increase.		P
46.1.13	An appliance employing a general use receptacle shall be loaded to the marked rating of the receptacle. The maximum length of the supply cord is to be used for the Temperature Test.		P

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46.1.14	Appliances shall be tested at the appliance's maximum normal load condition. Maximum normal load is considered to be the load that approximates as closely as possible the most severe conditions of normal use. It is not a deliberate overload except as the conditions of actual use are likely to be somewhat more severe than the maximum load conditions that are recommended by the manufacturer of the appliance. An appliance having features not contemplated in these test procedures may be tested as necessary to meet the intent of these requirements. An appliance intended to normally operate with its intake and/or discharge restricted shall be operated with the air intake and Vor discharge adjusted sufficiently to cause a maximum wattage input to the appliance.		P
46.1.15	For fans rated 12 Amps or less, and that employ wiring terminals for field wiring connections, the Temperature Test is to be conducted with supply wiring sized for the ampacity of the fan. When the fan is rated more than 12 Amps, the fan is to be tested with supply wiring sized 125 percent of the rating of the fan.		P
46.1.15	Fans for use over an eye-level range oven		N/A
46.2.1	The temperature test for a fan intended for use over an eye-level range oven is to be conducted with the appliance mounted above a heat source as described in 46.2.2 and illustrated in Figure 46.1, in accordance with the manufacturer's instructions. The test is to be conducted with the appliance and heat source in a 2-sided-right side and rear-alcove of 9.525-mm (3/8-inch) thick plywood. The sides of the alcove are to be painted black and are to extend at least 609.6 mm (2 feet) beyond the outermost edges of the assembly. The appliance and heat source are to be as close to the side and back of the alcove as their configuration permits. The test is to be conducted first with the fan on and with only the bake element energized with the thermostat set to give a temperature of 246°C (475°F) with the door of the heat source closed. The test is then repeated with the heat source set for broiling and the door open 101.60 mm (4 inches). Both of these tests are then to be repeated with the fan off.		N/A

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46.2.2	The heat source illustrated in Figure 46.1 is to be constructed of sheet metal having an average thickness of 0.81 mm (0.032 inch). The thermal insulation is to weigh 16.02 kilograms per cubic meter (1 pound per cubic feet). The heat source is to be approximately 381 mm (15 inches) deep, front to back, including the 25.4-mm (1-inch) thick door. The door is to be hinged on the left side and may be closed or opened as much as 101.60 mm (4 inches). The elements are to consist of coiled resistance wire embedded in fused magnesium oxide completely enclosed in nickel-alloy stainless steel. The heat from the source is to be controlled with a thermostat in which the bulb and capillary tube are located at the top of the heat source, toward the side.		N/A
46.3	Controllers		N/A
46.3.1	For the temperature test, a separate controller – that is, a controller that is not a physical part of the appliance – that is intended for installation in a wall is to be mounted as follows. The controller is to be secured inside its own enclosure, if provided. Otherwise, it is to be installed inside the smallest standard flush-type outlet box that accommodates it, and the box is to be mounted in a simulated wall section as illustrated in Figure 46.2.		N/A
47	Dielectric Voltage Withstand Test		P
47.1	An appliance shall withstand for 1 minute without electrical breakdown the application of a DC potential or an AC potential at a frequency within the range of 40 to 70 Hz between the following:		P
	a)Uninsulated live metal parts and the enclosure. A non-conductive enclosure is to be wrapped in conductive foil.		P
	b)Terminals of opposite polarity.		P
47.3	Capacitors connected across-the-line or line-to-ground shall withstand a DC dielectric potential of 1414 volts plus 2.828 times the maximum rated supply voltage, without breakdown for 1 minute, between the terminals of the capacitor, and between the terminals and foil wrapped around the case of the capacitor. The test shall be conducted with the capacitor at normal operating temperature.		N/A

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47.4	To determine whether an appliance complies with the requirements in 47.1, it is to be tested using a 500-volt-ampere or larger capacity transformer, the output voltage of which can be varied. The applied potential is to be increased from zero to the required test value and is to be held at that level for 1 minute. The increase in applied potential is to be at a substantially uniform rate as rapid as is consistent with correct indication of its value by a voltmeter.		P
47.5	The test equipment for conducting the dielectric voltage-withstand test is to be adjusted for sensitivity such that when a resistor of 120,000 ohms is connected across the output, the test equipment does not indicate unacceptable performance for any output voltage less than the specified test voltage, and the test equipment does indicate unacceptable performance for any output voltage equal to or greater than the specified test value. The resistance of the calibrating resistor is to be adjusted as close to 120,000 ohms as instrument accuracy can provide, and not more than 120,000 ohms.		N/A
47.6	An appliance employing a reversible shaded-pole motor shall withstand for 1 minute the application of a 60-hertz essentially sinusoidal potential:		N/A
	a)Between the stator winding and the shading coils; or		N/A
	b)Between the shading coils and the stator core, with the appliance at the temperature reached in intended use.		N/A
48	Water Spray Test		N/A
48.1	General		N/A
48.1.1	The following appliances shall comply , with the applicable water spray test requirements as specified in this section		N/A
	a)Any appliance intended for installation in a window opening;		N/A
	b)A roof ventilator;		N/A
	c)An attic fan;		N/A
48.1.2	Compliance with the water spray test shall be determined by:		N/A

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	a)A visual inspection to determine that there is no wetting of uninsulated live parts or film-coated wire – other than motor windings – and no accumulation of water in the wiring compartment or channel. The accumulation of water droplets shall only be acceptable when the fan complies with the tests in (b) and (c). A drain hole may be provided to reduce the accumulation of water above a level that results in the wetting of an electrical part or wiring compartment.		N/A
	b)A leakage current test for 120 volt cord connected appliances (see 48.4.1 – 48.4.6) or an insulation resistance test for all other appliances (see 48.5.1).		N/A
	c)A dielectric voltage withstand test (see 48.6.1).		N/A
48.2	Test preparation		N/A
48.2.1	The water spray test apparatus is to consist of three spray heads mounted in a water supply pipe rack as shown in Figure 48.1. Spray heads are to be constructed in accordance with the details shown in Figure 48.2.		N/A
48.3	Procedure		N/A
48.3.1	The appliance is to be mounted in accordance with the installation instructions. For items of installation not covered by the instructions, the most severe method of test installation is to be used.		N/A
48.3.2	The appliance is to operate during the exposure when it: a)Is intended to draw air in rather than expel it; or b)Has louvers that open only when the appliance is operating.		N/A
48.3.3	The appliance is to be subjected to a water spray for 4 hours in the direction most likely to cause water to enter.		N/A
48.3.3	Before conducting a leakage current measurement with the circuit in Figure 48.3, the appliance is to be disconnected from the receptacle. It is to be determined by closing S1, utilizing both positions of S2, and observing the leakage currents at the meter, that the stray leakage currents are negligible.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
48.3.4	Before conducting a leakage current measurement with the circuit in Figure 48.3, the appliance is to be disconnected from the receptacle. It is to be determined by closing S1, utilizing both positions of S2, and observing the leakage currents at the meter, that the stray leakage currents are negligible.		N/A
48.4	120 volt cord-connected appliances		N/A
48.4.1	The water spray test is to be conducted with the switch in the "on" position. For a multispeed appliance, the "on" position of the switch is to be the low-speed setting.		N/A
48.4.2	The leakage current is to be measured using the test methods and equipment described in 41.2 – 41.5, except that the circuit shown in Figure 48.3 is to be used. The leakage current is to be measured with switches S1 and S2 in all possible positions.		N/A
48.4.3	During exposure to the water spray described in 48.2.1, the leakage current is to be monitored using both positions of S2. The leakage current shall be no more than 2.5 milliamperes.		N/A
48.4.4	Immediately upon cessation of the water spray, the appliance is to be turned off by opening switch S1 unless it was in the open position during the exposure to the water. The leakage current shall be no more than 2.5 milliamperes.		N/A
48.4.5	After the 30-minute monitoring period, the leakage current is to be measured with switch S1 open and using both positions of switch S2. The leakage current shall be no more than 0.5 milliamperes.		N/A
48.4.6	Immediately after each of the leakage current measurements, a dielectric voltage withstand test is to be conducted as described in 48.6.1.		N/A
48.5	Other than 120 volt cord connected appliances		N/A
48.5.1	Immediately after the water spray test, the insulation resistance measured between live parts and interconnected dead metal parts of an appliance shall be 50,000 ohms or more. After the insulation resistance measurement, the appliance shall comply with the dielectric voltage withstand test described in 48.6.1.		N/A
48.6	All appliances		N/A

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48.6.1	Within 1 minute of cessation of the water spray and also 30 minutes after cessation of the water spray, a dielectric voltage withstand test shall be conducted in accordance with Section 47, Dielectric Voltage Withstand Test, except that the duration of the applied potential is to be 15 seconds for the test conducted within 1 minute of cessation of the water spray test.		N/A
49	Hosedown Test		N/A
49.1	When required by 80.1.9, the hosedown test shall be conducted on a fan.		N/A
49.2	At the conclusion of the test described in 49.3 – 49.5, a fan shall have no standing water inside the enclosure and there shall be no water on uninsulated live parts or on film-coated wire, other than motor windings.		N/A
49.3	For a permanently installed fan that is connected to conduit during installation, a conduit is to be installed on the enclosure to equalize internal and external pressures as required, but it is not to serve as a drain. No sealing compound other than that normally provided by the manufacturer is to be used. The enclosure interior is to be dry.		N/A
49.4	The enclosure and its external mechanisms are then to be sprayed by water from a hose having a 25.4-mm (1-inch) inside diameter nozzle that delivers at least 246 L (65 gallons) of water per minute.		N/A
49.5	For an enclosure having a test length – height plus width plus depth dimension – of 1.9 m (75 inches) or less, the duration of the water stream contact with the enclosure is to be 5 minutes. For an enclosure having a test length exceeding 1.9 m (75 inches), the duration of water stream contact in minutes is to be 2.6 times the test length measured in meters (the test length measured in inches divided by 15).		N/A
50	Locked Rotor Test		P
	50.1 An impedance-protected motor used in a wall-insert fan, ceiling-insert fan, a fan intended for use in cooking areas, or a fan in which the motor is subjected to conditions such as restricted ventilation or proximity to an external source of heat, shall comply with the requirements in 50.5 and 50.6.		P

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50.2	For fans rated 12 Amps or less, and that employ wiring terminals for field wiring connections, the Locked Rotor Test is to be conducted with supply wiring sized for the ampacity of the fan. When the fan is rated more than 12 Amps, the fan is to be tested with supply wiring sized 125 percent of the rating of the fan.		P
50.3	The fan is to be installed or placed in its intended position with the rotor of the fan motor locked and energized as described in the Locked-Rotor or No-Load Temperature Test in the Standard for Impedance Protected Motors, UL 1004-2. The temperature is to be determined after thermal equilibrium is attained.		P
50.4	In determining compliance with the requirements specified in 50.3, motor temperature readings are to be taken as follows:		P
	a)The temperature is to be measured by means of thermocouples applied directly to the actual conductor material or the integrally applied conductor insulation. Thermocouples shall be placed under the coil wrap, when provided; or		P
	b)The temperature is to be measured by use of the change-in-resistance method.		P
	c)In the instance where the motor is totally enclosed and the temperature can not be determined by the method in either 50.4 (a) or (b), the temperature is to be measured by thermocouples placed on the enclosure.		P
50.5	Under locked-rotor conditions:		P
	a)The stabilized temperature of an impedance-protected motor shall not exceed the temperature obtained when the motor was tested in the open in accordance with the Locked-Rotor Temperature Test in the Standard for Overheating Protection for Motors, UL 2111 or the Locked Rotor or No-Load Temperature Test in the Standard for Impedance Protected Motors, UL 1004-2; or		P
	b)The motor shall comply with the requirements in 50.6.		P

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50.6	When the stabilized temperature of the impedance-protected motor installed in the fan exceeds the temperature of the motor tested in the open in accordance with the Standard for Overheating Protection for Motors, UL 2111, or in the Standard for Impedance Protected Motors, UL 1004-2, or if the motor was never so tested, the rotor is to remain locked for 18 days under the conditions specified for the Locked- Rotor or No-Load Temperature Test in UL 1004-2, except the motor is to be installed in the fan as specified in 50.3. During the initial 72 hours, the motor temperature shall not exceed the applicable temperature limits specified in UL 1004-2. During and after the 18-day period, the motor shall comply with the Locked-Rotor or No-Load Temperature Test requirements in UL 1004-2.		P
50.7	Under locked rotor conditions, the temperature of a thermally protected motor shall not exceed therequire ments in the Standard for The rmally Protected Motors. UL 1004-3.		P
51	Locked Rotor Cycling		N/A
51.1	Three motor samples are to be provided with the coil wrap terminating on the bend of the coil and are to be subjected to the test described in 51.2 – 51.4.		N/A
51.2	Each sample is to be energized at a test potential in accordance with Table 40.1 with the rotor locked. The motor circuit is to be cycled on and off as quickly as the motor allows. The winding temperatures shall reach the maximum temperature and the minimum temperature shown in Table 51.1, as determined with a thermocouple. The test duration is to be for 18 days with the motor at room temperature at the beginning of the test.		N/A
51.3	Protective devices shall be by-passed and when the motor does not function throughout the test, a different motor shall be chosen and the test started from the beginning. When a part, such as a capacitor, can be replaced in order for the motor to function, then the test may continue.		N/A
51.4	As a result of the test in 51.2 and 51.3, there shall be no loosening of the coil wrap, lifting of the coil wrap termination greater than 1.6 mm (1/16 inch), nor other degradation of the coil wrap's adhesive bond as determined by visual examination.		N/A
52	Flagging		N/A

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52.1	The test method for flagging shall be in accordance with the Test for Flagging (as received), Method A- For Class 1 Tape, of the Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications, ASTM D 1000-04.		N/A
52.2	The rod used for the test shall be 19 mm (3/4 inch) in diameter.		N/A
52.3	The length of the unwound tape (flag) from the end of the tape to the point of tangent of the rod shall be less than 1.6 mm (1/16 inch).		N/A
53	Humidity Conditioning Test		P
53.1	A sample of the appliance is to be heated to a temperature just above 34°C (93°F) to reduce the likelihood of condensation of moisture during conditioning. The heated sample is then to be placed in the humidity chamber and conditioned for 48 hours in air having a relative humidity of 88 ±2 percent and a temperature of 32 ±2°C (90 ±4°F). Following the conditioning:		P
53.2	Insulation resistance is to be measured by means of a high-resistance voltmeter using a 250-volt, direct-current circuit.		P
54	Strain Relief Test		P
54.1	The strain relief means provided on a flexible cord shall withstand for 1 minute without displacement a direct pull of 155.68 N (35 pounds) applied to the cord with the connections within the appliance disconnected. The strain relief is not acceptable when, at the point of disconnection of the conductors, there is such movement of the cord as to indicate that stress on the connections has resulted.		P
54.2	The strain relief means provided on a flexible cord shall withstand for 1 minute without displacement a torque as shown in Table 42.1 in either direction between the cord and the enclosure with the connections within the appliance disconnected. The strain relief is not acceptable when, at the point of disconnection of the conductors, there is such movement of the cord as to indicate that stress on the connections has resulted.		P
54.3	A 16-kg (35-pound) weight is to be suspended from the cord and supported by the appliance so that the strain-relief means can be stressed from any angle the construction of the appliance permits.		P

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54.4	The strain relief means provided in a through cord switch shall withstand for 1 minute a direct pull of 133.44 N (30 pounds). The strain relief is not acceptable when a conductor is detached from a terminal or an uninsulated conductor of the cord is exposed.		P
54.5	For the construction mentioned in 15.2.3, six samples of the clamp that have been secured to the cord in the intended manner are to be used. Three samples are to be subjected to the dielectric voltage withstand test specified in Section 47, Dielectric Voltage Withstand Test, and shall then comply with the strain-relief test specified in 54.1 in the as-received condition. Three samples shall comply with the requirements specified in 54.1 after being subjected to the following procedures:		P
	The samples are then to be subjected to the dielectric voltage withstand test specified in Section 47, Dielectric Voltage Withstand Test, with the value of the applied potential based on the rating of the appliance. The potential is to be applied between conductors, and the potential is also to be applied between the clamp and all conductors spliced together.		P
55	Interconnecting Cords and Leads		P
55.1	Each lead or flexible cord provided for wiring between components or for interconnection between parts of a motor, (e.g. motor windings to capacitor, motor connections to receptacle, light connections to receptacle, etc.) shall be subjected to the test described in 54.1 and 54.3 except that the pull shall be 20 pounds (89 N). Each lead or cord is to be tested with the 20-pound (9-kg) weight.		P
56	Unguarded Impeller Tests		N/A
56.1	An impeller of a portable fan not required to be guarded shall not break, crack, or chip when operated for 1 hour connected to a supply voltage of 130 percent of the rated supply voltage. The test is to be conducted before and after conditioning as described in 56.2.		N/A

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56.2	An impeller not required to be guarded is to be placed in an air-circulating oven maintained at 70°C (158°F) for 7 hours. After removal, it is to be tested as described in Section 56, Unguarded Impeller Tests; Section 61, Impact Test on Guards; and Section 70, Drop Test. As a result of the testing, the impeller shall not break.		N/A
56.3	A motor-driven impeller not required to be guarded shall be energy absorbent to the extent that a 3.2 mm (1/8 inch) diameter dry hardwood dowel does not break when thrust into a rotating blade. The fan is to be fixed in place and energized so that the impeller rotates at intended speed. The dowel is to be supported on a stable, stationary flat surface perpendicular to the plane of rotation. The surface is to have a straight edge located approximately 9.5 mm (3/8 inch) from the fan blade. The dowel is then to be suddenly thrust and retained by hand along an axis perpendicular to the plane of impeller rotation into the blade. This procedure is to be repeated at different points on the impeller (blade and hub) with the impeller rotating at all intended speeds and from in front of and behind the impeller in order to include the most severe condition.		N/A
57	Push Back Relief Test		P
57.1	With reference to 15.2.4, a cord-connected fan shall be tested in accordance with 57.2 without occurrence of any of the following conditions:		P
	a) Mechanical damage to the supply cord or lead		P
	b)Exposure of the supply cord or lead to a temperature higher than that for which it is rated;		P
	c)Reduction of spacings (such as to a metal strain-relief clamp) below the minimum required values; or		P
	d)Damage to internal connections or components.		P

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57.2	The supply cord or lead is to be held 25 mm (1 inch) from the point where the cord or lead emerges from the product and is then to be pushed back into the product. When a removable bushing which extends further than 25 mm (1 inch) is present, it is to be removed prior to the test. When the bushing is an integral part of the cord, the test is to be carried out by holding the bushing. The cord or lead is to be pushed back into the product in 25-mm (1-inch) increments until the cord buckles or the force to push the cord into the product exceeds 27 N (6 pounds-force). The supply cord or lead within the product is to be manipulated to determine compliance with 57.1.		P
58	Oscillating Fan Test		P
58.1	An oscillating or adjustable appliance in which normal function causes movement of the power supply cord, electrical wiring or other insulated live parts, shall withstand an endurance test for the number of cycles described in 58.2. Upon completion of the test:		P
	a) There shall be no electrical malfunction of the appliance;		P
	b) There shall be no exposure of an uninsulated conductor strand either within or outside of the enclosure;		P
58.2	The endurance test required by 58.1 is to consist of:		P
	a) 750,000 cycles of operation for an appliance in which the movement of the power-supply cord, electrical wiring, or other insulated live parts occurs as a result of the operation of an automatic mechanical feature.		N/A
	b) 6000 cycles of operation for an appliance in which the movement of the power-supply cord, electrical wiring or other insulated live parts only as a result of the operation of a manual feature.		P

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58.3	Where movement of electrical wiring or other insulated live parts occurs, six representative samples shall be subjected to this test. Throughout the test, the appliance shall be continuously energized at maximum rated input. The movable member shall be operated so that it will reach the limits of travel in both directions during each cycle by either the integral automatic mechanical feature of the appliance or by a external mechanical arrangement that operates the movable member. The cycling rate shall be one of the following:		P
	a)twelve cycles perminute		P
	b)The rate at which the automatic mechanical feature operates, if the rate is less than 12 cycles per minute; or		N/A
	c)Greater than 12 cycles per minute using the external mechanical arrangement, if agreeable to all concerned, or as controlled by the integral automatic mechanical feature.		N/A
58.4	For an oscillating fan with a tilting head assembly, two samples are to be oriented in the head fully forward position, two are to be oriented in the head straight up position, and two are to be oriented in the head fully back position.		N/A
59	Tests of Switches and Controls		P
59.1	Overload		P
59.1.1	A switch or other device that controls a motor and that has not been previously investigated for its suitability of controlling a motor shall perform acceptably when subjected to an overload test consisting of 50 cycles of operation, making and breaking the locked-rotor current of the motor. As a result of the test, there shall be no electrical or mechanical breakdown of the device. The fuse in the grounding connection shall not open.		P

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59.1.2	In a test to determine whether a switch or other control device complies with the requirements in 59.1.1, the appliance is to be connected to a grounded supply circuit of rated frequency and maximum rated voltage in accordance with 46.1.10, with the rotor of the motor locked in position. During the test, exposed dead metal parts of the appliance are to be connected to ground through a 3 ampere plug fuse, and the connection is to be such that any single-pole, current-rupturing device is connected in the ungrounded conductor of the supply circuit. If the appliance is intended for use on direct current, or on direct current as well as on alternating current, the exposed dead metal parts are to be connected so as to be positive with respect to a single-pole, current-rupturing control device. The device is to be operated at a maximum rate of 10 cycles per minute, except that a faster rate of operation is to be employed only when agreeable to all concerned.		P
59.2	Reversing		P
59.2.1	A motor-reversing switch shall withstand a test consisting of 1000 cycles of operation as described in 59.2.2. There shall be no electrical or mechanical breakdown of the switch, nor pitting or burning of the contacts that impairs intended operation.		P
59.2.2	To determine whether a switch complies with the requirements in 59.2.1, the appliance is to be connected to a circuit of maximum rated voltage. Each cycle of operation is to consist of throwing the switch to the position in which the fan blades rotate in one direction, allowing the blades to come to full operating speed in that direction, then – without pause in any intermediate "off" position unless the switch does not function otherwise – throwing the switch to the position in which the rotation of the blades is reversed, allowing the rotation to attain normal operating speed in that direction, and then reversing the direction of rotation again by throwing the switch to the initial "on" position.		P
60	Static Load Test For Mounting Means		N/A
60.1	When subjected to the test specified in 60.2 – 60.3, a cord-connected wall- or ceiling-surface mounted or direct plug-in appliance shall comply with the following:		N/A
	a)The security of the attachment of the appliance to the wall shall not be adversely affected;		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b)There shall be no evidence of a risk of fire or electric shock;		N/A
60.2	An appliance that is wall or ceiling surface mounted as mentioned in 60.1 is to be mounted in accordance with the installation instructions provided by the manufacturer on 3/8-inch-thick plasterboard (dry wall) on nominal 2 by 4-inch wood studs/joists spaced on 24 inch (609 mm) centers. The mounting parts are to be used as specified in the instructions, and the securing screws are to be located between the studs/joists and secured in the plasterboard.		N/A
60.3	After installation, the appliance is to be subjected to a static load. The load is to be applied so as to transmit the maximum amount of stress to the mounting means and is to be increased during a 5 to 10 second interval, until a load equal to the weight of the product plus a force of three times the weight of the product, but not less than 10 pounds (45 N), is applied to the mounting system. The load is to be maintained for 1 minute.		P
60.4	Testing is to be repeated for all industrial/commercial air circulator fan head/mounting assembly combinations as described in 80.4.2.		P
60.5	For a Ceiling Insert Fan with tab type mounting means, the Static Load Test is subjected to the applicable requirements in 60.1 – 60.3, except for the modifications specified in (a) through (d):		N/A
	a)The security of the attachment of the appliance to the ceiling shall not be adversely affected; b)The face of the product secured by the tab mounting means shall not permanently displaced more than 1/8 in (3.2 mm) from its original position. The displacement shall be measured 1 minutes after the test load has been removed.		N/A
61	Impact Test on Guards		P
	A guard which is subject to impact, such as one on a portable fan, a window fan, a floor insert fan, a crawl space fan, or a wall insert fan installed less than 7 feet above the floor		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
61.2	In lieu of conducting the room temperature test described in 61.2 and 61.3, equipment intended to be used in cold environments, such as outdoor use products or fans mounted in a crawl space, shall be cooled to a temperature of minus 35.0 ±2.0° C (minus 31.0 ±3.6° F) for outdoor use products and 0° C (32°F) for crawl space or attic mount products and maintained at this temperature for 3 hours. While the appliance is still cold, the specimens shall be subjected to the impact described in 61.2 and 61.3. The conditions for acceptable results are indicated in 61.4 – 61.6.		P
61.3	An appliance is to be subjected to an impact of 6.67 N (1.5 foot-pounds) on any surface that is exposed to a blow during intended use. Only one impact is to be applied at a given point. The impact is to be produced by dropping a steel sphere, 50.8 mm (2 inches) in diameter and weighing approximately 0.54 kg (1.18 pounds), from a height of 381 mm (15 inches). For surfaces other than the top of an enclosure, the steel sphere is to be suspended by a cord and allowed to swing as a pendulum, dropping through a vertical distance of 381 mm. For the test on a freestanding fan, the fan is to stand in its intended operating position without restraint.		P
61.4	Following the impact test, the probe illustrated in Figure 9.1 is to be used to determine whether a portion of an impeller that presents a risk of injury to persons is exposed.		N/A
61.5	Deformation of a guard or detachment of a guard or portion of a guard during the impact test is acceptable if the part can readily be restored to its original shape or replaced in the intended manner. After restoration of the guard, the probe illustrated in Figure 9.1 shall not contact a portion of an impeller that can cause risk of injury to persons when inserted in any opening of the guard.		N/A
61.6	When the guard also serves as an enclosure, the guard shall be subjected to the impact test specified in 9.1.3.		N/A
61.7	With reference to 61.5, cracking or denting of the enclosure shall not affect the function of any safety controls or constructional features such as thermostats, overload protective devices, waterseals, or strain relief.		N/A
62	Static Force Test on Guards		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
62.1	When a 88.96-N (20-pound) force is applied for 1 minute over a 50.8-mm (2-inch) diameter area to any part of the guard of a portable fan or window fan, spacings to a moving part that presents a risk of injury to persons shall not be permanently reduced to the degree that the probe shown in Figure 9.1 contacts a portion of the moving part when inserted in any opening in the guard.		P
63	Impeller Test for Portable Fans		P
63.1	With reference to the requirement in 9.2.12, the following tests are to be conducted on non-metallic impellers of portable fans and window fans. A 6.35 mm (1/4 inch) diameter steel rod is to be pushed suddenly into the blade with the fan resting on the floor and operating at maximum speed and rated voltage. A test is to be made with the rod inserted near the hub, and a second sample is to be tested with the rod inserted 2/3 of the distance from the hub to the tip of the blade. The rod is to rest on the guard as it is inserted. A part of the blade is not to be thrown more than 1.52 m (5 feet) from the closest part of the base of the fan.		P
64	Impeller Ignition Test		N/A
64.1	The requirements in this Section are intended to investigate the risk of fire for fans as referenced in the Exception No. 1 (e) of 7.4.2.		N/A
64.2	A polymeric impeller that is located outside a thermally protected motor on a fan that does not comply with 7.4.2 and Exception No. 1 (a) – (d) of 7.4.2 shall not ignite as a result of a locked rotor test conducted as described in 64.3.		N/A
64.3	The motor thermal protector is to be shunted out of the motor winding so that the motor stays continually energized. The rotor is to be locked. The fan is to be positioned as intended in application and is to be energized in a room ambient temperature of 10 to 40°C (50 to 104°F) at the voltage indicated in Table 40.1. The fan is to be energized until ultimate results are observed, but no more than 18 days. This procedure is to be repeated on two additional fan samples.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
64.4	The cheesecloth referenced in the Exception to 64.2 is to be bleached, 914.40 mm (36 inches) wide, 28.22 – 30.24 meters per kilogram (14 – 15 yards per pound), and having what is known to the trade as a count of 32 × 28 – that is, along the two directions parallel to the threads, there are 13 threads per centimeter in one direction and 11 threads per centimeter in the other (32 threads per inch in one direction and 28 threads in the other).		N/A
65	Component Breakdown Test		P
65.1	As required by 34.1, a fan shall be subjected to the Component Breakdown Test as specified in 65.2–65.12.		P
65.2	With reference to 65.1, a risk of fire or electric shock is determined to exist when any of the following occur:		P
	a)Glowing, charring, or flaming of the cheesecloth or tissue paper as specified in 65.6; b)Opening of the 3 Amp fuse specified in 65.7;		P
65.3	The circuit between any two terminals of a device is to be opened or shorted. Only one of the simulat fault conditcns is to be imposed at a time		P
65.4	Each test is to be conducted on a separate sample unless it is agreeable to those concerned that more than one test be conducted on the same sample.		P
65.5	A part of the fan that is removed during routine operation or maintenance is to be omitted when it results in a more severe test, and the part is not:		P
	a)Required for the functioning of the equipment; and b)Exposed to view during intended operation.		P
65.6	During these tests, the sample is to be placed on a softwood surface covered with white tissue paper, and a single layer of cheesecloth is to be draped loosely over the entire enclosure.		P
65.7	During each test, exposed dead-metal parts of the sample are to be connected to earth ground through a 3 Amp nontime-delay fuse.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
65.8	The supply circuit is to have branch circuit overcurrent protection, the size of which equals 125 percent of the input current rating (20-ampere minimum). When this value does not correspond with the standard rating of a fuse or a circuit breaker, the next higher standard device rating shall be used. The test voltage and frequency are to be adjusted to the maximum rated voltage of the fan.		P
65.9	A fuse that is replaced during routine maintenance is to be defeated unless marked in accordance with 81.8. A fuse that is soldered in place, or is located such that it is accessible only to qualified service personnel, and marked in accordance with 81.8, and any other overcurrent protective device not subject to replacement during routine maintenance is to be left in the circuit.		N/A
65.10	Each abnormal condition is to be conducted for 7 hours or until one or more of the following results are observed:		P
	a)A risk of fire or electric shock develops (see 65.2);		P
	b)The branch-circuit fuse opens;		N/A
65.11	The overheating of parts referred to in 65.10(d) is to be detected by an indicator such as an odor, smoke, discoloration, cracking of materials, charring, flaming, glowing, arcing, changes in circuit current through the applied fault, or any similar phenomenon.		N/A
65.12	When a fault condition is terminated by the opening of a circuit component, the test is to be conducted two more times using new components for each test.		N/A
66	Fuseholder Cover Test		N/A
	66.1When required by 25.3, an open cover shall be subjected to a force of 36 N (8 lbs) applied for 1 minute in any direction that the cover may be removed, the open cover of a fuseholder, fused attachment plug, or current tap, or similar device, shall not detach from the body of the device. One fuseholder is to be tested.		N/A
67	General Purpose Transformers		N/A
67.1	General		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
67.1.1	In addition to the end-product Temperature Test and Dielectric Voltage-Withstand Test, a general purpose transformer shall also be subjected to the tests of 67.2 – 67.4.		N/A
67.2	Voltage measurement test		P
67.2.1	For purposes of comparison with voltages measured as described in the Overload Test of 67.3, each secondary open-circuit voltage shall be measured with the primary connected to a test voltage and frequency supply source as indicated in Input Test, Section 45.		P
67.3	Overload test		N/A
67.3.1	A transformer shall be subjected to the test conditions described in 67.3.2. The stabilized surface or core temperature recorded on the transformer during the second 50 percent load operation shall not be more than 5°C (9°F) greater than the stabilized core temperature obtained during the initial 50-percent of load operation. The open-circuit output voltage determined following the final 50 percent load operation shall be within 2 percent of the output voltage measured during the Voltage Measurement Test in 67.2. As an option, a protective device, if provided, may be bypassed when conducting this test.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
67.3.2	The transformer shall be operated as described in the Temperature Test in Section 46, except that the load shall be 50 percent of the rated value, until the core, or surface temperatures if encapsulated, stabilize. After stabilization, the load shall be adjusted until 200 percent of rated secondary current is reached. After 2 minutes of operation, the load shall be readjusted, if necessary, to restore the current to 200 percent, but no further adjustment is to be made thereafter. The duration of this overload shall be 30 minutes. The load is then to be restored to the original 50 percent of rated value. It shall be held at that value until the core temperature again stabilizes or until the temperature drops to within 5°C (9°F) of the original stabilized 50-percent load-current temperature (whichever occurs first). This temperature value shall be compared with the original 50-percent load stabilized condition, as specified in 67.3.1. Then, the secondary load shall be removed. With the primary energized, the secondary voltage (s) shall be measured and compared with the original output voltage measurements.		N/A
67.3.3	When the core of the transformer is not accessible for direct temperature measurement (due to the transformer construction or reasons such as encapsulation or filling with electrical insulating material), the surface of the transformer enclosure shall be used. The portion of the enclosure surface used to measure this temperature shall be the hottest spot occurring in the 100 percent load heating test		N/A
67.3.4	A protective device, when provided, shall be bypassed when the device opens while the load is adjusted after the surface temperatures have stabilized.		N/A
67.4	Repeated dielectric voltage-withstand test		N/A
67.4.1	Following the Overload Test in 67.3, the transformer shall be subjected to a repeated dielectric voltage-withstand test. The test potential shall be 65 percent of the value originally specified. After this test, the transformer shall perform as intended.		N/A
68	Thermal Aging		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
68.1	A polymeric material employed in a Class 105 (A) insulation system in accordance with the Exception to 33.3 is to be aged for the amount of time corresponding to an aging temperature that appears on the Class 105 (A) system response shown in Figure 68.1. The insulation system is to cool to room temperature and the applicable dielectric voltage-withstand requirements specified in Section 47 are to be applied between live parts and noncurrent-carrying metal parts that are isolated from each other by the material under consideration.		N/A
69	Permanence of Marking Tests		P
69.1	In addition to complying with 80.1, General, and, after being tested as described in 69.2 and 69.3, a tag used for a cautionary marking in accordance with 80.8.1 is considered to be permanently affixed to a power-supply cord if there is no:		P
	a)Tearing at any point for more than 1/16 in (1.6 mm),		P
	b)Separation from the power-supply cord,		N/A
	69.2To determine compliance with 69.1, a cord tag shall be conditioned in accordance with (a) – (c). Following the conditioning each sample shall be tested in accordance with 69.3. If a tag is applied by an adhesive, the conditioning and test are to be conducted no sooner than 25 h after application of the tag.		N/A
	a)Three samples, as received, shall be tested in accordance with 69.3.		N/A
	b)Three samples shall be conditioned in an air-circulating oven at 60 ±1°C (140 ±1.8°F) for 240 h followed by 30 min of conditioning at a room temperature of 23 ±2° C (73.4 ±3.6° F) and 50 ±5% relative humidity then followed by the test in 69.3.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
69.3	Each sample is to consist of a length of power-supply cord to which the tag has been applied. The power-supply cord, with the attachment plug pointing up, is to be held tautly in a vertical plane. A force of 5 lbf (22.2 N) is to be applied for one minute to the upper-most corner of the tag farthest from the power-supply cord, within 1/4 in (6.4 mm) of the vertical edge of the tag. The force is to be applied vertically downward in a direction parallel to the major axis of the cord. In determining compliance with 69.1 (d), manipulation is permissible, such as straightening of the tag by hand. To determine compliance with 69.1 (d), each sample is to be scraped 10 times across printed areas and edges, with a force of approximately 2 lbf (8.9 N), using the edge of a 5/64-in (2.0-mm) thick steel blade held at a right angle to the test surface.		N/A
70	Drop Test		N/A
70.1	A desk fan and a box fan shall withstand, with the fan operating at maximum speed, the drop test described in 70.2.		N/A
70.2	Each of three samples of a fan is to be dropped through a distance of 914.40 mm (3 feet) to strike a hardwood surface. Each sample is to be dropped three times. Three samples shall be employed for the test; however, if the manufacturer so elects, fewer samples may be used in accordance with Figure 70.1. As a result of the drop test, the probe illustrated in Figure 9.1 shall not be able to contact a portion of a blade or blower wheel that presents a risk of injury to persons when inserted in any opening in the guard.		N/A
70.3	The hardwood surface mentioned in 70.2 is to consist of a layer of 19-mm (3/4-inch) thick tongue-and-groove oak flooring mounted on two layers of 19-mm (3/4-inch) thick plywood. The assembly is to rest on a concrete floor during the test.		N/A
70.4	All samples are to be supported on a surface 914.40 mm (3 feet) above the hardwood surface. Each sample is to be dislodged from the supporting surface by a sudden pull applied to the power-supply cord in a plane parallel to the supporting surface and twice by being pushed by a force parallel to the mounting surface applied to the top of the sample, which is to be placed at the edge of the supporting surface. The sample is to be oriented differently for each test.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
70.5	Deformation of a guard or detachment of a guard or portion of a guard during the drop test is acceptable when the part (including ribs of a desk fan) can readily be restored to its original shape or a detached guard can be readily replaced in the intended manner. After restoration of the guard, the probe illustrated in Figure 9.1 shall not contact a portion of a blade or blower wheel that presents a risk of injury to persons when inserted in any opening in the guard.		N/A
70.6	A part of the blade shall not be thrown more than 1.52 m (5 feet) from the closest part of the base of the fan.		N/A
71	Security of Handle Test		N/A
71.1	A handle used to support or carry a fan shall withstand a force of four times the weight of the fan without breakage of the handle.		N/A
71.2	To determine if a handle complies with the requirements in 71.1, the force is to be started at zero and gradually increased so that the force specified in 71.1 is attained in 5 to 10 seconds and maintained for 1 minute. When the handle is 76.20 mm (3 inches) or more in width, the force is to be uniformly distributed over a 76.20-mm width at the center of the handle without clamping. When the width is less than 76.20 mm, the force is to be distributed over the entire handle. When more than one handle is furnished on a fan and the fan cannot be carried by only one handle, the force is to be distributed between the handles. The distribution of forces is to be determined by measuring the percentage of the fan weight sustained by each handle with the fan in the intended carrying position. When a fan is furnished with more than one handle and can be carried by only one handle, each handle is to sustain the total force.		N/A
72	Stability Test		P
72.1	A cord-connected freestanding appliance shall not tip over when placed on a plane inclined 10 degrees from the horizontal.		P

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Clause	Requirement + Test	Result - Remark	Verdict
72.2	In addition to the requirement in 72.1, a pedestal intended for ceiling fan mounting that is 1.68 m (66 inches) high or more and that also weighs 11.34 kg (25 pounds) or more shall not tip over when placed as intended on a horizontal surface and subjected to a force of 44.48 N (10 pounds) applied horizontally at a point farthest from the horizontal surface up to a maximum of 1.52 m (5 feet).		P
72.3	In addition to the requirements in 72.1, a cord connected freestanding appliance that is 2.1 m (6.9 ft) high or more shall not tip over when placed as intended on a horizontal surface and subjected to a force of 20 pounds applied horizontally at a height of 1.6 m (62 inches).		P
72.4	During the tests described in 72.1, 72.2, and 72.3, the appliance is to be prevented from sliding along the supporting surface and is to be adjusted and operated in any intended manner so that it is most likely to tip over. The test procedure is to include such items as:		P
	a) Positioning or removal of casters or feet that do not require a tool for removal		P
	b) Operating the fan at maximum speed and then evaluating it in the "off" position;		P
72.5	Testing is to be repeated for all industrial/commercial air circulator fan head/stand assembly combinations as described in 80.4.2. Consideration shall be given to any factor contributing to product stability including: stand height, front/back head rotation, side/side head oscillation, diameter of head assembly, and size/weight of motor assembly.		P
73	Haddock Fan Load Test		N/A
73.1	A haddock fan shall sustain a 1779 N (400 pound) load uniformly distributed over the top of the fan for 1 minute, without breakage or cracking of the enclosure or guard, after which the probe illustrated in Figure 9.1 shall not contact a portion of the impeller that presents a risk of injury to persons when inserted through any opening in the guard or enclosure.		N/A
74	Installation Test		P
74.1	The appliance shall function in the intended manner and shall comply with the applicable requirements in Sections 40 – 65.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
75	Tests for Fans for Unattended Areas		P
75.1	A fan for use in unattended areas shall comply with the tests described in Sections 178 and 179Ai.		P
76	Dielectric Voltage Withstand Test		P
76.1	Each appliance shall withstand without electrical breakdown, the application of a AC or DC potential as indicated in Table 76.1 as follows:		P
	a)Between the primary wiring, including connected components, and accessible dead metal parts that are capable of becoming energized; and		P
	b)Between primary wiring and accessible low-voltage (42.4 volts peak or less) metal parts, including terminals.		P
76.2	This test shall be conducted in accordance with either condition A or condition B of Table 76.1.		P
76.3	The appliance is to be in either a heated or unheated condition for the test.		P
76.4	The test is to be conducted when the appliance is fully assembled. It is not intended that the appliance be unwired, modified, or disassembled for the test.		P
76.5	The test equipment is to include a transformer having an essentially sinusoidal output, a means of indicating the test potential, an audible or visible indicator of electrical breakdown, and either a manually reset device to restore the equipment after electrical breakdown or an automatic reject feature of any unacceptable unit.		P
76.6	When the output of the test equipment transformer is less than 500 volt-amperes, the equipment shall include a voltmeter in the output circuit to directly indicate the test potential.		P
76.7	When the output of the test equipment transformer is 500 volt-amperes or larger, the test potential shall be indicated by any of the following:		P
	a)By a voltmeter in the primary circuit or in a tertiary-winding circuit;		P
	b)By a selector switch marked to indicate the test potential; or		P
76.8	Test equipment other than that described in 76.5 – 76.7 shall be used only when found acceptable to accomplish the intended factory control.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
76.9	During the test, the primary switch is to be in the "on" position, both sides of the primary circuit of the appliance are to be connected together and to one terminal of the test equipment, and the second test- equipment terminal is to be connected to the accessible dead metal.		P
77	Grounding Continuity Test		P
77.1	Each appliance that has a power-supply cord having a grounding conductor shall be tested to determine the grounding continuity between the grounding blade of the attachment plug and the accessible dead metal parts of the appliance that are capable of becoming energized.		P
77.2	Only a single test is required to be conducted when the accessible metal selected is conductively connected by design to all other accessible metal.		P
77.3	Any indicating device, such as an ohmmeter, a battery and buzzer combination, or the like, is to be used to determine compliance with the grounding-continuity requirement in 77.1.		P
78	Polarization Test		N/A
78.1	As a routine production-line test, each appliance provided with a manually operated, line-connected, single-pole switch for appliance "on-off" operation; an Edison-base lampholder or an Edison- base fuseholder; or a receptacle shall be tested for electrical continuity between the grounded supply circuit conductor of the attachment plug (wide blade of 2-wire plug) and the part of the appliance that is intended to be connected to the grounded supply circuit conductor of the attachment plug. The polarity shall be determined either visually or through the use of an electrical test. Equivalently, polarity may be verified between the ungrounded supply circuit conductor of the attachment plug and the part of the appliance that is intended to be connected to the ungrounded conductor.		N/A
78.2	Any indicating device, such as an ohmmeter, a battery and buzzer combination, or the like, is to be used to determine compliance with the requirement in 78.1.		N/A
79	Details		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
79.1	An appliance shall be rated in volts and, when intended for use on an alternating current supply, the frequency shall be expressed in one of the following terms: hertz (HZ), cycles-per-second, cps, cycles/second, or c/s.		N/A
79.2	An appliance shall also be rated in amperes.		N/A
79.3	When the appliance is intended for connection to a polyphase supply circuit, the electrical rating shall include the number of phases.		N/A
79.4	When an appliance is additionally marked with a horsepower rating, the rating shall not be less than the horsepower rating on the motor nameplate. When the appliance consists of multiple motors, or one or more motors and other loads, the rated horsepower, if provided, shall not be less than the equivalent horsepower of the combined loads, calculated in accordance with Section 430-110(C)(1) of the National Electrical Code, ANSI/NFPA 70.		N/A
80	General Markings		P
80.1	General		P
80.1.1	An appliance shall be plainly and permanently marked where visible with:		P
	a)The manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product is identified – hereinafter referred to as the manufacturer's name;		P
	b)A distinctive catalog number or the equivalent;		P
	c)The electrical rating; and		P
	d)The date or other dating period of manufacture not exceeding any three consecutive months. See 80.1.2.		P
80.1.2	With reference to 80.1.1 (d), when the date of manufacture is abbreviated or is in a nationally accepted conventional code or in a code affirmed by the manufacturer, the code shall:		P
	a)Not repeat less than 10 years for a household appliance and less than 20 years for a commercial appliance; and		P
	b)Not require reference to the production records of the manufacturer to determine when the appliance was manufactured.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
80.1.3	An appliance that does not start and attain normal running speed when connected to a circuit protected by a fuse other than a time-delay fuse as described in 44.1 shall be plainly marked, "If connected to a circuit protected by fuses, use time-delay fuses with this appliance," or with an equivalent wording.		P
80.1.4	A fan, other than a ceiling insert fan/light combination, provided with a lampholder for an incandescent lamp shall be plainly and permanently marked to indicate the maximum wattage rating of the lamp to be used in the lampholder. The marking shall be legible and located so that it is readily visible after the fan has been installed.		P
80.1.5	When a manufacturer produces or assembles an appliance at more than one factory, each finished appliance shall have a distinctive marking, such as a code, by which it is identified as the product of a particular factory.		P
80.1.6	A room-to-room fan shall be marked with the following or equivalent wording: "Do not mount in a fire-rated wall."		P
80.1.7	Unless known to be acceptable for the application, a pressure-sensitive label that is required to be permanent shall comply with the applicable requirements in the Standard for Marking and Labeling Systems, UL 969.		P
80.1.8	An appliance employing a general use receptacle shall be marked with the rating of the receptacle. See 21.19 and 21.21.		P
80.1.9	When the fan is marked, or the manufacturer's instructions indicate, that the fan can be hosed down with water, the fan shall be subjected to the test in Section 49, Hosedown Test, and shall comply with the requirements in 166.2, 166.4.4, 166.5.1, 166.7.1, and 169.1.		P
80.1.11	A fan that complies with Exception No. 6 to 14.1.2 shall be marked with the following or equivalent: "This fan shall not be installed behind a suspended floor/ceiling or a structural wall, ceiling, or floor."		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
80.1.12	An appliance, as described by rows 1 and 2 of Table 15.1, provided with a replaceable in-line fuse or fused attachment plug shall be permanently marked on the device with the following: "Use Only With a Fuse Rated Amperes, Volts." The blanks shall be filled in with the ampere value consistent with the rating of the fuse or fuses provided. The marking shall be visible during fuse replacement.		P
80.2	Motors		P
80.2.1	When an appliance employs a single motor as its only electric-energy-consuming component, the electrical rating given on the motor nameplate is not required to be shown elsewhere on the appliance when the nameplate is readily visible after the motor has been installed in the appliance.		P
80.2.2	When an appliance employs a dual-voltage motor, and when the motor nameplate provides the electrical rating of the appliance as specified in 80.2.1, the appliance shall be additionally marked – not necessarily in a permanent manner – or other suitable means shall be provided to indicate the voltage for which it is connected when shipped from the factory. When the appliance employs an attachment plug, instructions shall be provided to indicate the type of plug that should be used when the appliance is reconnected for the alternate voltage.		P
80.2.3	When the motor of a wall-insert fan or ceiling-insert fan is electrically connected to the fan by an attachment plug, both the housing and motor-blade assembly shall be marked with a catalog number, a model designation, or the equivalent regardless of whether the fan is completely assembled when shipped from the factory. Also:		P
	a)The motor-blade assembly shall be marked to positively identify the housing or housings with which it is suitable; or b)The housing shall be marked to positively identify the motor-blade assembly or assemblies with which it is suitable.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
80.2.4	The catalog number or equivalent designation mentioned in 80.1.1, marked on the motor-blade and on the housing, provides adequate marking for compliance with the requirement in 80.2.3. The catalog number or equivalent designation marked on the individual components is considered to comply with the requirement in 80.4.1.		P
80.2.5	When the motor of an appliance complies with the Exception to 23.1, the appliance shall be marked, "Suitable for Industrial Use Only."		P
80.2.6	A unit requiring field-provided motor overload protection as required by 26.4 shall have markings readily visible during and after installation stating such, and indicating the motor overload protective devices shall be rated or selected in compliance with the applicable installation code as specified by the authority having jurisdiction		P
80.3	Controllers		N/A
80.3.1	A separate controller for an appliance, other than a general-use snap switch that is provided in accordance with the requirement in 27.10, shall be marked with:		N/A
	a)The manufacturer's name; and b)The catalog number or equivalent designation of the controller unless the marking specifically indicates, by means of the manufacturer's name and by means of a catalog designation or the equivalent, the appliance or appliances with which it is intended to be used.		N/A
80.4	Shipping		N/A
80.4.1	If an appliance is not completely assembled when shipped from the factory, and is shipped from the factory in more than one carton, and if misassembly of components results in a risk of fire, electric shock, or injury to persons (see 11.6 and 11.7):		N/A
	a)A cross reference marking shall be indicated on each part packaged separately. This marking is not required to be permanent and shall be in the form of a tag or similar temporary marking.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
	b)Each carton containing parts to complete the appliance shall be marked "For Use Only With (Manufacturer's name), Model (s) (Name of Appliance)," or equivalent wording. The carton containing the motor assembly shall be marked "To Complete This (Name of Appliance), Parts Are Shipped In A Separate Carton. Cartons Containing These Parts Are Marked To Indicate Suitability With This Model," or equivalent wording.		N/A
80.4.2	Industrial air circulator motor, blade, and grill assemblies shall not be shipped separately from the head assembly. When an industrial/commercial air circulator fan head assembly is shipped separately from stand/mounting assembly:		N/A
	a)The fan and carton shall be marked with the following, "CAUTION: To Reduce the Risk of Personal Injury, Use Only With Stand/Mounting Assembly Models , Manufactured by ."		N/A
	b)The stand/mounting assembly and carton shall be marked with the following: "CAUTION: To Reduce the Risk of Personal Injury, Use Only With Fan Head Assembly Model , Manufactured by ."		N/A
80.5	Wall- or ceiling-insert fans		N/A
80.5.1	A wall- or ceiling-insert fan that has been found to be suitable for use in a cooking area may be marked to indicate that fact. See 112.1.		N/A
80.5.2	A wall-insert fan or ceiling-insert fan that is not acceptable for use in a cooking area because the fan does not comply with the requirements in 19.2, 19.3, 113.1.1, 113.2.1, or 116.1 shall be marked legibly with any one of the following, or equivalent wording:		N/A
80.5.3	Unless equipped with shutters or louvers, or unless it has been found to comply with the requirements in 48.1.1, a wall-insert fan intended for commercial or industrial use – see 48.1.1(d) – shall be marked "Install behind shutters for protection from rain" or with an equivalent wording located so that it will be readily visible after the fan has been installed as intended.		N/A
80.5.4	A wall-insert fan intended for mounting in an interior wall shall be permanently marked where the marking is readily visible after the fan has been installed as intended, "Install in interior wall" or with an equivalent wording.		N/A

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
80.5.5	A wall-insert fan that is intended to comply with the requirements in the Exception to 48.1.1 (d) shall be permanently marked in a location visible during installation with the following statement or the equivalent, "For Commercial or Industrial Use."		N/A
85.5.6	a fan described in a of exception no.2 to9.3.4 shall be marked install fan at least 1.5 meters(5 Feet) Above The Floor" or with equivalent wording.		N/A
80.5.7	A wall or ceiling insert fan or ceiling insert fan/light combination that is provided with a polymeric housing shall be marked, "FOR USE IN NON FIRE RATED INSTALLATIONS ONLY." This marking shall be permanent in letters not less than 2.4 mm (3/32 inch) high, shall be located such that it is visible during installation, and shall be in a contrasting color from the material to which it is applied.		N/A
80.5.8	A wall or ceiling insert fan or ceiling insert fan/light combination that is provided with a polymeric housing shall be marked, "FOR USE IN ONE- AND TWO-FAMILY DWELLINGS ONLY." This marking shall be permanent in letters not less than 2.4 mm (3/32 inch) high, shall be located such that it is visible during installation and inspection of wire connections, shall be located near the supply connections, and shall be in a contrasting color from the material to which it is applied.		N/A
80.6	Attic-mounted and roof-mounted fans		N/A
80.6.1	A fan described in 9.3.6 shall be marked "Install This Side Of The Fan Facing An Unoccupied Space" or with equivalent wording.		N/A
80.6.2	A fan described in 9.3.7(b) shall be marked "Attach Louvers Or Grilles When Installing The Fan" or with equivalent wording.		N/A
80.7	Wiring		P
80.7.1	When the wires in a terminal box or compartment intended for power-supply connections attain a temperature of more than 60° C (140°F) during the Temperature Test, Section 46, the appliance shall be marked with the following statement, or the equivalent, at or near the point where supply connections are made, and located so that it is readily visible during installation: "For supply connection, use wires suitable for at least C (F)." The temperature value to be used in the preceding statement shall be in accordance with Table 80.1.		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
80.7.2	If any point within a terminal box or wiring compartment of a permanently connected appliance in which field-installed conductors are intended to be connected – including such conductors themselves – attains a temperature more than 60° C (140° F) during the Temperature Test, Section 46, the appliance shall be marked in accordance with 80.7.3. The statement shall be legible and located so that it is clearly visible during installation and examination of the supply-wiring connections.		P
80.7.3	The marking mentioned in 80.7.2 shall be in accordance with Table 80.1 and the following:		P
	When the test was conducted with 14 AWG (2.1 mm ²) conductors, the wire size marking is not required.		P
80.8	Cord tag markings		P
80.8.1	The markings specified in this section shall:		P
	a) Be permanently affixed to an attached power-supply cord,		P
	b) Be located not more than 6 in (152.4 mm) from the attachment plug,		P
80.8.2	An appliance provided with a replaceable in-line fuse or fused attachment plug shall be marked "Always Unplug This Product Before Installing or Replacing Fuses."		N/A
80.8.3	A cord-connected appliance, as described in Table 15.1, rows 1 and 2, shall be marked:		N/A
	a) "Do not operate any fan with a damaged cord or plug. Discard fan or return to an authorized service facility for examination and/or repair."		N/A
	b) "Do not run cord under carpeting. Do not cover cord with throw rugs, runners, or similar coverings. Do not route cord under furniture or appliances. Arrange cord away from traffic area and where it will not be tripped over."		N/A
81	Cautionary Markings		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
81.1	A cautionary or warning marking intended to inform the user of a potential risk of fire, electrical shock, or injury to persons shall be prefixed by the signal word "CAUTION" or "WARNING." The signal word shall be more prominent than any which is intended to reduce the risk of injury, shall be permanent, in capital letters not less than 2.4 mm (3/32 inch) high, and shall be located on a part that cannot be:		P
	a)Removed without impairing the operation of the fan; or b)Left off the appliance without it being readily apparent.		P
81.2	A fan provided with an automatic-starting feature in accordance with 27.14 shall be provided with the following marking: "CAUTION" and the following or the equivalent, "Automatically Operated Device – To Reduce The Risk Of Injury Disconnect From Power Supply Before Servicing." The marking shall be visible to the user prior to the performance of intended maintenance or removing of any guard that exposes a moving part that presents a risk of injury to persons.		P
81.3	An exhaust fan shall be marked with the word "CAUTION" and the following or the equivalent: "To reduce risk of fire and to properly exhaust air, be sure to duct air outside – Do not vent exhaust air into spaces within walls or ceilings or into attics, crawl spaces, or garages." The marking shall be visible during installation.		P
81.4	Fans as specified in Exceptions No. 1 or No. 3 to 9.3.2 or Exception No. 1 to 9.3.4 or Exception No. 2 to 9.3.5 shall be marked with the word "CAUTION" and the following or equivalent wording: "To Reduce The Risk Of Injury To Persons, Install Fan At Least 2.1 m (7 Feet) Above The Floor."		P
81.5	A nonresidential cord-connected fan that is not subjected to the Water Spray Test (see 48.1.1) shall be marked in a readily visible location with the word "WARNING" and the following or equivalent wording: "To Reduce The Risk Of Electric Shock, Do Not Expose to Water or Rain."		P
81.6	When required by 7.1.3, a fan having play value shall be marked with the word "WARNING" and with the following or the equivalent:		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict
	a)"THIS IS A FAN – NOT A TOY!"; and b)"TO REDUCE THE RISK OF PERSONAL INJURY AND ELECTRIC SHOCK, IT SHOULD NOT BE PLAYED WITH OR PLACED WHERE SMALL CHILDREN CAN REACH IT."		P
81.7	An outdoor location fan employing a receptacle shall be marked "CAUTION: RISK OF ELECTRIC SHOCK, Do not use with extension cord near water or where water may accumulate. Keep fan at least 16 feet from pools and spas. Keep plugs and receptacles dry."		P
81.8	When required by 21.20, a fan shall be marked to indicate the type, ampere, and voltage rating of the replacement fuse. In addition, the portable fan shall be marked with the word "WARNING" and the following or equivalent: "For continued protection against risk of fire, replace only with same type and rating of fuse." These markings shall be located adjacent to the fuseholder so as to be visible during fuse replacement.		P
81.9	A portable fan employing a general use receptacle that is not subjected to the water spray test (see 48.1.1) shall be marked in a readily visible location with the word "WARNING" and the following or equivalent wording: "To reduce the risk of electric shock, do not expose to water or rain."		P
81.10	A portable fan employing a general use receptacle that is subjected to the water spray test (see 48.1.1) shall be marked in a location adjacent to the receptacle "Wet location only when cover closed."		P
81.11	An industrial air circulator whose surface temperatures exceed the limits of Table 46.1 (see footnote I), shall be marked with the word "CAUTION" and the following or equivalent wording: "Hot surface . Avoid Cortaca the marking shall be located or the sulface in question where visible while operating the actuator		P

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UL 507			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Input Test					P
Input deviation of/at:	P rated (W)	P measured (W)	ΔP	Required ΔP	Remark
120V~, 60Hz	110	114.6	+4.2%	+10%	P
Supplementary information: N/A					

4.5	TABLE: Temperature Test			P
Test voltage (V).....	120V~/60Hz			
Ambient (°C).....	23.5			
Maximum temperature T of part/at:	T (°C)		allowed T _{max} (°C)	
Power wire	57.8		80	
PCB	65.2		95	
Switch	47.9		75	
Metal enclosure	48.5		Ref.	
Motor winding	103.1		110	
Supplementary information: The temperatures were measured under worst case normal mode defined in 1.2.2.1 and as described in sub-clause 1.6.2 and at voltages as described above. With a rated maximum ambient temperature of 25°C. For the components temperatures limit, please refer to table 1.5.1.				

TABLE: Dielectric Voltage Withstand Test			P
Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)	
Basic insulation	1000V	No	
Supplementary information: N/A			

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Photo attachments:



Photo 1: Overall view



Photo 2: Overall view

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Photo 3: Side view



Photo 4: Side view

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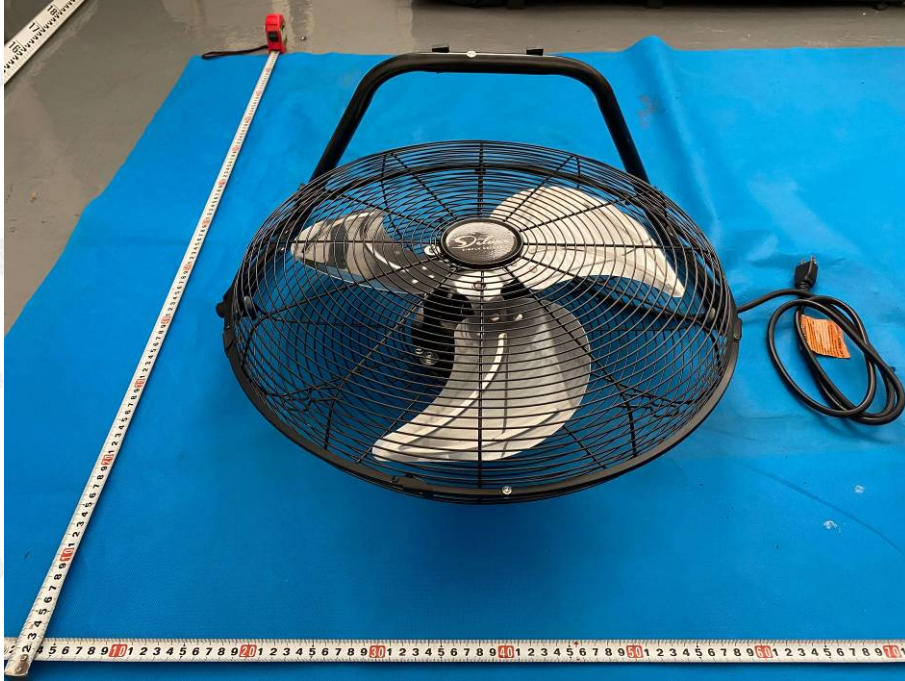


Photo 5: Side view



Photo 6: Side view

TRF No. UL507A

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Photo 7: Side view

-----End of report-----

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