

TEST REPORT UL 1278 STANDARD FOR SAFETY Movable and Wall- or Ceiling-Hung Electric Room Heaters	
Report Number : M2609213WY-R0107 Date of issue : 2026-09-14 Total number of pages : 53	
Name of Testing Laboratory preparing the Report : Shenzhen Meiou Testing Technology Co., Ltd	
Applicant's name : Wuxi Goldenwave Equipment Co., Ltd Address : Room 1-176, No. 297 Guangyuan Road, Liangxi District, Wuxi City	
Test specification: Standard : UL 1278:2022 TRF template used : Safety report	
Test item description : Electric Wooden Heater Trade Mark : N/A Manufacturer : DCC Technology (Wuxi) Co., Ltd. Address : Workshop 501, No.17-2 Rongtong Road, Yunlin Sub-district, Xishan Economic Development Zone, Wuxi City Model/Type reference : GD-1500D-2, GD-1500D-1 Ratings : GD-1500D-2 Input: AC110-120V, 50/60Hz, 2000W GD-1500D-1 Input: AC110-120V, 50/60Hz, 1500W	

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	Testing Laboratory:	Shenzhen Meiou Testing Technology Co., Ltd
Testing location/ address.....:		301, Building A2, Huafa Industrial Park, Fuyuan 1st Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Tested by (name, function, signature).....:		Tobin Project Engineer
Approved by (name, function, signature)...:		Jack Huang Reviewer
		
☐	Testing procedure: CTF Stage 1:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)...:		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature).....:		
Witnessed by (name, function, signature)..:		
Approved by (name, function, signature)...:		
☐	Testing procedure: CTF Stage 3:	
☐	Testing procedure: CTF Stage 4:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature)..:		
Approved by (name, function, signature)...:		
Supervised by (name, function, signature):		

List of Attachments (including a total number of pages in each attachment): -Attachment 1: Photo documentation (page 50-52)	
Summary of testing: The product fulfils the requirements of UL 1278	
Tests performed (name of test and test clause): Refer to appended clause table for details.	Testing location: Shenzhen Meiou Testing Technology Co., Ltd 301, Building A2, Huafa Industrial Park, Fuyuan 1st Road, Zhancheng Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Test case verdicts	
Test case does not apply to the test object:	N(/A)
Test item does meet the requirement :	P(ass)
Test item does not meet the requirement:	F(ail)
Testing	
Date of receipt of test item:	2026-09-07
Date(s)of performance of test:	2026-09-07 to 2026-09-14
General remarks: “(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 ☐ comma / ☒ point is used as the decimal separator.	
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... :	Same as manufacturer
Remark: The GD-1500D-1 and GD-1500D-2 models belong to the same product series and share the same basic structure, casing, control system and safety protection design. The main difference between the two lies in that the rated heating power of GD-1500D-2 is 2000W while that of GD-1500D-1 is 1500W. Therefore, GD-1500D-2 is chosen as the main test model.	

Copy of marking plate:**The artwork below may be only a draft.****Electric Wooden Heater**

Model: GD-1500D-2
Input: AC110-120V, 50/60Hz, 2000W

DCC Technology (Wuxi) Co., Ltd.
DD/MM/YYYY S/N:

Made in China

Electric Wooden Heater

Model: GD-1500D-1
Input: AC110-120V, 50/60Hz, 1500W

DCC Technology (Wuxi) Co., Ltd.
DD/MM/YYYY S/N:

Made in China

Note:

1. The above marking are the minimum requirements by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict

CONSTRUCTION			
7	Enclosure	V-0 plastic	P
7.1	The enclosure of a heater shall be so formed and assembled that it will have the strength and rigidity necessary to resist the abuses likely to be encountered during its intended service. The degree of resistance inherent in the appliance shall preclude total or partial collapse with the attendant reduction of spacings, loosening or displacement of parts, and other serious defects which alone or in combination constitute a risk of fire, electric shock, explosion, or injury to persons.		P
7.2	Among the factors taken into consideration if an enclosure is being judged for acceptability are its: a) Mechanical strength, b) Resistance to impact, c) Moisture-absorption properties, d) Flammability, e) Resistance to corrosion, and f) Resistance to distortion at temperatures to which the enclosure may be subjected under conditions of intended or abnormal use. For the requirements for a polymeric enclosure or part of an enclosure of a polymeric material, see Polymeric Materials, Section 1 2.		P
7.3	The enclosure of a heater shall prevent molten metal, burning insulation, flaming particles, or similar material from falling on combustible materials, including the surface upon which the heater is supported.		P
7.4	The requirement in 7.3 necessitates use of a barrier: a) Under a motor unless: 1) The structural parts of the motor or of the heater provide the equivalent of such a barrier. 2) The protection provided with the motor is such that no burning insulation or molten material falls to the surface that supports the heater if the motor is energized under each of the following fault conditions: i) Open main winding, ii) Open starting winding, and iii) Starting switch short-circuited		P

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
7.5	Except as noted in 7.6, an opening for ventilation in the enclosure, other than in the bottom, of a heater and an opening associated with the dissipation of heated air from the element shall be provided with one or more baffles that will prevent the emission of flame, molten metal, burning insulation, or similar material from the heater.		P
7.6	In a compartment other than one that houses an overload or overcurrent protective device, the baffles mentioned in 7.5 may be omitted if: a) No ventilating opening in a vertical wall, other than one associated with the dissipation of heated air from the elements during intended operation of the heater, is more than 3/8 inch (9.5 mm) in width, or b) The heater is constructed to be acceptable for the purpose, as shown by appropriate investigation.		P
7.7	Cast- and sheet-metal portions of the enclosure shall not be thinner than indicated in Table 7.1 unless the enclosure is found to be acceptable when judged under considerations such as are mentioned in 7.2 and 7.8.		P
7.8	In addition to being considered with reference to the factors mentioned in 7.2, an enclosure of sheet metal is to be judged with respect to its size and shape, the thickness of metal, and its acceptability for the particular application, considering the intended use of the heater.		P
7.9	At points where the face of an attachment-plug receptacle projects through it, the enclosure of a heater shall have a thickness not less than: a) 0.032 inch (0.81 mm) if of ferrous metal, b) 0.045 inch (1.14 mm) if of nonferrous metal, and c) 0.10 inch (2.5 mm) if of insulating material, except that an enclosure of insulating material may be of lesser thickness if formed or reinforced to provide physical strength. The insulating material shall be noncombustible.		P
8	Accessibility of Live Parts		P

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
8.1	An electrical part of a heater shall be so located or enclosed that protection against unintentional contact with uninsulated live parts will be provided, except that this requirement does not apply to a visibly glowing open-wire element and the connections immediately adjacent to the element. See 3.1 , 8.2, 32.7 and 32.1 4. Insulated motor brush caps do not require additional enclosures.		P
8.2	The requirement in 8.1 does not apply to the sheath of an isolated metal-clad element in a heater having provision for grounding the enclosure, although such a sheath is considered to be a bare live part when spacings are being measured.		P
8.3	In determining if an opening in an enclosure is acceptable, consideration is to be given to: a) The proximity of uninsulated live parts (as determined by applying 8.1 , 8.2, 8.4, 8.5, and 8.1 5 and b) The possibility of the emission of burning insulation, molten metal, and similar materials through the opening (as determined by applying 7.3 –7.6.)		P
8.4	To reduce the likelihood of unintentional contact that may involve a risk of electric shock from an uninsulated live part or film-coated wire, an opening in an enclosure shall comply with either (a) or (b). a) For an opening that has a minor dimension (see 8.8) less than 1 inch (25.4 mm), such a part or wire shall not be contacted by the probe illustrated in Figure 8.3. b) For an opening that has a minor dimension of 1 inch or more, such a part or wire shall be spaced from the opening as specified in Table 8.1 .		P

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
8.5	With respect to a part or wire as mentioned in 8.4, in an integral enclosure of a motor as mentioned in the exception to 8.4: a) An opening that has a minor dimension (see 8.8) less than 3/4 inch (19.1 mm) is acceptable if: 1) Film-coated wire cannot be contacted by the probe illustrated in Figure 8.2; 2) In a directly accessible motor (see 8.9), an uninsulated live part cannot be contacted by the probe illustrated in Figure 8.4; or 3) In an indirectly accessible motor (see 8.9), an uninsulated live part cannot be contacted by the probe illustrated in Figure 8.1 . b) An opening that has a minor dimension of 3/4 inch (19.1 mm) or more is acceptable if a part or wire is spaced from the opening as specified in Table 8.1 .		P
8.6	The probes mentioned in 8.4 and 8.5 and illustrated in Figures 8.1 , 8.2, 8.3, and 8.4 shall be applied to any depth that the opening will permit; and shall be rotated or angled before, during, and after insertion through the opening to any position that is necessary to examine the enclosure. The probes illustrated in Figures 8.3 and 8.4 shall be applied in any possible configuration; and, if necessary, the configuration shall be changed after insertion through the opening.		P
8.7	The probes mentioned in 8.6 and 8.8 shall be used as measuring instruments to judge the accessibility provided by an opening, and not as instruments to judge the strength of a material; they shall be applied with a force of 1 lb (4.4 N) through any opening.		P
8.8	With reference to the requirements in 8.4 and 8.5, the minor dimension of an opening is the diameter of the largest cylindrical probe having a hemispherical tip that can be inserted through the opening.		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.9	With reference to the requirements in 8.5, an indirectly accessible motor is a motor: a) That is accessible only by opening or removing a part of the outer enclosure, such as a guard or panel, that can be opened or removed without using a tool, or b) That is located at such a height or is otherwise guarded or enclosed so that it is unlikely to be contacted. A directly accessible motor is a motor: c) That can be contacted without opening or removing any part, or d) That is located so as to be accessible to contact.		P
8.10	During the examination of a heater in connection with the requirements in 8.1 –8.9, a part of the outer enclosure that may be removed without the use of tools by the user of the heater (to permit the attachment of accessories, to allow access to means for making operating adjustments, or for other reasons) is to be disregarded –that is, it will not be assumed that the part in question affords protection against the risk of electric shock. A warning marking such as that specified in 64.5 is not considered to adequately protect against this risk of electric shock.		P
8.11	With reference to the requirements in 8.4 and 8.5, insulated brush caps are not required to be additionally enclosed.		P
8.12	During the examination of a heater in connection with the requirements in 8.1 –8.9, a part of the outer enclosure that is removed with the use of tools by the user of the heater to permit resetting of the resettable temperature control is to be disregarded –that is, it will not be assumed that the part in question affords protection against the risk of electric shock, or injury to persons. A warning marking such as that specified in 64.5 is not considered to adequately protect against this risk of electric shock, or injury to persons.		P

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
8.13	A product may employ a reset table temperature control when the reset means is inaccessible if designed in a manner that the product cannot be disassembled with readily available tools, such as screw drivers, wrenches, and similar tools, and the product is marked in accordance with 64.4. Such fasteners as rivets, one way screws, fasteners not readily accessible after assembly, and similar fasteners would be considered as causing the product to be not readily disassembled.		P
8.14	Any manual adjustable controls shall be reset table or adjustable so that electrical or moving parts will not cause a risk of fire, or electric shock, to occur during the resetting or adjustment procedure. See Figure 8.5 and 8.1 0 and 8.1 2.		P
8.15	An uninsulated live part shall not be located behind an opening that may be used to make a user service function such as adjusting or resetting a manual limit control if a 1 /8-inch (3.2-mm) diameter straight rod can be made to touch the live part when the rod is inserted through the opening and moved to all positions possible without producing an angle of more than 30 degrees between the rod and the line drawn between the center of the opening and the center of the face of the part to be adjusted. The length of the rod beyond the opening is not to exceed the distance between the opening and the face of the adjustable mechanism by more than 3 inches (76 mm). See Figure 8.5.		N/A
8.16	The door or cover of an enclosure shall be provided with means for holding it securely in place in the closed position.	No such door or cover	N/A
8.17	The door or cover of an enclosure shall be hinged if it gives access to any fuse, circuit breaker, or manually resettable temperature control and if uninsulated live parts are exposed during the replacement of the fuse or resetting of the manually resettable temperature control. Such a door or cover shall also be provided with a latch or the equivalent and a captive screw to secure the door or cover in place.	No such door or cover	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.18	A door or cover giving access to any overload-protective device in other than a low-voltage circuit shall be tight fitting and shall suitably overlap the surface of the enclosure around the opening.	No such door or cover	N/A
8.19	A spring latch, a magnetic latch, a dimple, or any other mechanical arrangement that will hold the door in place and would require some effort on the user's part to open it is considered to be an acceptable means for holding the door in place as required in 8.1 7.		N/A
8.20	A component of a heater that is likely to need inspection, replacement, cleaning, or other servicing shall be as accessible as practicable, and shall be accessible without the use of special tools if it is intended to be manually operated or adjusted or if it will definitely require periodic servicing.		P
9	Accessibility of Moving Parts		P
9.1	The rotor of a motor, a pulley, a belt, a gear, a fan, or other moving parts shall be enclosed or guarded to reduce the risk of injury to persons.		P
9.2	A fan blade 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
9.3	The portion of a fan blade that can cause a risk of injury to persons shall be guarded so that the probe shown in Figure 9.1 cannot touch the part when inserted with a force of 1 lb (4.4 N) through any opening in the guard.		P
9.4	If a part used to comply with the requirement in 9.3 is made of a polymeric material, a piece of the material is to be re-examined for compliance with this requirement after being subjected to the Mold Stress- Relief istortion Test as described in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C. See 1 2.1 . While in the oven the part is to be assembled to the heater and the heater is to be in its intended operating position.		P
9.5	A guard employed to comply with the requirement in 9.3 shall be either attached to the heater or shall require the use of a tool or tools for removal.		P

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
9.6	An enclosure, a frame, a guard, a handle, or other part of the heater that is exposed to contact during intended operation shall not be sufficiently sharp to constitute a risk of injury to persons.		P
9.7	Any manual adjustable controls shall be resettable or adjustable so that moving parts will not cause a risk of injury to persons to occur during the resetting or adjustment procedure. See Figure 8.5, 8.10 and 8.12.		P
10	Guarding of Heating Elements		P
10.1	General		P
10.2	Panel-type heaters		N/A
11	Parts Subject to Pressure		N/A
11.1	Except as noted in 11.2 a pressure vessel having an inside diameter, width, height or cross-section diagonal of more than 6 inches (152 mm) with no limitation on length of vessel and subject to a pressure of more than 15 pounds force per square inch gauge (psig) (1.03 kilonewtons per square meter or 1.05 grams force per square millimeter) shall be certified by the National Board of Boiler and Pressure-Vessel Inspectors and marked in accordance with the appropriate boiler and pressure vessel code symbol of the American Society of Mechanical Engineers (ASME) – "H", "M", "S", or "U" – for a working pressure not less than the pressure determined by applying 11.2.		N/A
11.2	Except as noted in 11.3, a part of a heater that is subject to pressure (including the vapor pressure of a superheated fluid) shall comply with the Hydrostatic Test, Section 57.		N/A
11.3	A test need not be performed to determine whether or not a part complies with the requirement in 11.2 if the strength of the part is acceptable for the purpose as a result of its material and dimension – for example, copper or steel pipes of standard sizes and provided with standard fittings might be considered to have the necessary strength if they comply with Table 11.1.		N/A
11.4	A means for safely relieving pressure shall be provided for all parts in which pressure might be generated in the event of fire.		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
11.5	Pressure-relief devices (see 11.10), fusible plugs, soldered joints, spot or rolled weld joints, nonmetallic tubing, or other equivalent pressure-relief means may be employed to comply with the requirement in 11.4.		N/A
11.6	There shall be no shut-off valve between the pressure relief means and the parts that it is intended to protect.		N/A
11.7	A vessel having an inside diameter, width, height or cross-section diagonal of more than 3 inches (76.2mm) and subject to air or steam pressure generated or stored within the appliance shall be protected by a pressure-relief device.		N/A
11.8	The start-to-discharge pressure setting of the pressure-relief device shall not be higher than the maximum working pressure of the vessel. The discharge rate of the device shall be great enough to relieve the pressure.		N/A
11.9	A pressure-relief device shall: a) Be connected as close as possible to the pressure vessel or parts of the system that it is intended to protect, b) Be so installed that it is accessible for inspection and repair and cannot be readily rendered inoperative, c) Have its discharge opening so located and directed that the risk of scalding has been reduced to an acceptable degree, and d) Have its discharge opening so located and directed that operation of the device will not deposit moisture on uninsulated live parts, or on insulation or components affected detrimentally by moisture.		N/A
11.10	A pressure-relief device having an adjustable setting is to be judged on the basis of its maximum setting unless the adjusting means is sealed at a lower setting.		N/A
11.11	A pressure-relief device is considered to be a pressure-actuated valve or rupture member designed to relieve excessive pressures automatically.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	If a pressure-relief device is required, the electrical control responsible for limiting the pressure in the vessel shall be capable of performing under rated load for 100,000 cycles of operation and shall prevent the pressure from exceeding 90 percent of the relief-device setting under any condition of intended operation.		N/A
12	Polymeric Materials		P
12.1	Determination of the acceptability of a polymeric material shall be made based on the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.		P
12.2	For the purposes of conducting the Resistance to Impact Test in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, a heater intended for indoor use that is provided with a polymeric enclosure shall be considered a floor-supported appliance even if it is specifically intended for use at elevated locations and be evaluated for use in locations where the temperature is capable of being less than normal room temperature, such as unheated warehouses or rooms.		
13	Heat Transfer Fluids		P
13.1	General		P
14	Assembly of Components		P
14.1	A switch, a lampholder, a temperature control, an attachment-plug receptacle, a motor-attachment plug, or similar component shall be mounted securely and, except as noted in 1 4.2 and 1 4.3, shall be prevented from turning.		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
14.2	The requirement that a switch or a temperature control be prevented from turning may be waived if all five of the following conditions are met: a) The switch or the temperature control is of a plunger or other type that does not tend to rotate when operated. A toggle switch is considered to be subject to forces that tend to turn the switch or the temperature control during operation of the switch, b) The means for mounting the switch or the temperature control is not subject to loosening as the result of its operation, c) The spacings are not reduced below the minimum acceptable values if the switch or the temperature control rotates, d) The operation of the switch or the temperature control is by mechanical means rather than direct contact by persons, and e) The shifting of the switch or the temperature control in position does not result in false indication of its setpoint with respect to the setpoint markings.		N/A
14.3	A lampholder of a type in which the lamp cannot be replaced (such as a neon pilot or indicator light in which the lamp is sealed in non removable jewel) need not be prevented from turning if rotation cannot reduce spacings below the minimum acceptable values.		N/A
14.4	The means for preventing the turning mentioned in 14.1 is to consist of more than friction between surfaces – for example, a toothed lock washer which provides both spring take-up and an interference lock is acceptable as means to prevent turning of a small stem-mounted switch or other device having a single-hole mounting means.		N/A
14.5	Uninsulated live parts shall be secured to the base or mounting surface that they will be prevented from turning or shifting in position if such motion may result in a reduction of spacings below the minimum acceptable values indicated in 34.1 – 34.6.		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
14.6	Friction between surfaces is not acceptable as a means to prevent shifting or turning of live parts, but a toothed lock washer which provides both spring take-up and an interference lock is acceptable.		N/A
15	Protection Against Corrosion		P
15.1	Except as noted in 15.2, iron and steel parts shall be protected against corrosion by enameling, galvanizing, plating, or other equivalent means if the deterioration of such unprotected parts would be likely to result in risk of fire, electric shock, explosion, or injury to persons.		P
15.2	In certain equipment where the oxidation of steel is not likely to be accelerated due to the exposure of metal to air and moisture or other oxidizing influence – thickness of metal and temperature also being factors – surfaces of sheet steel within an enclosure may not be required to be protected against corrosion. Cast-iron parts are not required to be protected against corrosion. A sheath employed on a heating element operating in air and terminal parts attached directly to the heating element need not be protected against corrosion.		N/A
15.3	The aging characteristics of plating or other finish used in a heater shall be such that deterioration of the finish will not result in unacceptable performance of the heater.		N/A
15.4	The sheath of an immersion-type heating element shall be of a metal resistant to corrosion by the liquid in which the element is intended to be immersed.		N/A
16	Supply Connections		P
16.1	The mass of a wall or ceiling hung heater shall not exceed 50 pounds (22.7 kg).		N/A
16.2	Hanging brackets and any necessary fasteners required for hanging the heater shall be provided as part of the product. Optional hanging kits may be available if marked in accordance with 64.1.0.		N/A
16.3	A wall-hung heater shall not have provisions for permanent mounting. Keyhole slots, not accessible for tightening of screws, or provisions for hanging on a bracket furnished with a heater would be acceptable for mounting such heaters.		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
16.4	A heater shall be provided with a length of attached flexible cord and an attachment plug for connection to the supply circuit, or shall have male pin terminals that accommodate a detachable power-supply cord. The length of the detachable power-supply cord or attached power-supply cord (including fittings) shall not be less than 6 feet (1 .8 m) and not more than 8 feet (2.4 m). All detachable power-supply cords and attached power-supply cords shall comply with the requirements of the Standard for Cord Sets and Power-Supply Cords, UL 81 7.		N/A
16.5	The size of the flexible cord, based on the current rating of the heater, shall be in accordance with Table 1 6.2.		P
16.6	The current rating of the attachment plug shall not be less than 1 25 percent of the current rating of the heater except that a 1 5-ampere attachment plug is acceptable for a heater rated at not more than 1500 watts at 1 20 volts, or 3000 watts at 240 volts, and a 20-ampere attachment plug is acceptable for a heater rated at not more than 2000 watts at 120 volts or 4000 watts at 240 volts.		P
16.7	The flexible cord shall be as indicated in Table 1 6.1 or shall be of type having such properties that it will be at least equally serviceable for the particular application.		P
16.8	The flexible cord provided with a heater intended for outdoor use shall be marked with the suffix letter "W " .		P
16.9	The attachment plug (of a permanently attached cord or of a cord set) shall be acceptable for its intended use. Some of the more common plug configurations are shown in Figure 1 6.1 .		P
16.10	Supplementary insulation on a flexible cord shall not extend more than 1 /2 inch (1 2.7 mm) outside the heater (unless provided with additional mechanical protection), shall be prevented from fraying or unraveling, and shall not affect adversely the means for providing strain relief.		N/A
16.11	Strain relief shall be provided to prevent a mechanical stress on a flexible supply cord from being transmitted to terminals, splices, or interior wiring.		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
16.12	Means shall be provided to prevent the flexible cord from being pushed into the enclosure of a heater through the cord-entry hole if such displacement is likely to subject the cord to mechanical damage or to expose the cord to a temperature higher than that for which it is acceptable, or if it is likely to reduce spacings (such as to a metal strain-relief clamp) below the minimum acceptable values.		N/A
16.13	If a knot serves as strain relief in an attached flexible cord, any surface with which the knot may come in contact shall be free from projections, sharp edges, burrs, fins, and the like, which may cause abrasion of the insulators on the conductors.		N/A
16.14	If a heater is provided with pin terminals, the heater shall be constructed so that no live parts will be exposed to unintentional contact when the intended plug is in place on the pins.		P
16.15	A pin guard is required, such that: a) A straight edge placed in any position, across and in contact with edges of the plug opening without the plug in place, cannot be made to contact any current-carrying pin. b) With the plug aligned with the pins and the face of the plug in a plane located perpendicular to the end or ends of the farthest projecting current-carrying pin, the probe shown in Figure 8.3 shall not touch any current-carrying pin while the probe is inserted through any opening with the heater in any position.		P
16.16	A pin terminal shall be securely and rigidly mounted and shall be prevented from shifting in position by means other than friction between surfaces.		P
16.17	The requirement in 1 6.1 6 is intended primarily to provide for the maintenance of spacings in accordance with 34.1 – 34.6 and Table 34.1 , and for spacings between pin-type terminals as indicated in Table 1 6.3. Under this requirement, consideration is also to be given to the means for locking terminals in position to maintain tightness.		P

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Clause	Requirement + Test	Result - Remark	Verdict
17	Special Protection Devices		P
18	Static Load Test For Hanging Means		N/A
19	Current-Carrying Parts		N/A
20	Internal Wiring		P
20.1	General		P
20.2	Protection of wiring		P
20.3	Wire connectors		P
20.4	Separation of circuits		P
21	Heating Elements		P
21.1	A heating element shall be securely supported.		P
21.2	In determining if a heating element complies with the requirement in 19.1 , consideration is to be given to sagging, loosening, and other adverse conditions of the element resulting from continuous heating or flexing of the element supports or related wiring due to alternate heating and cooling of the element. See Element Support Impact Tests, Section 51 , for tests to be conducted on heating elements.		P
22	Heating Element Supports		P
22.1	The supports for an open-type heating element shall be positively secured in position if loosening of the element may result in reduction of electrical spacings between a heating element and a dead metal part. See Spacings, Section 34. The securement of the supports shall not be dependent on tension or pull by the heating element as evaluated by 20.2.		P
22.2	Element supports are evaluated by assuming an expansion of the heating element from its normal position, to any position that will not cause contact of the element with the exposed dead metal parts. The heater is then moved to various positions in an attempt to dislodge an element support.		P
23	Electrical Insulation		P

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
23.1	Insulating washers, bushings, and the like that are integral parts of a heater, and bases or supports for the mounting of live parts shall be of a moisture- resistant material that will not be damaged by the temperatures to which they will be subjected under conditions of actual use. Molded parts shall be constructed so that they will have the mechanical strength and rigidity necessary to withstand the stresses of actual service.		P
23.2	Insulating material employed in a heating appliance is to be judged with respect to its particular application. Materials such as mica, some molded compounds, and certain refractory materials are usually acceptable for use as the sole support of live parts; and some other materials that are not for general use, such as magnesium oxide, may be acceptable if used in conjunction with other less hygroscopic insulating materials or if located and protected so that they are not subject to mechanical damage and are resistant to the absorption of moisture. When it is necessary to investigate a material to determine whether or not it is acceptable, consideration is to be given to its mechanical strength, dielectric properties, insulation resistance (see 48.1), heat-resistant qualities, the degree to which it is enclosed or protected and any other features having a bearing on the likelihood that a risk of fire, electric shock, or injury to persons may occur, under conditions of actual service. All of these factors are considered with respect to thermal aging.		P
23.3	In the mounting or supporting of small, fragile, insulating parts, screw or other fastenings shall not be tight enough to cause cracking or breaking of these parts with expansion and contraction. Generally, such parts should be slightly loose.		P
24	Thermal Insulation		P
24.1	Thermal insulation shall be of such nature and located and mounted or supported so that it will not be adversely affected by any intended operation of the heater.		P

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Clause	Requirement + Test	Result - Remark	Verdict
24.2	Thermal insulation that is not rigid shall be mounted or supported so that it will not sag. Adhesive material employed for mounting thermal insulation shall be acceptable for use at the temperature to which it may be subjected.		P
24.3	Determination of the acceptability of an adhesive may be omitted if the thermal insulation is mechanically supported by at least one rivet or the equivalent per square foot of material (at least 1 rivets or the equivalent per square meter of material).		P
24.4	Unless it has been investigated for the purpose, flammable thermal insulation or other flammable material is not acceptable if it is located in the heated air stream of a heater.		P
24.5	Flammable or electrically conductive thermal insulation shall not make contact with uninsulated live parts of a heater.		P
24.6	Some types of mineral-wool thermal insulation contain conductive impurities in the form of slag that make its use unacceptable if in contact with uninsulated live parts. See 48.1 .		N/A
25	Motors		N/A
26	Overcurrent Protection		N/A
27.1	General		N/A
27.2	Heating elements		N/A
27.3	Motors and motor-circuits		N/A
27.4	Tapped high-voltage control circuits		N/A
27.5	High-voltage transformers		N/A
27.6	Low-voltage transformers		N/A
28	Secondary Circuits		P
28.1	General		P
28.2	Limited-energy-secondary circuits		P
29	Temperature Limiting Controls		P

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Clause	Requirement + Test	Result - Remark	Verdict
29.1	With respect to the Normal Temperature Test, Section 39, and Abnormal Operation Tests, Section 41 , if operation of the heater in accordance with Subsection 39.2 could result in a risk of fire or electric shock due to overheating of the heater, a thermal cutoff or a manual reset type temperature limiting control shall be provided. The manual reset type temperature limiting control shall be of a type that will not operate as an automatic reset control when the reset means is held in the reset position.		P
29.2	A thermal cutoff shall be secured in place. A thermal cut-off that is field-replaceable shall be used only in a commercial/industrial heater.		P
29.3	If an appliance is provided with a replaceable overcurrent and/or over-temperature protective device, the device shall be secured in place and shall be so located that it will be accessible for replacement without damaging other connections or internal wiring. See 64.5.		P
29.4	A thermal cutoff shall open the circuit in the intended manner without causing the short-circuiting of live parts and without causing live parts to become grounded to the enclosure when the heater is connected to a circuit of voltage in accordance with 39.1 .9 and operated in a normal position to cause abnormal heating.		P
29.5	To determine if a thermal cutoff complies with the requirement in 28.4, the heater is to be operated with separate cutoffs five times with any other thermally operated control devices in the heater short-circuited. Each cutoff is required to perform acceptably. During the test, the enclosure is to be connected through a 3-ampere fuse to ground.		P

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Clause	Requirement + Test	Result - Remark	Verdict
29.6	With respect to 28.4, for heaters employing open- type heating elements or series-connected metal-sheathed heating elements, thermal cutoffs shall be used in all ungrounded supply conductors if the thermal cutoff in one side of the supply circuit could be rendered ineffective by faults such as shorting of the heating element or its connection wire to metal parts that are or may become grounded. In determining the likelihood of occurrence of such a fault, conditions such as sagging or breakage of an open-type heating element and breakage or loosening of the connection to a heating element are to be considered. For a 1 20-volt heater with an unpolarized plug, both sides of the supply circuit are to be considered as being ungrounded.		P
29.7	A temperature-limiting control that is depended upon to reduce a risk of fire or electric shock shall be a calibrated control that is either: a) A control complying with the Standard for Limit Controls, UL 353, or b) A temperature-limiting control complying with the Standard for Temperature-Indicating and -Regulating Equipment, UL 873. See the Endurance Test, Section 43, also.		P
30	Alarms		N/A
30.1	A heater as specified in (a) of exception to 28.1 , or a heater employing an automatically reset auxiliary temperature control, shall include an audible or visual alarm to indicate that one or more controls has operated. The alarm shall become energized when an abnormal ambient condition occurs and a control functions to de-energize the heater. If the control functions to reenergize the heater the alarm may be de-energized or it may remain energized until it has been de-energized manually.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
30.2	An audible alarm shall consist of a sounding device such as a buzzer, horn, beeper, or bell that generates a continuous distinct signal while it is energized. The alarm shall comply with the Alarm Device Endurance Test, Section 40.		N/A
30.3	A visual alarm shall consist of a light that is red and of a different color than the lamp used in the "power on" pilot light (see 31 .1) or of a flashing indicator light that has an "on" time not less than one third of the "off" time and that cycles on and off at least 1 5 times a minute. The light shall be constructed and located as specified in 31 .1 and it shall comply with the visibility requirements in 31 .2. The lamp used in the indicator light shall have a minimum rated life of 20,000 continuous hours at rated voltage, or it shall withstand the test specified in the Alarm Device Endurance Test, Section 40.		N/A
30.4	The "Important Instructions" furnished with a heater that includes an alarm shall include instructions in accordance with of 65.2.1 (1 6).		N/A
31	Lampholders		N/A
31.1	If a heater is equipped with a polarized attachment plug, a lampholder supplied as a part of the heater shall be wired so that the screw shell will be connected to the identified grounded conductor.		N/A
31.2	Except as noted in 30.3, a lampholder shall be installed so that uninsulated live parts, other than the screw shell, will not be exposed to contact by persons removing or replacing lamps.		N/A
31.3	The requirement in 30.2 does not apply if, in order to remove or replace a lamp, it is necessary to dismantle the heater by means of tools. See 64.5.		N/A
31.4	A medium-base lampholder or screw-shell receptacle shall not be used as a holder for a heating element rated at more than 6 amperes or 660 watts, except that a screw shell with a left-hand thread may be used with a heating element rated at not more than 1 0 amperes.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
31.5	A female screw shell used as a holder for a heating element shall be of copper or copper alloy and shall be plated with nickel or equivalent oxidation- resistant metal.		N/A
32	Pilot Lights		P
32.1	A movable heater shall be provided with a pilot light having a lamp or lens that glows red or amber. The light shall: a) Be located on the front or top surface of the heater; and b) Comply with 31 .2. The light shall be connected to the heater circuit so that it is energized whenever the on-off switch (see 32.1 2) is in the on position. Compliance of the light shall be determined only when the on-off switch is in the on position.		P
32.2	The light from a pilot light mentioned in 31 .1 shall be visible from a point 1 0 feet (3 m) in front of the center of the heater and 5 feet (1 .5 m) above the floor. Compliance with this requirement shall be determined while the heater is: a) Standing on the floor if the heater is intended for placement on the floor while in operation,or b) Elevated from the floor by 3 feet (0.91 m) if the heater is intended for use at an elevated location (see 3.6).For a heater intended to be used either on the floor or at an elevated location, the light shall be visible while the heater is mounted on the floor and also when it is elevated by 3 feet.		P
33	Switches		N/A
33.1	A switch or other control device shall be rated for the particular application and shall have a current and voltage rating not less than that of the circuit (load) which it controls.		N/A
33.2	A switching device shall be so located or protected that it will not be subjected to physical damage in use.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
33.3	A switching device or manual mode control shall be of the indicating type or the switch function, such as "on-off", "high-low", and the like, shall be otherwise indicated. The switch or manual control position indications shall be visible when the heater is located and positioned in the intended use position.		N/A
33.4	For a movable heater of other than the commercial/industrial type that employs a fan only operating control and that is unlikely to be moved to view the controls when operating the controls, the indications for the fan only selection position and the various heat selector positions shall be visible from a point 5 feet (1.5 m) above the floor and between 1 and 4 feet (0.3 and 1.2 m) away from the front surface of the heater with the lower edge of the heater located at any point between and including 2.5 and 5 feet (0.75 and 1.5 m) above the floor. Heaters complying with the dimensions of 3.6 are considered as likely to be moved to view the control markings when operating the control.		N/A
34	Automatic Controls and Control Circuits		N/A
34.1	General		N/A
34.2	Terminals and actuating members of safety and temperature limiting controls		N/A
35	Spacings		P
35.1	Except as noted in 34.2 and 34.3, the spacings in a heater shall be in accordance with Table 34.1.		P
35.2	The spacings specified in Table 34.1 do not apply to the inherent spacings of a component part, such as a snap switch or motor, of a heater. Such spacings are judged under the requirements for the component in question.		P
36	Grounding		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
36.1	A heater intended for operation on a circuit involving a potential of more than 150 volts to ground shall have provision for grounding, in accordance with 35.2, of all exposed noncurrent-carrying parts, and all noncurrent-carrying metal parts exposed during any servicing operation (including maintenance and repair), that are likely to be energized.		N/A
36.2	On a heater where grounding is required or provided, the power-supply cord or cord set shall include a grounding conductor which shall be: a) Green, with or without one or more yellow stripes, b) Connected to the grounding blade of an attachment plug of a grounding type, and c) Connected to the enclosure of the appliance by means of a screw not likely to be removed during ordinary servicing, or by other equivalent means. Solder alone is not acceptable for making this connection. See 35.4.		N/A
36.3	If a heater intended for operation on a circuit involving a potential of 150 volts or less to ground has provision (although not required) for grounding noncurrent-carrying metal parts by means of a conductor of the cord, a directly attached flexible cord or a cord set provided with the heater shall comply with the requirement in 35.2.		N/A
36.4	With reference to 35.2(c), a grounding connection that is mechanically crimped before being soldered is to be tested for acceptability as a connection without the solder in place.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
36.5	A 2-wire heater, having a voltage rating within the range of 220 to 250 volts is considered as requiring provision for grounding in accordance with 35.1 , unless the marked rating on the heater is 1 20/240 volts or unless the heater is otherwise marked to indicate that it is to be connected only to a 1 20/240-volt circuit with grounded neutral.		N/A
PERFORMANCE			
37	General		P
37.1	If a heater is intended to be shipped with the legs or base detached, the tests are to be conducted with the legs or base in place, as well as detached.		P
38	Power Input Test	See table 37	P
38.1	The power input to a heater shall not be more than 1 05 percent of its marked rating.		P
38.2	To determine if a heater complies with the requirement in 37.1 , the power input is to be measured at the temperature developed under intended operating conditions and under full-load conditions and while connected to a supply circuit of rated voltage in accordance with 39.1 .9. If a heater employs a nonmetallic element (such as carbon), the power input is to be determined when the element is new.		P
39	Leakage Current Test	Test and passed	P
39.1	The leakage current of a heater rated for a nominal 1 20-, 208-, or 240-volt supply when tested in accordance with 38.3 –38.6 shall not be more than: a) 0.5 milliamperes for a movable heater, and b) 0.75 milliamperes for other than a movable heater employing a standard attachment plug rated 20 amperes or less.		P
39.2	Leakage current refers to all currents, including capacitively coupled currents, which may be conveyed between exposed conductive surfaces of a heater and ground or other exposed conductive		P

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Clause	Requirement + Test	Result - Remark	Verdict
	surfaces of a heater.		
39.3	All exposed conductive surfaces are to be tested for leakage currents. The leakage currents from the surfaces are to be measured to the grounded supply conductor individually as well as collectively where simultaneously accessible and from one surface to another where simultaneously accessible. Parts are considered to be exposed surfaces unless guarded by an enclosure considered acceptable for protection against the risk of electric shock as defined in 8.1 – 8.1.0. Surfaces are considered to be simultaneously accessible where they can be contacted by one or both hands of a person at the same time. These measurements do not apply to terminals operating at voltages which are considered to be nonhazardous.		P
39.4	If a conductive surface other than metal is used for the enclosure or part of the enclosure, the leakage current is to be measured using a metal foil with an area of 10 by 20 centimeters in contact with the surface. Where the surface is less than 10 by 20 centimeters, the metal foil is to be the same size as the surface. The metal foil is not to remain in place long enough to effect the temperature of the heater.		P

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Clause	Requirement + Test	Result - Remark	Verdict
39.5	The measurement circuit for leakage current is to be as shown in Figure 38.1 . The measurement is defined in (a) through (d). The meter which is actually used for a measurement need only indicate the same numerical value for a particular measurement as would the defined instrument. The meter used need not have all the attributes of the defined instrument. a) The meter is to have an input impedance of 1 500 ohms resistive shunted by a capacitance of 0.1 5 microfarad. b) The meter is to indicate 1 .1 1 times the average of the full-wave rectified composite waveform of voltage across the resistor or current through the resistor. c) Over a frequency range of 0 to 1 00 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 1 500 ohm resistor shunted by 0.1 5 microfarad capacitor to 1 500 ohms. At an indication of 0.5 or 0.75 milliampere, the measurement is to have error of not more than 5 percent. d) Unless the meter is being used to measure leakage from one part of a heater to another, the meter is to be connected between the accessible parts and the grounded supply conductor.		P

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Clause	Requirement + Test	Result - Remark	Verdict
39.6	A representative heater is to be tested for leakage current starting with the as-received condition with all switches and temperature controls closed, but with its grounding conductor, if any, opened at the attachment plug. The as-received condition is without prior energization, except as may occur as part of the production line testing. The supply voltage is to be 120, 208, or 240 volts, depending upon the voltage rating of the heater. The test sequence, with reference to the measuring circuit (Figure 38.1), is to be as follows: a) With switch S1 opened, the heater is to be connected to the measuring circuit. Leakage current is to be measured using both positions of switch S2. b) Switch S1 is then to be closed, energizing the heater, and within a period of 5 seconds, the leakage current is to be measured using both positions of switch S2 and with the heater operated at the maximum heat setting of controls. c) Leakage current is to be monitored until thermal stabilization under the maximum heat condition. Both positions of switch S2 are to be used. The equivalent of thermal stabilization is considered to be obtained as in any normal temperature test. If any temperature control does not cycle at the maximum heating setting, it is to be adjusted until it does cycle before the final measurements at thermal stabilization are taken. Measurements are to be made with the temperature control, if any, open and closed. d) If the heater employs a single pole switch or an adjustable temperature control, monitoring of leakage current is to continue until the leakage current stabilizes or decreases after the heater is turned off.		P
40	Normal Temperature Tests	See table 40	P
40.1	General		P

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Clause	Requirement + Test	Result - Remark	Verdict
40.2	Temperature controls		P
40.3	Specified test conditions		P
41	Alarm Device Endurance Test		N/A
41.1	With regard to 29.1 and 29.2, an audible alarm device and a control which activates the alarm shall withstand without malfunction or breakdown, an endurance test consisting of 6000 cycles of operation at the rate of 1 minute on and 30 seconds off. The test is to be conducted at rated voltage and at the maximum ambient temperature determined during the Normal Temperature Test, Section 39.		N/A
41.2	With regard to 29.1 and 29.3, a visual alarm device and a control which activates the alarm shall withstand without burning out or failing to light, an endurance test consisting of 6000 cycles of operation at the rate of 1 minute on and 30 seconds off. The test is to be conducted at the rated voltage and at the maximum ambient temperature determined during the Normal Temperature Test, Section 39.		N/A
42	Abnormal Operation Tests		P
42.1	General		P
42.2	Overvoltage test		N/A
42.3	Stalled-fan test		N/A
42.4	Tip-over test		N/A
42.5	Vertical-wall test		N/A
42.6	Terry cloth drape test		N/A
42.7	Terry cloth band drape test		N/A
42.8	Wall-hung heaters		N/A
42.9	Abnormal ambient test		P
42.10	Motor overload and stalled motor – motors protected by a remote protective device		N/A
42.11	Impedance-protected motors		N/A
42.12	Motor connected across heating elements		P
43	Endurance Test		P
43.1	Temperature Control		N/A
43.2	Electrical wiring		P

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Clause	Requirement + Test	Result - Remark	Verdict
44	Short Circuit Tests		P
44.1	Devices and conductors referenced in 26.1 .2(c) and Exception No. 3 to 26.4.3 shall withstand short circuit and ground fault conditions when protected by: a) A device that is acceptable for branch circuit protection and is located in the heater, or b) A branch circuit overcurrent protective device of the type and maximum rating specified on the heater nameplate. There shall be no damage to the conductor or its termination, no ignition of the cheesecloth surrounding the enclosure housing the components under test, and no arc-over between line- and low-voltage circuits.		P
44.2	For the purpose of these tests: a) Circuit breakers and fuses are not considered to be interchangeable, b) Fuses of the same rating are considered to be interchangeable, c) HACR type circuit breakers of the same rating are considered to be interchangeable, and d) Circuit breakers of other than the HACR type are not considered to be interchangeable with each other or with HACR type circuit breakers.		P
44.3	Each device and each conductor is to be connected in a circuit having a minimum capacity based on the maximum rated current and voltage of the heater in accordance with Table 43.1 . Each concurrent load condition is to be considered separately, and the maximum resulting current employed as the basis of selection of the capacity of the test circuit. The voltage source for the test circuit is to be an alternating voltage and the circuit capacity is to be measured without the devices or the conductors in the circuit.		P
45	Overload Test – High-Voltage Transformers		N/A
45.1	This test applies to a high-voltage transformer provided with thermal protection of other than the nonrenewable thermal cutoff type. See 26.5.2.		N/A
45.2	Temperatures measured on the surface of the windings of a thermally protected high-voltage transformer shall not exceed the temperature indicated in 44.4 when the transformer is		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	tested as indicated in 44.3 and 44.4.		
45.3	A variable resistance load is to be connected to the output terminals and the transformer is to be operated continuously at the test voltage indicated in 39.1 .9. If the protective device controls a switching device that, in turn, interrupts primary current to the transformer, the switching device is to be included in the circuit. The test ambient temperature is to be approximately 25 ° C (77 ° F). The resistance load is to be adjusted so that the transformer winding is brought to a stabilized temperature of approximately 10° C (18 ° F) below its insulation rating. The load is then to be gradually increased until operation of the protector occurs.		N/A
45.4	Each of three of the transformer-protective device combination is to be tested. Average temperatures of the three representative devices shall not exceed the winding insulation rating and the temperature of any one representative device shall not exceed the insulation rating by more than 5 °C(9 ° F).		N/A
45.5	Upon completion of this test, each representative device shall comply with the Dielectric Voltage-Withstand Test, Section 47.		N/A
46	Burnout Test – High-Voltage Transformers		N/A
46.1	There shall be no emission of flame or molten metal from the heater enclosure when a high-voltage transformer is operated under the conditions described in 45.2 and 45.3.		N/A
46.2	Three transformers shall be operated continuously at the normal test voltage indicated in Table 39.2 and at rated frequency with the enclosure grounded. The test ambient temperature is to be approximately 25 ° C (77 ° F) and operation is to be continued until constant temperature is indicated by a thermocouple on the enclosure or until burnout occurs. The circuit on which the transformer is tested is to be protected by fuses rated not less than that required for the heater.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
46.3	The load connected to the output terminals is to be the highest of the following and is to be readjusted to the specified value after 2 minutes of operation if necessary, with no further readjustment during the test. a) A resistance load to provide a current equal to three times the full rated transformer secondary current, or b) If the transformer supplies a motor with or without additional loads, a resistance load to provide a current equal to the motor locked rotor current plus any additional loads, or c) If the transformer supplies an inductive load (other than a motor), such as the coils of relays, solenoids, and the like, a resistance load to provide a current equal to the sum of such loads with the armature of the largest blocked open.		N/A
47	Component Failure Test		P
47.1	If a heater employs one or more rectifiers, transistors, or similar solid-state components, no risk of fire or electric shock shall develop when the circuit between any two terminals of any such component is open-circuited or short-circuited. If the heater employs a capacitor in combination with one or more of the above-mentioned components, no risk of fire or electric shock shall develop when the capacitor is short-circuited. Only one of the simulated fault conditions described above is to be imposed at one time. See 46.2 –46.5.		P
47.2	If a semiconductor rectifier is employed, three representative devices shall be tested with the rectifier terminals connected together. Three additional devices shall be tested with the terminals of the electrolytic capacitor connected together.		P
47.3	Three complete tests are to be made under each of the conditions described in 46.2 using new components in each test. The equipment to be tested is to be operated as indicated in 41.1.2.		P

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Clause	Requirement + Test	Result - Remark	Verdict
47.4	An unacceptable condition is considered to exist if flame is emitted from the overall enclosure of the equipment or if a permanently conductive path is established between live parts and exposed dead metal.		P
47.5	The tests described in 46.1 –46.3 may be omitted if one or both of the following conditions exist: a) There is 1 0,000 ohms or more of additional series impedance in a circuit in which the voltage is 1 25 or less. b) There is 20,000 ohms or more of additional series impedance in a circuit in which the voltage is more than 1 25 but is no more than 250.		P
48	Dielectric Voltage-Withstand Test	See table 48	P
48.1	A heater shall withstand for 1 minute without breakdown the application of a 60-hertz essentially sinusoidal potential between live parts and noncurrent-carrying metal parts, with the heater at its maximum normal operating temperature. The test potential (rms) shall be 1 000 volts for a heater rated at 250 volts or less and 1 000 volts plus twice rated voltage for a heater rated at more than 250 volts.		P
48.2	To determine whether or not a heater complies with the requirement in 47.1, it is to be tested by means of a 500-volt-ampere or larger capacity transformer, the output voltage of which can be regulated and is essentially sinusoidal. The increase in the applied potential is to be at a uniform rate and as rapidly as consistent with its value being correctly indicated by a voltmeter.		P
49	Insulation Resistance Test		P
49.1	A heater employing thermal insulation such as mineral wool in contact with uninsulated live parts or electrical insulating material that is likely to be affected adversely by moisture under the conditions of intended use shall have an insulation resistance of not less than 50,000 ohms when tested as specified in 41 .1 .8 after exposure for 24 hours to moist air having a relative humidity of 85 ±5 percent at a temperature of 34.0 ±2.0 °C (89.6 ±3.6 ° F). See 1 8.2.		P

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Clause	Requirement + Test	Result - Remark	Verdict
50	Water Spray Test		N/A
50.1	When tested as described in 49.2 –49.4, a heater intended for outdoor use shall: a) Have an insulation resistance of not less than 50,000 ohms between live parts and interconnected noncurrent-carrying metal parts; b) Withstand without breakdown for 1 minute the application of a 60-hertz essentially sinusoidal potential between live parts and interconnected noncurrent-carrying metal parts. The test potential (rms) shall be 1000 volts if the heater is rated 250 volts or less, and shall be 1000 volts plus twice rated voltage if it is rated more than 250 volts; and		N/A
50.2	During the test, the heater is to be mounted or supported as it would be in actual service. If a heater is provided with a shelter, shield, or similar device (see 64.1 8), is to be mounted therein. A radiant reflector-type heater is to be suspended in any intended operating position.		N/A
50.3	The heater is to be subjected for 4 hours to a water spray as described in 49.4 applied at an angle of 45 degrees from the vertical. The insulation- resistance and dielectric voltage-withstand tests are to be conducted immediately upon conclusion of exposure to the water spray.		N/A
50.4	The water-spray-test apparatus is to consist of three spray heads mounted in a water supply pipe rack as illustrated in Figure 49.1 . Spray heads are to be constructed in accordance with the details illustrated in Figure 49.2. The heater is to be positioned in focal area of the spray heads so that the greatest quantity of water is likely to enter the heater. The water pressure is to be maintained at 5 pounds per square inch (34.5 kPa) at each spray head.		N/A
51	Stability of Movable Heaters		P
51.1	A movable heater shall return to its intended at-rest position on a level surface after being tipped in any direction to an angle of 1 0 degrees from horizontal.		P

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Clause	Requirement + Test	Result - Remark	Verdict
51.2	The test is to be conducted on the unit when placed under the most unfavorable conditions. The heater is to be arranged with all doors and other appurtenances in the position tending to decrease stability. The legs or other points of support may be blocked to prevent the unit from sliding.		P
52	Element Support Impact Tests		P
52.1	A movable heater shall neither: a) Emit sparks, flames, or molten metal, nor b) Cause the terry cloth to ignite, nor c) Open a 1 /2 ampere fuse of other than the time- delay type installed in accordance with 51 .2, when tested as described in 51 .5 – 51 .7.		P
52.2	The 1 /2-ampere fuse is to be connected between the accessible dead metal parts (see 51 .1 0) of the heater and the earth ground through a manual switch arranged to permit remote opening and closing of the circuit to the fuse.		P
52.3	One representative movable heater is to be subjected to the test described in 51 .5 and 51 .6 and another is to be subjected to the test described in 51 .7 – 51 .9. For a heater employing a grounded (neutral) conductor, an additional representative heater for each of the tests is to be tested with the supply conductors reversed. A grounding conductor, if provided, is to be open during the tests. Each heater is to be operated at rated voltage and maximum rated input for 1 5 minutes immediately prior to being tested.		P
52.4	The hardwood surface mentioned in 51 .5 and 51 .7 is to consist of a layer of nominal 1 -inch thick tongue-and-groove oak flooring nailed onto a layer of nominal 3/4-inch plywood or nominal 1 - inch thick tongue-and-groove pine board subflooring. The complete surface is to rest on a concrete or equivalently nonresilient surface during the tests.		P

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Clause	Requirement + Test	Result - Remark	Verdict
52.5	While the heater is energized and the switch to the fuse circuit is in the open position, the heater is to be lifted by its intended carrying means to a height of 2 feet (0.6 m) as measured from the hardwood test surface to the lowest point of the lowest point of the heater.		N/A
52.6	The heater is to be held in the intended carrying position and is then to be dropped onto the hardwood test surface that is covered with one layer of terry cloth. The switch to the fuse circuit is then to be closed and the fuse is to be observed for opening prior to and while being uprighted. This procedure is to be repeated two times, for a total of three drops.		P
52.7	The representative heater in the as-received condition is to rest on the hardwood surface covered with two layers of terry cloth. While energized at the rated voltage, the heater is to be tipped over five times in the manner specified in 51 .8. The first tipover is to be onto the front face of the heater and then subsequent tipovers are to proceed in the clockwise or counterclockwise direction, one tipover onto face or side, with the last tipover again onto its front face. If the angle of critical balance (see 32.1 8) exceeds 60 degrees, the heater is not to be tipped over in this direction, but a total of five tipovers are to be made with each heater tested.		P
52.8	Each tipover is to be accomplished by tilting the heater quickly (in not more than 1 second), in one steady motion, to an angle greater than the angle of critical balance. The heater is then to be immediately released and allowed to fall freely by the force of gravity. While being tipped over, the switch to the fuse circuit is to be in the open position. After the heater comes to rest, the switch is to be closed and the fuse is to be observed for open circuiting prior to and while the heater is being uprighted.		P

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Clause	Requirement + Test	Result - Remark	Verdict
52.9	If a part of the heater is structurally or functionally damaged by a tipover, described in 51 .7 and 51 .8, onto a face or side other than the front, but the damage has not caused the fuse to open, a second heater is to be subjected to five tipover tests with the first tipover in the direction that caused damage in the first test.		P
52.10	With reference to 51 .2, a dead metal part is to be considered accessible if it does not comply with the accessibility requirements for uninsulated live metal parts in 8.4 and 8.1 0, and if the dead metal part can become energized by direct or indirect contact with a broken heating element.		P
53	Drop Test		N/A
53.1	A movable heater that is likely to be used in an elevated location, such as on a table, desk, or shelf (see 3.6) shall not: a) Emit sparks, flames, or molten metal, b) Cause the terry cloth to ignite, c) Open a 1 /2-ampere nontime delay fuse, or d) Become a risk of fire or electric shock – see 41 .7.4 –when subjected to a drop test in accordance with 52.3 –52.8. If the heater is operational after the drop tests it shall be subjected to the Terry Cloth Band Drape Tests, 41 .7.1 –41 .7.1 0.		N/A
53.2	If the heater is inoperative after the drop test with no adverse effects occurring in accordance with 52.1 , three additional heaters are to be tested.		N/A
53.3	The heater is to be dropped three times through a distance of 3 feet (0.91 m) to strike a hardwood surface in the positions most likely to produce adverse results. The drop height is to be measured from the lowest point of the heater to the hardwood surface.		N/A
53.4	The hardwood surface mentioned in 52.4 is to be as described in 51 .4, but additionally covered with two layers of terry cloth material.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
53.5	Before conducting the drop, a nontime delay, 1 /2-ampere fuse is to be connected between the accessible dead metal parts (see 51 .1 0) of the heater and earth ground through a manual switch arranged to permit remote opening and closing of the circuit to the fuse. The grounded conductor and a grounding conductor, if provided, are to be treated as described in 51 .3.		N/A
53.6	The heater is to be operated at maximum rated input for 1 5 minutes immediately prior to the drop. While energized and with the switch to the fuse circuit in the open position the heater is to be dropped so that it strikes the surface in a different position for each of the drops.		N/A
53.7	Following each drop, the heater is to be left energized in the position in which it comes to rest and the switch to the fuse circuit is to be closed. The heater is to be observed for the potential to ignite the terry cloth material and the fuse is to be observed for opening. The observation is to last for 1 5 minutes after which the heater is to be uprighted while energized and observed for opening of the 1 /2 ampere fuse.		

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Clause	Requirement + Test	Result - Remark	Verdict
53.8	After completion of the last drop in accordance with 52.3 – 52.7, an evaluation is to be made concerning which of the positions in which the heater came to rest is most likely to produce the most adverse condition if left to lay in that position for a longer period of time. The heater is then to be placed in that position with the heater energized and the switch to the fuse circuit closed. The heater is to be observed for 7 hours for ignition of the terry cloth or opening of the fuse unless: a) No opening of the fuse and no discoloration of the terry cloth material is observed in 30 minutes after the drop. For this situation, it is assumed that no ignition will occur and the heater is to be uprighted in accordance with 52.7. b) Discoloration occurs, but no smoking or charring is observed in the next 2 hours. For this situation it is assumed that no ignition will occur and the heater is to be uprighted in accordance with 52.7. c) A manual reset type temperature limiting control or thermal cutoff de-energizes the heater circuits so that there is no longer a risk of fire or development of an electric shock.		N/A
54	Test for Permanence of Cord Tag		N/A
54.1	General		N/A
54.2	Test conditions		N/A
54.3	Test method		N/A
55	Protection Against Injury to Persons Test		N/A
55.1	Unless it is intended for hanging in a location (such as a ceiling) where it is not likely to be exposed to physical abuse, a panel of glass or similarly brittle material employed in a heater shall withstand, without cracking or breaking, the impact resulting from the test described in Figure 54.1 .		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
55.2	A panel of glass or similarly brittle material employed in a heater shall withstand, without cracking or breaking, while in a fully heated condition, the application of: a) A wet cloth, fully saturated with water at room temperature, wiped across the surface of the panel; and b) After the panel has returned to normal operating temperature, a fine spray of cold, tap water played across the surface of the panel.		N/A
55.3	A ceiling-hung heater employing glass or similarly brittle material integral with the element shall be provided with a guard that will prevent dropping of glass particle having: a) A weight of more than 1 -1 /2 ounces (43 grams), b) Any dimension larger than 1 inch (25.4 mm).		N/A
56	Knob Securement Test		N/A
56.1	A removable knob, button, or pointer mentioned in 32.8 that is attached to its operating shaft by friction and not additionally secured by mechanical means, such as a set screw, shall not separate from the intended position on its operating shaft by application of a force of 3 pounds (1 3.34 N) applied for 1 minute as a straight pull in line with the shaft.		N/A
57	Strength of Adjustment Stop Test		N/A
57.1	A control or a switch on a heater intended for commercial/industrial use that is operated by a push, pull, slide, toggle or lever adjustment shall withstand a force of 20 pounds (89 N) for 1 5 seconds.		N/A
57.2	A control or a switch on a heater intended for use other than that of 56.1 that is operated by a push, pull, slide, toggle, or lever adjustment shall withstand a force of 1 0 pounds (45 N) for 1 5 seconds.		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
57.3	The heater shall not be damaged so as to cause a reduction of electrical spacings, erroneous indications of the control setpoint, or other conditions that may result in a risk of fire, electric shock, or injury to persons. The force is to be applied to the free end of the adjustment means, in line with the direction of its intended movement, and it is to be applied in each direction of the movement with the control adjustment set at the extreme position in the direction of the movement.		N/A
57.4	Switches and controls operated by a rotary adjustment when mounted in the product, shall withstand the torque specified in 56.5 and shall not be damaged so as to cause a reduction of electrical spacings, an increase in a temperature setting, displacement of the control with respect to the mounting surface, or other condition that may result in a risk of fire, electric shock, or injury to persons.		N/A
57.5	With reference to 56.4, a torque is to be applied for 15 seconds to the adjustment knob in the direction of intended operation in accordance with the following: a) For a control provided with a knob where D 1 is 1 inch (25.4 mm) or less, the applied torque is to be 9 pound inches (1.0N·m) if the heater is intended for commercial/industrial use or 7 pound-inches (0.8N·m) if it is intended for all other uses. b) For a control provided with a knob where D 1 is more than 1 inch, the torque applied is to be determined in accordance with the following formula:		N/A
58	Hydrostatic Test		N/A
58.1	With regard to 11.1, a part that is subjected to pressure (including the vapor pressure of a superheated fluid) during intended or abnormal operation shall withstand without failure, a pressure equal to five times the working pressure.		N/A

UL 1278			
Clause	Requirement + Test	Result - Remark	Verdict
58.2	Two representative parts are to be filled with water to exclude air and are to be connected to a hydraulic pump. The pressure is to be raised gradually to the specified test value, and is to be held at that value for 1 minute. The results are not acceptable if either part bursts or leaks, except as indicated in 57.3.		N/A
58.3	Leakage at a gasket during the hydrostatic-pressure test is not considered to constitute a failure unless it occurs at a pressure 40 percent or less of the required test value.		N/A
59	Strain Relief Test		P
59.1	With regard to 16.1.1, strain relief shall be provided to prevent mechanical stress on a flexible supply cord from being transmitted to terminals, splices or interior wiring.		P
59.2	When tested in accordance with 58.3, the strain-relief means provided on the flexible cord shall withstand for 1 minute, without displacement, a direct pull of 35 pounds force (155N force) applied to the cord, with the connections within the heater disconnected.		P
59.3	A 35-pound (15.9 kg) weight is to be suspended on the cord and so supported by the heater that the strain-relief means will be stressed from any angle which the construction of the heater permits. The strain relief is not acceptable if, at the point of disconnection of the conductors, there is movement of the cord that indicates stress on the connection would have resulted.		P
60	Permanence of Marking		P
60A	Supply Cord Abrasion		P
60B	Supply Cord Pinching – Mandrel		P
60C	Supply Cord Crushing - Mandrel		P
60D	Supply Cord Flexing		P
MANUFACTURING AND PRODUCTION TESTS			
61	Production-Line Dielectric Voltage-Withstand		P
62	Production-Line Grounding Continuity		P
63	Production-Line Tip Over		P
64	Production Leakage Test		P

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Clause	Requirement + Test	Result - Remark	Verdict
65	Hydrostatic Test		P
RATINGS			
66	Details		P
MARKINGS			
67	Details		P
68	Instructions for Use and Care		P
68.1	General		P
68.2	Important instructions		P
68.3	User instructions		P
68.4	Grounding instructions		N/A
68.5	Heater carton information		N/A
69	Cord Tag Markings		P
SUPPLEMENT SA - CERTAIN RADIANT ROOM HEATERS			
INTRODUCTION			
SA1	Scope		N/A
CONSTRUCTION			
SA2	Enclosure		N/A
SA2.1	General		N/A
	Guards		N/A
SA3	Stability		N/A
SA4	Supply Connections		N/A
SA5	Internal Wiring		N/A
SA6	Automatic Controls and Control Circuits		N/A
SA7	Spacings		N/A
PERFORMANCE			
SA8	General		N/A
SA9	Normal Temperature Test		N/A
SA9.1	General		N/A
SA9.2	Normal temperature		N/A
SA10	Padded Surface and Blanketing Test .		N/A
SA11	Curtain Drape Test		N/A
SA12	Shredded Paper Test		N/A
MANUFACTURING AND PRODUCTION TESTS			
SA13	General		N/A
MARKING			
SA14	Details		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

SUPPLEMENT SB - HEATERS INTENDED FOR USE IN BATHROOMS, LAUNDRY AREAS AND SIMILAR INDOOR LOCATIONS			
INTRODUCTION			
SB1	Scope		N/A
SB2	Enclosure		N/A
SB3	Current-Carrying Parts		N/A
SB4	Thermal Insulation		N/A
SB5	Immersion Detection Circuit Interrupters (IDCI'S)		N/A
SB6	Ground Fault Circuit Interrupters (GFCI'S)		N/A
SB7	Other Protective Devices		N/A
SB8	Switches		N/A
SB9	Grounding		N/A
PERFORMANCE			
SB10	Immersion Leakage Current Tests		N/A
SB10.1	General		N/A
SB10.2	Rising water immersion		N/A
SB10.3	Drop immersion		N/A
SB10.4	Tip-over immersion test		N/A
SB10.5	Saturation immersion test		N/A
SB11	Dew Point Test		N/A
SB12	Splash Test		N/A
MANUFACTURING AND PRODUCTION TESTS			
SB13	Production Line Trip-Time Measurement		N/A
SB14	Test Button Activation		N/A
MARKINGS			
SB15	Details		N/A
SB16	Instructions for Use and Care		N/A

Appendix 1: Critical components information					
Component Name	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Plastic Enclosure	Shenzhen Shiguangchishi yeyouxiangongsi	PA-765(+)	Min thickness 1.5mm, V-0 HWI=2, HAI=0, 80°C, screw for fixing	UL 94	UL E56070
PCB material	Shenzhen Shiguangchishi yeyouxiangongsi	YY-02	130 °C, V-0	UL 796 UL 94	UL E364546
Alt.	Various	Various	130 °C, V-0	UL 796 UL 94	UL
Fuse	Various	Various	T10A, 250Vac	UL	UL
Relay	Various	Various	10A, 24/120Vac/250	UL	UL
X-cap	Various	Various	0.11-0 22uF, 100°C	UL	UL
Internal wire	Various	Various	18-24AWG, 85°C	UL	UL
Temperature-Sensing Controls	Various	Various	85°C	UL	UL
Switch	Various	Various	5A, 120Vac	UL	UL
Remark:					

37	TABLE: Power Input test					P
Current deviation of/at	wattage rated (W)	wattage measured (W)	ΔI (%)	Required ΔI (%)	Remark	
110	2000	1920	-4.0%	+5%	Pass	
120	2000	1924	-3.8%	+5%	Pass	

39	Normal Temperature Tests						P
	Supply voltage (V)	120Vac	--	--	--	--	—
	Ambient Tmin (°C)	25.0	--	--	--	--	—
	Ambient Tmax (°C)	25.0	--	--	--	--	
Maximum measured temperature T of part/at:		T (°C)				Allowed Tmax (°C)	
Plug holder		30.8	--	--	--	105	
E-cap(C2)		48.9	--	--	--	105	
X-CAP		53.3	--	--	--	100	
Relay		54.6	--	--	--	85	
PCB near main IC		61.2	--	--	--	130	
Chock winding		69.5	--	--	--	130	
Fan winding		42.5	--	--	--	130	
Heating		100.9	--	--	--	Ref.	
Test floor		49.8	--	--	--	65	
Supplementary information:							
Temperature T of winding:		t1 (°C)	R1 (Ω)	t2 (°C)	R2 (Ω)	T (°C)	Allowed Tmax (°C)
Insulation class							
--		--	--	--	--	--	--
Supplementary information:							

47	TABLE: Dielectric Voltage-Withstand Test		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
Input to enclosure		1000	No

48	TABLE: Insulation Resistance Test		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
Input to enclosure		1000	No

ATTACHMENT 1 Photo Documentation



Photo 1



Photo 2



Photo 3

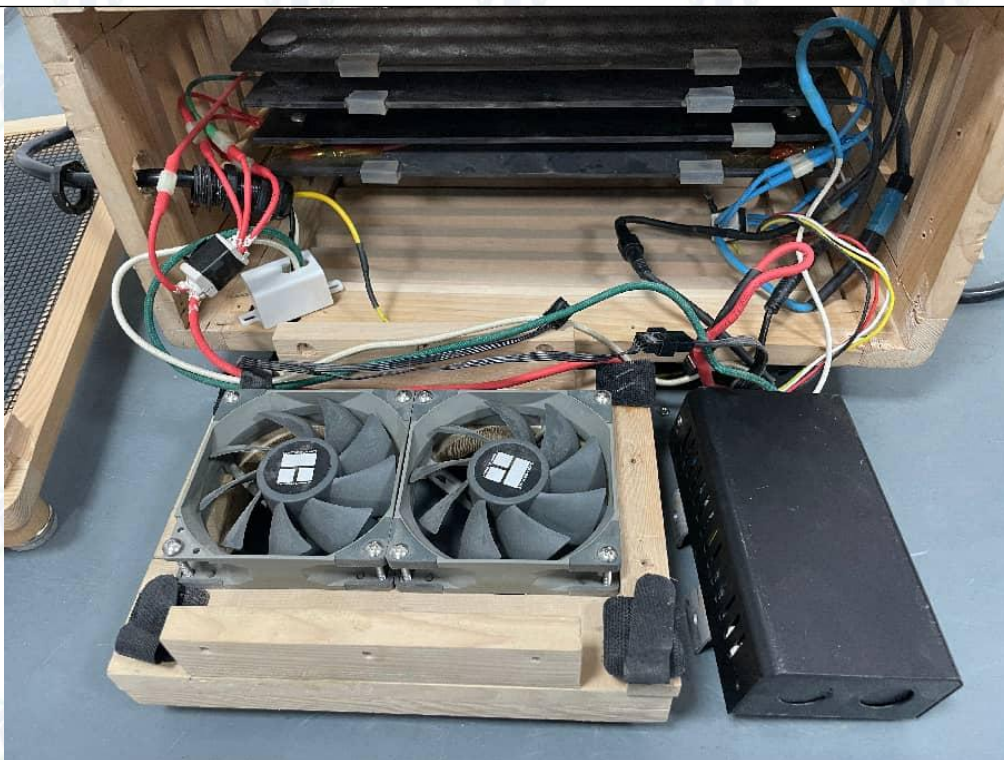


Photo 4

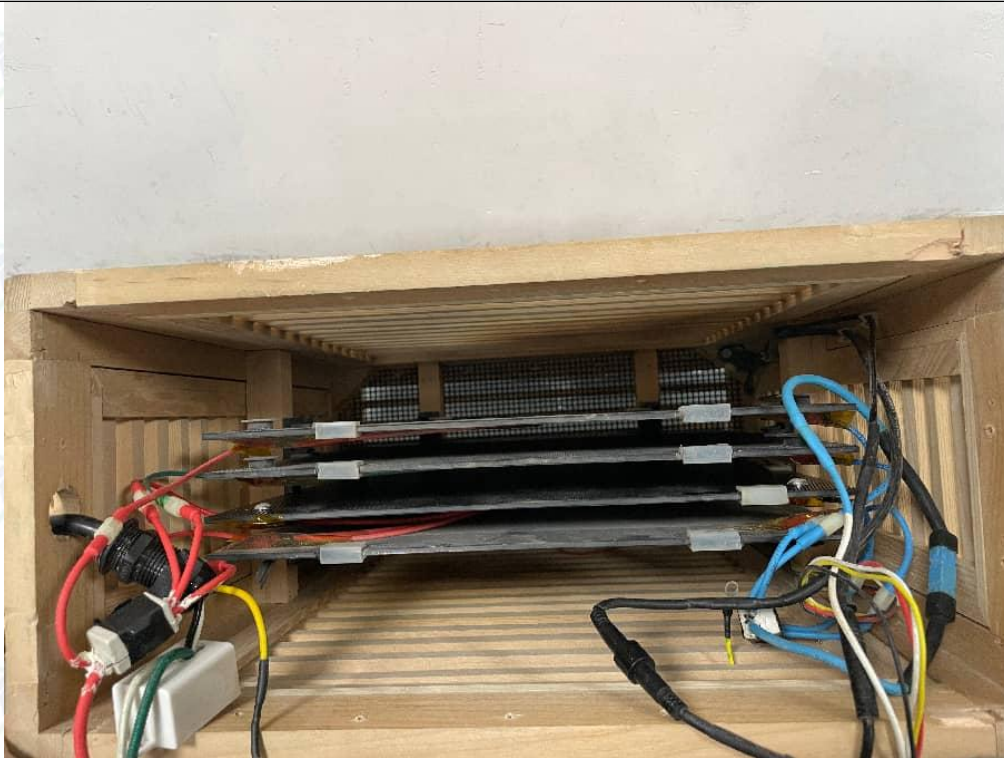


Photo 5

The end of report

Statement:

1. The information as listed on the first page of this test report was all provided by the client except the sample from, date received, test period, test results and test conclusion. The client shall be responsible for the representativeness of sample and authenticity of materials, for which MEIOU shall bear no responsibilities.
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