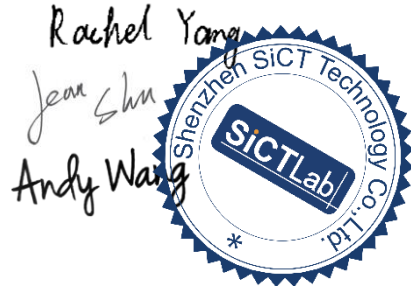


<b>TEST REPORT</b>	
<b>UL 1278</b>	
<b>Movable and Wall-or Ceiling-Hung Electric Room Heaters</b>	
<b>Job Number</b> .....	XK2208013049S
<b>Test by (print+signature)</b> .....	Rachel Yang
<b>Checked by (print+signature)</b> .....	Jean Shu
<b>Approved by (print+signature)</b> .....	Andy Wang
<b>Date of issue</b> .....	October 9, 2022
<b>Total number of pages</b> .....	46 pages
<b>Name of Testing Laboratory preparing the Report</b> .....	<b>Shenzhen SiCT Technology Co., Ltd.</b> 202, Building 3, No.111, Huanguan Middle Road, Songyuanxia Community, Guanhu Street, Longhua District, Shenzhen, Guangdong, China
<b>Applicant's name</b> .....	<b>BHBGOAON</b>
<b>Address</b> .....	XiaoDianQuDaWuCunZhenGuanYuanAQu4HaoLou2DanYuan 1301 TaiYuanShi 030000 ShanXiSheng CN
<b>Manufacturer's name</b> .....	<b>BHBGOAON</b>
<b>Address</b> .....	XiaoDianQuDaWuCunZhenGuanYuanAQu4HaoLou2DanYuan 1301 TaiYuanShi 030000 ShanXiSheng CN
<b>Test specification:</b>	
<b>Standard</b> .....	UL 1278:2014 Ed.4, Re: Dated September 10, 2020
<b>Test procedure</b> .....	UL test report
<b>Non-standard test method</b> .....	N/A
<b>Test Report Form No.</b> .....	UL1278_2020
<b>Test Report Form(s) Originator</b> .....	SiCT
<b>Master TRF</b> .....	Dated 2020-10
<b>Test item description</b> .....	Space Heater
<b>Trade Mark</b> .....	BHBGOAON
<b>Model/Type reference</b> .....	BHBGOAON-608
<b>Ratings</b> .....	110V~, 60Hz, 650W



**Possible test case verdicts:**

- test case does not apply to the test object..... : N/A (or N)
- test object does meet the requirement..... : P (Pass)
- test object does not meet the requirement..... : F (Fail)

**Testing** .....

Date of receipt of test item..... : October 2, 2022

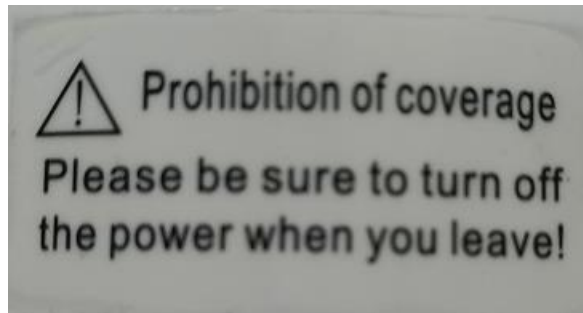
Date(s) of performance of tests ..... : October 2, 2022 to October 9, 2022

**Copy of marking plate** (Additional requirements for markings. See 1.7 NOTE)

Space Heater  
Model: BHBGOAON-608  
Input: 110V~, 60Hz, 650W



Manufacturer: BHBGOAON  
Made in China

**Marking label****Cautionary marking**

## Note:

1. The making will be silk-screen printed or stamped on the product.
2. The above markings are the minimum requirements required by the safety standard as a reference marking label. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.

**General product information:**

All the test were performed on the model BHBGOAON-608. And found to comply with the standard was subjected to all the tests.

**Test Requested:**

UL1278/Section	Performance	Required	Comply
38	Power Input Test	Y	P
39	Leakage Current Test	Y	P
40	Normal Temperature Tests	Y	P
41	Alarm Device Endurance Test	N/A	/
42	Abnormal Operation Tests	Y	P
42.2	Overvoltage Test	Y	P
42.3	Stalled-fan Test	Y	P
42.4	Tip-over Test	Y	P
42.5	Vertical-wall Test	Y	P
42.6	Terry Cloth Drape Test	Y	P
42.7	Terry Cloth Band Drape Test	Y	P
42.8.2	Wall-hung Heaters - Padded surface and blanketing	N/A	/
42.8.3	Wall-hung Heaters - Curtain drape	N/A	/
42.9	Abnormal Ambient Test	Y	P
42.10	Motor Overload and Stalled Motor-Motors Protected by a Remote Protective Device	Y	P
42.11	Impedance-protected Motors	N/A	/
42.12	Motor Connected across Heating Elements	N/A	/
43.1	Endurance Test - Temperature Control	N/A	/
43.2	Endurance Test - Electrical Wiring	N/A	/
44	Short Circuit Tests	N/A	/
45	Overload Test - High-Voltage Transformers	N/A	/
46	Burnout Test - High-Voltage Transformers	N/A	/
47	Component Failure Test	Y	P

UL1278/Section	Performance	Required	Comply
48	Dielectric Voltage-Withstand Test	Y	P
49	Insulation Resistance Test	Y	P
50	Water Spray Test	N/A	/
51	Stability of Movable Heaters	Y	P
52	Element Support Impact Tests	Y	P
53	Drop Test	Y	P
54	Test For Permanence of Cord Tag	Y	P
55	Protection Against Injury to Persons Test	N/A	/
56	Knob Securement Test	Y	P
57	Strength of Adjustment Stop Test	Y	P
58	Hydrostatic Test	N/A	/
59	Strain Relief Test	Y	P
60	Permanence of Marking	Y	P

**Remark: Y-Yes; N-No; N/A-Not Applicable; P-Pass; F-Fail**

Appendix 1: Critical components information					
Component Name	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Plug	ZHONGSHAN KE JIN POWER SUPPLY CORD CO LTD	KJ-126	125VAC 10A	UL 817	UL E253095
Alt.	Interchangeable	Interchangeable	10A, 125V, NEMA 1-15P	UL 817	UL
Power cord	ZHONGSHAN KE JIN POWER SUPPLY CORD CO LTD	SPT-2	18AWGx2, 300V, VW-1, 105°C	UL 62	UL E252928
Alt.	Interchangeable	Interchangeable	18AWGx2, 300V, VW-1, 105°C	UL 62	UL
Varistor (VR1)	Cerglass MFG Inc	10D271K	270V, 85°C	--	UL
Temperature control	AUONE ELECTRONIC MFG LTD	AUT-155	16A,125Vac, 155°C	UL 873	E179137
Internal wire	NINGBO HAOCHEN WIRE & CABLE CO LTD	1015	AWM18, AWM16 AWM 24	UL 758	E490469
Fan motor	HX	07	12VDC, 0.18A	UL 1278	Tested with appliance
Heater element	Shenzhen Sumei youpin Technology Co., Ltd.	/	110-120VAC, 60Hz 650W	UL 1278	Tested with appliance
PCB	KING BOARD LAMINATES HOLDINGS LTD	KB-5150	CEM-1 V-0	UL 796	UL E123995
Fuse on PCB	DONGGUAN HONGDA ELECTRONIC TECHNOLOGY CO.,LTD	2009	2A, 250Vac	UL 248-1 UL 248-14	UL E318938
High temperature wire	ZHONG SHAN SHI CHEUNG HING ELECTRON CO LTD	3122	300Vac, 200°C, VW-1, Min. 20AWG	UL 758	UL
Heat shrinkable tube	DONGGUAN SALIPT CO LTD	SALIPT S-901-600	600V, 125°C, VW-1	UL	UL E209436
Alt.	Interchangeable	Interchangeable	600V, 125°C	UL	UL
Enclosure	TORAY INDUSTRIES INC	1404	V-0, HWI=3, HAI=0, 120°C, Min. 1.5 mm thick.	UL 746C	UL E41797

Alt.	Interchangeable	Interchangeable	V-0, HWI=3, HAI=0, 120°C, Min. 1.5 mm thick.	UL 746C	UL
Heater wire bracket	CHINA PETROLEUM AND CHEMICAL CO.,LTD.	PA66	Min.thickness:1.5mm	UL 1278	Tested with appliance
TURNTABLE	Formosa plastics(Ningbo) co.,ltd	ABS	Min.thickness:1.5mm	UL 1278	Tested with appliance
Transformer(T1)	ShenZhen YLD Electronics Co., LTD.	PQ3220	Class B	UL 1278	Tested with appliance

**38 Power Input Test****Method(s):**

A sample was placed on its intended support and connected to a supply circuit at rated voltage. The power input was measured with the heater operated under its intended conditions. When the constant condition was attained, the electrical values, such as voltage, ampere and power, were recorded in table below.

**Result(s):**

Ambient Temp. (°C)	Removable Filter	Voltage (Volts)	Current (Amps)	Wattage (Watts)	Rating (W or A)	Limit (W or A)
25	/	110	5.140	517.4	650	682.5
25	/	120	4.308	516.8	650	682.5

The maximum power input at rated voltage was not more than 105% of its marked rating.

True  False

**Note(s):**

If a heater employs a nonmetallic element (such as carbon), the power input is to be determined when the element is new.

**Conclusion:**

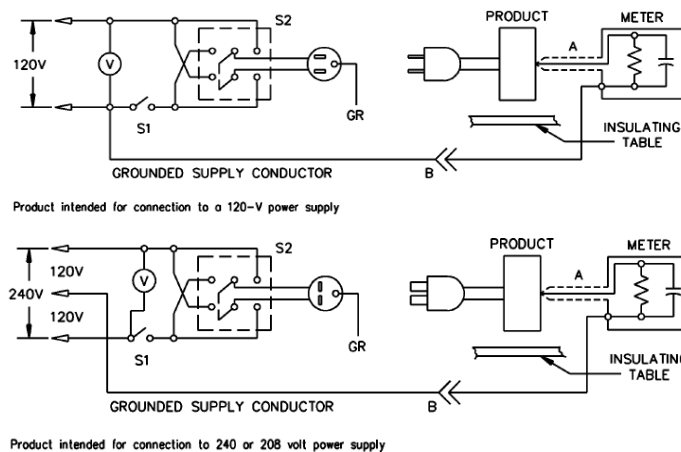
This result (complied /-did not comply) with the requirements.

### 39 Leakage Current Test

#### Method(s):

One "as received" sample of the appliance was placed on an insulated surface and a suitable leakage current meter was connected between accessible metal parts of the heater (or metal foil in a dimension 10 cm by 20 cm in contact with the polymeric enclosures) and the grounded supply conductor, and from one surface to another surface. The supply voltage was [120], [208], [240] volts, depending upon the voltage rating of the heater. The test sequence, with reference to the measuring circuit (See the following circuit), was as follows:

- With switch S1 opened, the heater was connected to measuring circuit. Leakage current was measured using both positions of switch S2;
- S1 was then closed, energizing the heater and within a period of 5 seconds, the leakage current was measured using both positions of switch S2 and with the heater was operated at the maximum heat setting of controls.
- Leakage current was monitored until thermal stabilization under the maximum heat condition. Both positions of switch S2 were used. Measurements were made with the temperature control, if any, open and closed.
- If the heater employed a single pole switch or a adjustable temperature control, monitoring of leakage current was continue until the leakage current stabilizes or decreases after the heater was turned off.



#### Result(s):

The maximum leakage current was less than 0.5 mA for a movable heater (or 0.75 mA for other heater.)

True X False    .

#### Note(s):

	S1 open	S1 closed (0~5)	S2 closed (Steady)	Turn off
S2 Normal	0.05mA	0.03mA	0.03mA	0.01mA
S2 Reversed	0.05mA	0.03mA	0.03mA	0.01mA

#### Conclusion:

This result (complied / ~~did not comply~~) with the requirements.

#### 40 Normal Temperature Tests

##### Method(s):

A sample of heater was supported as described below:

For a movable heater, it is supported on two layers of white tissue paper on a softwood surface and placed in a corner alcove as close to the side walls as possible;

For a wall-hung heater, it was supported in the intended manner on a black-painted surface of a wall as close to the wall angle as its construction permits (For details, refer to Clause 40.3.1 of UL1278);

For ceiling-hung heater, it was mounted on or in the ceiling surface as close to the alcove corner as its physical dimensions permit (For details, refer to Clause 40.3.2 of UL1278).

With a temperature control device (or all) in or out of the circuit, the heater was connected to a 60 Hz supply source at high heat setting. The test voltage was adjust to

rated voltage [~~120~~][~~208~~][~~240~~] V; or  the voltage \_\_\_\_V, which caused to rated wattage ( 1500)

The heater was operated until stabilized conditions were obtained. The temperature and temperature rise of components or surfaces of the heater were recorded in the table on the next page by thermocouples method or resistance-change method.

During the test, the following conditions were considered:

If the heater uses a confined heat transfer fluid, a suitable pressure-measuring instrument, such as a pressure gauge, pressure transducer or similar device, shall be fitted for measuring the pressure during the normal temperature test. The measured pressure valve shall be recorded and serve as a basic for determining the suitability of the strength of the vessel under pressure.

Ordinarily, the movable heater is to be placed close to side wall of the corner alcove, but if a temperature limiting control operates when the heater is in such position, the test is to be repeated with the heater moved away from the side walls, in one inch increments, until such time that the temperature limiting control does not cycle, or a maximum of 18 inches is attained.

If the heater might produce higher temperature on some components when the heater was operated at lower heat setting (or lower fan setting), the test shall be repeated at the lower setting.

For the above test on a fan heater, if the test voltage test is need to adjusted, the fan motor shall be connected to supply circuit at \_\_\_\_V, 60 Hz, separately.

##### Result(s):

During the heater is operation under normal temperature test, the temperature limiting control of the heater does not function. True  X

False \_\_\_\_.

The sample did not attain a temperature at any point high enough to constitute a risk of fire or to damage any material employed in the appliance. True  X  False \_\_\_\_.

The sample did not show greater temperature rises at certain specified points itemized in the table on the next page. True  X  False \_\_\_\_.

**Note: /**

**40 Normal Temperature Tests – Continued**Input: 120 V, 60 Hz, 4.31 A, 516.8 WLoad: MAX. operational powerAmbient Temp. : 25.0 °CFor heater which used a confined heat transfer fluid, the maximum pressure during the test was  /  MPa**Thermocouple method**

Ch.	Components (or Locations)	Temp. (°C)	Temp. Rise (K)	Limit Rise (K)
1	Power cord	42.3	17.3	80
2	Switch	39.6	14.6	60
3	Lead wire of DC Fan	44.8	19.8	80
4	Internal wire to heating components	78.9	53.9	80
5	Plastic near heating components	82.4	57.4	Ref.
6	C2 body	49.6	24.6	80
7	C5 body	51.4	26.4	80
8	T1 winding	57.3	32.3	105
9	T1 bobbin	46.8	21.8	Ref.
10	Enclosure near air outlet, outside	65.4	40.4	60
11	Enclosure near air outlet, inside	77.3	52.3	Ref.
12	Air outlet	65.5	40.5	60
13	Support	32.9	7.9	60
14	Test alcove side wall surfaces	46.7	21.7	60
15	DC fan	45.3	20.3	90
16	Ambient	25.0	--	--

**Conclusion:**

This result (complied /-did not comply) with the requirements.

**41 Alarm Device Endurance Test N/A****Method(s):**

Audible Alarm Device and Control:

The audible alarm device and a control was positioned in a maximum ambient at a temperature that was decided on the audible alarm device and a control in normal temperature test (Section 40) and was connected the intended circuit of the heater. By using a timer or the like device, the audible alarm device and a control was operated at the rate of 1 min on and 30 seconds off to complete 6000 cycles.

Visible Alarm Device and Control:

The visible alarm device and a control was positioned in a maximum ambient at a temperature that was decided on the visible alarm device and a control in normal temperature test (Section 40) and was connected the intended circuit of the heater. By using a timer or the like device, the visible alarm device and a control was operated at the rate of 1 min on and 30 seconds off to complete 6000 cycles.

**Result(s):**

Audible Alarm Device and Control:

The audible alarm device and a control completed the endurance test without malfunction or break down.

True \_\_\_ False \_\_\_.

Visible Alarm Device and Control:

The visible alarm device and a control completed the endurance test without burning out or failing to light.

True \_\_\_ False \_\_\_.

**Note(s):****Conclusion:**

This result (complied / did not comply) with the requirements.

## 42 Abnormal Operation Tests

### General:

1. For each Abnormal Operation Test, the test is to be performed with any combinations of temperature controls other than the limiting control in the circuit and out of the circuit where such combinations may result in higher temperatures or increase a risk of electric shock or fire.
2. After having been subjected to an Abnormal Operation Test, a heater is considered to involve a risk of electric shock or injury to persons if it appears to be usable and the insulation resistance is less than 50,000 ohms, or the heater does not comply with the requirements in Sections 8 or 9.
3. During each abnormal test, except otherwise noted, the test voltage was subjected to  [ X ] rated voltage [120][~~208~~][240]; or  [ ] the voltage \_\_\_\_ V, which caused to rated wattage (\_\_\_\_W).
4. Ultimate results refer to a continuous for 7 to 8 hours, or until a limiting control (or a limiting cut-off) operated to de-energized circuit permanently.
5. Insulation Resistance Test should be conducted after each abnormal operation test. The insulation resistance measured should be not less than 30,000 ohms.
6. Except for Stalled-Fan Test, during the tests, the maximum temperatures of the enclosure of the heater should be recorded for Clause 64.15.
7. If the temperature-limiting control of a wall or ceiling hung heater or a movable heater cycles at 18 inches from the alcove wall, all applicable abnormal tests shall be repeated while the heater is located in a room having an average temperature of 0 °C.

The following applicable tests were conducted on a heater, as specified in the following pages.

- [ X ] 41.2 Overvoltage Test
- [ X ] 41.3 Stalled-fan test
- [ X ] 41.4 Tip-over test
- [ X ] 41.5 Vertical-wall test
- [ X ] 41.6 Terry cloth drape test
- [ X ] 41.7 Terry cloth band drape test
- [ ] 41.8 Wall-hung heaters (Padded surface and blanketing, and Curtain drape)
- [ X ] 41.9 Abnormal ambient test
- [ X ] 41.10 Motor overload and stalled motor - motors protected by a remote protective device
- [ ] 41.11 Impedance-protected motors
- [ ] 41.12 Motor connected across heating elements

### Result(s):

Refer to the following pages.

Note(s):

**42.2 Overvoltage Test****Method(s):**

A sample was operated at a voltage as described in the Normal Temperature Test until constant temperatures were attained, following which it was operated for 2 hours at a 12 percent higher voltage. After the test, the insulation resistance was recorded.

**Result(s):**

There was no emission of flame or molten metal. True  X

False     .

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed. True  X

False     .

There was no glowing or flaming of test material or supporting or adjacent surfaces. True  X

False     .

The insulation resistance measured was not less than 50,000 ohms. True  X

False     .

**Note(s):**

During the test, the maximum temperature of the surface of the heater was  73.0  °C.

After the test, the insulation resistance measured was  10M  ohms.

**Conclusion:**

This result (complied /-~~did not comply~~) with the requirements.

### 42.3 Stalled-fan Test

**Method(s):**

A sample was placed in accordance with the Normal Temperature Test. A 1/2A fuse of other than the time-delay type was connected between the accessible dead metal parts of the heater and the earth ground. With the rotor of the fan motor locked, the heater was energized and operated for 7 hours on the maximum heat setting unless a manual reset type temperature limiting control or a thermal cut-off operated to de-energize either all or a sufficient number of heating elements so that there was no longer a risk of fire or development of an electric shock.

After the test, the insulation resistance was recorded.

During the test, the following condition was considered:

If one temperature limiting control or thermal cut-off operated to de-energize the circuit during the former test and there might be a possible risk when the heater was operated on a lower heat setting due to non-operation of the limiting control or thermal cut-off, the test should be repeated at a lower heat setting.

**Result(s):**

There was no emission of flame or molten metal. True  X

False \_\_\_\_.

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed. True  X

False \_\_\_\_.

There was no glowing or flaming of test material or supporting or adjacent surfaces. True  X

False \_\_\_\_.

The insulation resistance measured was not less than 50,000 ohms. True  X

False \_\_\_\_.

**Note(s):**

During the test, the maximum temperature of the surface of the heater was  81.2 °C.

After the test, the insulation resistance measured was  10M  ohms.

**Conclusion:**

This result (complied /-did not comply) with the requirements.

#### 42.4 Tip-over Test

##### **Method(s):**

A sample was operated under maximum heat setting as same as Normal Temperature Test until constant temperatures were attained. Then it was overturned onto a softwood surface covered with a single layer of terry cloth and operated under the most severe conditions that result when comes to rest, without further guiding or propping, after having been pushed over. Generally, all orientations were tested in according to the above method.

After the test, the insulation resistance was recorded.

During the test, the following conditions was considered:

[ ] If a tip-over switch is employed in the heater and the heater complies with the requirement of 32.18, the tip-over switch can be left in the circuit. Otherwise, the tip-over switch shall be bypassed during the test.

[ ] For a heater witch contains a confined heat fluid, and is intended to be shipped with the legs or base detached, the test is to be conducted with the legs or base installed as well as detached.

##### **Result(s):**

There was no emission of flame or molten metal.

True  X

False \_\_\_\_.

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True  X

False \_\_\_\_.

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True  X

False \_\_\_\_.

The insulation resistance measured was not less than 50,000 ohms.

True  X

False \_\_\_\_.

##### **Note(s):**

During the test, the maximum temperature of the surface of the heater was  72.6 °C.

After the test, the insulation resistance measured was  10M  ohms.

#### **Conclusion:**

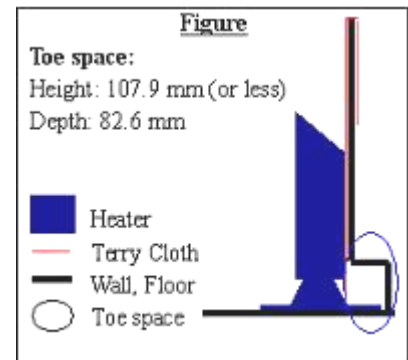
This result (complied /-did not comply) with the requirements.

## 42.5 Vertical-wall Test

### Method(s):

A sample was supported on a horizontal surface that abuts the vertical wall. The side of the heater that radiates or convects heat faced the wall. The wall is to consist of 19.1 mm thick fir plywood, and was covered with one layer of terry cloth material. The wall is to be constructed so the grain of the plywood runs in the horizontal direction. The wall is to extend at least 305 mm beyond the heater on both sides and 610 mm above the heater. Any heater projections such as guards or grilles in the front of the heater that do not require tools for their removal were removed. If the heater is provided with a base or foot that extends for the front side, the vertical wall is to include a recessed "toe space" next to the floor, see the figure.

The heater was operated at a voltage same as that in Normal Temperature Test and placed at a distance from the wall that resulted in the highest temperature on the wall. The highest temperatures are usually encountered at the closest distance a heater can be placed to the wall except that: 1) A temperature limiting control or an auxiliary temperature control may operate and not permit operation of the heater for sufficient length of time to produce the highest temperatures. In this case additional tests are to be conducted at increased distances between the heater and the wall. The test time at each distance is to be sufficient to observe the ultimate results. 2) If a radiant type heater is



provided with a reflector, the reflector may have a focusing effect that causes higher temperatures at a greater distance than the minimum distance between the heater and the wall. In this case additional tests are to be conducted at increased distances. Generally, to observe the ultimate results, the test is to be continued for 7 hours. However, the test may be discontinued after 2 hours if this duration of testing produces no discoloration of the terry cloth material.

After the test, the insulation resistance was recorded.

### Result(s):

There was no emission of flame or molten metal.

True  X

False     .

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True  X

False     .

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True  X

False     .

The insulation resistance measured was not less than 50,000 ohms.

True  X

False     .

### Note(s):

During the test, the maximum temperature of the surface of the heater was  75.7  °C.

After the test, the insulation resistance measured was  10M  ohms.

### Conclusion:

This result (complied / ~~did not comply~~) with the requirements.

## 42.6 Terry Cloth Drape Test

### Method(s):

The heater was placed and operated in according to Normal Temperature Test until constant temperatures were attained and then covered with a single layer of terry cloth. The test was repeated (if acceptable results are obtained for the initial condition) beginning with the heater at room temperature ( $25\pm 3$  °C). The tests under the two conditions might be combined by initially draping the heater, and after equilibrium conditions are obtained, replacing the terry cloth with a new single layer.

During the test, the following conditions were considered:

[ ] If the heater does not employ an automatic reset temperature-limiting control and there would be unacceptable result occurred when the temperature-regulating control is returned to the circuit during the test starting from room temperature, the temperature-regulating control shall be returned to the circuit and repeated the former tests.

[ ] If the heater is provided with an auxiliary temperature control or a temperature limiting control that does not cycle due to partial draping, the heater shall also be subject to terry cloth drape test under such partial draping conditions. Generally, the partial draping conditions may include 3/4, 1/2 and 1/4 covering of outlet section and inlet section, but it isn't limited in the three conditions, another partial draping conditions shall be considered during the practical tests in order to evaluate completely any danger when the heater is covered partially by terry cloth.

After the test, the insulation resistance was recorded.

### Result(s):

There was no emission of flame or molten metal.

True  X

False     .

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True  X

False     .

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True  X

False     .

The insulation resistance measured was not less than 50,000 ohms.

True  X

False     .

### Note(s):

During the test, the maximum temperature of the surface of the heater was  73.1  °C.

After the test, the insulation resistance measured was  10M  ohms.

### **Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

**42.7 Terry Cloth Band Drape Test**

**Method(s):**

The heater was operated initially at least 15 minutes at maximum rated wattage in accordance with the Power Input Test, Section 38. The heater was then draped with the terry cloth band (see the figure) and operated continuously for 7 hours or until:

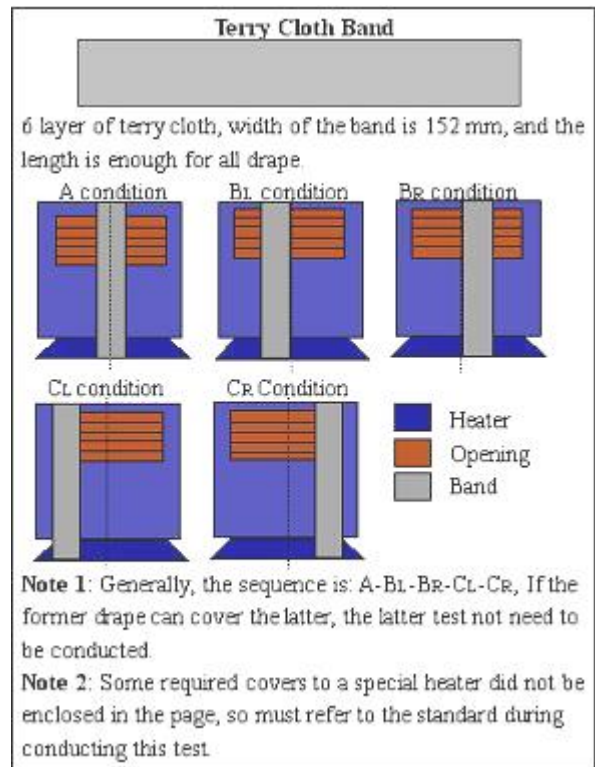
- A) One half hour after a manual reset type temperature limit control or a thermal cut-off operates to de-energize either all or a sufficient number of heating elements so that there is no longer a risk of fire or development of an electric shock; or
- B) Thermal stabilization occurs and there is no discoloration of the terry cloth material.

If the heater includes adjustable settings for heat output, other than maximum setting, these settings are also to be considered during the tests, unless it can be determined without testing that the maximum setting will produce the most adverse conditions.

Several drape conditions of the terry cloth shall be considered during the tests to evaluate completely any danger when the heater is covered partially by terry cloth.

Refer to the Figure (some general drape conditions). Noted that these conditions shown in the figure are only the basis conditions, another conditions shall be also considered during the tests in order to evaluate completely any danger when the heater is covered partially by terry cloth band.

After the test, the insulation resistance was recorded.



**Result(s):**

- There was no emission of flame or molten metal. True  False
- There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed. True  False
- There was no glowing or flaming of test material or supporting or adjacent surfaces. True  False
- The insulation resistance measured was not less than 50,000 ohms. True  False

**Note(s):**

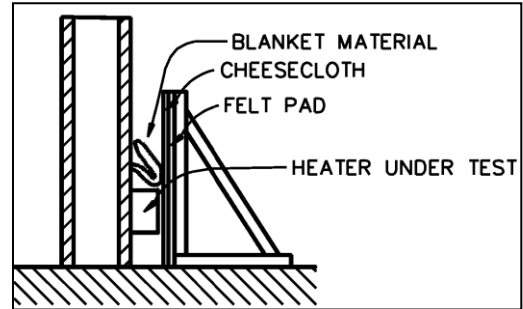
During the test, the maximum temperature of the surface of the heater was 72.8 °C.  
 After the test, the insulation resistance measured was 10M ohms.

**Conclusion:**

This result (complied /-did not comply) with the requirements.

**41.8.2 Wall-hung Heaters - Padded surface and blanketing N/A****Method(s):**

A wood surface covered with a 1 inch (25 mm) thick felt pad, and with the pad, in turn, covered by a double layer of cheesecloth, was supported in a vertical position as near the heater as the construction of the latter will permit. (See the figure). A sample was covered to such an extent as to produce maximum heating of the cheesecloth, and the padded surface was extend at least 76 mm above the top surface of the heater. During the test, the covered wood surface was moved horizontally 13 mm away from its initial position and operation continued until temperatures stabilized. If it is determined that its temperature increases when the surface is moved horizontally, the test is to be repeated with the surface in the new position starting with the heater at approximately room ambient temperature. The wood surface shall be of sufficiently rigid construction so that it will not change shape (bow or warp) during the test.



While still operating as described above with the padded vertical surface in its initial position in front of the heater, four thicknesses of loosely folded cotton blanket material were introduced into the space between the vertical padded surface and the vertical wall on which the heater was hung in such a manner that the upper slot of the heater was blocked. The folded blanket material was located at any points along the length of the heater installation in such a manner that any sensing device provided was so exposed as to produce the most adverse operating conditions. Generally, a length of folded material up to a maximum of 80 inches (2 m) is to be used, but a shorter length of the material may be introduced into the space at any one time to obtain the most adverse operating conditions possible. Operation in any one blocked condition was continued until constant temperatures were obtained, or until glowing or flaming of the cotton blanket material resulted.

After the test, the insulation resistance was recorded.

**Result(s):**

There was no emission of flame or molten metal.

True

False .

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True

False .

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True

False .

The insulation resistance measured was not less than 50,000 ohms.

True

False .

**Note(s):**

During the test, the maximum temperature of the surface of the heater was \_\_\_\_\_°C.

After the test, the insulation resistance measured was \_\_\_\_\_ohms.

**Conclusion:**

This result (complied / did not comply) with the requirements.

**41.8.3 Wall-hung Heaters - Curtain drape N/A****Method(s):**

The upper edge of a simulated curtain at least 3 feet (0.9 m) high, but long enough to be supported at least 300 mm above the heater in any case, was continuously attached to the wall at the base of which the heater was installed. The curtain is to consist of white duck as specified in 41.1.11 (see the standard) and an overlay of a double layer of cheesecloth on the side facing the heater, and was hung so that the lower edge just touches the floor. During the test, the entire length of the heater was initially covered and the curtain was arranged to conform as closely as possible with the contour of the heater. Those sections judged to be least likely to affect the operation of the temperature limiting control were covered. This test was then repeated with:

- A) 3/4 of the heater covered, then with
- B) 1/2 of the heater covered, and then with
- C) 1/4 of the heater covered.

Each test was conducted with the heater at room ambient at the start of the test.

After the test, the insulation resistance was recorded.

**Note(s):** If it is apparent that the former test is severer than the latter, the latter tests don't need to be conducted.

**Result(s):**

There was no emission of flame or molten metal.

True \_\_\_\_

False \_\_\_\_.

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True \_\_\_\_

False \_\_\_\_.

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True \_\_\_\_

False \_\_\_\_.

The insulation resistance measured was not less than 50,000 ohms.

True \_\_\_\_

False \_\_\_\_.

**Note(s):**

During the test, the maximum temperature of the surface of the heater was \_\_\_\_°C.

After the test, the insulation resistance measured was \_\_\_\_\_ohms.

**Conclusion:**

This result (complied / did not comply) with the requirements.

#### 41.9 Abnormal Ambient Test

##### **Method(s):**

A sample was subjected to an abnormal ambient test in accordance with either Condition 1 or Condition 2 as specified below, respectively.

##### **[ X ] Condition 1**

A sample was placed in an enclosure where the ambient could be elevated and accurately maintained while the heater was operating. The ambient was raised slowly until the auxiliary temperature control or the temperature limiting control operated. The control was then to be shunted out of the circuit and the heater was operated at the ambient at which the control operated, plus or minus 10 °F (5.6 °C) for 7 hours.

##### **[ ] Condition 2**

Air heated by a controlled temperature source was directed to the air intake openings of the heater using air ducts or other similar means. The temperature of the air was gradually increased until the auxiliary temperature control or the temperature limiting control operated. The control was then shunted out of the circuit and the heater was operated for 7 hours with the intake air maintained at the temperature at which the control operated, plus or minus 10 °F (5.6 °C).

After the test, the insulation resistance was recorded.

Subsequent to this test, the heater was conducted the Normal Temperature Tests, Section 39.

##### **Result(s):**

There was no emission of flame or molten metal.

True  X

False     .

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True  X

False     .

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True  X

False     .

The insulation resistance measured was not less than 50,000 ohms.

True  X

False     .

##### **Note(s):**

During the test, the maximum temperature of the surface of the heater was  71.3  °C.

After the test, the insulation resistance measured was  10M  ohms.

#### **Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

**42.9+40 Normal Temperature Test after Abnormal Ambient Test****Method(s):**

A sample of heater was supported as described below:

For a movable heater, it is supported on two layers of white tissue paper on a softwood surface and placed in a corner alcove as close to the side walls as possible;

For a wall-hung heater, it was supported in the intended manner on a black-painted surface of a wall as close to the wall angle as its construction permits (For details, refer to Clause 39.3.1 of UL1278);

For ceiling-hung heater, it was mounted on or in the ceiling surface as close to the alcove corner as its physical dimensions permit (For details, refer to Clause 39.3.2 of UL1278).

With a temperature control device (or all) shorted out of the circuit, the heater was connected to a 60 Hz supply source at high heat setting. The test voltage was adjust to

rated voltage [120] [208] [240] V; or  the voltage \_\_\_\_V, which caused to rated wattage (\_\_\_\_W).

The heater was operated until stabilized conditions were obtained. The temperature and temperature rise of components or surfaces of the heater were recorded in the table on the next page by thermocouples method or resistance-change method.

During the test, the following conditions were considered:

If the heater uses a confined heat transfer fluid, a suitable pressure-measuring instrument, such as a pressure gauge, pressure transducer or similar device, shall be fitted for measuring the pressure during the normal temperature test. The measured pressure valve shall be recorded and serve as a basic for determining the suitability of the strength of the vessel under pressure.

Ordinarily, the movable heater is to be placed close to side wall of the corner alcove, but if a temperature limiting control operates when the heater is in such position, the test is to be repeated with the heater moved away from the side walls, in one inch increments, until such time that the temperature limiting control does not cycle, or a maximum of 18 inches is attained.

If the heater might produce higher temperature on some components when the heater was operated at lower heat setting (or lower fan setting), the test shall be repeated at the lower setting.

For the above test on a fan heater, if the test voltage test is need to adjusted, the fan motor shall be connected to supply circuit at \_\_\_\_V, 60 Hz, separately.

**Result(s):**

During the heater is operation under normal temperature test, the temperature limiting control of the heater does not function. True  X  False \_\_\_\_.

The sample did not attain a temperature at any point high enough to constitute a risk of fire or to damage any material employed in the appliance. True  X  False \_\_\_\_.

The sample did not show greater temperature rises at certain specified points itemized in the table on the next page. True  X  False \_\_\_\_.

Note(s):

**42.9+40 Normal Temperature Test after Abnormal Ambient Test –Continued**Input: 120 V, 60 Hz, 4.32 A, 521.2 WLoad: Max. operational powerAmbient Temp. : 23.6 °C

[ ] For heater which used a confined heat transfer fluid, the maximum pressure during the test was MPa

**Thermocouple method**

Ch.	Components or Locations	Temp. (°C)	Temp. Rise (K)	Limit Rise (K)
1	Power cord	55.3	23.8	80
2	Switch	41.7	24.1	60
3	Lead wire of DC Fan	69.6	36.5	80
4	Internal wire to heating components	43.5	27.4	80
5	Plastic near heating components	76.3	44.5	Ref.
6	EC1 body	67.2	41.3	80
7	EC3 body	68.2	45.4	80
8	T1 winding	53.4	39.3	105
9	T1 bobbin	58.7	26.2	Ref.
10	Enclosure near air outlet, outside	67.5	35.3	60
11	Enclosure near air outlet, inside	52.4	32.8	Ref.
12	Air outlet	59.8	28.9	60
13	Support	54.4	21.5	60
14	Test alcove side wall surfaces	46.2	25.2	60
15	Ambient	23.6	--	--

**Conclusion:**This result (complied / ~~did not comply~~) with the requirements.

**42.10 Motor overload and stalled motor - motors protected by a remote protective device****Method(s):**

The motor and its protective device were connected in the intended manner to a supply circuit having a voltage 120 V. Temperatures were measured by thermocouples secured to the surface of the motor coils. The motor and its protective device were tested in the ambient encountered in the operation of the heater in which the motor and its protective device were employed as determined during the applicable normal temperature test.

If the motor is protected by a manual-reset protector, this test is to be continued for four operations of the protective device, with the device being reset as quickly as possible after it is opened.

If the motor is protected by an auto-reset protector, this test is to be continued for 72 hours unless the equipment includes other controls - such as a timer- that will demonstrably limit the duration of the operation to a shorter interval.

During the entire test, the temperatures of the coil of the motor were monitored and recorded.

After the test, the insulation resistance was recorded.

**Result(s):**

During the first hour of operation, the maximum temperature of the coil of the motor was 105.2 °C;

After the first hour of operation, the maximum temperature of the coil of the motor was      /      °C;

After the first hour of operation, the average temperature (that is, the average of the arithmetic mean of the maximum temperatures and the arithmetic mean of the minimum temperatures) was      /      °C.

There was no emission of flame or molten metal. True   
False .

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed. True   
False .

There was no glowing or flaming of test material or supporting or adjacent surfaces. True   
False .

The insulation resistance measured was not less than 50,000 ohms. True   
False .

During the entire test, the motor did not burn out, and there was other evidence of risk of fire. True  False .

The temperature of the coil of the motor did not exceed the limited temperature as the followings: True  False .

Class A Motor: 200 °C for the first hour, 175 °C after the first hour, and 150 °C for the average temperature;

Class B Motor: 225 °C for the first hour, 200 °C after the first hour, and 175 °C for the average temperature;

Class      Motor:      °C for the first hour,      °C after the first hour, and      °C for the average temperature.

**Note(s):**

After the test, the insulation resistance measured was 10M ohms.

**Conclusion:**

This result (complied /-did not comply) with the requirements.

**42.11 Impedance-protected Motors - (Stalled-Rotor Test) N/A****Method(s):**

The temperature of the coil of the motor was monitored and recorded by thermal couple means or resistance-change means during the test. With the rotor of the motor locked, the heater was placed and operated with accordance to Normal Temperature Test at all intended setting (or the adverse setting). The test included the following steps in according to UL2111:

- 1) Locked-Rotor Temperature Test for 3 days;
- 2) Dielectric Strength Test after Locked-Rotor Temperature Test;
- 3) Locked-Rotor Endurance Test for 15 days.

For the details of the above tests, refer to UL2111.

If a temperature limiting control, including a thermal cutoff, in the heater operates when the rotor is locked, the applicable temperature limits in the Standard for Overheating Protection for Motors, UL2111, may be applied. Such temperature limiting controls and thermal cutoffs shall comply with the requirements in UL 2111 concerning the number of such devices to be tested and the test time.

After the test, the insulation resistance was recorded.

**Result(s):**

There was no emission of flame or molten metal.

True \_\_\_\_

False \_\_\_\_.

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True \_\_\_\_

False \_\_\_\_.

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True \_\_\_\_

False \_\_\_\_.

The insulation resistance measured was not less than 50,000 ohms.

True \_\_\_\_

False \_\_\_\_.

During the 3-days Locked-Rotor Temperature Test, the maximum temperature of the coil of the motor was \_\_\_\_\_ °C, which did not exceed the limited temperature (150 °C for Class A motor; 175 °C for Class B motor, or \_\_\_\_\_ °C for Class \_\_\_\_\_ motor) in according to UL2111; and there were not another averse conditions occurred.

True \_\_\_\_ False \_\_\_\_.

During the Dielectric Strength Test, there was not indication of dielectric breakdown or arc-over.

True \_\_\_\_ False \_\_\_\_.

After Locked-Rotor Endurance Test, the motor could operate normally when unlocked, and there was not another averse conditions occurred.

True \_\_\_\_

False \_\_\_\_.

**Note(s):**

After the test, the insulation resistance measured was \_\_\_\_\_ohms.

[ ] One temperature limiting control (or thermal cut-off) operated and de-energized the power when the rotor was locked, and such temperature limiting control complies with the requirements in UL2111 concerning the number of such devices to be tested and the test time.

[ ] If a motor has been previously tested in accordance with the Standard for Overheating Protection for Motors, UL 2111, this testing can be discontinued if the temperature is no longer than the previous test results.

**Conclusion:**

This result (complied / did not comply) with the requirements.

#### 42.12 Motor Connected Across Heating Elements N/A

##### Method(s):

Three representative heaters were used for the test. The heaters were tested in accordance with the conditions specified in Normal Temperature Tests. The heating element connected in parallel with the motor was open-circuited (see **◆**) and two layers of cheesecloth were draped to cover all air inlet and outlet openings of the heater. The heater was operated continuously until either motor burnout or stabilized motor temperature occurs, or the below test were conducted if applicable.

**◆** For a heater that includes more than one heating element in parallel with the motor, the test described as above is to be conducted by first opening one of the elements. If the opening of one element does not manifest itself in the heater operation, the temperature of the motor windings shall not exceed the limits specified in Table 39.1 and the test shall be repeated with other elements in parallel with the motor opened

[ ] The temperature rise of the motor exceeded the rise specified in Table 39.1 during the above test, the operation was continued for 15 days and temperatures were monitored.

[ ] The thermal protector of a thermally protected motor operated during the above test, the operation was continued for 15 days in accordance with the Standard for Overheating Protection for Motors, UL 2111. After the test, the insulation resistance was recorded.

##### Result(s):

[ ] Motor burnout within 1 hour without emission of flaming particles, molten metal, or ignition or glowing of the cheesecloth.

[ ] No burnout and no operation of a thermal protector occurred, the temperature rise of the motor winding was \_\_\_\_°C, which (does / **does not**) exceed the rise specified in Table 39.1 for the motor coil.  
(Class \_\_\_\_)

[ ] No burnout but the temperature rise of the motor winding was \_\_\_\_°C, which exceeded the rise specified in Table 39.1 for the motor coil (Class \_\_\_\_). During 15 days of operation under such overheating condition, the average temperature of the coil was \_\_\_\_°C, which (does / **does not**) exceed the temperature limits for locked rotor conditions specified in UL2111.

[ ] No burnout but one thermal protector in the heater operated. The temperature rise of the motor winding was \_\_\_\_°C, which (does / **does not**) exceed the rise specified in Table 39.1 for the motor coil. (Class \_\_\_\_)

[ ] No burnout but one thermal protector in the heater operated. The temperature rise of the motor winding was \_\_\_\_°C, which exceeded the rise specified in Table 39.1 for the motor coil (Class \_\_\_\_). During 15 days of operation under such overheating condition, the average temperature of the coil was \_\_\_\_°C, which (does / **does not**) exceed the temperature limits for locked rotor conditions specified in UL2111.

The insulation resistance measured was not less than 50,000 ohms. \_\_\_\_\_ True \_\_\_\_\_ False \_\_\_\_\_.

##### Note(s):

After the test, the insulation resistance measured was \_\_\_\_\_ ohms.

##### **Conclusion:**

This result (complied / did not comply) with the requirements.

**43.2 Endurance Test-Electrical Wiring N/A****Method(s):**

Where movement of electrical wiring or other insulated live parts occurs during normal function, six representative air heaters were subject to this test. Throughout the test the air heater was continuously energized at maximum rated input in accordance with 39.1.9 by short-circuiting any and all temperature controls. The movable member was operated so that it reached the limits of travel in both directions during each cycle by either the automatic mechanical feature of the heater or by a separate mechanical arrangement that operates the movable member. If an oscillating heater has 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. The endurance test consists of:

750,000 cycles of operation for an air heater 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, such as a motorized base not prohibited from being separately activated;

6000 cycles of operation for an air heater in which the movement of the power-supply cord, electrical wiring or other insulated live parts occurs only as a result of the operation of a manual feature, such as a swivel base that requires a user to manipulate the air heater.

The cycling rate was approximately one of the following:

Twelve cycles per minute;

At the rate at which the automatic mechanical feature in the air heater operates, if the rate is less than 12 cycles per minute;

Greater than 12 cycles per minute using the mechanical arrangement, if agreeable to all concerned, or as controlled by the automatic mechanical feature.

**Result(s):**

The heater completed the required cycles.

True \_\_\_\_

False \_\_\_\_.

There was no electrical or mechanical malfunction of the air heaters after completing the test.

True \_\_\_\_ False \_\_\_\_.

There was no exposure of an uninsulated conductor strand either within or outside of the enclosure after completing the test.

True \_\_\_\_

False \_\_\_\_.

The heaters complied with the Dielectric Voltage-Withstand Test, Section 47 after completing the test.

True \_\_\_\_ False \_\_\_\_.

There was no breakage of more than 10% of the strands of any conductor.

True

False \_\_\_\_.

There was no signs of oscillation cord or wire insulation abrasion

True

False \_\_\_\_.

Note(s):

**Conclusion:**

This result (complied / did not comply) with the requirements.

**45 Overload Test-High-Voltage Transformers N/A****Method(s):**

Three transformers were used in the test. Each transformer was fixed in the heater in the intended condition and the temperature of the transformer's coil were monitored and recorded during the test. A variable resistance load was connected to the output terminals and the transformer was operated continuously at the test voltage (\_\_\_\_V). If the protective device controls a switching device that, in turn, interrupts primary current to the transformer, the switching device was included in the circuit. The test ambient temperature was approximately 25 °C (77 °F). The resistance load was adjusted so that the transformer winding was brought to a stabilized temperature of approximately 10 °C (18 °F) below its insulation rating. The load was then gradually increased until operation of the protector occurred. At this time, the temperature of the transformer' coil was recorded as T1. The test was repeated two times on another two transformers and T2 and T3 were recorded. The average value of T1, T2 and T3 was calculated as T.

**Result(s):**

T1=\_\_\_\_ °C; T2=\_\_\_\_ °C; T3=\_\_\_\_ °C; T=\_\_\_\_ °C.

The average temperatures of the three representative transformers did not exceed the winding insulation rating.

True \_\_\_\_ False \_\_\_\_.

Any one representative transformer did not exceed the insulation rating by more than 5 °C (9 °F) during the test.

True \_\_\_\_ False \_\_\_\_.

The transformers complied with the Dielectric Voltage-Withstand Test, Section 47 after completing the overload test.

True \_\_\_\_ False \_\_\_\_.

**Note(s):**

The insulation rating of the transformer is \_\_\_\_ °C.

**Conclusion:**

This result (complied / did not comply) with the requirements.

**46 Burnout Test-High-Voltage Transformers N/A****Method(s):**

Three representative transformers were fixed within the heaters in intended means and connected to supply circuit at \_\_\_\_\_V, 60 Hz with the enclosure grounded. One adjustable resistance load was used and connected to the terminals of the output side for each transformer. The resistance load connected to the output terminals was the highest of the following and was readjusted to the specified value after 2 minutes of operation if necessary, with no further readjustment during the test.

A resistance load to provide a current equal to three times of the full rated transformer secondary current,

If the transformer supplies a motor with or without additional loads, a resistance load provide a current equal to the motor locked rotor current plus any additional loads, or

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.

The test may be conducted with the output terminals short circuited if this results in less than three times rated secondary current.

The test ambient temperature was approximately 25 °C (77 °F) and operation was continued until constant temperature was indicated by a thermocouple on the enclosure or until burnout occurred.

**Result(s):**

During the entire test, there was not emission of flame or molten metal from the heater enclosure.

True \_\_\_ False \_\_\_.

**Note(s):****Conclusion:**

This result (complied / did not comply) with the requirements.

#### 47 Component Failure Test

##### Method(s):

Firstly, the heater was positioned and operated in according to Normal Temperature, then one electric component, such as rectifier, transistor, or similar solid-state component was shorted or opened by a switch connected to the terminals of the electric component. Under such abnormal condition, the heater was operated until constant condition was indicated or until unacceptable condition occurred. Only one of the simulated fault conditions described above was imposed at one time. During the test, the essential phenomena and results were recorded in the following table for reference.

<b>Components Shorted/Opened</b>	<b>Phenomena and Results</b>
C7 shorted	The Fuse opened immediately, no damage, no hazards.
C9 shorted	The Fuse opened immediately, no damage, no hazards.
T1(1-3) shorted	The Fuse opened immediately, no damage, no hazards.
T1(4-6) shorted	The product normal operation, no damage, no hazards.
Q1(G-S) shorted	The product normal operation, no damage, no hazards.
Q1(G-D) shorted	The unit shut down immediately, no damaged, no hazards.
Q1(D-S) shorted	The unit shut down immediately, no damaged, no hazards.
U1(pin 1-5)	The unit shut down immediately, no damaged, no hazards.

##### Result(s):

During the test, there was not any risk of electric shock, fire or injury to persons.

True  False .

##### Note(s):

##### **Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

**48 Dielectric Voltage-Withstand Test****Method(s):**

With the heater at its maximum normal operating temperature, a 60-hertz essentially sinusoidal potential (rms) as note \* was applied between live parts and non-current-carrying metal parts for 60 s. The potential was increased gradually from zero to 1000 V ac and held for one minute.

**Result(s):**

No breaking or arcing was evident as a result of the applied potential.

True  X  False  .

**Note(s):**

\* [ X ] - 1000 V for appliance rated 250 V or less.

[ ] - 1000 V plus twice the rated voltage for appliance rated more than 250 V. ( \_\_\_\_\_V)

**Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

**49 Insulation Resistance Test****Method(s):**

A heater was conditioned in a chamber that was maintained at a relative humidity of 85±5 percent at a temperature of 34.0±2 °C for 24 hours. After being conditioned, the heater was measured insulation resistance between live parts and non-current-carrying metal parts.

**Result(s):**

The measured resistance between live parts and non-current-carrying metal parts was not less than 50,000 ohms.

True  False .

**Note(s):**

The measured resistance was 10M ohms.

**Conclusion:**

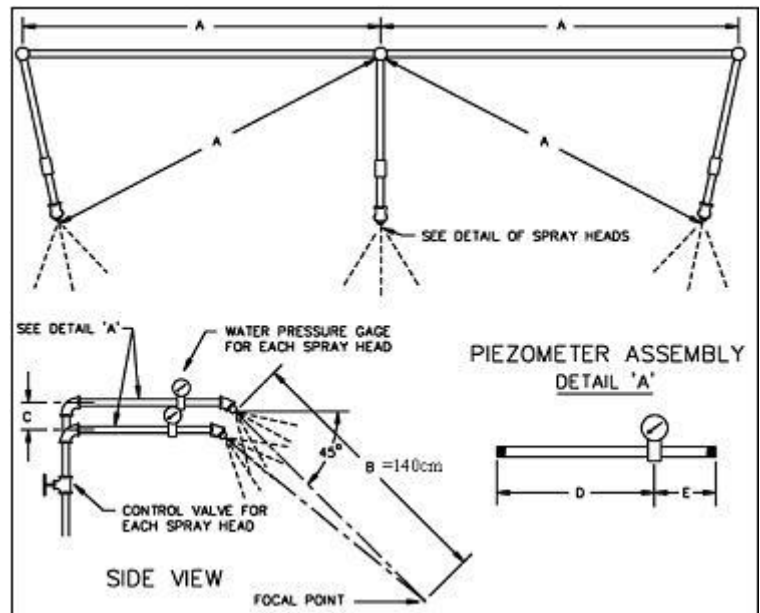
This result (complied / ~~did not comply~~) with the requirements.

**50 Water Spray Test N/A****Method(s):**

A heater sample was mounted or supported as it would be in actual service, If the heater was provided with a shelter, shield, or similar device, was mounted therein. A radiant reflector-type heater was suspended in any intended operating position. The heater was subjected for 4 hours to a water spray as described in the following:

The water-spray-test apparatus is to consist of three spray heads mounted in a water supply pipe rack as illustrated at right. The heater was positioned in focal area of the spray heads so that the greatest quantity of water was likely to enter the heater. The water pressure was maintained at 5 pounds per square inch (34.5 kPa) at each spray head.

After 4 hours exposure, the insulation resistance and dielectric voltage-withstand tests were conducted immediately upon conclusion of exposure to the water spray.

**Result(s):**

The measured resistance between live parts and non-current-carrying metal parts was not less than 50,000 ohms.

True \_\_\_ False \_\_\_.

The heater withstood the Dielectric Voltage-Withstand Test without any breakdown.

True \_\_\_ False \_\_\_.

**Note(s):**

The measured resistance was \_\_\_\_\_ohms.

**Conclusion:**

This result (complied / did not comply) with the requirements.

**51 Stability of Movable Heaters****Method(s):**

A sample was tipped to an angle of 10 degree from the horizontal under conditions most likely to cause the appliance to overturn. The test was arranged with all doors and other appurtenances in the position tending to decrease stability. The legs or other points of support were blocked to prevent the unit from sliding.

**Result(s):**

The sample returned to their intended at rest position.

True  X  False  .

**Note(s):****Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

## 52 Element Support Impact Tests

### Method(s):

Two representative heater samples were used in the tests. One was used for **Test 1**, and the other was used for **Test 2**. A 1/2 A fuse was connected between the accessible metal part of each heater and the earth ground through a manual switch arranged to permit remote opening and closing of the circuit to the fuse. One standard hardwood surface was used in the tests and covered by one layer of terry cloth for **Test 1** and two layers for **Test 2**.

**Test 1:** The heater was energized and operated at rated voltage and maximum rated input for 15 minutes. The switch to the fuse circuit was in the open position, the heater was 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. If the overall height of the heater is 2 feet or more (including its extended carrying handle, if any), the lowest point of the heater may be less than 2 feet but not less than 6 inches (75 mm) from the test surface, provided the top of such heater or the intended carrying means, whichever is the higher, is at least 4 feet (1.2 m) from the test surface. The heater was held in the intended carrying position and was then dropped onto the hardwood test surface that was covered with one layer of terry cloth. The switch to the fuse circuit was then closed and the fuse was observed for opening prior to and while being uprighted. This procedure was repeated two times, for a total of three drops.

**Test 2:** The other heater was rested on the hardwood surface covered with two layers of terry cloth. While energized at the rated voltage, the heater was tipped over five times in the manner specified in 51.8. The first tipover was onto the front face of the heater and then subsequent tipovers were 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 32.18) exceeds 60 degrees, the heater was not tipped over in this direction, but a total of five tipovers were made with each heater tested. Each tipover was 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 was then immediately released and allowed to fall freely by the force of gravity. While being tipped over, the switch to the fuse circuit was in the open position. After the heater came to rest, the switch was closed and the fuse was observed for open circuiting prior to and while the heater was being uprighted. If a part of the heater was structurally or functionally damaged by a tipover, described in the above, onto a face or side other than the front, but the damage had not caused the fuse to open, a second heater was subjected to five tipover tests with the first tipover in the direction that caused damage in the first test.

### Result(s):

The heater didn't emit sparks, flames, or molten metal emitted from the heater; True  X

False     .

It didn't result the terry cloth to ignite; True  X

False     .

The 1/2 fuse did not open after each impacting. True  X

False     .

Note(s):

### **Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

**53 Drop Test****Method(s):**

A sample was positioned on a evaluated surface and one standard hardwood surface covered two layers of terry cloth was so placed under the evaluated surface that the distance from the lowest point of the heater to the hardwood surface is 3 feet (0.91 m). One non-time delay, 1/2-ampere fuse was connected between the accessible dead metal parts of the heater and earth ground through a manual switch arranged to permit remote opening and closing of the circuit to the fuse. Firstly, the heater was operated at maximum rated input for 15 minutes, then immediately was dropped to strike the standard hardwood surface covered two layers of terry cloth in the positions most likely to produce adverse results. Following the drop, the heater was left energized in the position in which it came to rest and the switch to the fuse circuit was closed. The heater was observed for the potential to ignite the terry cloth material and the fuse was observed for opening. The observation was last for 15 minutes after which the heater was uprighted while energized and observed for opening of the 1/2 ampere fuse. If there was no any risk of fire, electric shock, or injury to persons, another two drops were conducted in turns in another positions most likely to produce adverse results. After completion of the last drop, an evaluation was 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 was then placed in that position with the heater energized and the switch to the fuse circuit closed. The heater was observed for 7 hours for ignition of the terry cloth or opening of the fuse unless:

[ X ] No opening of the fuse and no discoloration of the terry cloth material is be 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 and operated and observed for 7 hours;

[ X ] 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 and operated and observed for 7 hours;

[ X ] 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.

[ X ] If for each of the drops conducted, a tipover switch had de-energized the heater circuits.

Note(s):

[ ] If the heater is inoperative after the drop test with no adverse effects occurring, three additional heaters are to be tested in according to the methods specified in the above.

[ X ] If the heater is operational after the drop tests it shall be subjected to the Terry Cloth Band Drape Tests, sub-section 41.7. Refer to the data sheet on the next page.

**Result(s):**

The heater didn't emit sparks, flames, or molten metal from the heater; True   X    
False     .

The heater didn't cause the terry cloth to ignite; True   X    
False     .

The 1/2 fuse did not open after each impacting. True   X    
False     .

Note(s):

**Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

### 53+42.7 Terry Cloth Band Drape Test after Drop Test

#### Method(s):

The heater was operated initially at least 15 minutes at maximum rated wattage in accordance with the Power Input Test, Section 37. The heater was then draped with the terry cloth band (see the figure) and operated continuously for 7 hours or until:

- A) One half hour after a manual reset type temperature limit control or a thermal cut-off operates to de-energize either all or a sufficient number of heating elements so that there is no longer a risk of fire or development of an electric shock; or
- B) Thermal stabilization occurs and there is no discoloration of the terry cloth material.

If the heater includes adjustable settings for heat output, other than maximum setting, these settings are also to be considered during the tests, unless it can be determined without testing that the maximum setting will produce the most adverse conditions.

Several drape conditions of the terry cloth shall be considered during the tests to evaluate completely any danger when the heater is covered partially by terry cloth.

Refer to the Figure (some general drape conditions). Noted that these conditions shown in the figure are only the basis conditions, another conditions shall be also considered during the tests in order to evaluate completely any danger when the heater is covered partially by terry cloth band.

After the test, the insulation resistance was recorded.

#### Result(s):

There was no emission of flame or molten metal.

True

False .

There was no so deformation of nonmetallic parts or enclosure that the deformation developed openings through which the live parts (or moving part) may be accessed.

True

False .

There was no glowing or flaming of test material or supporting or adjacent surfaces.

True

False .

The insulation resistance measured was not less than 50,000 ohms.

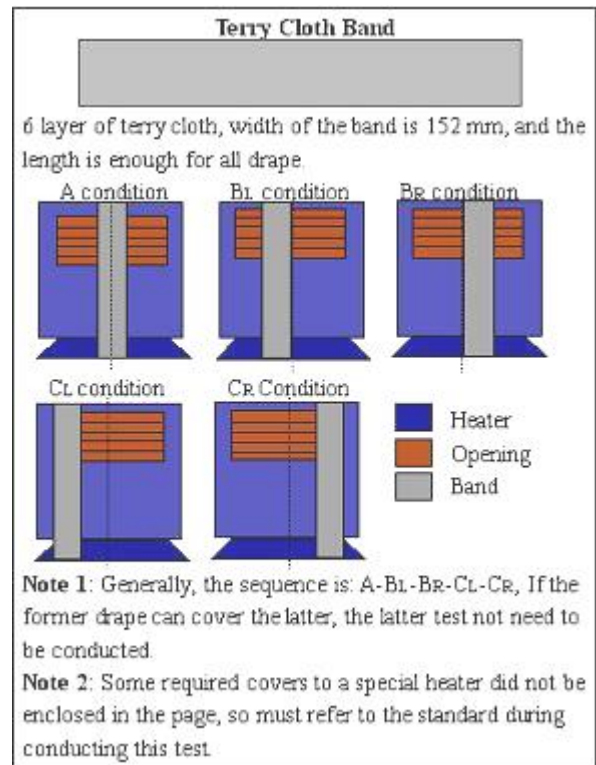
True

False .

#### Note(s):

During the test, the maximum temperature of the surface of the heater was 80.7 °C.

After the test, the insulation resistance measured was 10M ohms.



#### Conclusion:

This result (complied / ~~did not comply~~) with the requirements.

## 54 Test for Permanence of Cord Tag

### Test conditions:

For each mentioned type of conditioning in the below, three representative lengths of power supply cord having a tag applied in the intended manner were used. If tags are applied by an adhesive, tests are to be conducted no sooner than 24 hours after application of the tag.

**Condition 1:** Three representative lengths of power supply cord each with a tag are to be tested as received;

**Condition 2:** Three lengths of power supply cord each with a tag are to be tested at the end of 30 minutes of conditioning at a room temperature of  $23\pm 2$  °C ( $73.4\pm 3.6$  °F) and  $50\pm 5$  percent relative humidity, following conditioning in an air-circulating oven at  $60\pm 1$  °C ( $140\pm 1.8$  °F) for 240 hours;

**Condition 3:** Three lengths of power supply cord each with a tag are to be tested within 1 minute after exposure for 72 hours to a relative humidity of  $85\pm 5$  percent at  $32\pm 2$  °C ( $89.6\pm 3.6$  °F).

### Method(s):

Each representative device consists of a length of power supply cord to which the tag has been applied. The power supply cord, with the attachment plug pointing up, was held tautly in a vertical plane. A force of 3 pounds (13.3 N) was applied for 1 minute to the upper most corner of the tag farthest from the power supply cord, within 1/4 inch (6.4 mm) of the vertical edge of the tag. The force was applied vertically downward in a direction parallel to the major axis of the cord. In determining compliance with the **Item 3 in Result(s)**, manipulation was permissible, such as straightening of the tag by hand. To determine compliance with **Item 4 in Result(s)**, each tag was scraped ten times across printed areas and edges, with a force of approximately 2 pounds (8.9 N), using the edge of a 5/64 inch (2.0 mm) thick steel blade held at a right angle to the test surface.

### Result(s):

- 1) The tags could resist tearing for longer than 1/16 inch (1.6 mm) at any point; True  X   
False \_\_\_\_.
- 2) The tags did not separate from the power supply cord; True  X   
False \_\_\_\_.
- 3) There was no permanent shrinkage, deformation, cracking, or any other condition that will render the marking on the tag illegible; True  X   
False \_\_\_\_.
- 4) Overlamination remained in place and did not be torn or otherwise damaged. The printing remained legible. True  X  False \_\_\_\_.

### Note(s):

### **Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

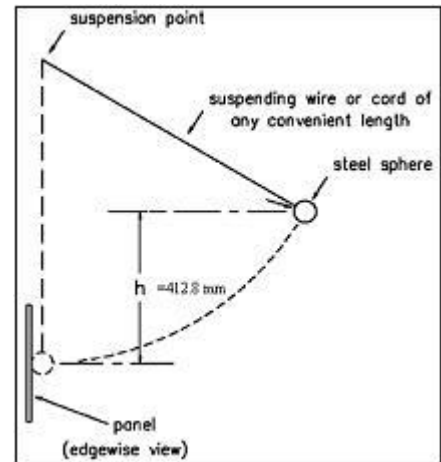
**55 Protection Against Injury to Persons Test N/A****Method(s):**

Included the following tests:

**Test 1:** The panel of glass or similarly brittle material employed in the heater (other than Ceiling-Hung heater) was subjected to an impact test specified in the figure right. The point of suspension is one inch (25.4 mm) in front of the panel,  $h$  is 16.25 inches (412.8 mm), the diameter of the steel sphere is 2 inches (50.8 mm), and the mass of the steel sphere is 1.18 lbs (0.535 kg mass) and it is to be released from rest.

**Test 2:** Operated the heater in maximum input until the panel of glass or similarly brittle material had been in a fully heated condition, hot, then used a wet cloth, fully saturated with water at room temperature to wipe across the surface of the Panel.

**Test 3:** Following Test 2, when the panel had returned to normal operating temperature again, a fine spray of cold, tap water played across the surface of the panel.

**Result(s):**

The panel of glass or similarly brittle material did not crack and did not break.

True \_\_\_\_ False \_\_\_\_.

**Note(s):****Conclusion:**

This result (complied / did not comply) with the requirements.

**56 Knob Securement Test****Method(s):**

The removable knob, button, or pointer mentioned in Claus 32.8 that is attached to its operating shaft by friction and not additionally secured by mechanical means, such as a set screw, were subjected to a pull of a force of 3 pounds (13.34 N) in line with the shaft for 1 minute.

**Result(s):**

The knob, button, or pointer did not separate from its operating shaft.

True  X  False  \_\_\_\_ .

**Note(s):****Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

## 57 Strength of Adjustment Stop Test

### Method(s):

[ X ] control or a switch on the heater that is operated by a push, pull, slide, toggle or lever adjustment were subjected to a force for 15 seconds. The force was 89 N for commercial/industrial heater and 45 N for household heater, and the force was applied to the free end of the adjustment means, in line with the direction of its intended movement, and it was applied in each direction of the movement with the control adjustment set at the extreme position in the direction of the movement.

[ X ] Switches and controls operated by a rotary adjustment when mounted in the product, were subjected to a torque for 15 seconds to the adjustment knob in the direction of intended operation. The torque was 0.8 N·m, which is determined in accordance with the following:

- 1) For a control provided with a knob where D1 is 1 inch (25.4 mm) or less, the applied torque is to be 9 pound inches (1.0 N·m) if the heater is intended for commercial/industrial use or 7 pound-inches (0.8 N·m) if it is intended for household use.
- 2) For a control provided with a knob where D1 is more than 1 inch, the torque applied is to be determined in accordance with the following formula:

$$T = \frac{D_1}{D} K$$

T is the torque to be applied in pound inches (N·m)  
 D1 is the actuator diameter for a round actuator or grip length for a nonround actuator in inches (mm)  
 D is 1 inch (25.4 mm)  
 K is 9 pound-inches (1.0 N·m) for a heater intended for commercial/industrial use or 7 pound-inches (0.8 N·m) for a heater intended for household uses.

### Result(s):

The heater wasn't 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.

True X False    .

Switches and controls operated by a rotary adjustment when mounted in the product did not been 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.

True X False    .

### Note(s):

### **Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

**58 Hydrostatic Test N/A****Method(s):**

Two representative parts were filled with water to exclude air and were connected to a hydraulic pump. The pressure was raised gradually to the specified test value, and was held at that value for 1 minute.

**Remark:** 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.

**Result(s):**

The parts could withstand the test without failure.

True \_\_\_\_ False \_\_\_\_.

The parts at a gasket didn't leak at a pressure 40 percent or less of the required test value.

True \_\_\_\_ False \_\_\_\_.

**Note(s):**

The working pressure was \_\_\_\_\_MPa, as recorded form Normal Temperature Test.

The test pressure was \_\_\_\_\_MPa.

**Conclusion:**

This result (complied / did not comply) with the requirements.

**58 Strain Relief Test****Method(s):**

A 35-pound (15.9 kg) weight was suspended on the cord and so supported by the heater that the strain-relief means would be stressed from any angle which the construction of the heater permits. The force on the supply cord was applied for 1 minute, with the connections within the heater disconnected.

**Result(s):**

The strain-relief means provided on the flexible cord could withstand the force for 1 minute, without displacement.

True  False .

There was not any movement of the cord that indicated stress on the connection would have resulted, at the point of disconnection of the conductors.

True  False .

**Note(s):****Conclusion:**

This result (complied / ~~did not comply~~) with the requirements.

Pictures



Overall view\_1 of product

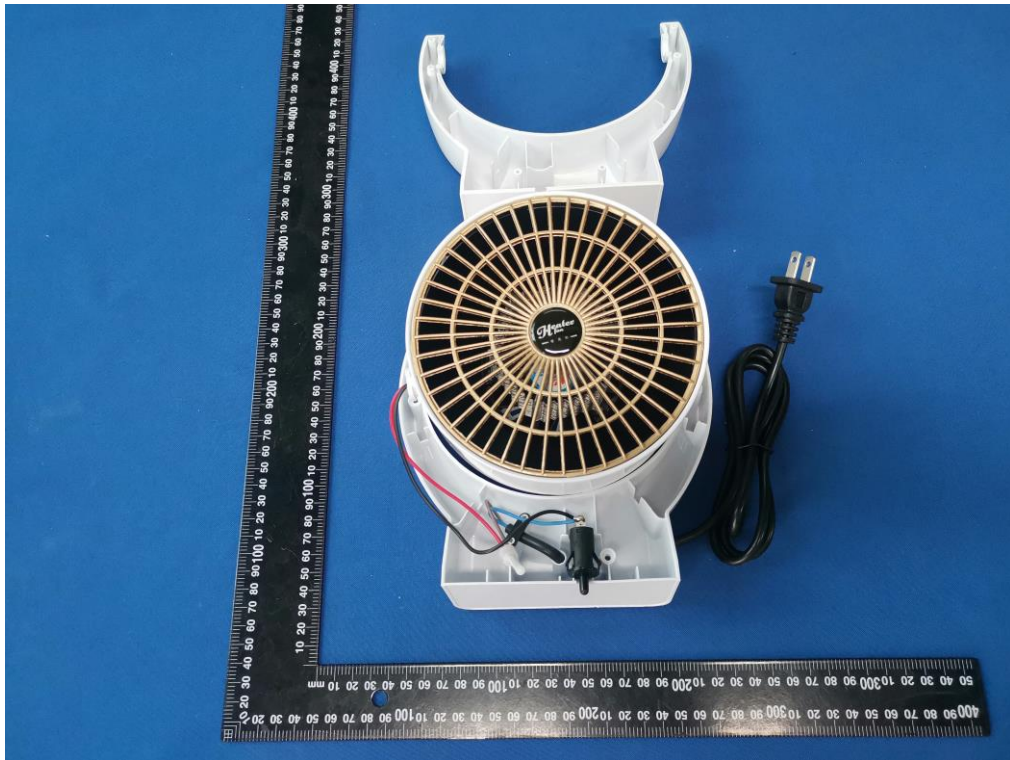


Overall view\_2 of product

Pictures

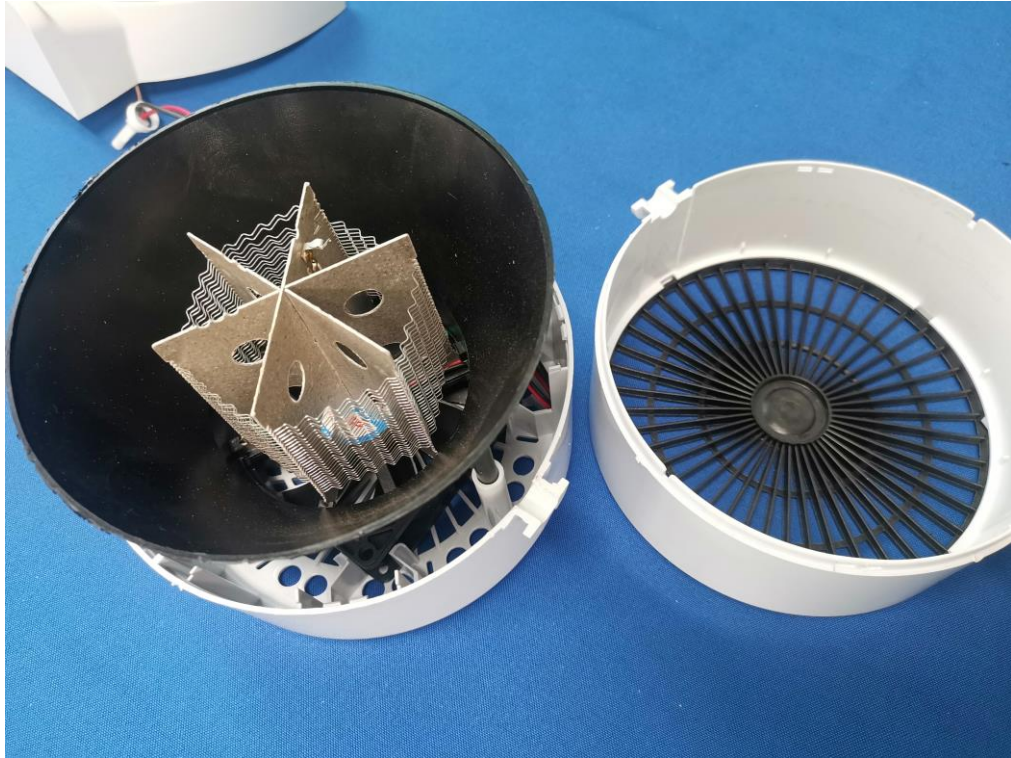


Overall view\_3 of product

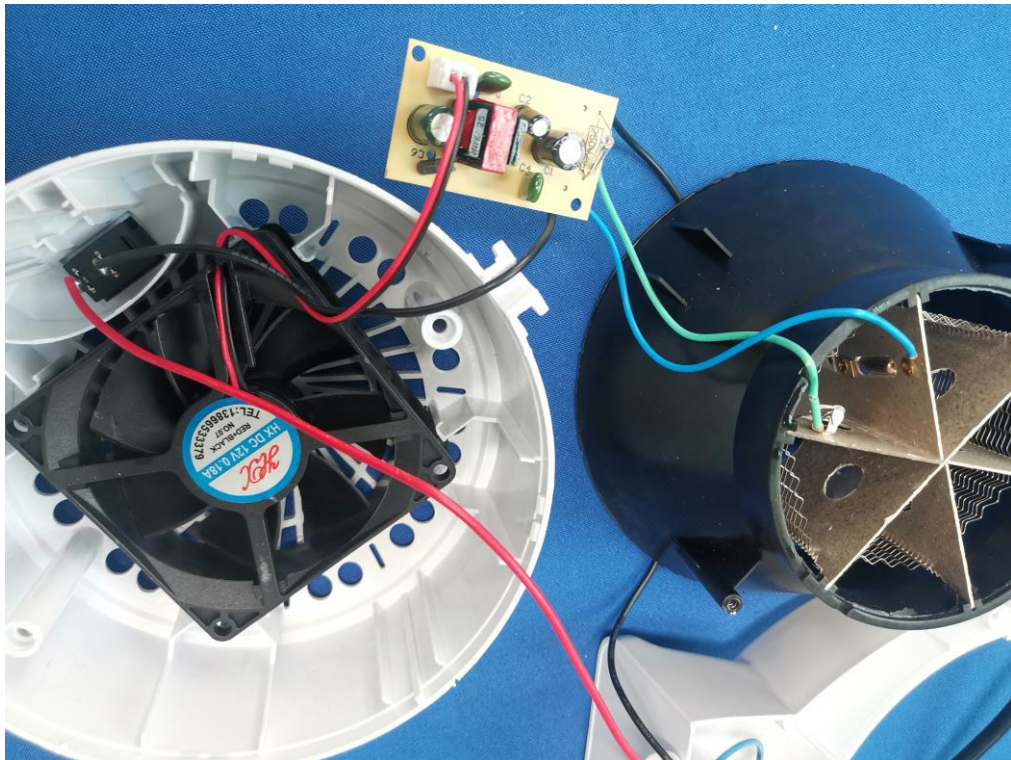


Internal view\_1 of product

Pictures



Internal view\_2 of product



Internal view\_3 of product

\*\*\*\*\* The End of Report \*\*\*\*\*