Attestation of Compliance

Reference No.	:	**LCS210510002DR**
Applicant	:	**Shenzhen Liandianchuang Technology Co., LTD**
Address	:	**Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen**
Sample Name	:	**Sovol Filament Dryer**
Trade Mark	:	**Sovol 3D, COMGROW**
Style/ Item No.	:	**SH01, SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09**
Tested according to	:	**IEC 62321-3-1:2013 IEC 62321-5:2013 IEC 62321-4:2013+AMD1:2017 CSV IEC 62321-6:2015 IEC 62321-7-1:2015 IEC 62321-7-2:2017 IEC 62321-8:2017**

The submitted products have been tested by us with the listed standards.

This Attestation of Compliance is issued according to the council Directive 2011/65/EU and its amendment directives (EU) 2015/863. It confirms that the listed product complies with all essential requirements of the ROHS Directive and applies only to the sample and its technical documentation submitted to Shenzhen LCS Compliance Testing Laboratory Ltd. for testing.

After preparation of the necessary technical documentation as well as the EC conformity declaration the required CE marking can be affixed on the product.Other relevant Directives have to be observed.

RoHS

LCS TESTING LABORATORY * APPROVED *

Date of issue: June 24, 2021

Zhongshan LCS Compliance Testing Laboratory LTd.
Y1403, 14th floor, one of the 15 east xinxing avenue, guzhen town, zhongshan city, guangdong province
Tel: (86) 0760-85323817 Fax: (86) 0760-85282906

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Zhongshan LCS Compliance Testing Laboratory Ltd.
Add:Y1403, 14th floor, one of the 15 east xinxing avenue, guzhen town, zhongshan city, guangdong province
Tel: (86) 0760-85323817 Fax: (86) 0760-85282906

TEST REPORT

Applicant	:	**Shenzhen Liandianchuang Technology Co., LTD**
Address	:	**Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen**

Report on the submitted samples said to be:

Sample Name	:	**Sovol Filament Dryer**
Trade Mark	:	**Sovol 3D, COMGROW**
Style/ Item No.	:	**SH01, SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09**
Manufacturer	:	**Shenzhen Jiexinhua Technology Co., Ltd.**
Address	:	**Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen**
Sample Receiving Date	:	**June 18, 2021**
Testing Period	:	**June 18, 2021 ~ June 24, 2021**
Results	:	**Please refer to next page(s).**
Conclusion	:	**Based on the performed tests on submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls(PBBS), Polybrominated diphenyl ethers(PBDEs) and phthalates such as bis(2-ethylhexyl) phthalate(DEHP), Butyl benzyl phthalate(BBP), Dibutyl phthalate(DBP), and diisobutyl phthalate(DIBP) comply with the limits as set by ROHS Directive (EU)2015/863 amending Annex II to Directive 2011/65/EU.**

Signed for and on behalf of LCS

Written By: Terry.Wang
Tenny.Wang

Approved by: Cat Zhang
Cat Zhang

LCS TESTING LABORATORY APPROVED

1. LISTS

No.	Part Name	Report No.
1	White plastic shell	LCS201212030AR
2	Silvery metal shell	LCS201212076AR
3	Black metal shell	LCS201212062AR
4	Silver metal screw	LCS201212061AR
5	Golden metal	LCS201212080AR
6	White plastic	LCS201212051AR
7	Red plastic	LCS201212040AR
8	Black plastic line	LCS201212043AR
9	Gray plastic line	LCS201212046AR
10	Red plastic line	LCS201212041AR
11	Silvery metal line	LCS201212069AR
12	Label	LCS201212034AR
13	White plastic (Transformer)	LCS201212052AR
14	Yellow plastic tape(Transformer)	LCS201212032AR
15	Ceramic(Transformer)	LCS201212022AR
16	Black plastic(Transformer)	LCS201212033AR
17	Copper line(Transformer)	LCS201212064AR
18	Silvery metal needle (Transformer)	LCS201212065AR
19	Black plastic case(C1)	LCS201212037AR
20	Silvery metal case(C1)	LCS201212067AR
21	Black plastic(C1)	LCS201212039AR
22	Electrolytic paper(C1)	LCS201212038AR
23	Silvery metal needle(C1)	LCS201212068AR
24	IC	LCS201212123AR
25	Triode	LCS201212026AR
26	Diode	LCS201212025AR

27	Chips of resistance	LCS201212028AR
28	Chips of capacitance	LCS201212027AR
29	PCB	LCS201212050AR
30	Solder on PCB	LCS201212063AR

2. TEST DATA SUMMARY

Test items	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Hexavalent Chromium Cr(VI)	PBBs	PBDEs	BBP	DBP	DEHP	DIBP
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
3	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
5	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
6	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
7	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
8	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
9	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
10	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
11	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
12	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
13	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
15	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
16	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
17	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
18	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
19	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

20	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
21	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
22	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
23	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
24	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
25	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
26	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
27	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
28	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
29	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
30	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Note:

(1) N.D. = Not detected (<MDL) (2) ppm = mg/kg (3) N.A. = Not Analyzed

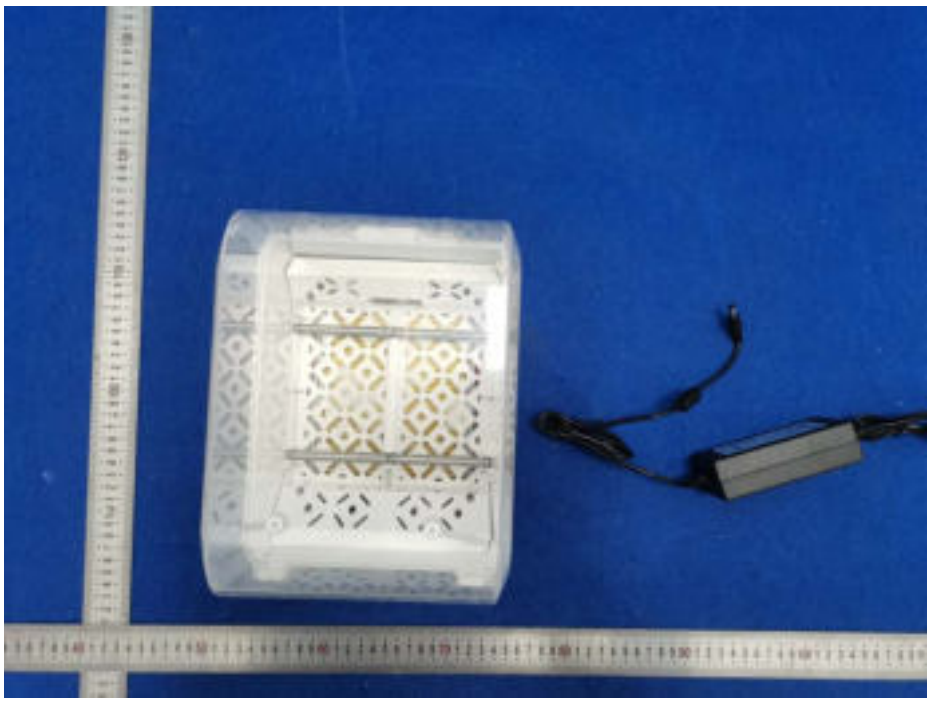
(4) Negative = the concentration of Hexavalent Chromium extracted from 50cm2 sample is less than the detection limit.

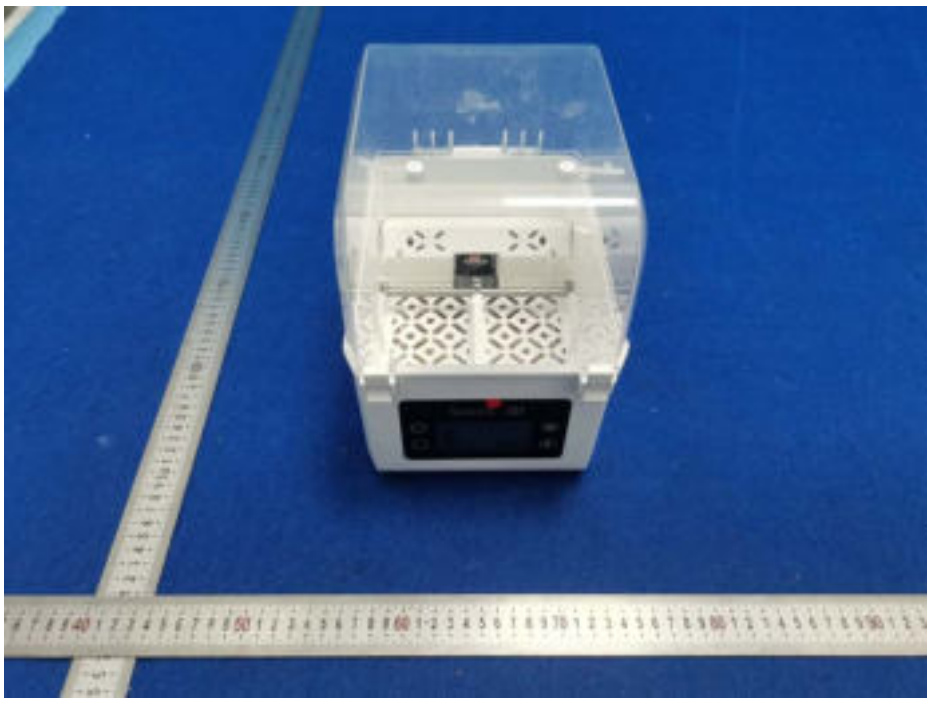
Remark: Lead in electronic components, which are exempted from (RoHS) the requirements.

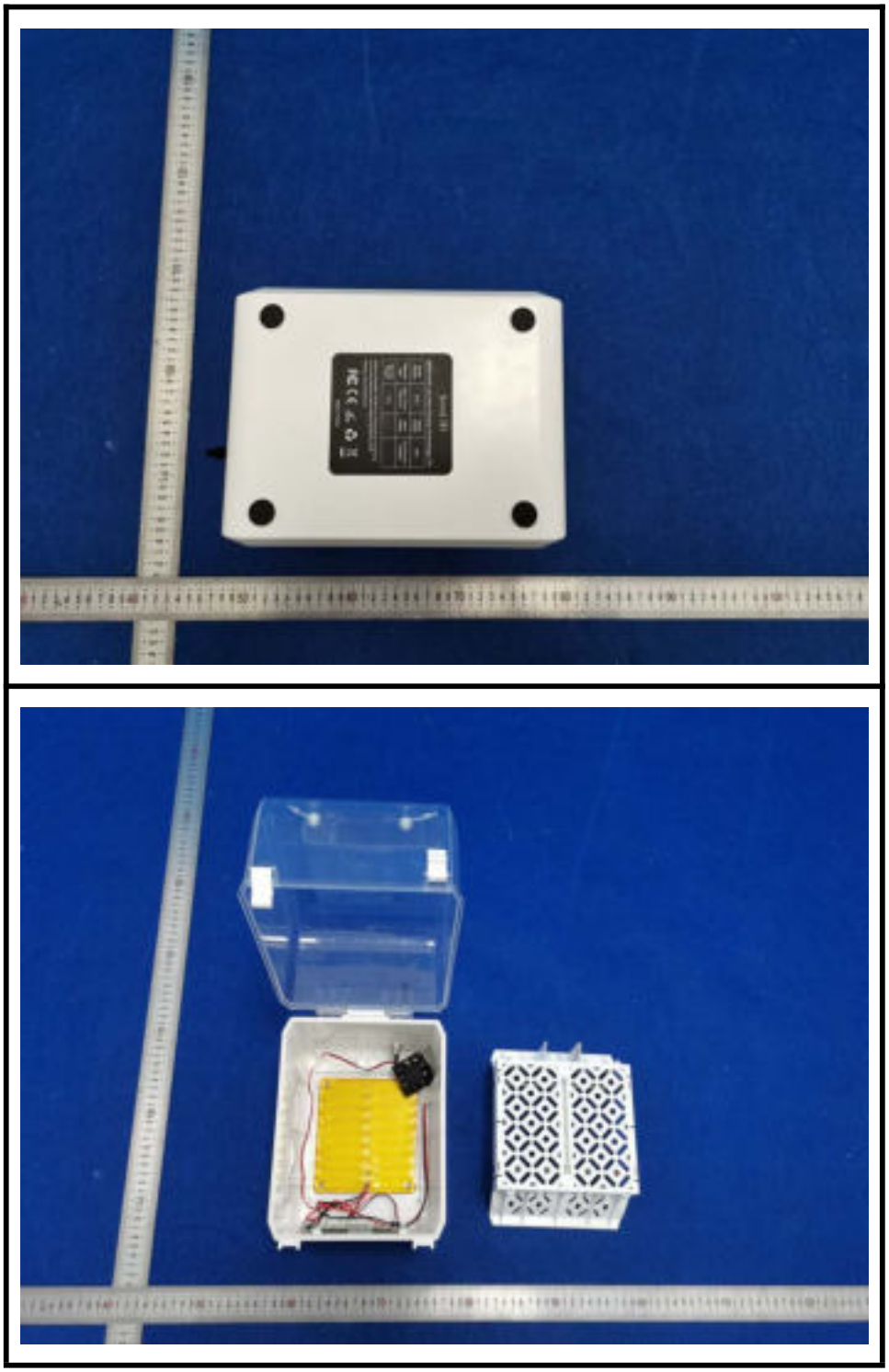
Disclaimer:

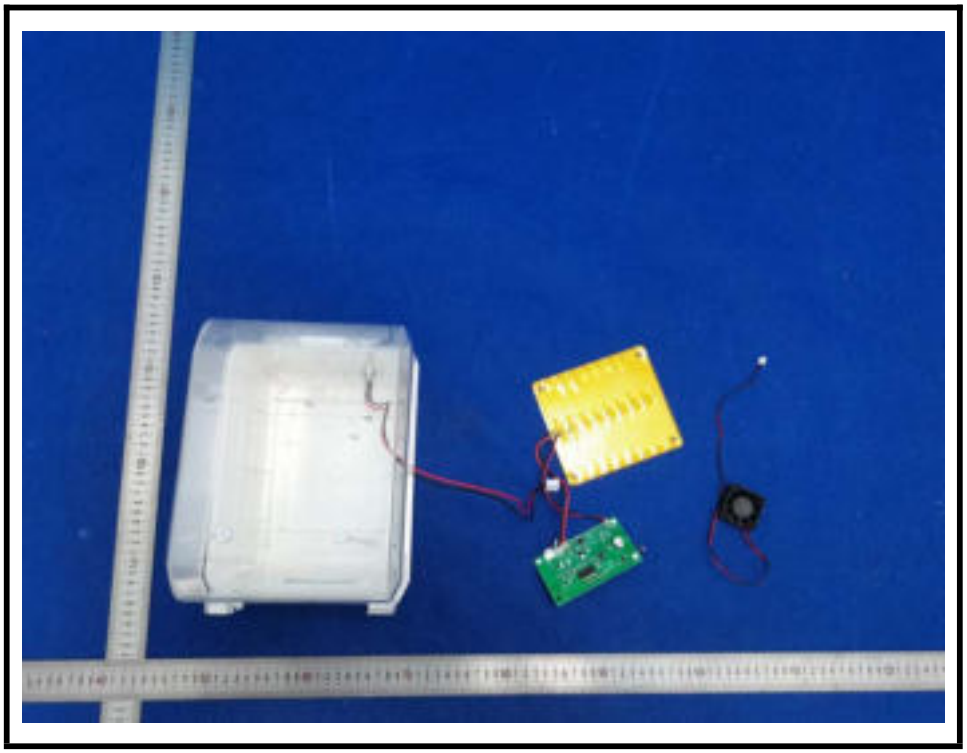
- The integration report is not equivalent to the test report.
- LCS does not shoulder responsibility for the authenticity of all the test data listed in integration report, which are submitted by the applicants.
- The applicants are responsible for all legal obligation caused by the inaccuracy and invalidity of the original report.
- If this disclaimer contradicts any other terms and conditions of LCS, this disclaimer will prevail.

3. PHOTOGRAPHS OF TEST SAMPLE









LCS authenticate the photo on original report only

End of Report

Attestation of Compliance

Reference No.	:	**LCS210510030AE**
Applicant	:	**Shenzhen Liandianchuang Technology Co., LTD**
Address	:	**Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen**
Trade Mark	:	**Sovol 3D, COMGROW**
Product	:	**Sovol Filament Dryer**
Model(s)	:	**SH01, SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09**
Tested according to	:	**EN 55014-1: 2017, EN 55014-2: 2015 EN IEC 61000-3-2: 2019, EN 61000-3-3: 2013+A1: 2019**

The submitted products have been tested by us with the listed standards.

This Attestation of Compliance is issued according to the council Directive 2014/30/EU, Referred to as the Electromagnetic Compatibility. It confirms that the listed product complies with all essential requirements of the EMC directive and applies only to the sample and its technical documentation submitted to Shenzhen LCS Compliance Testing Laboratory Ltd. for testing.

After preparation of the necessary technical documentation as well as the EC conformity declaration the required CE marking can be affixed on the product.Other relevant Directives have to be observed.

CE

LCS TESTING LABORATORY APPROVED

Manager

Date of issue: June 01, 2021

Shenzhen LCS Compliance Testing Laboratory Ltd.
Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
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扫码查询真伪
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EMC TEST REPORT
For

Shenzhen Liandianchuang Technology Co., LTD

Sovol Filament Dryer

Test Model: SH01

Additional Model No.: Please refer to page 8

Prepared for	:	Shenzhen Liandianchuang Technology Co., LTD
Address	:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Tel	:	(+86)755-82591330
Fax	:	(+86)755-82591332
Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	May 19, 2021
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	May 19, 2021 ~ May 28, 2021
Date of Report	:	June 01, 2021

CE

EMC TEST REPORT

EN 55014-1: 2017

Requirements for household appliances, electric tools and similar apparatus -- Part 1: Emission

EN 55014-2: 2015

Requirements for household appliances, electric tools and similar apparatus -- Part 2: Immunity - Product family standard

Report Reference No. .....:	**LCS210510030AE**
Date Of Issue .....:	June 01, 2021
Testing Laboratory Name ....:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address .....:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure ..:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name .....:	**Shenzhen Liandianchuang Technology Co., LTD**
Address .....:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Test Specification:	
Standard .....:	EN 55014-1: 2017 EN IEC 61000-3-2: 2019 EN 61000-3-3: 2013+A1: 2019 EN 55014-2: 2015
Test Report Form No. .....:	LCSEMC-1.0
TRF Originator .....:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF .....:	Dated 2011-03

Test Item Description.....:	**Sovol Filament Dryer**
Trade Mark.....:	Sovol 3D, COMGROW
Test Model .....:	SH01
Ratings.....:	Please refer to page 8
Result .....:	Positive

Compiled by:	**Supervised by:**	**Approved by:**
Cindy Nie	Tom Wang	
Cindy Nie/ File administrators	Tom Wang/ Technique principal	Gavin Liang/ Manager

EMC -- TEST REPORT

Test Report No. : LCS210510030AE	June 01, 2021 Date of issue

Test Model.....	: SH01
EUT.....	: Sovol Filament Dryer
Applicant.....	**: Shenzhen Liandianchuang Technology Co., LTD**
Address.....	: Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Shenzhen Jiexinhua Technology Co., Ltd.**
Address.....	: Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Telephone.....	: /
Fax.....	: /
Factory.....	**: Shenzhen Jiexinhua Technology Co., Ltd.**
Address.....	: Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Telephone.....	: /
Fax.....	: /

Test Result according to the standards on page 8:	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	June 01, 2021	Initial Issue	Gavin Liang

TABLE OF CONTENT

Test Report Description Page

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION (EN 55014-1: 2017)			
Description of Test Item	**Standard**	**Limits**	**Results**
Conducted disturbance at mains terminals	EN 55014-1: 2017	--------	PASS
Disturbance Power	EN 55014-1: 2017	--------	PASS
Radiated disturbance	EN 55014-1: 2017	--------	N/A
Harmonic current emissions	EN IEC 61000-3-2: 2019	Class A	PASS
Voltage fluctuations & flicker	EN 61000-3-3: 2013+A1: 2019	--------	PASS
IMMUNITY (EN 55014-2: 2015)			
Description of Test Item	**Basic Standard**	**Performance Criteria**	**Results**
Electrostatic discharge (ESD)	EN 61000-4-2: 2009	B	PASS
Radio-frequency, Continuous radiated disturbance	EN 61000-4-3: 2006+A2: 2010	A	N/A
Electrical fast transient (EFT)	EN 61000-4-4: 2012	B	PASS
Surge (Input a.c. power ports)	EN 61000-4-5: 2014+A1：2017	B	PASS
Radio-frequency, Continuous conducted disturbance	EN 61000-4-6: 2014	A	PASS
Power frequency magnetic field	EN 61000-4-8: 2010	A	N/A
Voltage dips, 60% reduction	EN 61000-4-11: 2004+A1：2017	C	PASS
Voltage dips, 30% reduction		C	PASS
Voltage interruptions		C	PASS
N/A is an abbreviation for Not Applicable.			

Test mode:		
Mode 1	Working	Record

1.2.Description of Performance Criteria

General Performance Criteria
Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:
─ essential operational modes and states;
─ tests of all peripheral access (hard disks, floppy disks, printers, keyboard, mouse, etc.);
─ quality of software execution;
─ quality of data display and transmission;
─ quality of speech transmission.

1.2.1.Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacture when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deliver from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

1.2.2.Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacture, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operation state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be deliver from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

1.2.3.Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacture’s instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be loss.

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

EUT : Sovol Filament Dryer

Trade Mark : Sovol 3D, COMGROW

Test Model : SH01

Additional Model No. : SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09

Model Declaration : PCB board, structure and internal of these model(s) are the same, So no additional models were tested.

Power Supply : Input: 100-240V~, 50/60Hz
Output: 12V⎓4A, 48W

EUT Clock Frequency :≤15MHz

2.2. Description of Support Device

Name	Manufacturers	M/N	S/N
--	--	--	--

2.3.Test Facility

EMC Lab. : NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.

2.4.Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.4.Measurement Uncertainty

Test	Parameters	Expanded uncertainty (Ulab)	Expanded uncertainty (Ucispr)
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Power Disturbance	Level accuracy (30MHz to 300MHz)	± 2.90dB	± 4.5 dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	± 3.60 dB	± 3.3 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB
Mains Harmonic	Voltage	± 0.510%	N/A
Voltage Fluctuations & Flicker	Voltage	± 0.510%	N/A

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

(2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

3. MEASURING DEVICES AND TEST EQUIPMENT

3.1.Conducted Disturbance

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
2	EMI Test Receiver	R&S	ESPI	101840	2020-06-22	2021-06-21
3	Artificial Mains	R&S	ENV216	101288	2020-06-22	2021-06-21
4	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2020-06-22	2021-06-21
5	Impedance Stabilization Network	TESEQ	ISN T800	45130	2020-12-02	2021-12-01

3.2.Disturbance Power

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
2	EMI Test Receiver	R&S	ESPI	101840	2020-06-22	2021-06-21
3	Absorbing clamp	R&S	MDS 21	4033	2020-07-22	2021-07-21
4	6dB Attenuator	/	/	50FP-006-H3B	2020-06-22	2021-06-21

3.3.Harmonic Current

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Power Analyzer Test System	Voltech	PM6000	20000670053	2020-06-22	2021-06-21

3.4.Voltage fluctuation and Flicker

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Power Analyzer Test System	Voltech	PM6000	20000670053	2020-06-22	2021-06-21

3.5.Electrostatic Discharge

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	ESD Simulator	SCHLODER	SESD 230	604035	2020-07-21	2021-07-20

3.6.Electrical Fast Transient/Burst

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500 M4	0101-34	2020-06-22	2021-06-21

3.7.Surge

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Immunity Simulative Generator	EM test	UCS500 M4	0101-34	2020-06-22	2021-06-21

3.8.Conducted Susceptibility

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Simulator	FRANKONIA	CIT-10/75	A126A1195	2020-06-22	2021-06-21
2	CDN	FRANKONIA	CDN-M2+M3	A2210177	2020-06-22	2021-06-21
3	6dB Attenuator	FRANKONIA	DAM25W	1172040	2020-06-22	2021-06-21

3.9.Voltage Dips

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2020-06-22	2021-06-21

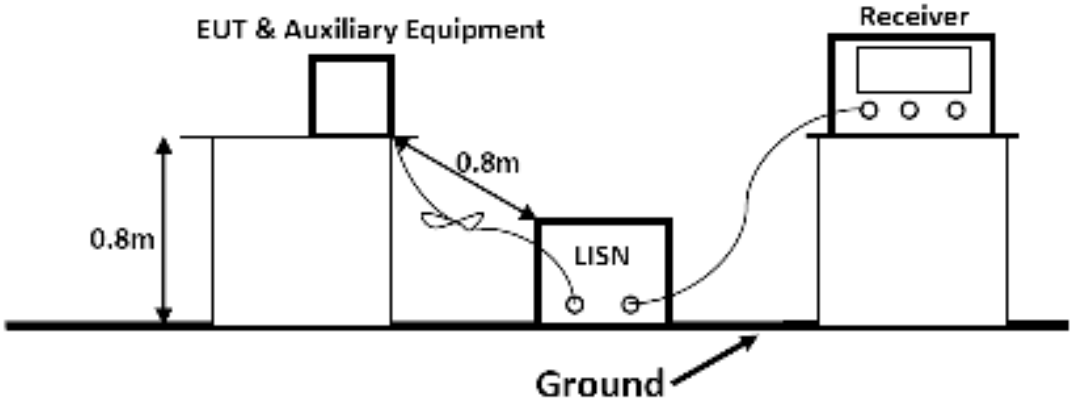
3.10.Voltage Short Interruptions

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
1	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2020-06-22	2021-06-21

4. TEST RESULTS

4.1.Power Line Conducted Emission Measurement

4.1.1.Block Diagram of Test Setup



4.1.2.Power Line Conducted Emission Limits

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	59.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

Remark: * means decreasing linearly with logarithm of frequency.

4.1.3.EUT Configuration on Test

The following equipments are installed on Conducted Emission Measurement to meet EN 55014–1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.1.4.Operating Condition of EUT

4.1.4.1.Setup the EUT as shown on Section 4.1.1.

4.1.4.2.Turn on the power of all equipments.

4.1.4.3.Let the EUT work in measuring Mode 1 and measure it.

4.1.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and connected to the AC mains through a Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are investigated to find out the maximum conducted emission according to the EN 55014-1 regulations during conducted emission measurement.

The bandwidth of the field strength meter is set at 9kHz.

The frequency range from 150kHz to 30MHz is investigated. The scanning waveform please refer to the next page.

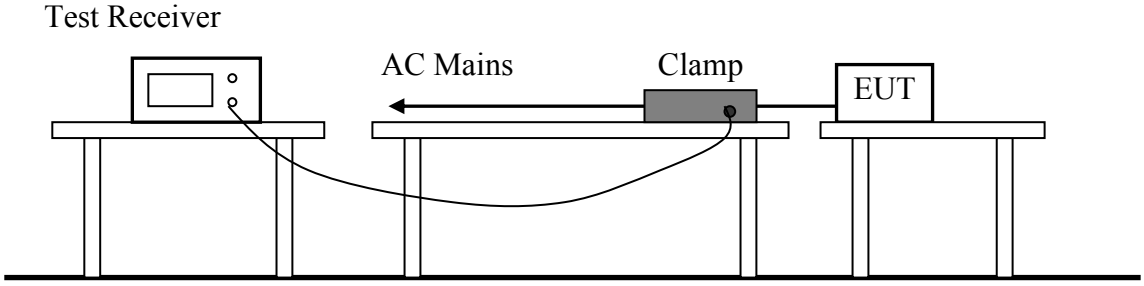
4.1.6.Test Results

PASS.

Refer to attached Annex B.1

4.2. Disturbance Power Measurement

4.2.1.Block Diagram of Test Setup



4.2.2.Test Standard

EN 55014-1: 2017

4.2.3.Disturbance Power Limits

All emanations from devices or system including any network of conductors and apparatus connected there to, shall not exceed the level of field strengths specified below:

Frequency MHz	Limits dB(pW)	
	Quasi-peak Value	Average Value
30 ~ 300	45 Increasing Linearly with Frequency to 55	35 Increasing Linearly with Frequency to 45

	Household and similar appliances		Tools					
1	2	3	4	5	6	7	8	9
Frequency range			Rated motor power not exceeding 700 W		Rated motor power above 700 W and not exceeding 1000 W		Rated motor power above 1000 W	
(MHz)	dB (pW) Quasi-peak	dB (pW) Average	dB (pW) Quasi-peak	dB (pW) Average	dB (pW) Quasi-peak	dB (pW) Average	dB (pW) Quasi-peak	dB (pW) Average
Increasing linearly with the frequency from:								
200 to 300	0 to 10 dB	-	0 to 10 dB	-	0 to 10 dB	-	0 to 10 dB	-
NOTE 1 This table only applies if specified in 4.1.2.3.2. NOTE 2 The measured result at a particular frequency shall be less than the relevant limit minus the corresponding margin (at that frequency).								

4.2.4.EUT Configuration on Test

The EN 55014-1 Regulations test method must be used to find the maximum emission during radiated emission measurement. The configuration of the EUT is the same as used in conducted emission measurement.

4.2.5.Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 4.1.1 except the test set up replaced as Section 4.2.1.

4.2.6.Test Procedure

The EUT is placed on the plane 0.8m high above the ground by insulating support and away from other metallic surface at least 0.4m. It is connected to the power mains through an extension cord of 6m min. The absorber clamp clamps the cord and moves from the far end to the EUT to measure the disturbing energy emitted from the cord.

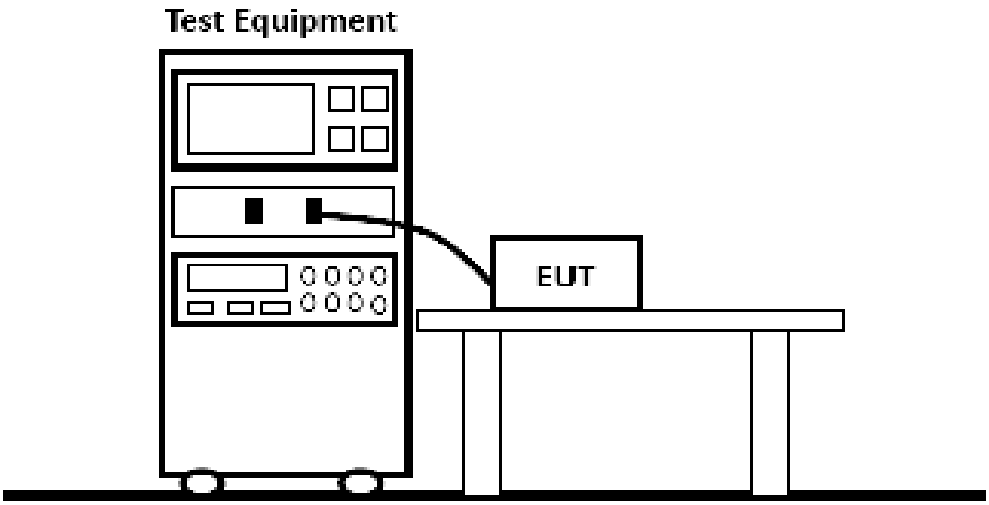
The bandwidth of the field strength meter is set at 120kHz.
All the test results are listed in Section 4.2.7.

4.2.7.Test Results

PASS.
Refer to attached Annex B.2

4.3. Harmonic Current Emission Measurement

4.3.1.Block Diagram of Test Setup



4.3.2.Test Standard

EN IEC 61000-3-2: 2019, Class A

4.3.3.Operation Condition of EUT

Same as Section 4.1.4 except the test setup replaced as Section 4.3.1.

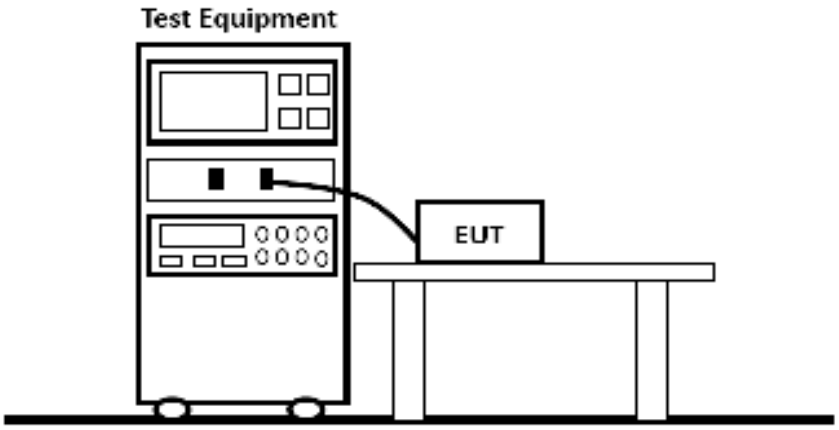
4.3.4.Test Results

Pass.

Refer to attached Annex B.3

4.4. Voltage Fluctuation And Flicker Measurement

4.4.1.Block Diagram of Test Setup



4.4.2.Test Standard

EN 61000-3-3: 2013+A1: 2019

4.4.3.Operation Condition of EUT

4.4.3.1.Setup the EUT as shown Section 4.4.1.

4.4.3.2.Turn on the power of all equipments.

4.4.3.3.Let EUT work in test mode (On/Off) and measure it.

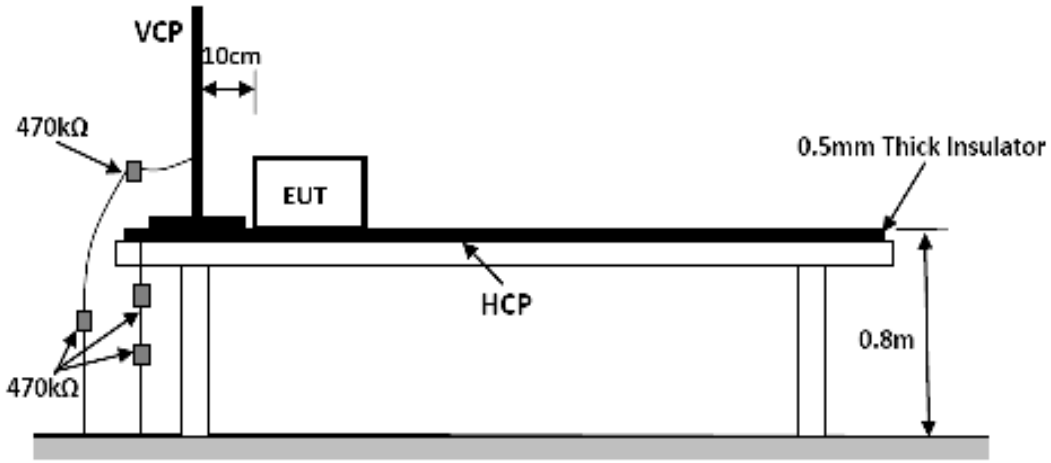
4.4.4.Test Results

PASS.

Refer to attached Annex B.4

4.5. Electrostatic Discharge Immunity Test

4.5.1.Block Diagram of Test Setup



4.5.2.Test Standard

EN 55014-2: 2015(EN 61000-4-2: 2009, Severity Level: 3 / Air Discharge: ±8KV; Level: 2 / Contact Discharge: ±4KV)

4.5.3.Severity Levels and Performance Criterion

4.5.3.1.Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

4.5.3.2.Performance criterion: **B**

4.5.4.EUT Configuration on Test

The configuration of EUT are listed in Section 4.5.1.

4.5.5.Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 4.1.4, except the test set up replaced by Section 4.5.1.

4.5.6.Test Procedure

4.6.6.1.Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

4.5.6.2.Contact Discharge

All the procedure shall be same as Section 4.5.6.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

4.5.6.3.Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

4.5.6.4.Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

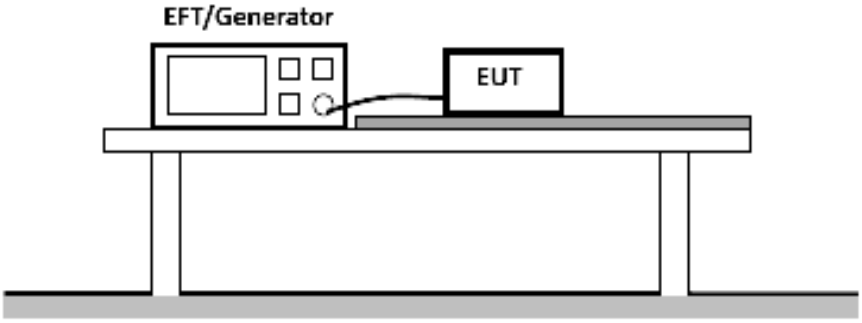
4.5.7.Test Results

PASS.

Refer to attached Annex B.5

4.6. Electrical Fast Transient/Burst Immunity Test

4.6.1.Block Diagram of Test Setup



4.6.2.Test Standard

EN 55014-2: 2015 (EN 61000-4-4: 2012, Severity Level: Level 2: 1KV)

4.6.3.Severity Levels and Performance Criterion

4.7.3.1.Severity level

Open Circuit Output Test Voltage ± 10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1.	0.50KV	0.25KV
2.	1.00KV	0.50KV
3.	2.00KV	1.00KV
4.	4.00KV	2.00KV
X	Special	Special

4.6.3.2.Performance criterion: **B**

4.6.4.EUT Configuration on Test

The configuration of EUT are listed in Section 4.6.1.

4.6.5.Operating Condition of EUT

4.6.5.1.Setup the EUT as shown in Section 4.6.1.

4.6.5.2.Turn on the power of all equipments.

4.6.5.3.Let the EUT work in test Mode 1 and measure it.

4.6.6.Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

4.6.6.1.For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

4.6.6.2.For signal lines and control lines ports:

No I/O ports. It's unnecessary to test.

4.6.6.3.For DC output line ports:

No DC output ports. It's unnecessary to test.

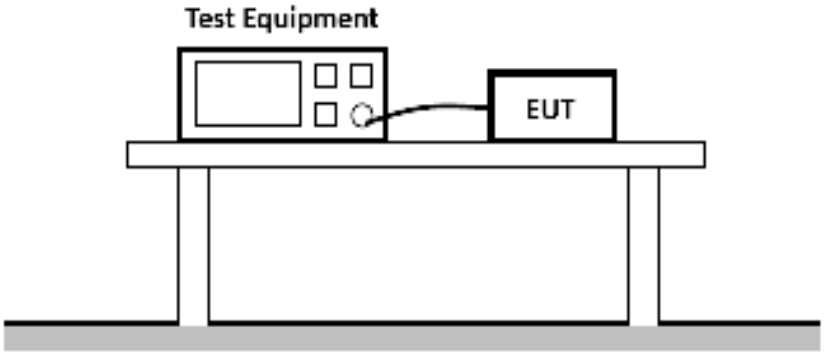
4.6.7.Test Results

PASS.

Refer to attached Annex B.6

4.7. Surge Immunity Test

4.7.1.Block Diagram of Test Setup



4.7.2.Test Standard

EN 55014-2: 2015

(EN 61000-4-5: 2014+A1：2017, Severity Level: Level 2, Line to Line: 1.0KV; Level 3: Line to Ground: 2.0KV)

4.7.3.Severity Levels and Performance Criterion

4.8.3.1.Severity level

Severity Level	Open-Circuit Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

4.7.3.2.Performance criterion: **B**

4.7.4.EUT Configuration on Test

The configuration of EUT are listed in Section 4.7.1.

4.7.5.Operating Condition of EUT

4.7.5.1.Setup the EUT as shown in Section 4.7.1.

4.7.5.2.Turn on the power of all equipments.

4.7.5.3.Let the EUT work in test Mode 1 and measure it.

4.7.6.Test Procedure

4.7.6.1.Set up the EUT and test generator as shown on Section 4.7.1.

4.7.6.2.For line to line coupling mode, provide a 1.0 KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.

4.7.6.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test

4.7.6.4.Different phase angles are done individually.

4.7.6.5.Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

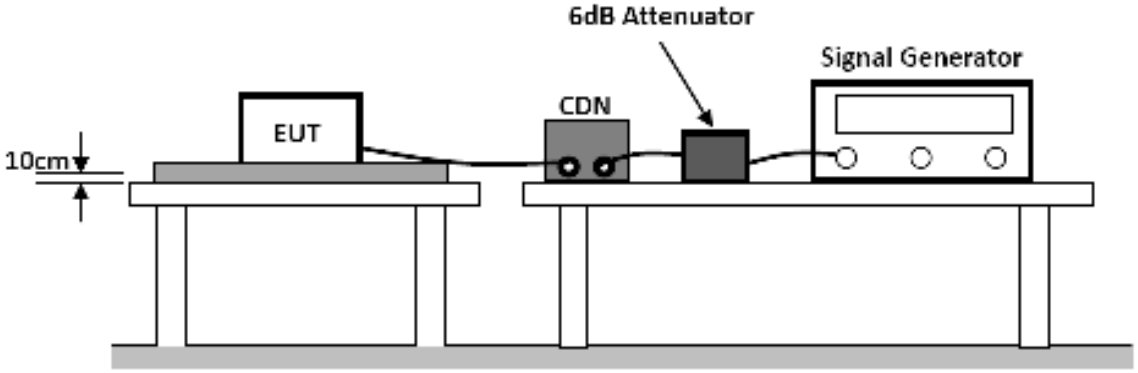
4.7.7.Test Results

PASS.

Refer to attached Annex B.7

4.8. Injected Currents Susceptibility Test

4.8.1.Block Diagram of Test Setup



4.8.2.Test Standard

EN 55014-2: 2015(EN 61000-4-6: 2014, Severity Level: 3V (rms), (0.15MHz ~ 230MHz))

4.8.3.Severity Levels and Performance Criterion

4.8.3.1.Severity level

Level	Field Strength (V)
1	1
2	3
3	10
X	Special

4.8.3.2.Performance criterion: **A**

4.8.4.EUT Configuration on Test

The configuration of EUT are listed in Section 4.8.1.

4.8.5.Operating Condition of EUT

4.8.5.1.Setup the EUT as shown in Section 4.8.1.

4.8.5.2.Turn on the power of all equipments.

4.8.5.3.Let the EUT work in test Mode 1 and measure it.

4.8.6.Test Procedure

4.8.6.1.Set up the EUT, CDN and test generators as shown on Section 4.8.1.

4.8.6.2.Let the EUT work in test mode and measure it.

4.8.6.3.The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

4.8.6.4.The disturbance signal described below is injected to EUT through CDN.

4.8.6.5.The EUT operates within its operational mode(s) under intended climatic conditions after power on.

4.8.6.6.The frequency range is swept from 150kHz to 230MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

4.8.6.7.The rate of sweep shall not exceed 1.5*10-3 decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

4.8.6.8.Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

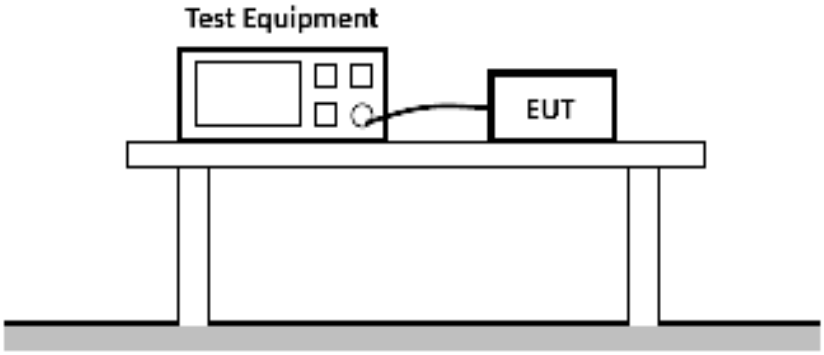
4.8.7.Test Results

PASS.

Refer to attached Annex B.8

4.9. Voltage Dips And Interruptions Test

4.9.1.Block Diagram of Test Setup



4.9.2.Test Standard

EN 55014-2: 2015 (EN 61000-4-11: 2004+A1：2017)

4.9.3.Severity Levels and Performance Criterion

4.9.3.1.Severity level

Test Level (%U_T)	Voltage dip and short interruptions (%U_T)	Duration (in period)	
0	100	0.5	0.6
40	60	10	12
70	30	25	60

4.9.3.2.Performance criterion: **C&C**

4.9.4.EUT Configuration on Test

The configuration of EUT are listed in Section 4.9.1.

4.9.5.Operating Condition of EUT

4.9.5.1.Setup the EUT as shown in Section 4.9.1.

4.9.5.2.Turn on the power of all equipments.

4.9.5.3.Let the EUT work in test Mode 1 and measure it.

4.9.6.Test Procedure

4.9.6.1.Set up the EUT and test generator as shown on Section 4.9.1.

4.9.6.2.The interruptions is introduced at selected phase angles with specified duration.

4.9.6.3.Record any degradation of performance.

4.9.7.Test Results

PASS.

Refer to attached Annex B.9

ANNEX A

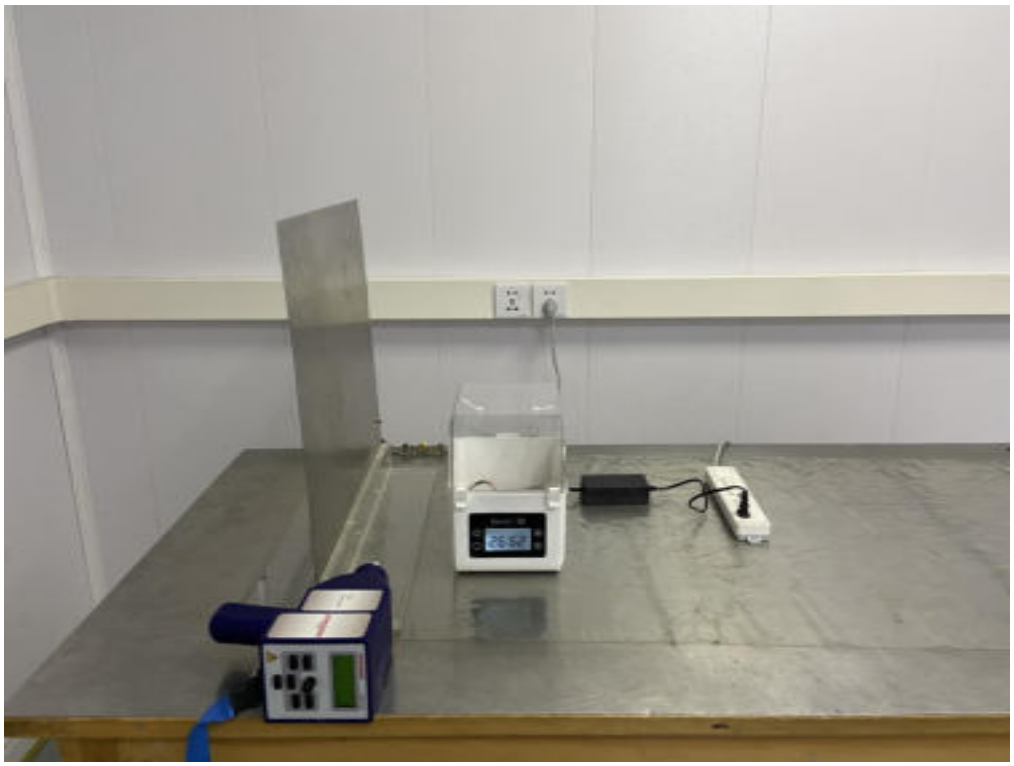
（Test photograph）

A.1.Photo of Power Line Conducted Measurement

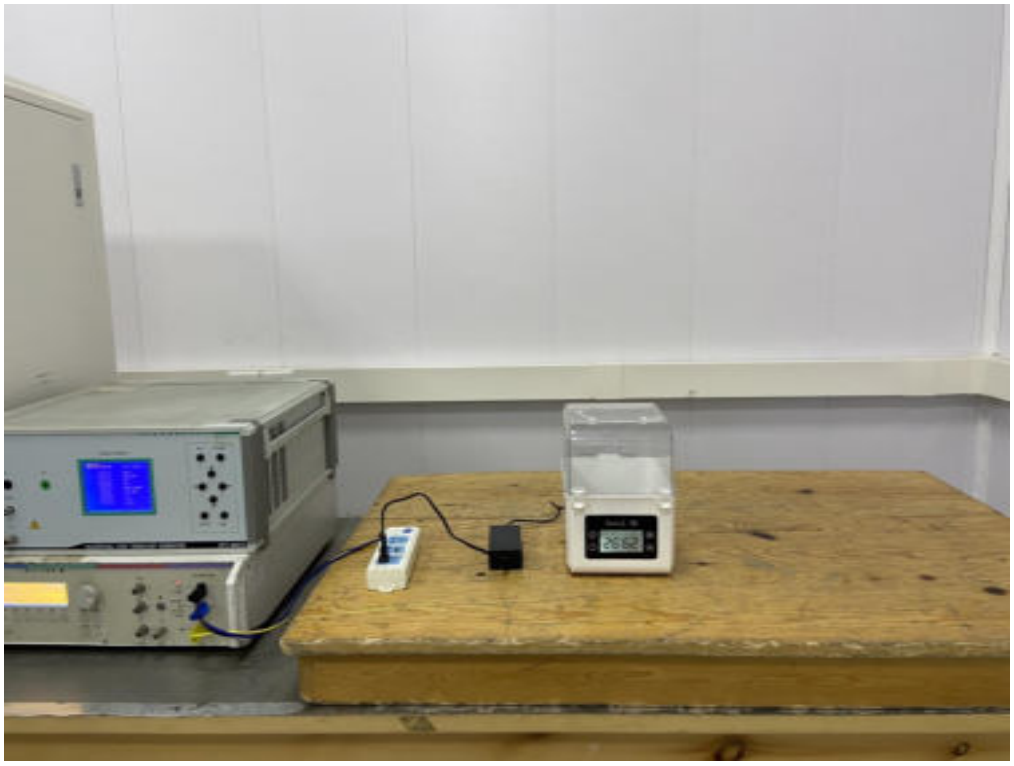
A.2.Photo of Disturbance Power Test

A.3.Photo of Harmonic & Flicker Measurement

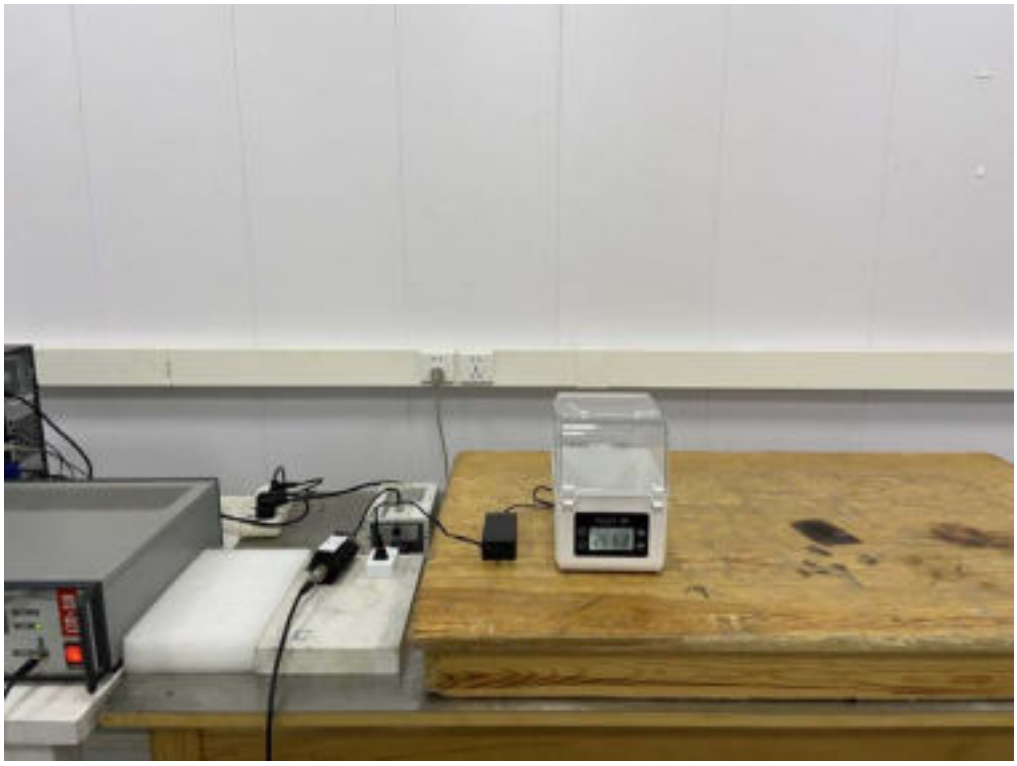
A.4.Photo of Electrostatic Discharge Test



A.5. Photo of Electrical Fast Transient/Burst Test & Surge Immunity Test



A.6.Photo of Injected Currents Susceptibility Test



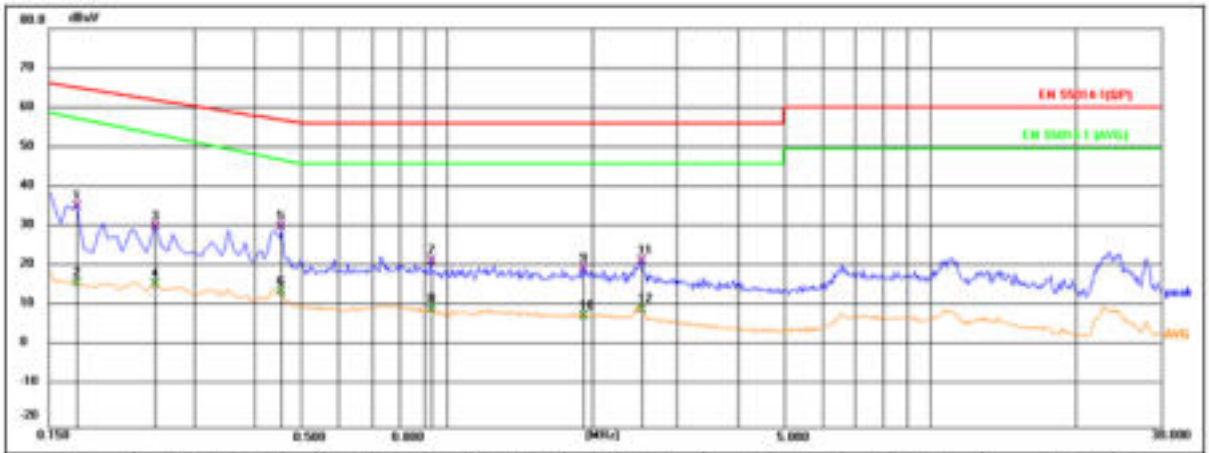
A.7.Photo of Voltage Dips and Interruptions Test

ANNEX B

（Emission and Immunity test results）

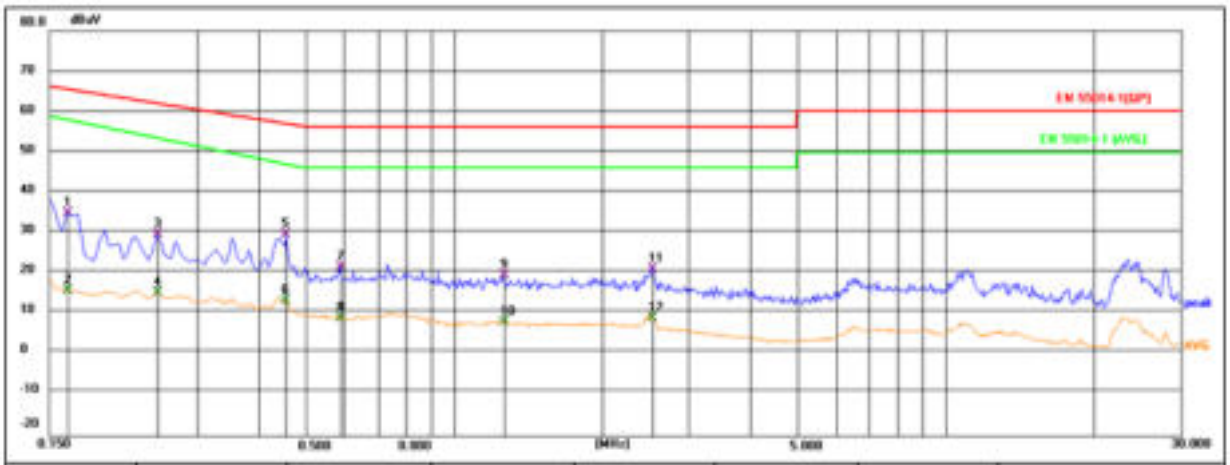
B.1 POWER LINE CONDUCTED EMISSION MEASUREMENT

Environmental Conditions:	22.7℃, 53.7% RH
Test Voltage:	AC 230V,50Hz
Test Model:	SH01
Test Mode:	Mode 1
Test Engineer:	Daiwei Dai
Pol:	Line
Detailed results are shown below	



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1726	18.15	17.21	35.36	64.83	-29.47	QP
2	0.1726	-1.06	17.21	16.15	57.48	-41.33	AVG
3	0.2491	13.38	16.91	30.29	61.79	-31.50	QP
4	0.2491	-0.95	16.91	15.96	53.52	-37.56	AVG
5	0.4561	14.59	15.69	30.28	56.76	-26.48	QP
6	0.4561	-1.72	15.69	13.97	46.99	-33.02	AVG
7	0.9286	5.88	15.69	21.57	56.00	-34.43	QP
8	0.9286	-6.17	15.69	9.52	46.00	-36.48	AVG
9	1.9096	4.54	15.18	19.72	56.00	-36.28	QP
10	1.9096	-7.36	15.18	7.82	46.00	-38.18	AVG
11	2.5306	7.36	14.24	21.60	56.00	-34.40	QP
12	2.5306	-4.54	14.24	9.70	46.00	-36.30	AVG

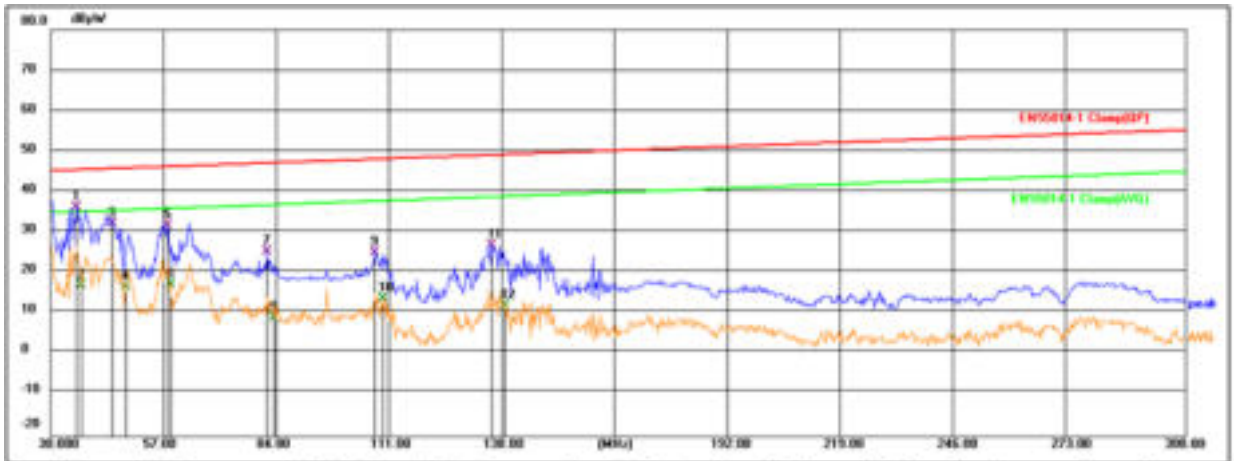
Environmental Conditions:	22.7℃, 53.7% RH
Test Voltage:	AC 230V,50Hz
Test Model:	SH01
Test Mode:	Mode 1
Test Engineer:	Daiwei Dai
Pol:	Neutral
Detailed results are shown below	



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1636	17.75	17.18	34.93	65.28	-30.35	QP
2	0.1636	-1.16	17.18	16.02	58.06	-42.04	AVG
3	0.2491	12.88	16.91	29.79	61.79	-32.00	QP
4	0.2491	-1.45	16.91	15.46	53.52	-38.06	AVG
5	0.4561	14.09	15.69	29.78	56.76	-26.98	QP
6	0.4561	-2.22	15.69	13.47	46.99	-33.52	AVG
7	0.5866	6.22	15.50	21.72	56.00	-34.28	QP
8	0.5866	-6.48	15.50	9.02	46.00	-36.98	AVG
9	1.2616	4.51	15.11	19.62	56.00	-36.38	QP
10	1.2616	-7.15	15.11	7.96	46.00	-38.04	AVG
11	2.5306	6.86	14.24	21.10	56.00	-34.90	QP
12	2.5306	-5.04	14.24	9.20	46.00	-36.80	AVG

B.2 Disturbance Power Measurement

Environmental Conditions:	22.7℃, 53.7% RH
Test Voltage:	AC 230V,50Hz
Test Model:	SH01
Test Mode:	Mode 1
Test Engineer:	Daiwei Dai
Detailed results are shown below	



No.	Frequency (MHz)	Reading (dBpW)	Correct (dB)	Result (dBpW)	Limit (dBpW)	Margin (dB)	Remark
1	36.2400	25.65	10.62	36.27	45.23	-8.96	QP
2	37.5600	6.50	10.65	17.15	35.28	-18.13	AVG
3	44.8800	21.36	10.80	32.16	45.55	-13.39	QP
4	47.9400	5.76	10.86	16.62	35.66	-19.04	AVG
5	57.8400	21.58	10.27	31.85	46.03	-14.18	QP
6	58.7400	7.19	10.20	17.39	36.06	-18.67	AVG
7	81.7200	14.00	11.46	25.46	46.92	-21.46	QP
8	83.2200	-2.40	11.49	9.09	36.97	-27.88	AVG
9	107.2800	13.54	11.69	25.23	47.86	-22.63	QP
10	109.1400	2.00	11.80	13.80	37.93	-24.13	AVG
11	135.1200	15.10	12.00	27.10	48.89	-21.79	QP
12	138.3000	0.26	11.93	12.19	39.01	-26.82	AVG

B.3 Harmonic Current Emission Measurement

Pass

Because the power of EUT is less than 75W, according to standard EN 61000-3-2, harmonic current unnecessary to test.

B.4 Voltage Fluctuation And Flicker Measurement

Test Voltage:	AC 230V,50Hz
Test Model:	SH01
Test Engineer:	Daiwei Dai
Detailed results are shown below	

Overall Result:	Notes:
PASS	Measurement method - Voltage

	Pst	dc (%)	dmax (%)	Tmax(> 3.3%)(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.088	0.005	0.190	0

B.5 Electrostatic Discharge Immunity Test

Electrostatic Discharge Test Results

Standard	☐ IEC 61000-4-2 ☑ EN 61000-4-2		
Applicant	Shenzhen Liandianchuang Technology Co., LTD		
EUT	Sovol Filament Dryer	**Temperature**	22.3℃
M/N	SH01	**Humidity**	53.1％
Criterion	B	**Pressure**	1021mbar
Test Mode	Mode 1	**Test Engineer**	Daiwei Dai
Test Voltage	AC 230V/50Hz		

Air Discharge

Test Points	Test Levels			Results		
	± 2kV	± 4kV	± 8kV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☒	☐	☐A ☒B
Back	☒	☒	☒	☒	☐	☐A ☒B
Left	☒	☒	☒	☒	☐	☐A ☒B
Right	☒	☒	☒	☒	☐	☐A ☒B
Top	☒	☒	☒	☒	☐	☐A ☒B
Bottom	☒	☒	☒	☒	☐	☐A ☒B

Contact Discharge

Test Points	Test Levels		Results		
	± 2 kV	±4 kV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☐	☐A ☒B
Back	☒	☒	☒	☐	☐A ☒B
Left	☒	☒	☒	☐	☐A ☒B
Right	☒	☒	☒	☐	☐A ☒B
Top	☒	☒	☒	☐	☐A ☒B
Bottom	☒	☒	☒	☐	☐A ☒B

Discharge To Horizontal Coupling Plane

Side of EUT	Test Levels		Results		
	± 2 kV	± 4 kV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☐	☐A ☒B
Back	☒	☒	☒	☐	☐A ☒B
Left	☒	☒	☒	☐	☐A ☒B
Right	☒	☒	☒	☐	☐A ☒B

Discharge To Vertical Coupling Plane

Side of EUT	Test Levels		Results		
	± 2 kV	± 4 kV	Passed	Fail	Performance Criterion
Front	☒	☒	☒	☐	☐A ☒B
Back	☒	☒	☒	☐	☐A ☒B
Left	☒	☒	☒	☐	☐A ☒B
Right	☒	☒	☒	☐	☐A ☒B

B.6 Electrical Fast Transient/Burst Immunity Test

Electrical Fast Transient/Burst Test Results

Standard	☐ IEC 61000-4-4 ☑ EN 61000-4-4		
Applicant	Shenzhen Liandianchuang Technology Co., LTD		
EUT	Sovol Filament Dryer	**Temperature**	22.6℃
M/N	SH01	**Humidity**	53.2%
Test Mode	Mode 1	**Criterion**	B
Test Engineer	Daiwei Dai	**Test Voltage**	AC 230V/50Hz

Line	Test Voltage	Result (+)	Result (-)
L	1KV	PASS	PASS
N	1KV	PASS	PASS
PE			
L-N	1KV	PASS	PASS
L-PE			
N-PE			
L-N-PE			
Signal Line			
I/O Cable			

Note:

B.7 Surge Immunity Test

Surge Immunity Test Result			
Standard	☐ IEC 61000-4-5 ☑ EN 61000-4-5		
Applicant	Shenzhen Liandianchuang Technology Co., LTD		
EUT	Sovol Filament Dryer	**Temperature**	22.3℃
M/N	SH01	**Humidity**	53.2%
Test Mode	Mode 1	**Criterion**	B
Test Engineer	Daiwei Dai	**Test Voltage**	AC 230V/50Hz

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Result
L-N	+	90°	5	1.0	PASS
	-	270°	5	1.0	PASS
L-PE					
N-PE					
Signal Line					
Note					

B.8 Injected Currents Susceptibility Test

Injected Currents Susceptibility Test Results			
Standard	☐ IEC 61000-4-6 ☑ EN 61000-4-6		
Applicant	Shenzhen Liandianchuang Technology Co., LTD		
EUT	Sovol Filament Dryer	**Temperature**	23.9℃
M/N	SH01	**Humidity**	52.8%
Test Mode	Mode 1	**Criterion**	A
Test Engineer	Daiwei Dai	**Test Voltage**	AC 230V/50Hz

Frequency Range (MHz)	Injected Position	Strength (Unmodulated)	Criterion	Result
0.15 ~ 230	AC Mains	3V	A	PASS

Note:

B.9 Voltage Dips And Interruptions Test

Voltage Dips And Interruptions Test Results			
Standard	☐ IEC 61000-4-11 ☑ EN 61000-4-11		
Applicant	Shenzhen Liandianchuang Technology Co., LTD		
EUT	Sovol Filament Dryer	**Temperature**	22.5℃
M/N	SH01	**Humidity**	53.1%
Test Mode	Mode 1	**Criterion**	C&C
Test Engineer	Daiwei Dai	**Test Voltage**	AC 230V/50Hz

Test Level % U_T	**Voltage Dips & Short Interruptions % U_T**	**Duration (in periods)**		**Criterion**	**Result**
		50Hz	**60Hz**		
40	60	10P	12P	C	PASS
70	30	25P	60P	C	PASS
0	100	0.5P	0.6P	C	PASS

Note:

ANNEX C

（External and internal photos of the EUT）

Fig. 1

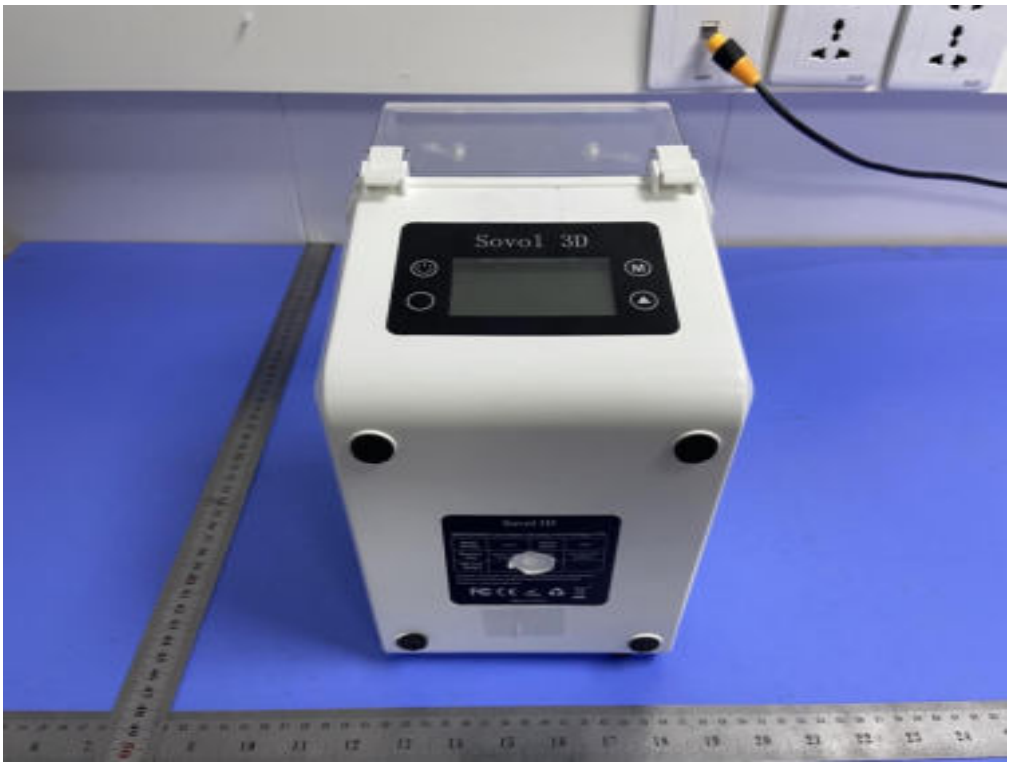


Fig. 2

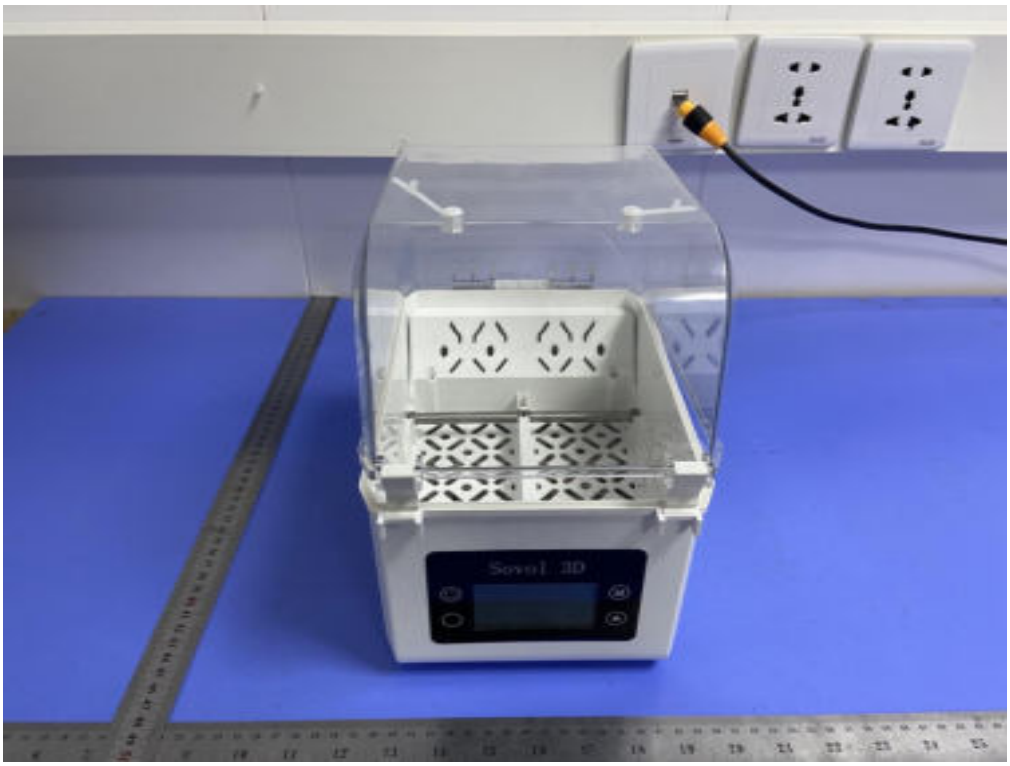


Fig. 3

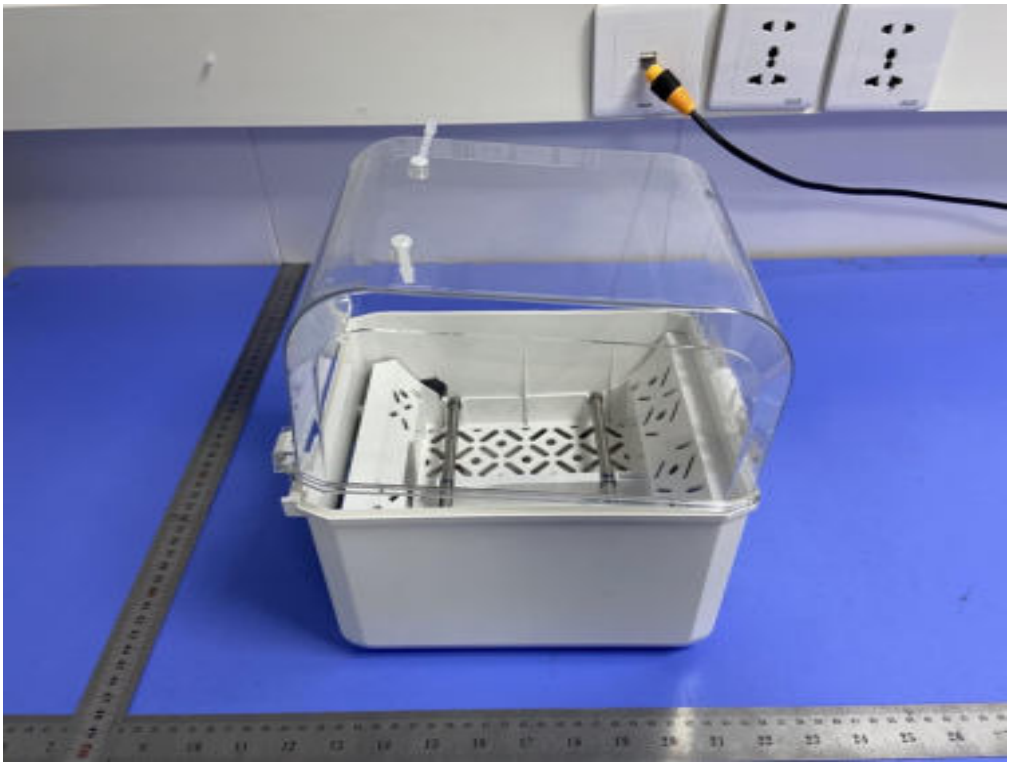


Fig. 4


AC/DC ADAPTOR
Switching Adapter
MODEL:JCY-1240
INPUT:AC100-240V
50/60Hz
OUTPUT:12V ⎓ 4A
CAUTION:
INDOOR USE ONLY
CAUTION:
RISK OF ELECTRONIC SHOCK
DO NOT OPEN
FOR USE WITH INFORMATION
TECHNOLOGY EQUIPMENT ONLY
MADE IN CHINA

Fig. 5

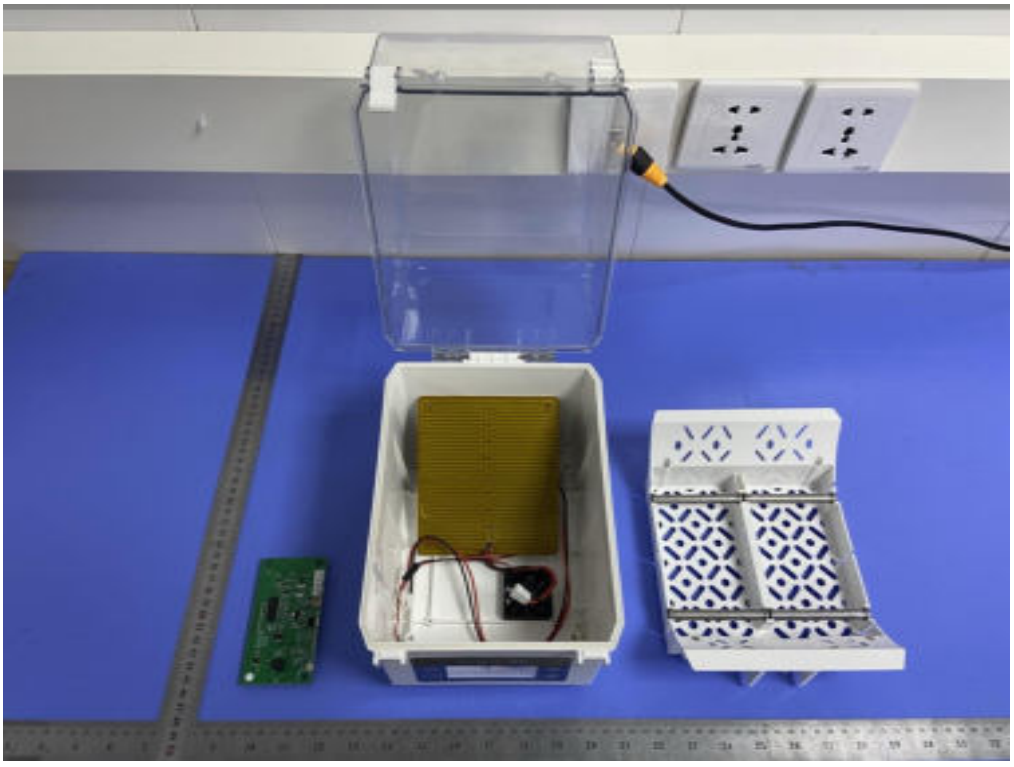


Fig. 6

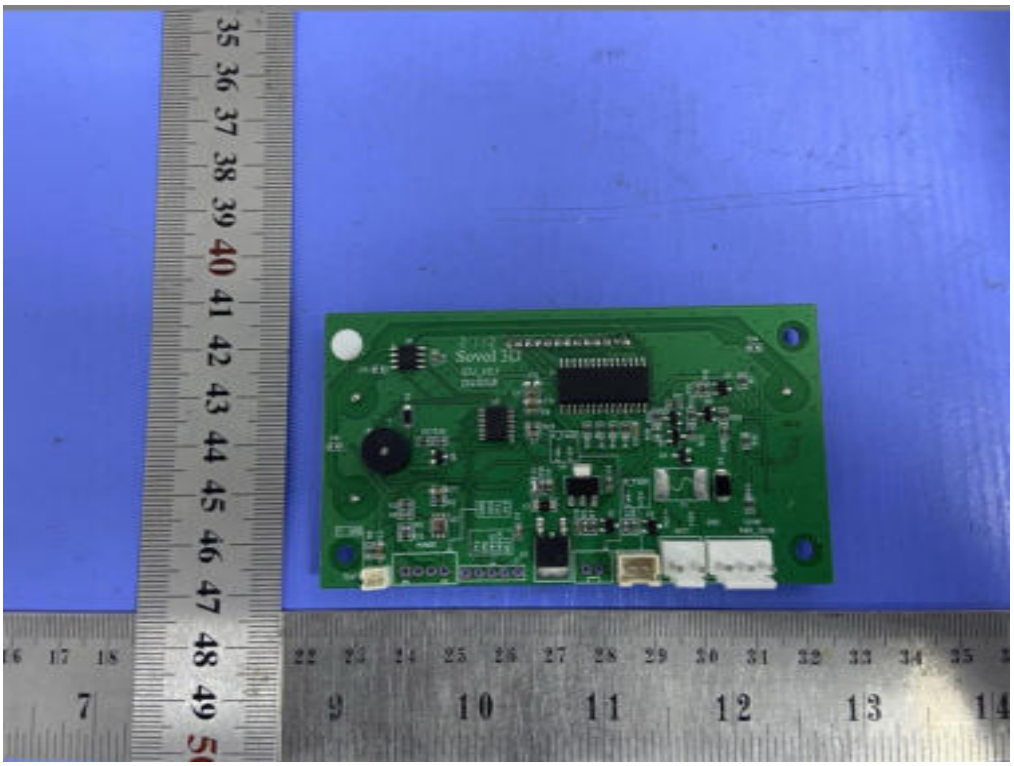


Fig. 7

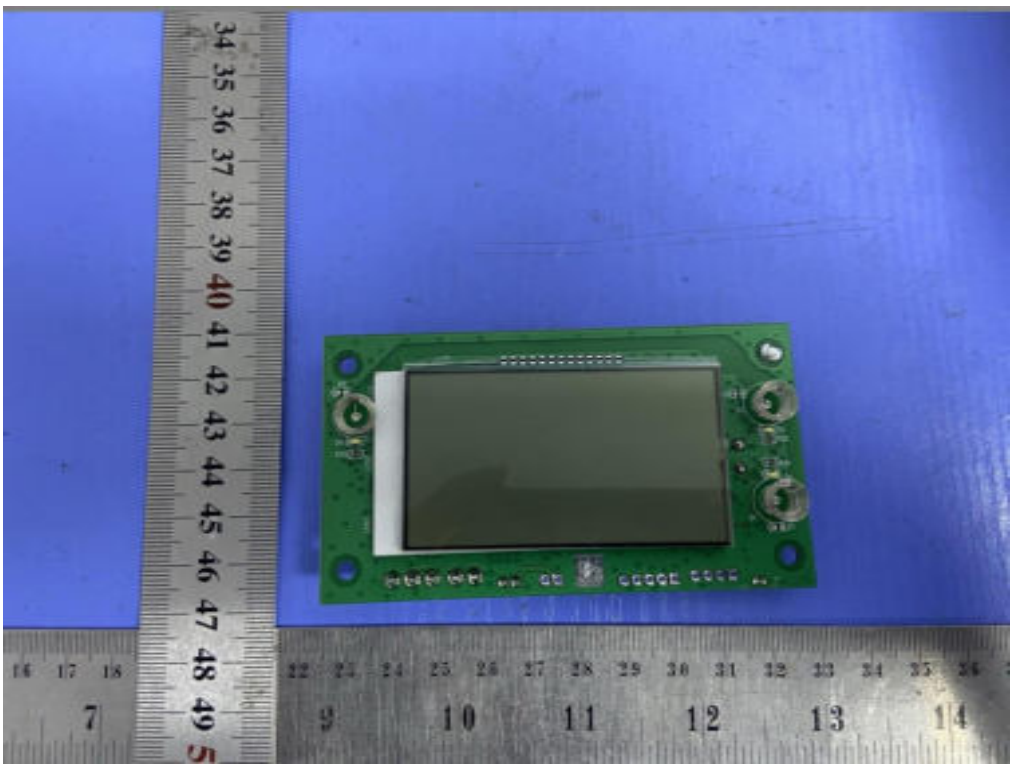


Fig. 8

----------THE END OF TEST REPORT----------

Attestation of Compliance

Reference No.	:	LCS210510031AS
Applicant	:	Shenzhen Liandianchuang Technology Co.,LTD.
Address	:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Product	:	Sovol Filament Dryer
Trade Mark		Sovol 3D, COMGROW
Model(s)	:	SH01, SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09
Parameters	:	For power supply unit input: 100-240V~, 50/60Hz, 0.8A Max Output: 12V⎓, 4A For Sovol Filament Dryer: 12V⎓, 4A, 48W
Tested according to	:	EN 60335-1: 2012+A11: 2014+A13: 2017+A1: 2019+A14: 2019+A2:2019; EN 60335-2-45: 2002+A1: 2008+A2: 2012; EN 62233: 2008;

The submitted products have been tested by us with the listed standards.

This Attestation of Compliance is issued according to The LVD 2014/35/EU, Referred to as the LVD Directive. It confirms that the listed product complies with all essential requirements of the Directive and applies only to the sample and its technical documentation submitted to Shenzhen LCS Compliance Testing Laboratory Ltd. for testing.

After preparation of the necessary technical documentation as well as the EC conformity declaration the required CE marking can be affixed on the product. Other relevant Directives have to be observed.

CE

LCS TESTING LABORATORY * APPROVED *

Manager

Date of issue: May 27, 2021

Shenzhen LCS Compliance Testing Laboratory Ltd.
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扫码查询真伪
Scan,Query authenticity

TEST REPORT
IEC 60335-2-45
Safety of household and similar electrical appliances
Part 2: Particular requirements for portable heating tools

Report Number. .....:	LCS210510031AS
Date of issue .....:	May 27, 2021
Total number of pages.....	117
Name of Testing Laboratory preparing the Report.....:	Shenzhen LCS Compliance Testing Laboratory Ltd. Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name.....:	Shenzhen Liandianchuang Technology Co.,LTD.
Address .....:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Test specification:	
Standard.....:	IEC 60335-2-45:2002, AMD1:2008, AMD2:2011 used in conjunction with IEC 60335-1:2010, COR1:2010, COR2:2011, AMD1:2013, COR1:2014, AMD2:2016, COR1:2016
Test procedure .....:	CE-LVD
Non-standard test method .....:	N/A
Test Report Form No.....:	IEC60335_2_45J
Test Report Form(s) Originator ....:	LCIE
Master TRF.....:	Dated 2018-10-04

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	Sovol Filament Dryer
Trade Mark ..... :	Sovol 3D, COMGROW
Manufacturer ..... :	Shenzhen Jiexinhua Technology Co., Ltd. Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Model/Type reference ..... :	SH01, SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09
Ratings ..... :	For power supply unit input: 100-240V~, 50/60Hz, 0.8A Max Output: 12V⎓, 4A For Sovol Filament Dryer: 12V⎓, 4A, 48W

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**Testing Laboratory:**	Shenzhen LCS Compliance Testing Laboratory Ltd.	
Testing location/ address ..... :		Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China	
Tested by ..... :		Uic Wan / Test Engineer	Uic Wan .....
Reviewed by ..... :		Caps Li/ Project engineer	Caps li .....
Approved by ..... :		Hart Qiu/ Technical manager	Hart Qiu .....

List of Attachments:
Attachment No.1:
National Differences
Attachment No.2:
Photo document

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
➢ Electrical safety IEC 60335-2-45:2002, AMD1:2008, AMD2:2011 used in conjunction with IEC 60335-1:2010, COR1:2010, COR2:2011, AMD1:2013, COR1:2014, AMD2:2016, COR1:2016 EN 60335-1: 2012+A11: 2014+A13: 2017+A1: 2019+A14: 2019+A2:2019; EN 60335-2-45: 2002+A1: 2008+A2: 2012; EN 62233: 2008;	Shenzhen LCS Compliance Testing Laboratory Ltd. Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):
☒ The product fulfils the requirements of EN 60335-1: 2012+A11: 2014+A13: 2017+A1: 2019+A14: 2019+A2:2019; EN 60335-2-45: 2002+A1: 2008+A2: 2012; EN 62233: 2008;

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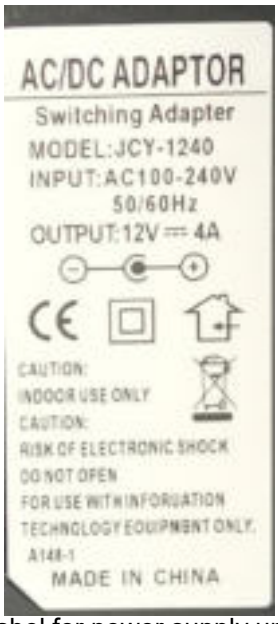
Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Label for power supply unit

Sovol 3D

Sovol Filament Dryer
Model: SH01
12V⎓, 4A

Shenzhen Jiexinhua Technology Co., Ltd.
Importer: XXXX
Address: XXXX

Made in China

COMGROW

Sovol Filament Dryer
Model: SH01
12V⎓, 4A

Shenzhen Jiexinhua Technology Co., Ltd.
Importer: XXXX
Address: XXXX

Made in China

Label for Sovol Filament Dryer

Remarks:

1. The height of the WEEE symbol should not less than 7mm.

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Test item particulars.....:	
Classification of installation and use.....:	Portable Appliance, Class II
Supply Connection.....:	Power by a power supply unit
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2021-05-10
Date (s) of performance of tests.....:	From 2021-05-10 to 2021-05-27

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.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒**Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) .....:	Shenzhen Jiexinhua Technology Co., Ltd. Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen

General product information:

1. The appliance used indoor and household only.
2. All models are identical except the model name.

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict

5	**GENERAL CONDITIONS FOR THE TESTS**		**P**
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.		P
6	**CLASSIFICATION**		**P**
6.1	Protection against electric shock: Class 0, 0I, I, II, III ....:	Class II	P
	For a class III construction with a detachable power supply part the appliance is classified according to the detachable power supply part		N/A
6.2	Protection against harmful ingress of water	IPX0	N/A
	Class II dehorning tools and transformers for class III dehorning tools shall be at least IP X4 (IEC 60335-2-45)		N/A
	Conduit-soldering tools and thermoplastic conduit-welding tools shall be at least IP X4 (IEC 60335-2-45)		N/A
	Hand-held paint strippers for outdoor use shall be at least IP X4 unless the instructions for use state they are not to be stored outdoors or left outdoors, in which case they may be IP X 0 (IEC 60335-2-45)		N/A
7	**MARKING AND INSTRUCTIONS**		**P**
7.1	Rated voltage or voltage range (V) ....:	See page 2	P
	Symbol for nature of supply, or ....:	See page 2	P
	Rated frequency (Hz) ....:	See page 2	P
	Rated power input (W), or ....:	See page 2	P
	Rated current (A)..... .....:	See page 2	P
	Manufacturer's or responsible vendor's name, trademark or identification mark..... .....:	See page 2	P
	Model or type reference ....:	See page 2	P
	Symbol IEC 60417-5172, for class II appliances	 for power supply unit	P
	IP number, other than IPX0..... .....:		N/A
	Symbol IEC 60417-5180, for class III appliances, unless		N/A
	the appliance is operated by batteries only, or		N/A
	for appliances powered by rechargeable batteries recharged in the appliance		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Symbol IEC 60417-5018, for class II and class III appliances incorporating a functional earth		N/A
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hose-sets for connection of an appliance to the water mains, if the working voltage exceeds extra-low voltage		N/A
	Contact fire lighters shall be marked with the limit of insertion into the fuel (IEC 60335-2-45)		N/A
	Contact fire lighters which are not at least IP X4 shall be marked with (IEC 60335-2-45): Do not expose to rain or moisture		N/A
	Thermoplastic conduit-welding tools shall be marked with the types of fittings with which they are to be used and with the corresponding settings. Each fitting shall be marked with the type of appliance with which it is to be used and with its own type reference (IEC 60335-2-45)		N/A
7.2	Warning for stationary appliances for multiple supply		N/A
	Warning placed in vicinity of terminal cover		N/A
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen	100-240V	P
	Different rated values marked with the values separated by an oblique stroke	50/60Hz	P
7.4	Appliances adjustable for different rated voltages or rated frequencies, the voltage or the frequency setting is clearly discernible		N/A
	Requirement met if frequent changes are not required and the rated voltage or rated frequency to which the appliance is to be adjusted is determined from a wiring diagram		N/A
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N/A
	the power input is related to the arithmetic mean value of the rated voltage range		N/A
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N/A
7.6	Correct symbols used		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Symbol for nature of supply placed next to rated voltage		P
	Symbol for class II appliances placed unlikely to be confused with other marking		N/A
	Units of physical quantities and their symbols according to international standardized system		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		N/A
	correct mode of connection is obvious		N/A
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		P
	- marking of terminals exclusively for the neutral conductor (letter N)		N/A
	- marking of protective earthing terminals (symbol IEC 60417-5019)		N/A
	- marking of functional earthing terminals (symbol IEC 60417-5018)		N/A
	- marking not placed on removable parts		P
7.9	Marking or placing of switches which may cause a hazard		P
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means ....:		P
	This applies also to switches which are part of a control		N/A
	If figures are used, the off position indicated by the figure 0		P
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		P
7.11	Indication for direction of adjustment of controls		P
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance		P
	The instructions state that:		P
	- the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	- children being supervised not to play with the appliance		P
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided		N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless		N/A
	it is a battery-operated appliance, the battery being charged outside the appliance		N/A
	For appliances for altitudes exceeding 2000 m, the maximum altitude is stated :		N/A
	The instructions for appliances incorporating a functional earth states that the appliance incorporates an earth connection for functional purposes only		N/A
	The instructions for use for appliances having a separate stand and not incorporating a biased-off switch shall include the substance of the following warning (IEC 60335-2-45): WARNING - This tool must be placed on its stand when not in use		N/A
	The instructions for use for class III dehorning tools shall include the substance of the following warning (IEC 60335-2-45): WARNING - Only use the transformer provided		N/A
	The instructions for use for heat guns and hand-held paint strippers shall include the substance of the following (IEC 60335-2-45):		P
	A fire may result if the appliance is not used with care, therefore:		P
	- be careful when using the appliance in places where there are combustible materials. Do not apply to the same place for a long time		P
	- do not use in presence of an explosive atmosphere		P
	- heat may be conducted to combustible materials which are out of sight		P
	- place on its stand after use and follow to cool before storage		N/A
	The instructions for use for fire lighters shall include the substance of the following (IEC 60335-2-45):		N/A
	- ensure that the fire lighter is properly positioned		N/A
	- unplug before removal from the fire		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	- allow to cool before storage		N/A
	- do not allow the hot parts of the fire lighter to touch the cord or other flammable materials		N/A
	The instructions for thermoplastic conduit-welding tools shall state that a welding operation must not be repeated on a fitting since this can result in live parts becoming accessible (IEC 60335-2-45)		N/A
7.12.1	Sufficient details for installation supplied		P
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		N/A
	If different rated voltages or different rated frequencies are marked, the instructions state what action to be taken to adjust the appliance		P
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules		N/A
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected		N/A
7.12.4	Instructions for built-in appliances:		N/A
	- dimensions of space		N/A
	- dimensions and position of supporting and fixing		N/A
	- minimum distances between parts and surrounding structure		N/A
	- minimum dimensions of ventilating openings and arrangement		N/A
	- connection to supply mains and interconnection of separate components		N/A
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N/A
	a switch complying with 24.3		N/A
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N/A
	Replacement cord instructions, type Y attachment		N/A
	Replacement cord instructions, type Z attachment		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		N/A
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		N/A
7.12.8	Instructions for appliances connected to the water mains:		N/A
	- max. inlet water pressure (Pa) ....:		N/A
	- min. inlet water pressure, if necessary (Pa).....:		N/A
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		N/A
7.12.9	Instructions specified in 7.12 and from 7.12.1 to 7.12.8 appear together before any other instructions supplied with the appliance		P
	These instructions may be supplied with the appliance separately from any functional use booklet		N/A
	They may follow the description of the appliance that identifies parts, or follow the drawings/sketches		N/A
	In addition, instructions are also available in an alternative format such as on a website or on request from the user in a format such as a DVD		P
	In addition, instructions are also available in an alternative format such as on a website or in a format such as a DVD ....:	Website	P
7.13	Instructions and other texts in an official language	In English	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
	Signal words WARNING, CAUTION, DANGER in uppercase having a height as specified ....:		P
	Uppercase letter of the text explaining the signal word not smaller than 1,6 mm ....:		P
	Moulded in, engraved, or stamped markings either raised above or have a depth below the surface of at least 0,25 mm, unless		N/A
	contrasting colours are used		N/A
	Markings checked by inspection, measurement and rubbing test as specified		P
7.15	Markings on a main part		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Marking clearly discernible from the outside, if necessary after removal of a cover		P
	For portable appliances, cover can be removed or opened without a tool		N/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		N/A
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N/A
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		P
	The symbol IEC 60417-5018 placed next to the symbol IEC 60417-5172 or IEC 60417-5180		N/A
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		N/A
8	**PROTECTION AGAINST ACCESS TO LIVE PARTS**		**P**
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Lamps behind a detachable cover not removed, if conditions met	No lamp	N/A
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N/A
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		N/A
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements or supporting parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For a single switching action obtained by a switching device, requirements as specified		N/A
	For appliances with a supply cord and without a switching device, the single switching action may be obtained by the withdrawal of the plug		N/A
8.1.4	Accessible part not considered live if:		P
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N/A
	- safety extra-low d.c. voltage: not exceeding 42.4 V	12V	P
	- or separated from live parts by protective impedance		N/A
	If protective impedance: d.c. current not exceeding 2 mA, and		N/A
	a.c. peak value not exceeding 0.7 mA		N/A
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μF		N/A
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC		N/A
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N/A
	Parts operating at safety extra-low voltage exceeding 12 V in thermoplastic conduit-welding tools are also considered to be live parts (IEC 60335-2-45)		N/A
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		N/A
	- built-in appliances		N/A
	- fixed appliances		N/A
	- appliances delivered in separate units		N/A
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only		P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P
9	**STARTING OF MOTOR-OPERATED APPLIANCES**		**N/A**
	Requirements and tests are specified in part 2 when necessary		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict

10	**POWER INPUT AND CURRENT**		**P**
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1 .:	(see appended table)	P
	If the power input varies throughout the operating cycle and the maximum value of the power input exceeds, by a factor greater than two, the arithmetic mean value of the power input occurring during a representative period, the power input is the maximum value that is exceeded for more than 10 % of the representative period		N/A
	Otherwise the power input is the arithmetic mean value		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		P
	the rated power input is related to the arithmetic mean value		N/A
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2.....:	(see appended table)	P
	If the current varies throughout the operating cycle and the maximum value of the current exceeds, by a factor greater than two, the arithmetic mean value of the current occurring during a representative period, the current is the maximum value that is exceeded for more than 10 % of the representative period		N/A
	Otherwise the current is the arithmetic mean value		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A
	the rated current is related to the arithmetic mean value of the range		N/A
11	**HEATING**		**P**
11.1	No excessive temperatures in normal use		P
11.2	The appliance is held, placed or fixed in position as described.....:		P
	Appliances are tested away from the walls of the test corner (IEC 60335-2-45)		P
11.3	Temperature rises, other than of windings, determined by thermocouples		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Temperature rises of windings determined by resistance method, unless		N/A
	the windings are non-uniform or it is difficult to make the necessary connections		N/A
11.4	Heating appliances operated under normal operation at 1.15 times rated power input (W).....:		P
	Soldering guns, induction soldering irons and other appliances operated with a transformer are supplied at 1,06 times rated voltage (IEC 60335-2-45)		N/A
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V).....:		N/A
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V).....:		N/A
11.7	Operation duration corresponding to the most unfavourable conditions of normal use		P
	Contact fire lighters are operated for 30 min. Hot-air fire lighters are operated for 10 min (IEC 60335-2-45)		N/A
	Other appliances are operated until steady conditions are established (IEC 60335-2-45)		P
11.8	Temperature rises monitored continuously and not exceeding the values in table 3 .....:	(see appended table)	P
	If the temperature rise of a motor winding exceeds the value of table 3, or		N/A
	if there is doubt with regard to classification of insulation,		N/A
	tests of Annex C are carried out		N/A
	Sealing compound does not flow out		P
	Protective devices do not operate, except		P
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4		N/A
	The temperature rise limit specified in Table 3 for pure mica and tightly sintered ceramic material is increased to 600K (IEC 60335-2-45)		N/A
13	**LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE**		**P**
13.1	Leakage current not excessive and electric strength adequate		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances operated with a transformer and induction soldering irons are tested as motor-operated appliances (IEC 60335-2-45)		P
	Heating appliances operated at 1.15 times the rated power input (W).....:		P
	Motor-operated appliances and combined appliances supplied at 1.06 times the rated voltage (V).....:		N/A
	Protective impedance and radio interference filters disconnected before carrying out the tests		N/A
13.2	The leakage current is measured by means of the circuit described in Figure 4 of IEC 60990:1999		P
	For class 0I appliances and class I appliances, except parts of class II construction, C may be replaced by a low impedance ammeter		P
	Leakage current measurements .....:	(see appended table)	P
13.3	The appliance is disconnected from the supply		P
	Electric strength tests according to table 4 .....:	(see appended table)	P
	No breakdown during the tests		P
14	**TRANSIENT OVERVOLTAGES**		**N/A**
	Appliances withstand the transient over-voltages to which they may be subjected		N/A
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6 .....:	(see appended table)	N/A
	No flashover during the test, unless		N/A
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N/A
15	**MOISTURE RESISTANCE**		**P**
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	IPX0	N/A
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		N/A
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529 .....:		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		N/A
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N/A
	Built-in appliances installed according to the instructions		N/A
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		N/A
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N/A
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N/A
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube, and		N/A
	for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		N/A
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N/A
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support, and		N/A
	for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Detachable parts subjected to the relevant treatment with the main part		N/A
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		N/A
15.2	Spillage of liquid does not affect the electrical insulation		N/A
	Spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N/A
	Detachable parts are removed		N/A
	Overfilling test with additional amount of water, over a period of 1 min (l) .....:		N/A
	The appliance withstands the electric strength test of 16.3		N/A
	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
15.3	Appliances proof against humid conditions		P
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		P
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part		P
	Humidity test for 48 h in a humidity cabinet	48h, 93%R.H., 30ºC	P
	Reassembly of those parts that may have been removed		P
	The appliance withstands the tests of clause 16	No breakdown observed.	P
15.101	Household film-welding appliances provided with a suction device shall be constructed so that suction of liquid does not impair electrical insulation (IEC 60335-2-45)		N/A
16	**LEAKAGE CURRENT AND ELECTRIC STRENGTH**		**P**
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		N/A
	Tests carried out at room temperature and not connected to the supply		P
	Appliances supplied by a transformer and induction soldering irons are tested as motor-operated appliances (IEC 60335-2-45)		P
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V).....:		P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3 (V) .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Leakage current measurements .....:	(see appended table)	P
	Limit values doubled if:		N/A
	- all controls have an off position in all poles, or		N/A
	- the appliance has no control other than a thermal cut-out, or		N/A
	- all thermostats, temperature limiters and energy regulators do not have an off position, or		N/A
	- the appliance has radio interference filters		N/A
	With the radio interference filters disconnected, the leakage current do not exceed limits specified .....:	(see appended table)	N/A
16.3	Electric strength tests according to table 7 .....:	(see appended table)	P
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified .....:	(see appended table)	P
	No breakdown during the tests		P
17	**OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS**		N/A
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use .....:	(see appended table)	N/A
	Appliance supplied with 1.06 or 0.94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V) .....:		N/A
	Basic insulation is not short-circuited		N/A
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		N/A
	Temperature of the winding not exceeding the value specified in table 8		N/A
	The test is not carried out on soldering guns and other appliances in which the heating element is part of the secondary circuit of a transformer (IEC 60335-2-45)		N/A
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N/A
18	**ENDURANCE**		N/A
	Requirements and tests are specified in part 2 when necessary		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict

19	**ABNORMAL OPERATION**		**P**
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe.....:	(see appended table)	P
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and		P
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and		P
	if applicable, to the test of 19.5		N/A
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6		N/A
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable		N/A
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		N/A
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		N/A
	Appliances incorporating voltage selector switches subjected to the test of 19.15		N/A
	Unless otherwise specified, the tests are continued until a non-self-resetting thermal cut-out operates, or		P
	until steady conditions are established		P
	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		N/A
	For heat guns and hot-air fire lighters, compliance is also checked by the test of 19.101 (IEC 60335-2-45)		P

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Clause	Requirement + Test	Result - Remark	Verdict
19.2	Appliances are operated under the conditions specified in clause 11 but supplied at 0,94 times rated voltage. However, appliances in which the heating element is part of the secondary circuit of a transformer are operated continuously for 30 min unless they incorporate a biased-off switch, in which case they are operated for 5 min. Fire lighters are operated for 2 h without adding fuel ..... (IEC 60335-2-45)		P
	Paint strippers incorporating integral scrapers are held horizontally in a clamp over the entire length of the handle. A force of 70 N is exerted on the scraper edge in the direction corresponding to normal use ..... (IEC 60335-2-45)		N/A
19.3	The test of 19.2 is repeated with the appliance supplied at 1,06 times rated voltage ..... (IEC 60335-2-45)		P
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited		P
	Thermoplastic conduit-welding tools are operated with the fastest possible sequence of welding operations (IEC 60335-2-45)		N/A
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath		N/A
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N/A
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N/A
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures (V) .....:		N/A
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or		P
	locking moving parts of other appliances		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Locked rotor, capacitors open-circuited one at a time		N/A
	Test repeated with capacitors short-circuited one at a time, unless		N/A
	capacitor is of class S2 or S3 of IEC 60252-1		N/A
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed.....:		N/A
	An electronic timer or programmer that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, is a protective electronic circuit		N/A
	Other appliances supplied with rated voltage for a period as specified .....:		P
	Winding temperatures not exceeding values specified in table 8.....:	(see appended table)	P
19.8	Multi-phase motors operated at rated voltage with one phase disconnected		N/A
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously		N/A
	Motor-operated and combined appliances for which 30.2.3 is applicable and that use overload protective devices relying on electronic circuits to protect the motor windings, are also subjected to the test		N/A
	Winding temperatures not exceeding values as specified .....:	(see appended table)	N/A
19.10	Series motor operated at 1.3 times rated voltage for 1 min (V).....:		N/A
	During the test, parts not being ejected from the appliance		N/A
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless		P
	they comply with the conditions specified in 19.11.1		N/A
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless		N/A
	restarting does not result in a hazard		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances having a device with an off position obtained by electronic disconnection, or a device placing the appliance in a stand-by mode, subjected to the tests of 19.11.4		P
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		N/A
	During and after each test the following is checked:		P
	- the temperature of the windings do not exceed the values specified in table 8		P
	- the appliance complies with the conditions specified in 19.13		P
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		P
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		N/A
	- the base material of the printed circuit board withstands the test of Annex E		N/A
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29		N/A
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to circuits or parts of circuits meeting both of the following conditions:		N/A
	- the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified		N/A
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit		N/A
19.11.2	Fault conditions applied one at a time, the appliance operating under conditions specified in clause 11, but supplied at rated voltage, duration of the tests as specified:		P
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29		P
	b) open circuit at the terminals of any component		P
	c) short circuit of capacitors, unless		P
	they comply with IEC 60384-14		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	d) short circuit of any two terminals of an electronic component, other than integrated circuits		
	This fault condition is not applied between the two circuits of an optocoupler		N/A
	e) failure of triacs in the diode mode		N/A
	f) failure of microprocessors and integrated circuits		P
	g) failure of an electronic power switching device		N/A
	Each low power circuit is short-circuited by connecting the low-power point to the pole of the supply source from which the measurements were made		N/A
19.11.3	If the appliance incorporates a protective electronic circuit that operates to ensure compliance with clause 19, the appliance is tested as specified		N/A
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		P
	a device that can be placed in the stand-by mode,		P
	subjected to the tests of 19.11.4.1 to 19.11.4.7, the device being set in the off position or in the stand-by mode		P
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, the tests being carried out after the protective electronic circuit has operated, except that		N/A
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		N/A
	Surge protective devices disconnected, unless		N/A
	They incorporate spark gaps		N/A
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		P
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, at frequency ranges specified		P
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		P
	An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode		N/A
	An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling		N/A
	Earthed heating elements in class I appliances disconnected		N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		P
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		P
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		N/A
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		P
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate		N/A
	The appliance continues to operate normally, or		N/A
	requires a manual operation to restart		N/A
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A).....:		N/A
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9 .....:	(see appended table)	P
	Compliance with clause 8 not impaired		P
	If the appliance can still be operated it complies with 20.2		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4:		P
	- basic insulation (V).....:	1000	P
	- supplementary insulation (V) .....:	1750	P
	- reinforced insulation (V) .....:	3000	P
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage		P
	The appliance does not undergo a dangerous malfunction, and		P
	no failure of protective electronic circuits, if the appliance is still operable		N/A
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		P
	- do not become operational, or		P
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		N/A
	If the appliance contains lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that:		N/A
	- the lid or door does not move automatically to an open position when the interlock is released, and		N/A
	- the appliance does not start after the cycle in which the interlock was released		N/A
	The temperature rise of the windings of induction soldering irons shall not exceed the values specified in 19.7. (IEC 60335-2-45)		N/A
	The electric strength test of induction soldering irons is carried out immediately after switching off the appliance. (IEC 60335-2-45)		N/A
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited		N/A
	For a relay or contactor with more than one contact, all contacts are short-circuited at the same time		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	A relay or contactor operating only to ensure the appliance is energized for normal use is not short-circuited		N/A
	If more than one relay or contactor operates in clause 11, they are short-circuited in turn		N/A
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied		N/A
19.101	Heat guns and hot-air fire lighters are operated as specified in clause 11 until steady conditions are established. The voltage at the terminals of the motor is then reduced until the running speed of the motor is just sufficient to prevent the thermal cut-out from operating, the power input to the heating element being maintained at 1,15 times rated power input (IEC 60335-2-45)		P
	The voltage is decreased at		P
	- 1 V per minute for motors having a working voltage not exceeding 30 V		P
	- 5 V per minute for motors having a working voltage exceeding 30 V		P
	The appliances are then operated until steady conditions are established		P
20	**STABILITY AND MECHANICAL HAZARDS**		**P**
20.1	Appliances having adequate stability		P
	Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn		N/A
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		P
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N/A
	Hand-held appliances are subjected to the test while placed on their stands (IEC 60335-2-45)		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		P
	Protective enclosures, guards and similar parts are non-detachable, and		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	have adequate mechanical strength		P
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		N/A
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard by unexpected closure		N/A
	Not possible to touch dangerous moving parts with the test probe described		P
20.101	Contact fire lighters shall have adequate stability (IEC 60335-2-45)		N/A
21	**MECHANICAL STRENGTH**		**P**
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 0,5 J	(see appended table)	P
	The appliance shows no damage impairing compliance with this standard, and		P
	compliance with 8.1, 15.1 and clause 29 not impaired		P
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N/A
	If necessary, repetition of groups of three blows on a new sample		N/A
	For hand-held appliances, compliance is also checked by the tests of 21.101 (IEC 60335-2-45)		N/A
	For contact fire lighters, compliance is also checked by the test of 21.102 (IEC 60335-2-45)		N/A
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		P
21.101	The supply cord of hand-held appliances is cut to a length of 100 mm, measured from the point where the cord, or cord guard, enters the appliance (IEC 60335-2-45)		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	The appliance is dropped from a height of 1 m on to a hardwood base having a thickness of 50 mm		N/A
	This test is made five times, the appliance being in a position such that its major axis is horizontal and so that a different part of the appliance is exposed to the impact each time		N/A
	The appliance is then dropped five times with its major axis vertical and with the soldering tip, or corresponding part of other appliances, pointing downwards		N/A
	The appliance shall not be damaged to such an extent that compliance with this standard is impaired; in particular live parts shall not have become accessible		N/A
21.102	The handle of a new contact fire lighter is held firmly between two lightly padded surfaces with the heating element in a horizontal plane. The fire lighter is supplied at rated voltage. After 3 min a mass of 4,5 kg is suspended at the end of the heating element for 1 min. This mass is removed and the element is allowed to cool. If the element has been bent, it is straightened to its original position (IEC 60335-2-45)		N/A
	After the test, the live parts shall not be accessible and the fire lighter shall withstand the electric strength test of 16.3		N/A
22	**CONSTRUCTION**		**P**
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	IPX0	N/A
22.2	Stationary appliance: means to ensure all-pole disconnection from the supply being provided:		N/A
	- a supply cord fitted with a plug, or		N/A
	- a switch complying with 24.3, or		N/A
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		N/A
	- an appliance inlet		N/A
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 01 and class I appliances, connected to the phase conductor		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
22.3	Appliance provided with pins: no undue strain on socket-outlets	Approved power supply unit	N/A
	Applied torque not exceeding 0.25 Nm		N/A
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N/A
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating, unless		N/A
	rotating does not impair compliance with this standard		N/A
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		N/A
22.5	No risk of electric shock when touching pins, for appliances having a capacitor with rated capacitance equal to or greater than 0,1μF, the appliance being disconnected from the supply at the instant of voltage peak	Approved power supply unit	N/A
	Voltage not exceeding 34 V (V) .....:		N/A
	If compliance relies on the operation of an electronic circuit, the electromagnetic phenomena tests of 19.11.4.3 and 19.11.4.4 are applied		N/A
	The discharge test is then repeated three times, voltage not exceeding 34 V (V) .....:		N/A
22.6	Electrical insulation not affected by condensing water or leaking liquid	No liquid used.	N/A
	Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks		N/A
	In case of doubt, test as described		N/A
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices	No device providing steam.	N/A
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		N/A
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless		P
	the substance has adequate insulating properties		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
22.10	Not possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance, if:	No such thermal cut-outs.	N/A
	- a non-self-resetting thermal cut-out is required by the standard, and		N/A
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		N/A
	Non-self-resetting thermal motor protectors have a trip-free action, unless		N/A
	they are voltage maintained		N/A
	Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely		N/A
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		P
	Obvious locked position of snap-in devices used for fixing such parts		P
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N/A
	Tests as described	50N pull & push, remain in position after test.	P
22.12	Handles, knobs etc. fixed in a reliable manner, if loosening result in a hazard		P
	Removing or fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible, if resulting in a hazard		P
	A choking hazard does not apply to appliances for commercial use		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		P
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		P
	If the part is removed and can be contained within the small parts cylinder, it is considered to be a choking hazard		N/A
22.13	Unlikely that handles, when gripped as in normal use, make the operator's hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded	No such devices.	N/A
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands and no undue wear of contacts	No such devices.	N/A
	Cord reel tested with 6000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1000 V applied		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner	No such devices.	N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless		N/A
	constructed to prevent inappropriate replacement		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		N/A
	material used is non-corrosive, non-hygroscopic and non-combustible		N/A
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless	No such material used.	P
	impregnated		N/A
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		N/A
22.22	Appliances not containing asbestos		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported		P
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		N/A
22.26	For class III constructions the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		N/A
22.27	Parts connected by protective impedance separated by double or reinforced insulation		N/A
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water, separated from live parts by double or reinforced insulation		N/A
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		N/A
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		P
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		N/A
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		N/A
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Ceramic and similar porous material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		N/A
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N/A
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts or,		N/A
	unearthed metal parts separated from live parts by basic insulation only		N/A
	Electrodes not used for heating liquids		N/A
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		N/A
22.34	Shafts of operating knobs, handles, levers etc. not live, unless		P
	the shaft is not accessible when the part is removed		N/A
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation		P
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	This requirement does not apply to handles, levers and knobs on stationary appliances and cordless appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N/A
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N/A
22.36*	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless		N/A
	they are separated from live parts by double or reinforced insulation		N/A
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N/A
	the capacitors comply with 22.42		P
22.38	Capacitors not connected between the contacts of a thermal cut-out		P
22.39	Lamp holders used only for the connection of lamps		N/A
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N/A
	If the appliance cannot operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation being fitted with a switch for stopping the operation. The actuating member of the switch being easily visible and accessible		N/A
22.41	No components, other than lamps, containing mercury	No component containing mercury.	P
22.42	Protective impedance consisting of at least two separate components		N/A
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Resistors checked by the test of 14.1 a) in IEC 60065		N/A
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14		N/A
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N/A
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		P
*22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1		N/A
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N/A
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N/A
*22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		N/A
	No leakage from any part, including any inlet water hose		N/A
*22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water		N/A
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless		N/A
	the appliance switches off automatically or can operate continuously without hazard		N/A
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		N/A
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode		N/A
	There is a visual indication showing that the appliance is adjusted for remote operation		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard:		N/A
	- continuously, or		N/A
	- automatically, or		N/A
	- remotely		N/A
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold		N/A
22.53	Class II appliances and class III appliances that incorporate functionally earthed parts have at least double insulation or reinforced insulation between live parts and the functionally earthed parts		N/A
22.54	Button cells and batteries designated R1 not accessible without the aid of a tool, unless		N/A
	the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously		N/A
22.55	Devices operated to stop the intended function of the appliance, if any, are be distinguished from other manual devices by means of shape, size, surface texture or position .....:		P
	The requirement concerning position does not preclude use of a push on push off switch		N/A
	An indication when the device has been operated is given by:		P
	– tactile feedback from the actuator or from the appliance, or		N/A
	– reduction in heat output; or		N/A
	– audible and visible feedback		P
22.56	Detachable power supply part provided with the part of class III construction		N/A
22.57	The properties of non-metallic materials do not degrade from exposure to UV-C radiation, as specified in Annex T		N/A
	This requirement does not apply to glass, ceramics or similar materials		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
22.101	Hand-held appliances intended to be used away from a workshop shall have an integral stand (IEC 60335-2-45)		N/A
	Hand-held appliances intended to be used on a table or similar surface shall have an incorporated stand or be provided with a separate stand (IEC 60335-2-45)		P
	These requirements do not apply to appliances if they withstand the test of clause 11 without a stand (IEC 60335-2-45)		N/A
22.102	Desoldering irons shall incorporate a device for collecting the solder (IEC 60335-2-45)		N/A
22.103	Soldering guns shall incorporate a biased-off switch (IEC 60335-2-45)		N/A
22.104	If a drain hole is provided in appliances which are likely to suck liquid in normal use, it shall be at least 5 mm in diameter or have an area of 20 mm² with a minimum width of 3 mm (IEC 60335-2-45)		N/A
22.105	Thermoplastic conduit-welding tools shall incorporate a timer which provides all-pole disconnection of the welding circuit and has to be reset before further operation (IEC 60335-2-45)		N/A
	Repetition of the welding operation on the same fitting shall be prevented (IEC 60335-2-45)		N/A
22.106	Thermoplastic conduit-welding tools shall be constructed so that, when they are operated without fittings, the voltage at the connecting terminals is extra-low voltage and does not exceed 24 V (IEC 60335-2-45)		N/A
22.107	Fittings for thermoplastic conduit-welding tools shall be constructed so that at least basic insulation is provided on surfaces which are only accessible before the fitting is placed on the conduit (IEC 60335-2-45)		N/A
22.108	Class III dehorning tools shall be supplied with a transformer (IEC 60335-2-45)		N/A
23	**INTERNAL WIRING**		**P**
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		P
	Wire holes in metal well-rounded or provided with bushings		N/A
	Wiring effectively prevented from coming into contact with moving parts		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges		N/A
	Beads inside flexible metal conduits contained within an insulating sleeve		N/A
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N/A
	Flexible metallic tubes not causing damage to insulation of conductors		N/A
	Open-coil springs not used		N/A
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N/A
	No damage after 10 000 flexings for conductors flexed during normal use, or		N/A
	100 flexings for conductors flexed during user maintenance		N/A
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		N/A
	Not more than 10% of the strands of any conductor broken, and		N/A
	not more than 30% for wiring supplying circuits that consume no more than 15W		N/A
23.4	Bare internal wiring sufficiently rigid and fixed		P
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		N/A
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		N/A
	no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation	2000V, 15 minutes, no breakdown.	N/A
	For class II construction, the requirements for supplementary insulation and reinforced insulation apply,		N/A
	except that the sheath of a cord complying with IEC 60227 or IEC 60245 may provide supplementary insulation.		N/A
	A single layer of internal wiring insulation does not provide reinforced insulation		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		P
	be such that it can only be removed by breaking or cutting		P
23.7	The colour combination green/yellow only used for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N/A
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		N/A
24	**COMPONENTS**		**P**
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components .....:	(see appended table)	P
	Motors not required to comply with IEC 60034-1, they are tested as part of the appliance		P
	Relays tested as part of the appliance, or		N/A
	alternatively acc. to IEC 60730-1, and meeting the additional requirements in IEC 60335-1		N/A
	The requirements of Clause 29 apply between live parts of components and accessible parts of the appliance		P
	Components can comply with the requirements for clearances and creepage distances for functional insulation in the relevant component standard		P
	30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections		P
	Components that have not been previously tested to comply with the IEC standard for the relevant component are tested according to the requirements of 30.2		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Components that have been previously tested to comply with the resistance to fire requirements in the IEC standard for the relevant component need not be retested provided the specified conditions are met		P
	If these conditions are not satisfied, the component is tested as part of the appliance.		P
	Power electronic converter circuits not required to comply with IEC 62477-1, they are tested as part of the appliance		N/A
	If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		P
	For components mentioned in 24.1.1 to 24.1.9 no additional tests specified in the relevant component standard are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components not tested and found to comply with relevant IEC standard and components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard		N/A
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		P
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14		P
	If the capacitors have to be tested, they are tested according to Annex F		N/A
24.1.2	Transformers in associated switch mode power supplies comply with Annex BB of IEC 61558-2-16		N/A
	Safety isolating transformers complying with IEC 61558-2-6		N/A
	If they have to be tested, they are tested according to Annex G		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000		P
	If they have to be tested, they are tested according to Annex H		P
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N/A
	If the switch only operates a motor staring relay complying with IEC 60730-2-10 with the number of cycles of a least 10 000 as specified, the complete switching system need not be tested		N/A
	Switches incorporated in the hand-held part of appliances not intended exclusively for household use are subjected to 50 000 cycles of operation (IEC 60335-2-45)		N/A
24.1.4	Automatic controls complying with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		N/A
	- thermostats: 10 000		N/A
	- temperature limiters: 1 000		N/A
	- self-resetting thermal cut-outs: 300		N/A
	- voltage maintained non-self-resetting thermal cut-outs: 1 000		N/A
	- other non-self-resetting thermal cut-outs: 30		N/A
	- timers: 3 000		N/A
	- energy regulators: 10 000		N/A
	The number of cycles for controls operating during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited		N/A
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D		N/A
	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IEC 60730-2-8 is IPX7		N/A
	Thermal cut-outs of the capillary type comply with the requirements for type 2.K controls in IEC 60730-2-9		P
24.1.5	Appliance couplers complying with IEC 60320-1		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	However, for appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		N/A
	Interconnection couplers complying with IEC 60320-2-2		N/A
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		N/A
24.1.7	For remote operation of the appliance via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151		N/A
24.1.8	The relevant standard for thermal links is IEC 60691		N/A
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		N/A
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance		N/A
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance.....:		N/A
24.2	Appliances not fitted with:		P
	- switches, automatic controls or power supplies in flexible cords		P
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		P
	- thermal cut-outs that can be reset by soldering, unless		P
	the solder has a melding point of at least 230 ˚C		N/A
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions		N/A
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly		N/A
	Voltage across capacitors in series with a motor winding does not exceed 1,1 times rated voltage, when the appliance is supplied at 1,1 times rated voltage under minimum load		N/A
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42 V		N/A
	In addition, the motors comply with the requirements of Annex I		N/A
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770		N/A
	They are supplied with the appliance		N/A
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N/A
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure		N/A
	One or more of the following conditions are to be met:		N/A
	- the capacitors are of class S2 or S3 according to IEC 60252-1		N/A
	- the capacitors are housed within a metallic or ceramic enclosure		N/A
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N/A
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		N/A
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N/A
25	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS**		N/A
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		N/A
	- supply cord fitted with a plug, the current rating and voltage rating of the plug being not less than the corresponding ratings of its associated appliance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		N/A
	- pins for insertion into socket-outlets		N/A
25.2	Appliance not provided with more than one means of connection to the supply mains		N/A
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		N/A
25.3	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains:		N/A
	- a set of terminals allowing the connection of a flexible cord		N/A
	- a fitted supply cord		N/A
	- a set of supply leads accommodated in a suitable compartment		N/A
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N/A
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm) .....:		N/A
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		N/A
25.5	Method for assembling the supply cord to the appliance:		N/A
	- type X attachment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- type Y attachment		N/A
	- type Z attachment, if allowed in relevant part 2		N/A
	Type Z attachment is allowed for (IEC 60335-2-45):		N/A
	- class III appliances		N/A
	- other appliances, unless they are provided with a polyvinyl chloride sheathed cord and the temperature rise of external metal parts exceeds 75 K		N/A
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N/A
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		N/A
25.6	Plugs fitted with only one flexible cord		N/A
25.7	Supply cords, other than for class III appliances, being one of the following types:		N/A
	- rubber sheathed (at least 60245 IEC 53)		N/A
	- polychloroprene sheathed (at least 60245 IEC 57)		N/A
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		N/A
	• light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg		N/A
	• ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances		N/A
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		N/A
	• heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg		N/A
	• heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		N/A
	- halogen-free, low smoke, thermoplastic insulated and sheathed		N/A
	• light duty halogen-free low smoke flexible cable (62821 IEC 101) for circular cable and (62821 IEC 101f) for flat cable		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	• Ordinary duty halogen-free low smoke flexible cable (62821 IEC 102) for circular cable and (62821 IEC 102f(for flat cable		N/A
	Supply cords for class III appliances adequately insulated		N/A
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N/A
	Light polyvinyl chloride sheathed cords may be used for class III appliances and other hand-held appliances, regardless of the mass of the appliance (IEC 60335-2-45)		N/A
	Polyvinyl chloride sheathed cords may be used for hand-held appliances having a rated power input not exceeding 100 W and a mass not exceeding 100 g, and for appliances provided with a biased-off switch, regardless of the temperature rise of external metal parts (IEC 60335-2-45)		N/A
	Polyvinyl sheathed cords are not allowed for thermoplastic conduit- welding tools and fire lighters (IEC 60335-2-45)		N/A
	The supply cord of class II dehorning tools shall be polychloroprene sheathed and be not lighter than heavy polychloroprene sheathed cord (code designation 245 IEC 66) (IEC 60335-2-45)		N/A
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm²).....:		N/A
	The length of the supply cord shall be at least (IEC 60335-2-45):		N/A
	- 1,5 m for fire lighters		N/A
	- 6 m for class II dehorning tools		N/A
25.9	Supply cords not in contact with sharp points or edges		N/A
25.10	Supply cord of class I appliances have a green/yellow core for earthing		N/A
	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue.		N/A
	Where additional neutral conductors are provided in the supply cord:		N/A
	– other colours may be used for these additional neutral conductors;		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– all of the neutral conductors and line conductors are identified by marking using the alpha numeric notation specified in IEC 60445		N/A
25.11	– the supply cord is fitted to the appliance		N/A
	the contact pressure is provided by spring terminals		N/A
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		N/A
25.13	Inlet openings so constructed as to prevent damage to the supply cord		N/A
	If it is not evident that the supply cord can be introduced without risk of damage, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		N/A
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is		N/A
	class 0, or		N/A
	a class III appliance not containing live parts		N/A
25.14	Supply cords moved while in operation adequately protected against excessive flexing		N/A
	Flexing test, as described:		N/A
	- applied force (N).....:		N/A
	- number of flexings.....:		N/A
	The test does not result in:		N/A
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		N/A
	- breakage of more than 10% of the strands of any conductor		N/A
	- separation of the conductor from its terminal		N/A
	- loosening of any cord guard		N/A
	- damage to the cord or the cord guard		N/A
	- broken strands piercing the insulation and becoming accessible		N/A
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		N/A
	Pull and torque test of supply cord:		N/A
	- fixed appliances: pull 100 N; torque (not on automatic cord reel) (Nm) :		N/A
	- other appliances: values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm) (first line of table 12: IEC 60335-2-45) :		N/A
	Pull and torque test of supply cord, values shown in table 12: pull (N); torque (not on automatic cord reel) (Nm) (first line of table 12: IEC 60335-2-45) .....:		N/A
	Cord not damaged and max. 2 mm displacement of the cord		N/A
25.16	Cord anchorages for type X attachments constructed and located so that:		N/A
	- replacement of the cord is easily possible		N/A
	- it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	- they are suitable for different types of supply cord		N/A
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless		N/A
	they are separated from accessible metal parts by supplementary insulation		N/A
	- the cord is not clamped by a metal screw which bears directly on the cord		N/A
	- at least one part of the cord anchorage securely fixed to the appliance, unless		N/A
	it is part of a specially prepared cord		N/A
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N/A
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		N/A
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N/A
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		N/A
	failure of the insulation of the cord does not make accessible metal parts live		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- for class II appliances they are of insulating material, or		N/A
	if of metal, they are insulated from accessible metal parts by supplementary insulation		N/A
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		N/A
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance		N/A
25.18	Cord anchorages only accessible with the aid of a tool, or		N/A
	Constructed so that the cord can only be fitted with the aid of a tool		N/A
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N/A
	Tying the cord into a knot or tying the cord with string not used		N/A
25.20	The conductors of the supply cord for type Y and Z attachment insulated from accessible metal parts		N/A
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		N/A
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		N/A
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		N/A
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		N/A
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		N/A
25.22	Appliance inlets:		N/A
	- live parts not accessible during insertion or removal		N/A
	Requirement not applicable to appliance inlets complying with IEC 60320-1		N/A
	- connector can be inserted without difficulty		N/A
	- the appliance is not supported by the connector		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless		N/A
	the supply cord is unlikely to touch such metal parts		N/A
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		N/A
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		N/A
	- the thickness of the insulation may be reduced		N/A
	- for class I or class II appliance with class III construction, the cross sectional areas of the conductors need not comply with 25.8 if specified conditions are met		N/A
	The length of the interconnection cord of class III dehorning tools shall be at least 4 m (IEC 60335-2-45)		N/A
	If necessary, electric strength test of 16.3		N/A
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected		N/A
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		N/A
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		N/A
26	**TERMINALS FOR EXTERNAL CONDUCTORS**		**P**
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts		N/A
	Earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection		N/A
26.2	Appliances with type X attachment and appliances for the connection of cables to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless		N/A
	the connections are soldered		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Screws and nuts not used to fix any other component, except		N/A
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N/A
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N/A
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N/A
26.3	Terminals for type X attachment and for connection of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		N/A
	Terminals fixed so that when the clamping means is tightened or loosened:		N/A
	- the terminal does not become loose		N/A
	- internal wiring is not subjected to stress		N/A
	- neither clearances nor creepage distances are reduced below the values in clause 29		N/A
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified (Nm).....:		N/A
	No deep or sharp indentations of the conductors		N/A
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		N/A
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		N/A
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N/A
	Stranded conductor test, 8 mm insulation removed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	No contact between live parts and accessible metal parts and,		N/A
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N/A
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm²).....:		N/A
	If a specially prepared cord is used, terminals need only be suitable for that cord		N/A
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other		N/A
26.9	Terminals of the pillar type constructed and located as specified		N/A
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless		P
	conductors ends fitted with means suitable for screw terminals		N/A
	Pull test of 5 N to the connection		P
26.11	For type Y and Z attachment, soldered, welded, crimped or similar connections may be used		N/A
	For Class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N/A
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		N/A
27	**PROVISION FOR EARTHING**		N/A
27.1	Accessible metal parts of Class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet	Class II appliances	N/A
	Earthing terminals and earthing contacts not connected to the neutral terminal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Class 0, II and III appliances have no provision for earthing		N/A
	Class II appliances and class III appliances can incorporate an earth for functional purposes		N/A
	Safety extra-low voltage circuits not earthed, unless		N/A
	protective extra-low voltage circuits		N/A
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		N/A
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm², and		N/A
	do not provide earthing continuity between different parts of the appliance, and		N/A
	conductors cannot be loosened without the aid of a tool		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part		N/A
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.4	No risk of corrosion resulting from contact between parts of the earthing terminal and the copper of the earthing conductor or other metal		N/A
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		N/A
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm		N/A
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.5	Low resistance of connection between earthing terminal and earthed metal parts		N/A
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω) .....:		N/A
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.		N/A
	They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit		N/A
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
28	**SCREWS AND CONNECTIONS**		**P**
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm		N/A
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity		N/A
	Screws used for electrical connections or connections providing earthing continuity screwed into metal		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		N/A
	For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation		N/A
	For screws and nuts; torque-test as specified in table 14.....:	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless		P
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		N/A
	This requirement does not apply to electrical connections in circuits of appliances for which:		N/A
	• 30.2.2 is applicable and that carry a current not exceeding 0,5 A		N/A
	• 30.2.3 is applicable and that carry a current not exceeding 0,2 A		N/A
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N/A
	Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread		N/A
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		N/A
	Thread-cutting, thread rolling and space threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection:		N/A
	- in normal use,		N/A
	- during user maintenance,		N/A
	- when replacing a supply cord having a type X attachment, or		N/A
	- during installation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	At least two screws being used for each connection providing earthing continuity, unless		N/A
	the screw forms a thread having a length of at least half the diameter of the screw		N/A
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		P
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		N/A
	if an alternative earthing circuit is provided		N/A
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion		N/A
29	**CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION**		**P**
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies.....:		N/A
	The microenvironment is pollution degree 1 under type 1 protection		N/A
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		N/A
	These values apply to functional, basic, supplementary and reinforced insulation .....:		P
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless .....:	(see appended table)	P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		N/A
	However, if the distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 is increased according to the relevant multiplier values in Table A.2 of IEC 60664-1		N/A
	Impulse voltage test is not applicable:		N/A
	- when the microenvironment is pollution degree 3, or		N/A
	- for basic insulation of class 0 and class 01 appliances		N/A
	- to appliances intended for use at altitudes exceeding 2 000 m		N/A
	Appliances are in overvoltage category II		P
	A force of 2 N is applied to bare conductors, other than heating elements		P
	A force of 30 N is applied to accessible surfaces		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		N/A
	The values of table 16 or the impulse voltage test of clause 14 are applicable.....:		N/A
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		N/A
	Lacquered conductors of windings considered to be bare conductors		N/A
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16 .....:		N/A
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage .....:		P N/A
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		N/A
29.1.4	Clearances for functional insulation are the largest values determined from:		P
	- table 16 based on the rated impulse voltage .....:		P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N/A
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		N/A
	the microenvironment is pollution degree 3, or		N/A
	the distances can be affected by wear, distortion, movement of the parts or during assembly		N/A
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
	Lacquered conductors of windings considered to be bare conductors		N/A
	However, clearances at crossover points are not measured		N/A
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N/A
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		N/A
	- table 16 based on the rated impulse voltage .....:		N/A
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N/A
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation		N/A
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160% of the withstand voltage required for basic insulation		N/A
	If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N/A
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15		N/A
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree.....:	(see appended table)	N/A
	Pollution degree 2 applies, unless	Pollution degree 2 only for Transformer	N/A
	- precautions taken to protect the insulation; pollution degree 1		N/A
	- insulation subjected to conductive pollution; pollution degree 3		N/A
	A force of 2 N is applied to bare conductors, other than heating elements		N/A
	A force of 30 N is applied to accessible surfaces		N/A
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		N/A
29.2.1	Creepage distances of basic insulation not less than specified in table 17.....:		N/A
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 17 .....:		N/A
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14 .....:		N/A
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or .....:		N/A
	Table 2 of IEC 60664-4, as applicable .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or .....:		N/A
	Table 2 of IEC 60664-4, as applicable .....:		N/A
29.2.4	Creepage distances of functional insulation not less than specified in table 18.....:		P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18 .....:		N/A
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		N/A
	Compliance checked:		N/A
	- by measurement, in accordance with 29.3.1, or		N/A
	- by an electric strength test in accordance with 29.3.2, if the insulation consists of more than one separate layer, other than flakey material similar to natural mica, or (IEC 60335-2-45)		N/A
	- for insulation, other than single layer internal wiring insulation,by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		N/A
	for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N/A
	- by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other, or		N/A
	- as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		N/A
29.3.1	Supplementary insulation have a thickness of at least 1 mm		N/A
	Reinforced insulation have a thickness of at least 2 mm		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		P
	Supplementary insulation consist of at least 2 layers		P
	Reinforced insulation consist of at least 3 layers		P
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N/A
	the electric strength test of 16.3		N/A
	If the temperature rise during the tests of clause 19 does not exceed the value specified in table 3, the test of IEC 60068-2-2 is not carried out		N/A
	If natural mica in thin sheet form is used	(IEC 60335-2-45)	N/A
	-for supplementary insulation, there shall be at least six layers, and any three layers together shall withstand the electric strength test of 16.3 for supplementary insulation.		N/A
	-for reinforced insulation, there shall be at least ten layers, and any five layers together shall withstand the electric strength test of 16.3 for reinforced insulation.		N/A
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19.....:		N/A
30	**RESISTANCE TO HEAT AND FIRE**		**P**
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		P
	parts of thermoplastic material providing supplementary or reinforced insulation		P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C).....:	(see appended table)	P
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C).....:	(see appended table)	P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C) .....:	(see appended table)	P
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		N/A
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		N/A
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		N/A
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies		P
	- for unattended appliances, 30.2.3 applies		N/A
	For appliances for remote operation, 30.2.3 applies		N/A
	For base material of printed circuit boards, 30.2.4 applies		P
	For contact firelighters , 30.2.3 is applicable (IEC 60335-2-45)		N/A
	For other appliances, 30.2.2 is applicable (IEC 60335-2-45)		N/A
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 °C		P
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		P
	the material is classified at least HB40 according to IEC 60695-11-10		N/A
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		N/A
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and		P
	parts of non-metallic material within a distance of 3mm of such connections,		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	subjected to the glow-wire test of IEC 60695-2-11		N/A
	The test severity is:		N/A
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts are to:		N/A
	- comprise material having a glow-wire flammability index of at least 750 °C, or 650 °C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or		N/A
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10 .....:		N/A
	Glow-wire test not applicable to conditions as specified .....:		N/A
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		N/A
	The tests are not applicable to conditions as specified .....:	(see appended table 30.2)	N/A
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and		N/A
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		N/A
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C		N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
30.2.3.2	Parts of non-metallic material supporting connections, and		N/A
	parts of non-metallic material within a distance of 3mm,		N/A
	subjected to glow-wire test of IEC 60695-2-11		N/A
	The test severity is:		N/A
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		N/A
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N/A
	• 775 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	• 675 °C, for other connections		N/A
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts are to:		N/A
	- comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or		N/A
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those:		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		N/A
	- parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts, that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts for which the needle-flame test of Annex E was applied, or		N/A
	- small parts for which a material classification of V-0 or V-1 was applied		N/A
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		N/A
	- parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or		N/A
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E		N/A
	Test not applicable to conditions as specified.....:	V-0	P
31	**RESISTANCE TO RUSTING**		**P**
	Relevant ferrous parts adequately protected against rusting		P
	Tests specified in part 2 when necessary		N/A
32*	**RADIATION, TOXICITY AND SIMILAR HAZARDS**		N/A
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		N/A
	Compliance is checked by the limits or tests specified in part 2, if relevant		N/A
A	**ANNEX A (INFORMATIVE) ROUTINE TESTS**		**P**
	Description of routine tests to be carried out by the manufacturer		P

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
B	**ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES THAT ARE RECHARGED IN THE APPLIANCE**		N/A
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N/A
	This annex does not apply to battery chargers		N/A
	Three forms of construction covered:		N/A
	a) Appliance supplied directly from the supply mains or a renewable energy source, the battery charging circuitry and other supply unit circuitry incorporated within the appliance		N/A
	b) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the part of the appliance containing the battery		N/A
	c) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the detachable supply unit		N/A
3.1.9	Appliance operated under the following conditions:		N/A
	- the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		N/A
	- the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N/A
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		N/A
	- if the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		N/A
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N/A
5.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N/A
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		N/A
	Appliances intending to be supplied from a detachable supply unit marked with symbol IEC 60417-6181 and its type reference along with symbol ISO 7000-0790 (2004-01), or		N/A
	use only with <model designation> supply unit :		N/A
7.6	Additional symbols		N/A
7.12	The instructions give information regarding charging		N/A
	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N/A
	Instructions for appliances containing non user-replaceable batteries state the substance of the following:		N/A
	This appliance contains batteries that are only replaceable by skilled persons		N/A
	Instructions for appliances containing non-replaceable batteries shall state the substance of the following:		N/A
	This appliance contains batteries that are non-replaceable		N/A
	For appliances intending to be supplied from a detachable supply unit for the purposes of recharging the battery, the type reference of the detachable supply unit is stated along with the following:		N/A
	WARNING: For the purposes of recharging the battery, only use the detachable supply unit provided with this appliance		N/A
	If the symbol for detachable supply unit is used, its meaning is explained		N/A
7.15	Markings placed on the part of the appliance connected to the supply mains		N/A
	The type reference of the detachable supply unit is placed in close proximity to the symbol		N/A
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	If the appliance can be operated without batteries, double or reinforced insulation required		N/A
11.7	The battery is charged for the period stated in the instructions or 24 h .....:		N/A
11.8	Temperature rise of the battery surface does not exceed the limit in the battery manufacturer's specification; measured (K); limit (K) .....:		N/A
	If no limit specified, the temperature rise does not exceed 20 K; measured (K) .....:		N/A
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		N/A
19.10	Not applicable		N/A
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N/A
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N/A
19.13	The battery does not rupture or ignite		N/A
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		N/A
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being:		N/A
	- 100, if the mass of the part does not exceed 250 g (g) .....:		N/A
	- 50, if the mass of the part exceeds 250 g .....:		N/A
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N/A
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N/A
25.13	An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		N/A
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N/A
	For other parts, 30.2.2 applies		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
C	**ANNEX C (NORMATIVE)** **AGEING TEST ON MOTORS**		N/A
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N/A
	Test conditions as specified		N/A
D	**ANNEX D (NORMATIVE)** **THERMAL MOTOR PROTECTORS**		N/A
	Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard		N/A
	Test conditions as specified		N/A
E	**ANNEX E (NORMATIVE)** **NEEDLE-FLAME TEST**		N/A
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		N/A
7	Severities		N/A
	The duration of application of the test flame is 30 s ± 1 s		N/A
9	Test procedure		N/A
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1		N/A
9.2	The first paragraph does not apply		N/A
	If possible, the flame is applied at least 10 mm from a corner		N/A
9.3	The test is carried out on one specimen		N/A
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		N/A
11	Evaluation of test results		N/A
	The duration of burning not exceeding 30 s		N/A
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N/A
F	**ANNEX F (NORMATIVE)** **CAPACITORS**		N/A
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
1.5	Terms and definitions		N/A
1.5.3	Class X capacitors tested according to subclass X2		N/A
1.5.4	This subclause is applicable		N/A
1.6	Marking		N/A
	Items a) and b) are applicable		N/A
3.4	Approval testing		N/A
3.4.3.2	Table 3 is applicable as described		N/A
4.1	Visual examination and check of dimensions		N/A
	This subclause is applicable		N/A
4.2	Electrical tests		N/A
4.2.1	This subclause is applicable		N/A
4.2.5	This subclause is applicable		N/A
4.2.5.2	Only table 11 is applicable		N/A
	Values for test A apply		N/A
	However, for capacitors in heating appliances the values for test B or C apply		N/A
4.12	Damp heat, steady state		N/A
	This subclause is applicable		N/A
	Only insulation resistance and voltage proof are checked		N/A
4.13	Impulse voltage		N/A
	This subclause is applicable		N/A
4.14	Endurance		N/A
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable		N/A
4.14.7	Only insulation resistance and voltage proof are checked		N/A
	No visible damage		N/A
4.17	Passive flammability test		N/A
	This subclause is applicable		N/A
4.18	Active flammability test		N/A
	This subclause is applicable		N/A
G	**ANNEX G (NORMATIVE)** **SAFETY ISOLATING TRANSFORMERS**		**P**

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	The following modifications to this standard are applicable for safety isolating transformers:		P
7	Marking and instructions		P
7.1	Transformers for specific use marked with:		N/A
	-name, trademark or identification mark of the manufacturer or responsible vendor .....:		N/A
	-model or type reference .....:		N/A
17	Overload protection of transformers and associated circuits		P
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N/A
22	Construction		P
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		P
29	Clearances, creepage distances and solid insulation		P
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		P
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		N/A
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		N/A
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1		N/A
H	**ANNEX H (NORMATIVE)** **SWITCHES**		N/A
	Switches comply with the following clauses of IEC 61058-1, as modified below:		N/A
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N/A
	Before being tested, switches are operated 20 times without load		N/A
8	Marking and documentation		N/A
	Switches are not required to be marked		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
	However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N/A
13	Mechanism		N/A
	The tests may be carried out on a separate sample		N/A
15	Insulation resistance and dielectric strength		N/A
15.1	Not applicable		N/A
15.2	Not applicable		N/A
15.3	Applicable for full disconnection and micro-disconnection		N/A
17	Endurance		N/A
	Compliance is checked on three separate appliances or switches		N/A
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless		N/A
	otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335 .....:		N/A
	Switches for operation under no load and which can be operated only by a tool, and		N/A
	switches operated by hand that are interlocked so that they cannot be operated under load,		N/A
	are not subjected to the tests		N/A
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		N/A
	Subclauses 17.2.2 and 17.2.5.2 not applicable		N/A
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1		N/A
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K).....:		N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N/A
	Clause 20 is applicable to clearances across full disconnection and micro-disconnection		N/A
	It is also applicable to creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24		N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict
I	**ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE**		N/A
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		N/A
8	Protection against access to live parts		N/A
8.1	Metal parts of the motor are considered to be bare live parts		N/A
11	Heating		N/A
11.3	The temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N/A
11.8	The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N/A
16	Leakage current and electric strength		N/A
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test		N/A
19	Abnormal operation		N/A
19.1	The tests of 19.7 to 19.9 are not carried out		N/A
19.I.101	Appliance operated at rated voltage with each of the following fault conditions:		N/A
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N/A
	- short circuit of each diode of the rectifier		N/A
	- open circuit of the supply to the motor		N/A
	- open circuit of any parallel resistor, the motor being in operation		N/A
	Only one fault simulated at a time, the tests carried out consecutively		N/A
22	Construction		N/A
22.I.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		N/A
	Compliance checked by the tests specified for double and reinforced insulation		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
J	**ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS**		N/A
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		N/A
5.7	Conditioning of the test specimens		N/A
	When production samples are used, three samples of the printed circuit board are tested		N/A
5.7.1	Cold		N/A
	The test is carried out at -25 °C		N/A
5.7.3	Rapid change of temperature		N/A
	Severity 1 is specified		N/A
5.9	Additional tests		N/A
	This subclause is not applicable		N/A
K	**ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES**		P
	The information on overvoltage categories is extracted from IEC 60664-1		P
	Overvoltage category is a numeral defining a transient overvoltage condition		P
	Equipment of overvoltage category IV is for use at the origin of the installation		N/A
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N/A
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		P
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N/A
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N/A
L	**ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES**		**P**
	Information for the determination of clearances and creepage distances		P

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Clause	Requirement + Test	Result - Remark	Verdict
M	**ANNEX M (NORMATIVE) POLLUTION DEGREE**		P
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		P
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		P
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		P
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N/A
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		P
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		N/A
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N/A
N	**ANNEX N (NORMATIVE) PROOF TRACKING TEST**		**P**
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		P
7	Test apparatus		P
7.3	Test solutions		P
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		P
10.1	Procedure		P
	The proof voltage is 100V, 175V, 400V or 600V...:	175V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	The test is carried out on five specimens		P
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100		N/A
10.2	Report		P
	The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N/A
O	**ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30**		P
	Description of tests for determination of resistance to heat and fire		P
P	**ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN TROPICAL CLIMATES**		N/A
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332		N/A
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332, if liable to be connected to a supply mains that excludes the protective earthing conductor		N/A
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C		N/A
7.1	The appliance marked with symbol IEC 60417-6332		N/A
7.12	The instructions state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA		N/A
	The instructions state that the appliance is considered to be suitable for use in countries having a warm damp equable climate, but may also be used in other countries		N/A
	If symbol IEC 60417-6332 is used, its meaning is explained		N/A
11.8	The values of Table 3 are reduced by 15 K		N/A
13.2	The leakage current for class I appliances not exceeding 0,5 mA		N/A
15.3	The value of t is 37 °C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
16.2	The leakage current for class I appliances not exceeding 0,5 mA (mA):		N/A
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		N/A
Q	**ANNEX Q (INFORMATIVE)** **SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS**		**P**
	Description of tests for appliances incorporating electronic circuits		P
R	**ANNEX R (NORMATIVE)** **SOFTWARE EVALUATION**		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 validated in accordance with the requirements of this annex		N/A
R.1	Programmable electronic circuits using software		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 constructed so that the software does not impair compliance with the requirements of this standard		N/A
R.2	Requirements for the architecture		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software		N/A
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.2 have one of the following structures:		N/A
	- single channel with periodic self-test and monitoring		N/A
	- dual channel (homogenous) with comparison		N/A
	- dual channel (diverse) with comparison		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 have one of the following structures:		N/A
	- single channel with functional test		N/A
	- single channel with periodic self-test		N/A
	- dual channel without comparison		N/A
R.2.2	Measures to control faults/errors		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area is stored in a different format from that in the other area		N/A
R.2.2.2	Programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.2 and that use dual channel structures with comparison, have additional fault/error detection means for any fault/errors not detected by the comparison		N/A
R.2.2.3	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, means are provided for the recognition and control of errors in transmissions to external safety-related data paths		N/A
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the programmable electronic circuits incorporate measures to address the fault/errors in safety-related segments and data indicated in table R.1 and R.2 as appropriate		N/A
R.2.2.5	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired		N/A
R.2.2.6	The software is referenced to relevant parts of the operating sequence and the associated hardware functions		N/A
R.2.2.7	Labels used for memory locations are unique		N/A
R.2.2.8	The software is protected from user alteration of safety-related segments and data		N/A
R.2.2.9	Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired		N/A
R.3	Measures to avoid errors		N/A
R.3.1	General		N/A
	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the following measures to avoid systematic fault in the software are applied		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Software that incorporates measures used to control the fault/error conditions specified in table R.2 is inherently acceptable for software required to control the fault/error conditions specified in table R.1		N/A
R.3.2	Specification		N/A
R.3.2.1	Software safety requirements:	Software Id:	N/A
	The specification of the software safety requirements includes the descriptions listed		N/A
R.3.2.2	Software architecture		N/A
R.3.2.2.1	The specification of the software architecture includes the aspects listed - techniques and measures to control software faults/errors (refer to R.2.2); - interactions between hardware and software; - partitioning into modules and their allocation to the specified safety functions; - hierarchy and call structure of the modules (control flow); - interrupt handling; - data flow and restrictions on data access; - architecture and storage of data; - time-based dependencies of sequences and data	Document ref. No:	N/A
R.3.2.2.2	The architecture specification is validated against the specification of the software safety requirements by static analysis		N/A
R.3.2.3	Module design and coding		N/A
R.3.2.3.1	Based on the architecture design, software is suitably refined into modules		N/A
	Software module design and coding is implemented in a way that is traceable to the software architecture and requirements		N/A
R.3.2.3.2	Software code is structured		N/A
R.3.2.3.3	Coded software is validated against the module specification by static analysis		N/A
	The module specification is validated against the architecture specification by static analysis		N/A
R.3.3.3	Software validation		N/A
	The software is validated with reference to the requirements of the software safety requirements specification		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Compliance is checked by simulation of:		N/A
	- input signals present during normal operation		N/A
	- anticipated occurrences		N/A
	- undesired conditions requiring system action		N/A

TABLE R.1 – GENERAL FAULT/ERROR CONDITIONS

Component [1)]	Fault/error	Acceptable measures [2) 3)]	Definitions	Document reference for applied measure	Document reference for applied test	Ver-dict
1 CPU 1.1 Registers	Stuck at	Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2			N/A
1.2 VOID						N/A
1.3 Programme counter	Stuck at	Functional test, or Periodic self-test, or Independent time-slot monitoring, or Logical monitoring of the programme sequence	H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2			N/A
2 Interrupt handling and execution	No interrupt or too frequent interrupt	Functional test, or time-slot monitoring	H.2.16.5 H.2.18.10.4			N/A
3 Clock	Wrong frequency (for quartz synchronized clock: harmonics/ sub-harmonics only)	Frequency monitoring, or time slot monitoring	H.2.18.10.1 H.2.18.10.4			N/A

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Clause	Requirement + Test	Result - Remark	Verdict

4. Memory 4.1 Invariable memory	All single bit faults	Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy	H.2.19.3.1 H.2.19.3.2 H.2.19.8.2			N/A
4.2 Variable memory	DC fault	Periodic static memory test, or word protection with single bit redundancy	H.2.19.6 H.2.19.8.2			N/A
4.3 Addressing (relevant to variable and invariable memory)	Stuck at	Word protection with single bit redundancy including the address	H.2.19.8.2			N/A
5 Internal data path	Stuck at DC fault	Word protection with single bit redundancy Comparison of redundant CPUs by either: - reciprocal comparison - independent hardware comparator	H.2.19.8.2 H.2.18.15 H.2.18.3			N/A
5.1 VOID						N/A
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19.8.2			N/A
6 External communication	Hamming distance 3	Word protection with multi-bit redundancy, or CRC – single work, or Transfer redundancy, or Protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14			N/A
6.1 VOID						N/A
6.2 VOID						N/A

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Clause	Requirement + Test	Result - Remark	Verdict

6.3 Timing	Wrong point in time Wrong sequence	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or Comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator Logical monitoring, or time-slot monitoring, or Scheduled transmission (same options as for wrong point in time)	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3 H.2.18.10.2 H.2.18.10.4 H.2.18.18			N/A
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check Comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator	H.2.18.13 H.2.18.15 H.2.18.3			N/A
7.1 VOID						N/A
7.2 Analog I/O 7.2.1 A/D and D/A-converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N/A
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13			N/A
8 VOID						N/A
9 Custom chips [4)] e.g. ASIC, GAL, Gate array	Any output outside the static and dynamic functional specification	Periodic self-test	H.2.16.6			N/A

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Clause	Requirement + Test	Result - Remark	Verdict

NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines.
[1] For fault/error assessment, some components are divided into their sub-functions. [2] For each sub-function in the table, the Table R.2 measure will cover the software fault/error. [3] Where more than one measure is given for a sub-function, these are alternatives. [4] To be divided as necessary by the manufacturer into sub-functions.

S	**ANNEX S (NORMATIVE) BATTERY OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGEABLE OR NOT RECHARGED IN THE APPLIANCE**		N/A
	The following modifications to this standard are applicable for battery-operated appliances where the batteries are either non-rechargeable (primary batteries), or		N/A
	rechargeable batteries (secondary batteries) that are not recharged in the appliance		N/A
5.8.1	If the supply terminals for the connection of the battery have no indication of polarity, the more unfavourable polarity is applied		N/A
5.S.101	Appliances intended for use with a battery box are tested with the battery box supplied with the appliance or with the battery box recommended in the instructions		N/A
5.S.102	Appliances are tested as motor-operated appliances.		N/A
7.1	Appliances marked with the battery voltage (V) and the polarity of the terminals, unless..... .....:		N/A
	the polarity is irrelevant		N/A
	Appliances also marked with:		N/A
	– name, trade mark or identification mark of the manufacturer or responsible vendor ....:		N/A
	– model or type reference ....:		N/A
	– IP number according to degree of protection against ingress of water, other than IPX0 .. ..:		N/A
	– type reference of battery or batteries ....:		N/A
	If relevant, the positive terminal is indicated by the symbol IEC 60417-5005 and the negative terminal by the symbol IEC 60417-5006		N/A
	If appliances use more than one battery, they are marked to indicate correct polarity connection of the batteries		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.6	Additional symbols		N/A
7.12	The instructions contain the following, as applicable:		N/A
	– the types of batteries that may be used .. ..:		N/A
	– how to remove and insert the batteries		N/A
	– non-rechargeable batteries are not to be recharged		N/A
	– rechargeable batteries are to be removed from the appliance before being charged		N/A
	– different types of batteries or new and used batteries are not to be mixed		N/A
	– batteries are to be inserted with the correct polarity		N/A
	– exhausted batteries are to be removed from the appliance and safely disposed of		N/A
	– if the appliance is to be stored unused for a long period, the batteries are removed		N/A
	– the supply terminals are not to be short-circuited		N/A
11.5	Appliances are supplied with the most unfavourable supply voltage between		N/A
	– 0,55 and 1,0 times the battery voltage, if the appliance can be used with non-rechargeable batteries		N/A
	– 0,75 and 1,0 times battery voltage, if the appliance is designed for use with rechargeable batteries only		N/A
	The values specified in Table S.101 for the internal resistance per cell of the battery is taken into account		N/A
19.1	The tests are carried out with the battery fully charged unless otherwise specified		N/A
19.13	The battery does not rupture or ignite		N/A
19.S.101	Appliances are supplied with the voltage specified in 11.5. The supply terminals having an indication of polarity are connected to the opposite polarity, unless		N/A
	such a connection is unlikely to occur due to the construction of the appliance		N/A
19.S.102	For appliances with provision for multiple batteries, one or more of the batteries are reversed and the appliance is operated, if reversal of batteries is allowed by the construction		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
25.5	The flexible leads or flexible cord used to connect an external battery or battery box in is connected to the appliance by a type X attachment		N/A
25.13	This requirement is not applicable to the flexible leads or flexible cord connecting external batteries or a battery box with an appliance		N/A
25.S.101	Appliances have suitable means for connection of the battery. If the type of battery is marked on the appliance, the means of connection is suitable for this type of battery		N/A
26.5	Terminal devices in an appliance for the connection of the flexible leads or flexible cord connecting an external battery or battery box are so located or shielded that there is no risk of accidental connection between supply terminals		N/A
30.2.3.2	There is no battery in the area of the vertical cylinder used for the consequential needle flame test, unless		N/A
	the battery is shielded by a barrier that meets the needle flame test of Annex E, or		N/A
	that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
T	**ANNEX T (NORMATIVE)** **UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS**		N/A
	Requirements for non-metallic materials subject to direct or reflected UV-C radiation exposure and whose mechanical and electrical properties are relied upon for compliance with the		N/A
	Does not apply to glass, ceramic and similar materials		N/A
	Tested as specified in ISO 4892-1 and ISO 4892-2, with the following modifications:		N/A
	Modifications to ISO 4892-1:		N/A
5.1.6	The UV-C emitter is a low pressure mercury lamp with a quartz envelope having a continuous spectral irradiance of 10 W/m2 at 254 nm		N/A
	Subclause 5.1.6.1 and Table 1 are not applicable		N/A
5.2.4	The black-panel temperature shall be 63 °C +/- 3 °C		N/A
5.3.1	Humidification of the chamber air is specified in part 2 when necessary		N/A
9	This clause is not applicable		N/A
	Modifications to ISO 4892-2:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.1	At least three test specimens are tested		N/A
	Ten samples of internal wiring is tested		N/A
7.2	The specimens are attached to the specimen holders such that they are not subject to any stress		N/A
7.3	Apparatus prepared as specified		N/A
	The test specimens and, if used, the irradiance-measuring instrument are exposed for 1 000 h		N/A
7.4	If used, a radiometer is mounted and calibrated such that it measures the irradiance at the exposed surface of the test specimen		N/A
7.5	Material properties and test methods for parts providing mechanical support or impact resistance as specified in Table T.1		N/A
	Material properties and test method for electrical insulation of internal wiring as specified in Table T.2		N/A
8	This clause is not applicable		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

10.1	TABLE: Power input deviation				N/A
Input deviation of/at:	P rated (W)	P measured (W)	dP (W, %)	Required dP (W, %)	Remark
Supplementary information:					

10.2	TABLE: Current deviation				P
Current deviation of/at:	I rated (A)	I measured (A)	dI (A, %)	Required dI (A, %)	Remark
100V, 50Hz	0.8	0.61	-23.7%	+20%	--
100V, 60Hz	0.8	0.38	-52.5%	+20%	--
240V, 50Hz	0.8	0.67	-16.2%	+20%	--
240V, 60Hz	0.8	0.40	-50.0%	+20%	--
Supplementary information:					

11.8	TABLE: Heating test, thermocouple measurements		P
	Test voltage (V) ..... :	1.06x240V	—
	Ambient (°C) ..... :	23.2°C	—
Thermocouple locations	Max. temperature rise measured, dT (K)	Max.temperature rise limit, dT (K)	
Power supply unit surface	49.6	50	
DC inlet	12.4	Cl.30	
DC connector	5.4	Cl.30	
PCB near IC	32.4	T85-25=60	
Internal wire	7.6	T200-25=175	
Control switch terminal	10.0	30	
Inside enclosure near heating element	38.1	Cl.30	
Outside enclosure near heating element	19.8	60	
Internal wire lead to heating element	9.8	T200-25=175	
Fan motor winding	28.4	65, Class A	
Test corner	3.1	65	
Supplementary information: Model: SH01			

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11.8	TABLE: Heating test, resistance method					N/A
	Test voltage (V) ..... :					—
	Ambient, t1 (°C) ..... :					—
	Ambient, t2 (°C) ..... :					—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	dT (K)	Max. dT (K)	Insulation class
--		--	--	--	--	--
Supplementary information:						

13.2	TABLE: Leakage current		P
	Heating appliances: 1.15 x rated input (W).....:	1.06x240V	—
	Motor-operated and combined appliances: 1.06 x rated voltage (V).....:	--	—
Leakage current between		I (mA)	Max. allowed I (mA)
L/N to accessible plastic enclosure/Switch		0.005 / 0.005	0.35mA peak
L/N to accessible output terminal		0.055 / 0.055	0.35mA peak
DC inlet to enclosure		0.005 / 0.005	0.7mA peak
Supplementary information:			

13.3	TABLE: Electric strength		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
L/N to accessible plastic enclosure/Switch		3000	No
L/N to accessible output terminal		3000	No
DC inlet to enclosure		500	No
Supplementary information:			

14	TABLE: Transient overvoltages					N/A
Clearance between:		Cl (mm)	Required Cl (mm)	Rated impulse voltage (V)	Impulse test voltage (V)	Flashover (Yes/No)
--		--	--	--	--	--
--		--	--	--	--	--
--		--	--	--	--	--
--		--	--	--	--	--

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Supplementary information:

16.2	TABLE: Leakage current		P
	Single phase appliances: 1.06 x rated voltage (V) .....:	1.06x240V	—
	Three phase appliances 1.06 x rated voltage divided by √3 (V) .....:	--	—

Leakage current between	I (mA)	Max. allowed I (mA)
L/N to accessible plastic enclosure/Switch	0.005	0.25mA
L/N to accessible output terminal	0.060	0.25mA
DC inlet to enclosure	0.005	0.5mA
Supplementary information:		

16.3	TABLE: Electric strength		P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
L/N to accessible plastic enclosure/Switch	3000	No
L/N to accessible output terminal	3000	No
DC inlet to enclosure	500	No
Supplementary information:		

17	TABLE: Overload protection, thermocouple measurements		N/A

Temperature rise of part/at:	dT (K)	Max. dT (K)
Supplementary information:		

17	TABLE: Overload protection, resistance method		N/A
	Test voltage (V) .....:	--	—
	Ambient, t1 (°C) .....:	--	—
	Ambient, t2 (°C) .....:	--	—

Temperature of winding	R1 (Ω)	R2 (Ω)	dT (K)	T (°C)	Max. T (°C)
--	--	--	--	--	--
--	--	--	--	--	--

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--	--	--	--	--	--
--	--	--	--	--	--
Supplementary information:					

19	**Abnormal operation conditions**	**P**
Operational characteristics	YES/NO	Operational conditions
Are there electronic circuits to control the appliance operation?	Yes	--
Are there ~~-off~~" or ~~-s~~tand-by" position?	Yes	--
The unintended operation of the appliance results in dangerous malfunction?	No	--

Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	restricted heat dissipation 0.94times rated voltage,	No hazard	N.A	N.A	N.A	N.A	Pass
19.3	Repeat 19.2, but supplied at 1.06 times rated voltage	No hazard	N.A	N.A	N.A	N.A	Pass
19.4	Test as clause 11, but thermostat switch is short-circuited	No hazard	N.A	N.A	N.A	N.A	Pass
19.5	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.6	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.7	locked moving parts	Pass	N.A	N.A	N.A	N.A	Pass
19.8	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.9	N.A	N.A	N.A	N.A	N.A	N.A	N.A

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19.10	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.11.2	Electronic circuit abnormally	No hazard	N.A	N.A	N.A	N.A	Pass
19.11.4.8	N.A	N.A	N.A	N.A	N.A	N.A	N.A
19.101	Pass	Pass	N.A	N.A	N.A	N.A	Pass
Supplementary information:							

19.7	**TABLE: Abnormal operation, locked rotor/moving parts**					P
	Test voltage (V) ..... :		240V			—
	Ambient, t1 (°C) ..... :		23.8			—
	Ambient, t2 (°C) ..... :		24.1			—
Temperature of winding	R1 (Ω)	R2 (Ω)	dT (K)	T (°C)	Max. T (°C)	
Fan motor	--	--	62.5	86.6	200	
Power cord	--	--	12.5	36.6	150K	
Test corner	--	--	10.3	34.4	150K	
Supplementary information:						

19.9	**TABLE: Abnormal operation, running overload**					N/A
	Test voltage (V) ..... :					—
	Ambient, t1 (°C) ..... :					—
	Ambient, t2 (°C) ..... :					—
Temperature of winding	R1 (Ω)	R2 (Ω)	dT (K)	T (°C)	Max. T (°C)	
--	--	--	--	--	--	
Supplementary information:						

19.13	**TABLE: Abnormal operation, temperature rises**	P
Thermocouple locations	Max. temperature rise measured, dT (K)	Max.temperature rise limit, dT (K)
Test clause: 19.2		
Test condition: Operated under the conditions specified in Clause 11but supplied at 0.94times rated voltage, steady conditions are established		
Test voltage(V): 0.94x240V		
Test ambient(°C): 24.8		

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Power cord insulation	5.2	150
Wall of test corner	2.1	See clause 30.1
Enclosure inside near Transformer	9.38	See cl.30
Enclosure inside near Heating element	68.1	See cl.30
Test clause: 19.3		
Test condition: Repeat 19.2, but supplied at 1.06 times rated voltage		
Test voltage(V): 1.06x240V		
Test ambient(°C): 24.8		
Power cord insulation	10.1	150
Wall of test corner	2.5	See clause 30.1
Enclosure inside near Transformer	11.3	See cl.30
Enclosure inside near Heating element	70.2	See cl.30
Test clause: 19.4		
Test condition: Test as clause 11, but thermostat switch is short-circuited		
Test voltage(V): 1.06x240V		
Test ambient(°C): 24.8		
Power cord insulation	14.2	150
Wall of test corner	4.0	See clause 30.1
Enclosure inside near Transformer	16.3	See cl.30
Enclosure inside near Heating element	75.9	See cl.30
Supplementary information:		

24.1	**TABLE: Components information**				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1])
Alternative	Wuxi Zhonghui Wire & Cable Co. Ltd.	H05RN-F	2×1,0mm² Black color	DIN EN 50525-2-21 AfPS GS 2014:01-PAK	TUV R/ 0244219332 c1 001 +tested with appliance
Top / bottom enclosure	FORMOSA CHEMICALS & FIBRE CORP PLASTICS DIV	ABS,AG15A1	85°C,HB	UL 94,UL 1694, UL 723	UL E162823
Heating wire	DONGGUAN LIUQUAN WIRE CO LTD	1332	200°C,300V, min24AWG	UL758	UL E327087

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Clause	Requirement + Test	Result - Remark	Verdict

Internal wires to switch	SHENZHEN HONGYA ELECTRONICS CO LTD	2651	80°C,300V,min28AWG	UL758	UL E346933
Switch	Zhejiang zhongxun electronics co., ltd.	KCD1	10A, 125V AC 6A 250V AC	EN 61058-1	VDE 40025514
Thermal fuse	NEC SCHOTT Components Corporation	SF 76E	250VAC,10A, 150℃	DIN EN 60691, EN 60691, IEC 60691	VDE 40006568
Motor	Zhejiang Yongkang Gaosheng Motor Co., Ltd	7712-8S	120VAC, Class A	IEC 60335-2-45	Test with appliance
Power supply unit	Shenzhen Longhua New District Deliang electronics factory	SCY-1240	Input: 110-240V~, 50/60Hz, 0.8A Output: DC12V, 4A	EN 61558-1 EN 61558-2-16	Test with appliance
Supplementary information: [1]) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

28.1	TABLE: Threaded part torque test			P
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)	
Fixed enclosure	2.75	II	0.4	
Supplementary information:				

29.1	TABLE: Clearances		P
	Overvoltage category..... ..... :	II	—

		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic (mm)	Supplementary (mm)	Reinforced (mm)	Functional (mm)	Verdict / Remark
330	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
500	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
800	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
1 500	0,5 / 0,8** / 1,0***	--	--	--	--	N/A
2 500	1,5 / **2,0****	>2.0mm	>2.0mm	--	>2.0mm	P
4 000	3,0 / **3,5****	--	--	>3.5mm	--	P
6 000	5,5 / 6,0***	--	--	--	--	N/A

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8 000	8,0 / 8,5***	--	--	--	--	N/A
10 000	11,0 / 11,5***	--	--	--	--	N/A

Supplementary information:

*) For tracks on printed circuit boards if pollution degree 1 and 2
**) For pollution degree 3
***) If the construction is affected by wear, distortion, movement of the parts or during assembly

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree										
	1	2			3			Type of insulation			
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*)	B**)	S**)	R**)	Verdict
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9		—	—	N/A
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9	—		—	N/A
≤50	0,36	1,2	1,7	2,4	3,0	3,4	3,8	—	—		N/A
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4		—	—	N/A
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4	—		—	N/A
125	0,56	1,5	2,1	3,0	3,8	4,2	4,8	—	—		N/A
250	0,56	1,25	1,8	2,5	3,2	3,6	**4,0**	>4.0	—	—	P
250	0,56	1,25	1,8	2,5	3,2	3,6	**4,0**	—	>4.0	—	P
250	1,12	2,5	3,6	5,0	6,4	7,2	**8,0**	—	—	>8.0	P
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	N/A
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	N/A
400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		N/A
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	N/A
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	N/A
500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		N/A
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		—	—	N/A
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—		—	N/A
>630 and ≤800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—		N/A
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—	—	N/A

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>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—		—	N/A
>800 and ≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—		N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0		—	—	N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—		—	N/A
>1000 and ≤1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0	—	—		N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0		—	—	N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—		—	N/A
>1250 and ≤1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0	—	—		N/A
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0		—	—	N/A
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	—		—	N/A
>1600 and ≤2000	11,2	16,0	22,0	32,0	40,0	44,0	50,0	—	—		N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0		—	—	N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—		—	N/A
>2000 and ≤2500	15,0	20,0	28,0	40,0	50,0	56,0	64,0	—	—		N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0		—	—	N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—		—	N/A
>2500 and ≤3200	20,0	25,0	36,0	50,0	64,0	72,0	80,0	—	—		N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0		—	—	N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—		—	N/A
>3200 and ≤4000	25,0	32,0	44,0	64,0	80,0	90,0	100,0	—	—		N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0		—	—	N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—		—	N/A
>4000 and ≤5000	32,0	40,0	56,0	80,0	100,0	112,0	126,0	—	—		N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0		—	—	N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—		—	N/A
>5000 and ≤6300	40,0	50,0	72,0	100,0	126,0	142,0	160,0	—	—		N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0		—	—	N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—		—	N/A
>6300 and ≤8000	50,0	64,0	90,0	126,0	160,0	180,0	200,0	—	—		N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0		—	—	N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—		—	N/A

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>8000 and ≤10000	64,0	80,0	112,0	160,0	200,0	220,0	250,0	—	—		N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0		—	—	N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—		—	N/A
>10000 and ≤12500	80,0	100,0	142,0	200,0	250,0	280,0	320,0	—	—		N/A

Supplementary information:

*) Material group IIIb is allowed if the working voltage does not exceed 50 V

**) B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation

29.2	TABLE: Creepage distances, functional insulation							P
Working voltage (V)	Creepage distance (mm) Pollution degree							
	1	2			3			
		Material group			Material group			
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*)	Verdict / Remark
≤10	0,08	0,4	0,4	0,4	1,0	1,0	1,0	N/A
50	0,16	0,56	0,8	1,0	1,4	1,6	1,8	N/A
125	0,25	0,71	1,0	1,4	1,8	2,0	2,2	N/A
250	0,42	1,0	1,4	2,0	2,5	2,8	**3,2**	P
400	0,75	1,6	2,2	3,2	4,0	4,5	5,0	N/A
500	1,0	2,0	2,8	4,0	5,0	5,6	6,3	N/A
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	N/A
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	N/A
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	N/A

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IEC 60335-2-45			
Clause	Requirement + Test	Result - Remark	Verdict

>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	N/A
Supplementary information: *) Material group IIIb is allowed if the working voltage does not exceed 50 V								

30.1	**TABLE: Ball Pressure Test of Thermoplastics**		P
Allowed impression diameter (mm) ..... :		2mm	—
Object/ Part No./ Material	**Manufacturer/ trademark**	**Test temperature (°C)**	**Impression diameter (mm)**
Plastic enclosure	See table 24.1	75.9+40=115.9	1.3
Supplementary information:			

30.2	**TABLE: Resistance to heat and fire - Glow wire tests**							P
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow wire test (GWT); (°C)**						**Verdict**
		550	**650**		**750**		**850**	
			te	**ti**	**te**	**ti**		
Plastic enclosure	See table 24.1	X No flame	--	--	--	--	--	Pass
Fan support	See table 24.1	--	--	--	0s	0s	X No flame	Pass
Power switch	See table 24.1	--	--	--	0s	0s	X No flame	Pass
DC inlet	See table 24.1	--	--	--	0s	0s	X No flame	Pass
Connector	See table 24.1	--	--	--	0s	0s	X No flame	Pass
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow-wire flammability index (GWFI), °C**				**GW ignition temp. (GWIT), °C**		**Verdict**
		550	**650**	**750**	**850**	**675**	**775**	
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--
The test specimen passed the glow wire test (GWT) with no ignition [(te – ti) ≤ 2s] (Yes/No) ..... :								Yes

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If no, then surrounding parts passed the needle-flame test of annex E (Yes/No)..... :	No
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)? ..... :	No
Ignition of the specified layer placed underneath the test specimen (Yes/No) ..... :	No
Supplementary information: - 550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF - The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances	

30.2/30.2.4	TABLE: Needle- flame test (NFT)				N/A
Object/ Part No./ Material	**Manufacturer/ trademark**	**Duration of application of test flame (ta); (s)**	**Ignition of specified layer Yes/No**	**Duration of burning (tb) (s)**	**Verdict**
--	--	--	--	--	--
Supplementary information: - NFT not relevant (or applicable) for Parts of material classified as V-0 or V-1 - NFT not relevant (or applicable) for Base material of PCBs classified as V-0 or if relevant VTM-0					

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Attachment No.1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60335-2-45
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Household and similar electrical appliances – Safety –
Part 2: Particular requirements for portable heating tools

Differences according to……:	EN 60335-2-45: 2002+A1: 2008+A2: 2012 used in conjunction with EN 60335-1: 2012+A11: 2014+A13: 2017+A1: 2019+A2: 2019+A14:2019 EN 62233:2008
Attachment Form No……...:	EU_GD_IEC60335_2_45I
Attachment Originator……:	SIQ
Master Attachment……...:	2017-11

	CENELEC COMMON MODIFICATIONS (EN)		
6.1	Delete ~~c~~lass 0" and ~~c~~lass 01"	Class II	P
7.1	Single-phase appliances to be connected to the supply mains: 230 V covered	220-240V 50/60Hz	P
	Multi-phase appliances to be connected to the supply mains: 400 V covered		N/A
7.10	Devices used to start/stop operational functions of the appliance distinguished from other manual devices by means of shape, size, surface texture, position, etc.		N/A
	An indication that the device has been operated is given by:		--
	• a tactile feedback, or		N/A
	• an audible and visual feedback		N/A
7.12	The instructions include the substance of the following:		P
	- this appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved		P
	- children shall not play with the appliance		P
	- cleaning and user maintenance shall not be made by children without supervision		P

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Clause	Requirement + Test	Result - Remark	Verdict
7.12.Z1	The specific instructions related to the safe operation of this appliance is collated together in the front section of the user instructions		P
	The height of the characters, measured on the capital letters, is at least 3 mm		P
	These instructions are also available in an alternative format, e.g. on a website		P
8.1.1	Also test probe 18 of EN 61032 is applied		P
	The appliance being in every possible position during the test except that		P
	appliances normally used on the floor and having a mass exceeding 40 kg are not tilted		N/A
	The force on the probe in the straight position is increased to 10 N when probe 18 is used		N/A
	When using test probe 18 the appliance is fully assembled as in normal use without any parts removed, and		P
	parts intended to be removed for user maintenance are also not removed		P
8.2	Compliance is checked by applying the test probes of EN 61032		P
	For built-in appliances and fixed appliances, the test probe B and probe 18 of EN 61032 are applied only after installation		P
11.8	Footnotes to –External enclosure of motor-operated appliances" to be taken into account		P
15.1.2	Appliances with an automatic cord reel tested with the cord in the most unfavourable position so that the reeling of the wet cord may affect electrical insulation during operation, the cord not being dried before reeling		N/A
20.2	When using the test probe similar to test probe B with a circular stop face, the accessories and detachable covers are removed		N/A
	Test probe 18 applied with a force of 2,5N on the appliance fully assembled		N/A
24.1	Components comply with the safety requirements specified in the relevant standards as far as they reasonably apply		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance.		P
	The requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components		P
	Components that have not been previously tested or do not comply with the standard for the relevant component are tested according to the requirements of 30.2		P
	Components that have been previously tested and shown to comply with the resistance to fire requirements in the standard for the relevant component need not be retested provided that:		N/A
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		N/A
	- the test report for the component states whether it complied with the standard for the relevant component with or without flame, flames not exceeding 2 s during the test are ignored		N/A
	Unless components have been previously tested and found to comply with the relevant standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		N/A
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant standard for the component are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components that have not been separately tested and found to comply with the relevant standard, and		P
	components that are not marked or not used in accordance with their marking,		N/A
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard		P
	Lamp holders and starter holders that have not been previously tested and found to comply with the relevant standard are tested as a part of the appliance and additionally comply with the gauging and interchangeability requirements of the relevant standard under the conditions occurring in the appliance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Where the relevant standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used		P
	Plugs and socket-outlets and other connecting devices of interconnection cords are not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1, or		P
	with connectors and appliance inlets complying with the standard sheets of IEC 60320-1,		N/A
	if direct supply to these parts from the supply mains gives rise to a hazard		N/A
24.1.7	If the remote operation of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is EN 41003		N/A
	Compliance with Clause 8 of this standard is not impaired by connecting the appliance to a device covered by EN 41003		N/A
24.Z1	For motor running capacitors (IEC 60252-1 type P2) with a metallic enclosure having an overpressure fuse the flame testing of internal plastic parts supporting current carrying connections as required in 30.2.2 and 30.2.3.1 is not necessary		N/A
25.6	Supply cords of single-phase portable appliances having a rated current not exceeding 16 A, fitted with a plug complying with the following standard sheets of IEC/TR 60083:		N/A
	- for Class I appliances: standard sheet C2b, C3b or C4 ....:		N/A
	- for Class II appliances: standard sheet C5 or C6..... ....:		N/A
25.7	Rubber sheathed cords (60245 IEC 53) are not suitable for appliances intended to be used outdoors or when they are liable to be exposed to significant amount of ultraviolet radiation		N/A

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	Halogen-free thermoplastic compound sheathed supply cords have properties at least those of:		N/A
	• halogen-free thermoplastic compound sheathed cords (H03Z1Z1H2-F or H03Z1Z1-F), for appliances having a mass not exceeding 3 kg		N/A
	• halogen-free thermoplastic compound sheathed cords (H05Z1Z1H2-F or H05Z1Z1-F), for other appliances		N/A
	Cross-linked halogen-free compound sheathed supply cords have properties at least those of cross-linked halogen-free compound sheathed cords (H07ZZ-F)		N/A
26.11	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain them in position unless they are held in place near the terminals independently of the solder		N/A
29.3.Z1	Appliance constructed so that if there is a possibility of damaging the insulation during installation, the insulation withstands the scratch and penetration test of 21.2		N/A
32	Compliance regarding electromagnetic fields is checked according to EN 62233		N/A
Annex I, 19.I.101	The appliance is supplied at rated voltage and operated under normal operation with each of the fault conditions specified		N/A
	The duration of the test is as specified in 19.7		N/A

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ZA	**ANNEX ZA** (NORMATIVE) **SPECIAL NATIONAL CONDITIONS**		P
	Norway		N/A
19.5	The test is also applicable to appliances intended to be permanently connected to fixed wiring		N/A
	Norway		N/A
22.2	The second paragraph of this subclause, dealing with single-phase, permanently connected class I appliances having heating elements, is not applicable due to the supply system		N/A
	All CENELEC countries		--
25.6 and 25.25	Information concerning National plug and socket-outlets is available from the CENELEC website. Normative national requirements concerning plug and socket-outlets are shown in the relevant National standard		N/A
	Ireland and United Kingdom		N/A
25.8	In the table, the lines for 10 A and 16 A are replaced by:		N/A
	> 10 and ≤ 13 1,25 (1,0)[b]		N/A
	> 13 and ≤ 16 1,5 (1,0)[b]		N/A
ZB	**ANNEX ZB** (INFORMATIVE) **A-DEVIATIONS**		N/A
	Ireland		N/A
25.6	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances		N/A
	United Kingdom		N/A

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25.6	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs to BS 1363 to be fitted to domestic appliances. It also allows plugs to BS 4573 and EN 50075 to be fitted to shavers and toothbrushes		N/A
ZC	**ANNEX ZC** (NORMATIVE) **NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**		P
	A list of referenced documents in this standard		P
	Normative references to international publications with their corresponding European publications		P
ZD	**ANNEX ZD** (INFORMATIVE) **IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS**		P
	A table with IEC and CENELEC code designations for flexible cords		P
ZE	**ANNEX ZE** (INFORMATIVE) **SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE**		N/A
7.1	Business name and full address of the manufacturer and, where applicable, his authorized representative.....:		N/A
	Model or type reference .....:		N/A
	Serial number, if any .....:		N/A
	Production year		N/A
	Designation of the appliance.....:		N/A
7.12	Instructions provided with the appliance so that the appliance can be used safely		N/A
	The instructions contain at least the following information:		N/A
	- the business name and full address of the manufacturer and, where applicable, his authorized representative		N/A
	- model or type reference of the appliance as marked on the appliance itself, except for the serial number		N/A

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	- the designation of the appliance together with its explanation in case it is given by a combination of letters and/or numbers		N/A
	- the general description of the appliance, when needed due to the complexity of the appliance		N/A
	- specific precautions if required during installation, operation, adjusting, user maintenance, cleaning, repairing or moving		N/A
	- when needed drawings, diagrams, descriptions and explanations necessary for the safe use and user maintenance of the appliance		N/A
	- the possible reasonably foreseeable misuse and, whenever relevant, a warning against the effects it may have on the safe use of the appliance		N/A
	The words "Original instructions" appear on the language version(s) verified by the manufacturer or by the authorized representative		N/A
	When a translation of the original instructions has been provided by a person introducing the appliance on the market; the meaning of the sentence "Translation of the original instructions" appear in the relevant instructions delivered with the appliance		N/A
	The instructions for maintenance/service to be done by specialized personnel, mandated by the manufacturer or the authorized representative may be supplied in only one Community language which the specialized personnel understand		N/A
	The instructions indicate the type and frequency of inspections and maintenance required for safe operation including the preventive maintenance measures		N/A
7.12.ZE1	If needed for specific appliances, the following information to be given:		N/A
	• on use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns, if these operations have consequences on stability of the appliance in order to avoid overturning, falling or uncontrolled movements of the appliance or of its component parts		N/A

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	• on how to maintain adequate mechanical stability when in use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance		N/A
	• on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided		N/A
	• on the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur the operating method to safely unblock the appliance		N/A
	• on the specifications on the spare parts to be used, when these affect the health and safety of the operator		N/A
	• on airborne noise emissions, determined and declared in accordance with the relevant Part 2, which includes:		N/A
	- the A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A) .....;		N/A
	- where this level does not exceed 70 dB(A), this fact is indicated		N/A
	- the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 μPa).....:		N/A
	- the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A).....:		N/A
7.12.ZE2	The instructions includes a warning to disconnect the appliance from its power source during service and when replacing parts		N/A
	If the removal of the plug is foreseen, it is clearly indicated that the removal of the plug has to be such that an operator can check from any of the points to which he has access that the plug remains removed		N/A
	If this is not possible, due to the construction of the appliance or its installation, a disconnection with a locking system in the isolated position is provided		N/A

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19.11.4.8	The appliance continues to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage fluctuation occurred, or		N/A
	a manual operation is required to restart it		N/A
20.1	Appliances and their components and fittings have adequate mechanical stability during transportation, assembly, dismantling and any other action involving the appliance		N/A
20.2	Dangerous moving transmission parts safeguarded either by design or guards		N/A
	When guards are used, they are fixed guards, interlocking movable guards or protective devices		N/A
	Moving parts directly involved in the function of the appliance which cannot be made completely inaccessible fitted with:		N/A
	- fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and		N/A
	- adjustable guards restricting access to those sections of the moving parts where access is necessary		N/A
	Interlocking movable guards used where frequent access is required		N/A
21.1	Appliances and their components and fittings have adequate mechanical strength and is constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance		N/A
22.ZE.1	For appliances provided with a seat, the seat gives adequate stability		N/A
	The distance between the seat and the control devices capable of being adapted to the operator		N/A
22.ZE.2	For appliances provided with separate devices for the start and the stop functions, the stop function is unambiguously identifiable and does always override the start function		N/A
	For appliances provided with one device performing the start and the stop function, the stop function is unambiguously identifiable and does always override the start function		N/A

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22.ZE.3	Appliances designed in such a way that incorrect mounting is avoided, if this can lead to an unsafe situation		N/A
	If this is not possible, information on the correct mounting is given directly on the part and/or the enclosure		N/A
22.ZE.4	Where the weight, size or shape prevents appliances from being moved manually, they are fitted with attachments for lifting gear, or		N/A
	so designed that they can be fitted with such attachments, or		N/A
	be shaped in such a way that standard lifting gear can easily be used		N/A
	Appliances to be moved manually are constructed or equipped so that they can be moved easily and safely		N/A
22.ZE.5	The fixing systems of fixed guards which prevent access to dangerous moving transmission parts only removable with the use of tools		N/A
	If such guards have to be removed by the user for routine cleaning or maintenance their fixing systems remain attached to the fixed guards or to the machine after removal		N/A
	Where possible, guards are incapable of remaining in place without their fixings		N/A
	This does not apply if, after removal of the screws, or if the component is incorrectly repositioned, the appliance becomes inoperative		N/A
	Movable guards are interlocked		N/A
	The interlocking devices prevent the start of hazardous appliance functions until the guards are fixed in their position, and give a stop command whenever they are no longer closed		N/A
	Where it is possible for an operator to reach the danger zone before the risk due to hazardous appliance functions has ceased, movable guards associated with a guard locking device in addition to an interlocking device that:		N/A
	- prevents the start of hazardous appliance functions until the guard is closed and locked, and		N/A
	- keeps the guard closed and locked until the risk of injury from the hazardous appliance functions has ceased		N/A

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	Interlocking movable guards remain attached to the appliance when open, and		N/A
	they are designed and constructed in such a way that they can be adjusted only by means of an intentional action		N/A
22.ZE.6	Interlocking movable guards designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous appliance functions		N/A
	The guard is opened to the extent needed to cause the interlocking to operate and is then closed, the number of operations being defined in the specific Part 2 .....:		N/A
	After this test any defect that may be expected in normal use is applied to the interlock system, including interruption of the supply, only one defect being simulated at a time		N/A
	After these tests the interlock system is fit for further use		N/A
22.ZE.7	Adjustable guards restricting access to areas of the moving parts strictly necessary for the work are:		N/A
	- adjustable manually or automatically, depending on the type of work involved, and		N/A
	- readily adjustable without the use of tools		N/A
22.ZE.8	In case of interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply, the appliance does not restart		N/A
	However, automatic restarting of the operation is allowed if the appliance may continue to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage interruption or fluctuation occurred		N/A
22.ZE.9	Appliances fitted with means to isolate them from all energy sources		N/A
	Such isolators are clearly identified, and		N/A
	they are capable of being locked if reconnection endanger persons		N/A
	After the energy source is disconnected, it is possible to dissipate any energy remaining or stored in the circuits of the appliance without risk to persons		N/A

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Attachment No.1: **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES**			
Clause	Requirement + Test	Result - Remark	Verdict
ZF	**ANNEX ZF** (INFORMATIVE) **CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD**		P
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive).....:	LVD	P
ZG	**ANNEX ZG** (NORMATIVE) **UV APPLIANCES**		N/A
	The following modifications to this standard apply to appliances having UV emitters		N/A
	This annex is not applicable to appliances covered by the scopes of IEC 60335-2-27, IEC 60335-2-59 or IEC 60335-2-109		N/A
7.12.ZG	The instructions for appliances incorporating UVC emitters include the substance of the following: WARNING — This appliance contains a UV emitter. Do not stare at the light source		N/A
32	For appliances incorporating UV emitters the manufacturer delivers a declaration providing evidence that the plastic material exposed to the radiation is UV resistant		N/A
ZZA	**ANNEX ZZ** (INFORMATIVE) **COVERAGE OF ESSENTIAL REQUIREMENTS OF EC DIRECTIVES**		P
	Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered	2014/35/EU	P
ZZB	Relationship between this European standard and the essential requirements of Directive 2006/42/EC aimed to be covered		N/A

Annex EN 62233:2008			
Clause	Requirement + Test	Result - Remark	Verdict
EMF- ELECTROMAGNETICS FIELDS			
	The tested product also complies with the requirements of EN 62233:2008		P
	Limit ……100%	Measured max. : 1.329%	P

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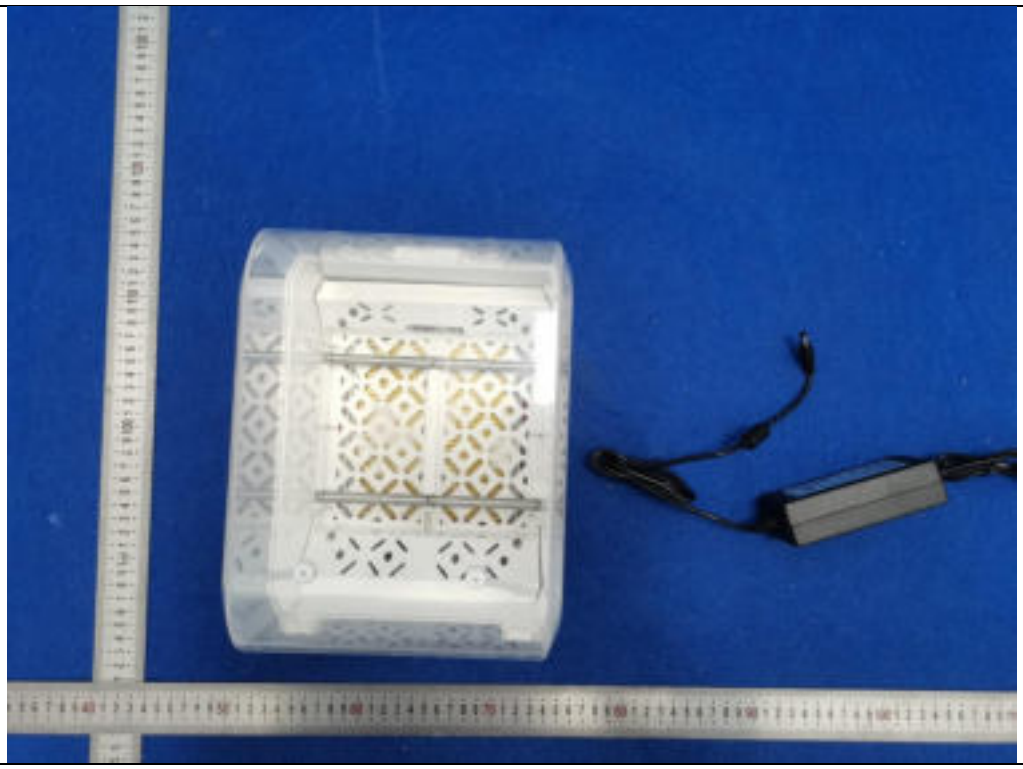
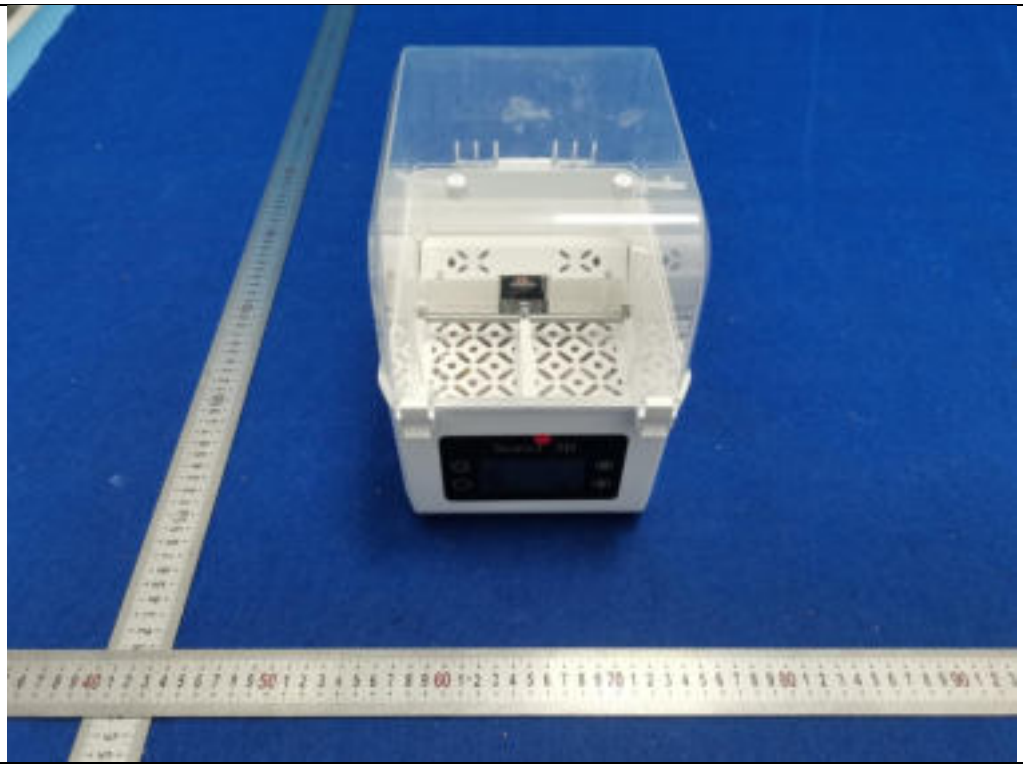
Attachment No.2: Photo Document

Details of: Overview for model SH01



Details of: Detail view for model SH01



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Attachment No.2: Photo Document

Details of: Detail view for model SH01

Details of: Detail view for model SH01

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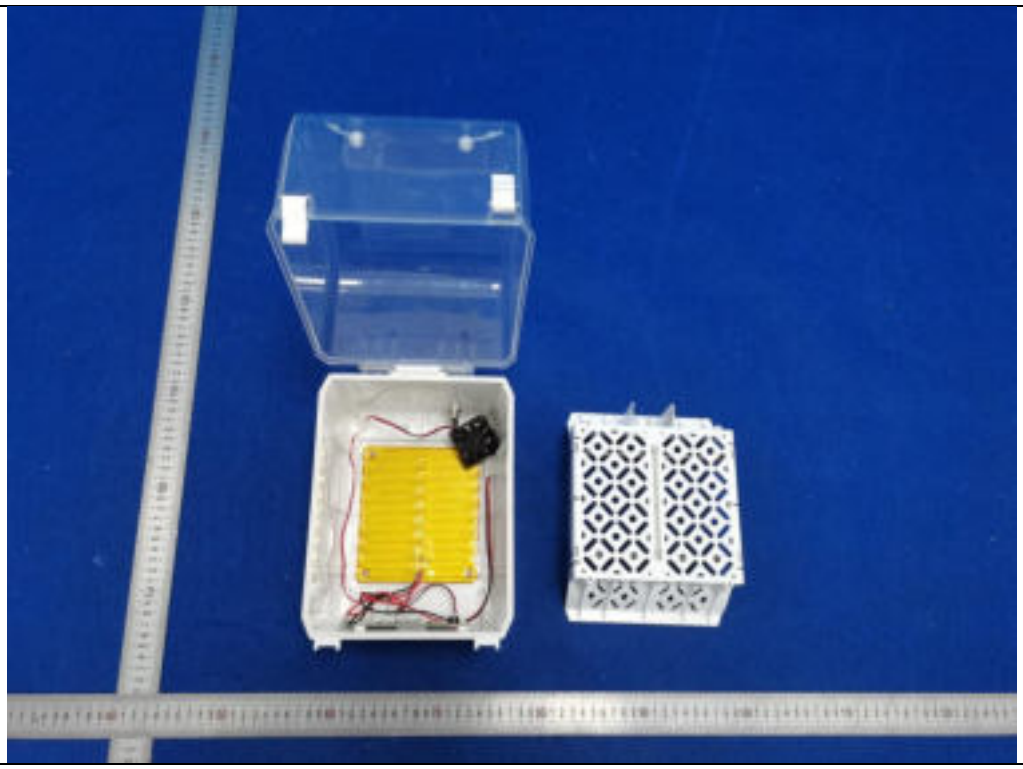
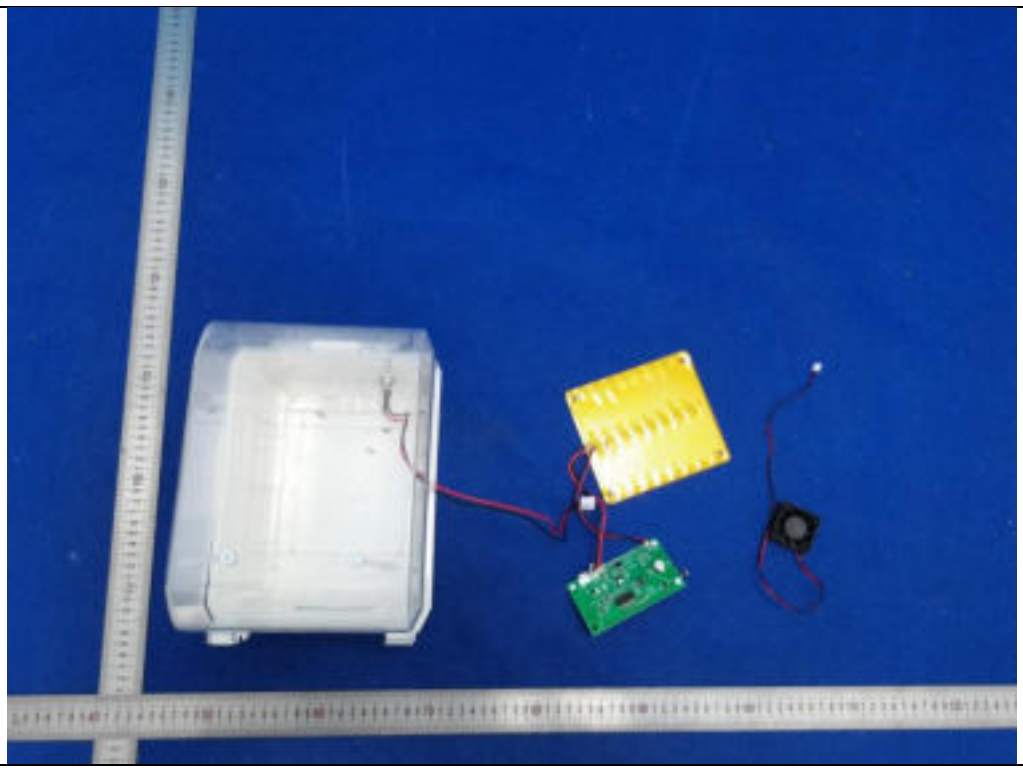
Attachment No.2: Photo Document

Details of: Internal view for model SH01



Details of: Internal view



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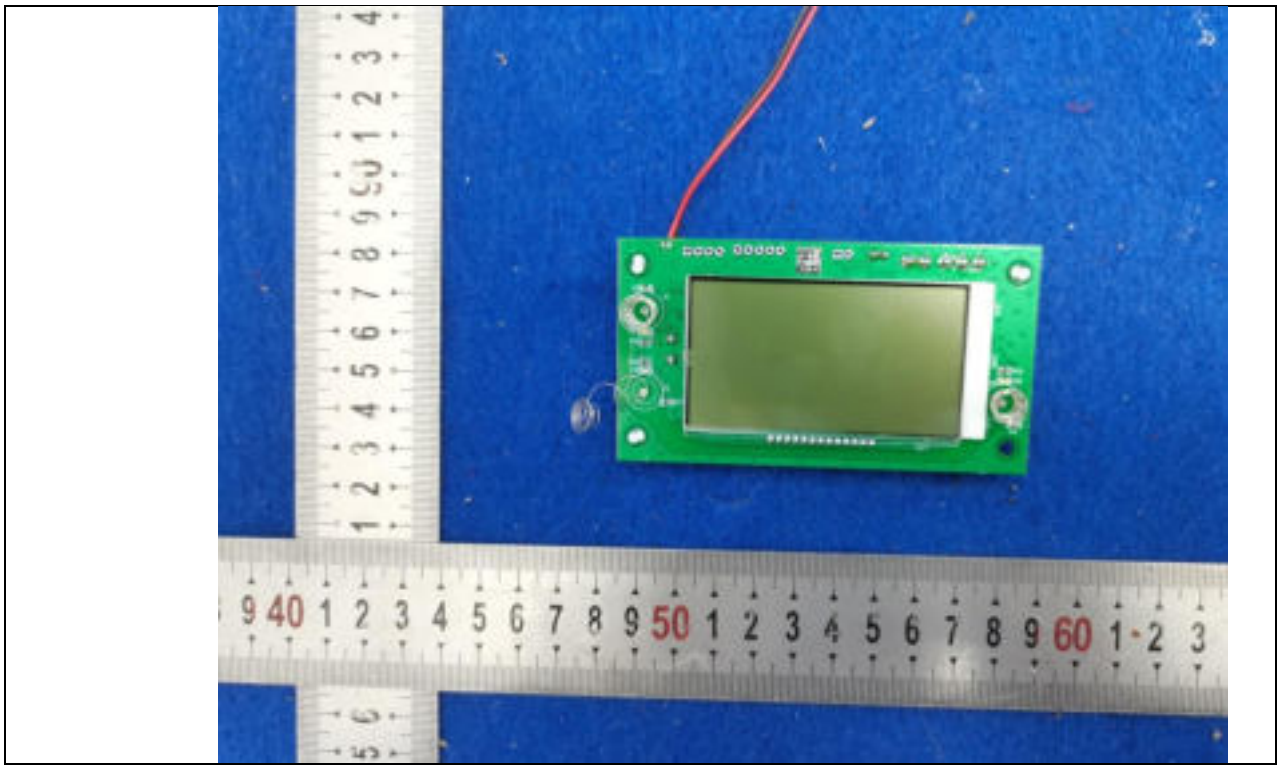
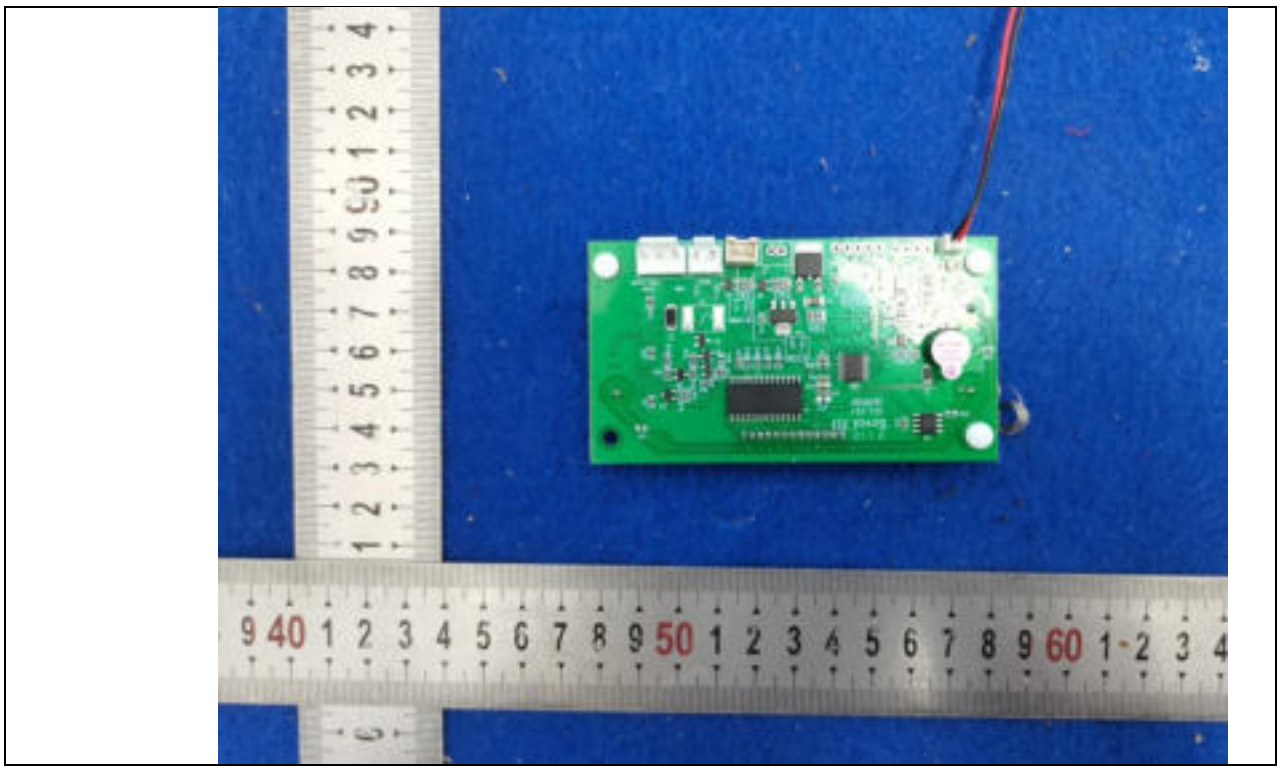
Attachment No.2: Photo Document

Details of: Internal view



Details of: Internal view



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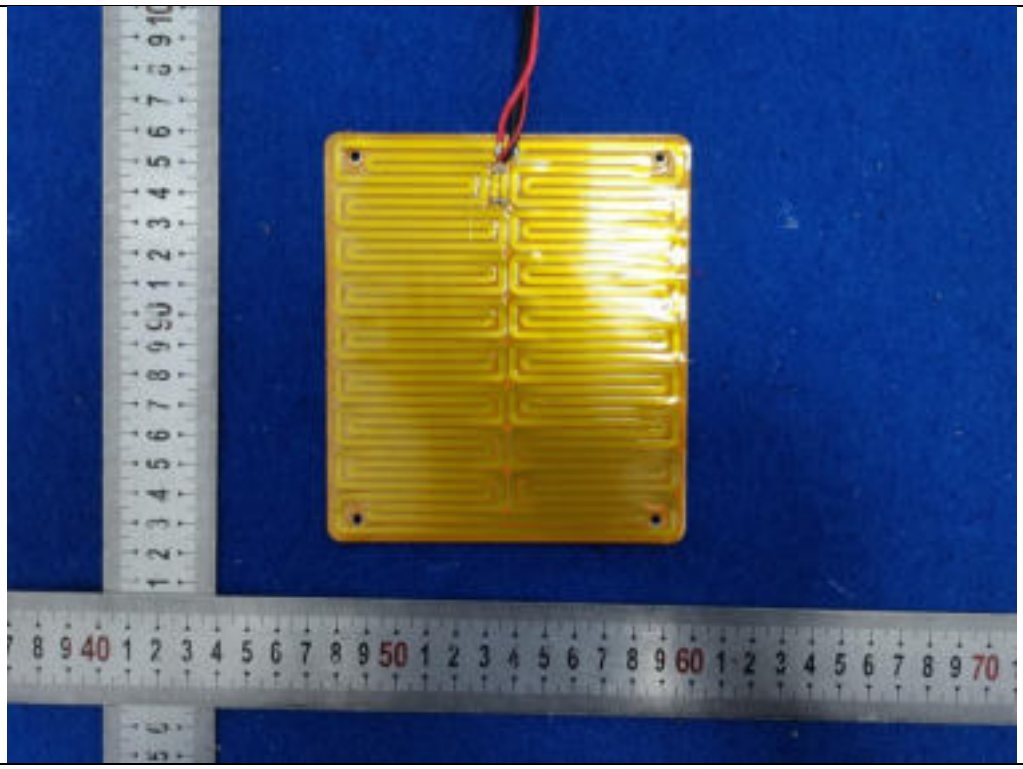
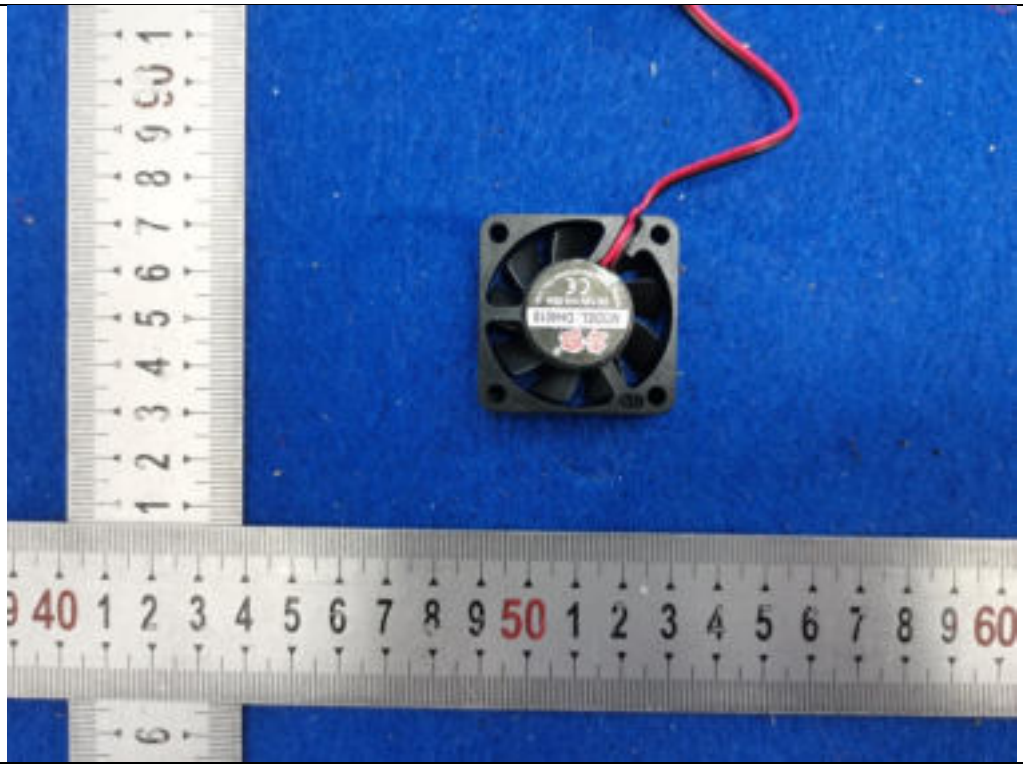
Attachment No.2: Photo Document

Details of: Internal view



Details of: Detail view



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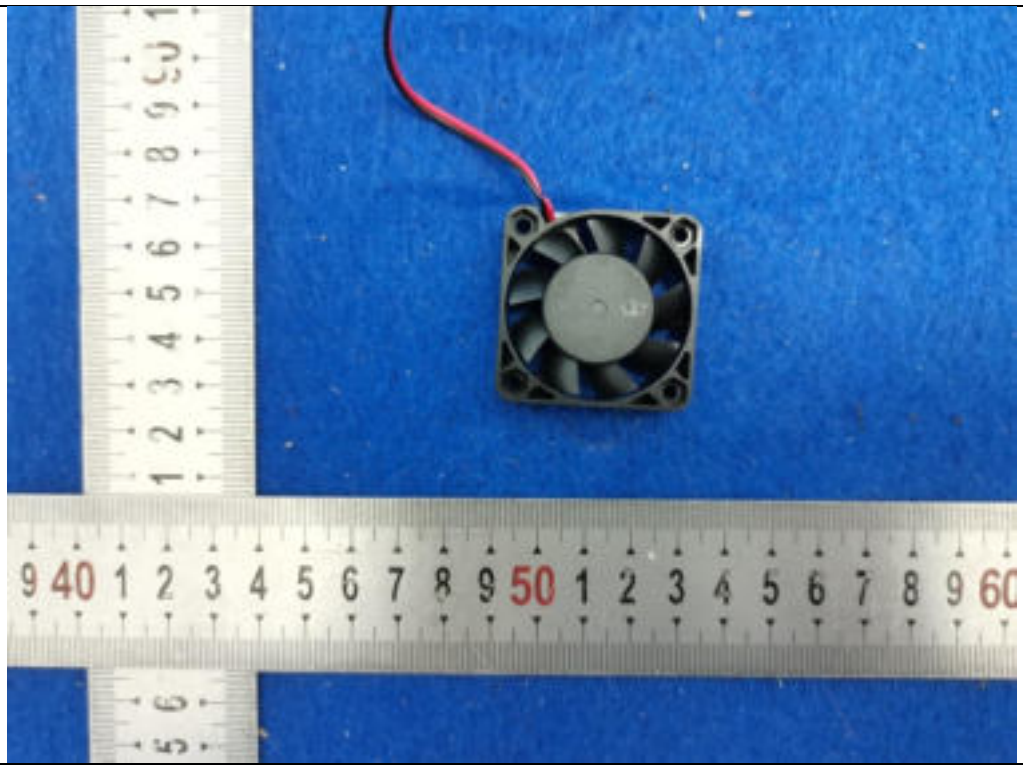
Details of: Internal view



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

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FCC SDoC TEST REPORT

Shenzhen Liandianchuang Technology Co., LTD

Sovol Filament Dryer

Test Model: SH01

Additional Model No.: Please refer to page 7

Prepared for	:	Shenzhen Liandianchuang Technology Co., LTD
Address	:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Tel	:	(+86)755-82591330
Fax	:	(+86)755-82591332
Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	May 19, 2021
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	May 19, 2021 ~ May 28, 2021
Date of Report	:	June 01, 2021

FCC SDoC TEST REPORT
FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014

Report Reference No.	**: LCS210510032AE**
Date Of Issue	: June 01, 2021
Testing Laboratory Name	**: Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	: Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure...	: Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	**: Shenzhen Liandianchuang Technology Co., LTD**
Address	: Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Test Specification	
Standard.....	: FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014
Test Report Form No.....	: LCSEMC-1.0
TRF Originator.....	: Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	: Dated 2011-03

Test Item Description.	**: Sovol Filament Dryer**
Test Model	: SH01
Trade Mark.....	: Sovol 3D, COMGROW
Ratings	: Please Refer to Page 7
Result	**: Positive**

Compiled by:	Supervised by:	Approved by:
Cindy Nie	Tom Wang	
Cindy Nie/ File administrators	Tom Wang/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS210510032AE	June 01, 2021 Date of issue

Test Model	:	SH01
EUT.....	:	Sovol Filament Dryer
Applicant.....	**:**	**Shenzhen Liandianchuang Technology Co., LTD**
Address.....	:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Telephone.....	:	/
Fax.....	:	/
Manufacturer.....	**:**	**Shenzhen Liandianchuang Technology Co., LTD**
Address.....	:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Telephone.....	:	/
Fax.....	:	/
Factory.....	**:**	/
Address.....	:	/
Telephone.....	:	/
Fax.....	:	/

Test Result according to the standards on page 6: **Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revisions	Revised By
000	June 01, 2021	Initial Issue	Gavin Liang

TABLE OF CONTENTS

Test Report Description Page

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014	Class B	PASS
Radiated disturbance	FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014	Class B	PASS
N/A is an abbreviation for Not Applicable.			

Test mode:		
Mode 1	Working	Record

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : Sovol Filament Dryer

Trade Mark : Sovol 3D, COMGROW

Test Model : SH01

Additional Model No. : SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09

Model Declaration : PCB board, structure and internal of these model(s) are the same, So no additional models were tested.

Power Supply : Input: 100-240V~, 50/60Hz
Output: 12V⎓4A, 48W

2.2. Support equipment List

Name	Manufacturers	M/N	S/N
--	--	--	--

2.3. Description of Test Facility

Site Description
EMC Lab. : NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.

2.4. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.5. Measurement Uncertainty

Test	Parameters	Expanded Uncertainty (Ulab)	Expanded Uncertainty (Ucispr)
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB

（1）Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

（2）The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

3. TEST RESULTS

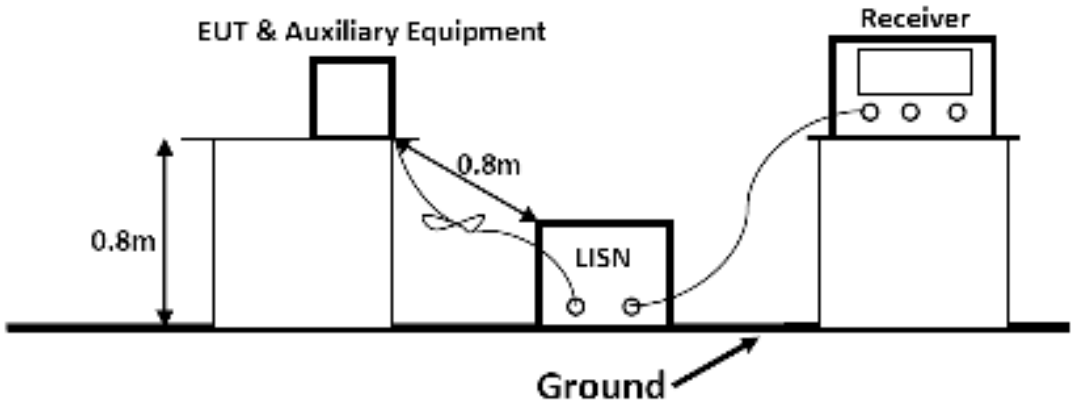
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
2	EMI Test Receiver	R&S	ESPI	101840	2020-06-22	2021-06-21
3	Artificial Mains	R&S	ENV216	101288	2020-06-22	2021-06-21
4	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2020-06-22	2021-06-21

3.1.2.Block Diagram of Test Setup



3.1.3.Test Standard

Power Line Conducted Emission Limits (Class B)

Frequency (MHz)			Limit (dBμV)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50	~	5.00	56.0	46.0
5.00	~	30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.				

3.1.4.EUT Configuration on Test

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

3.1.5.Operating Condition of EUT

3.1.5.1.Setup the EUT as shown on Section 3.1.2

3.1.5.2.Turn on the power of all equipments.

3.1.5.3.Let the EUT work in measuring Mode 1 and measure it.

3.1.6.Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC/ANSI C63.4-2014 on Conducted Emission Measurement.

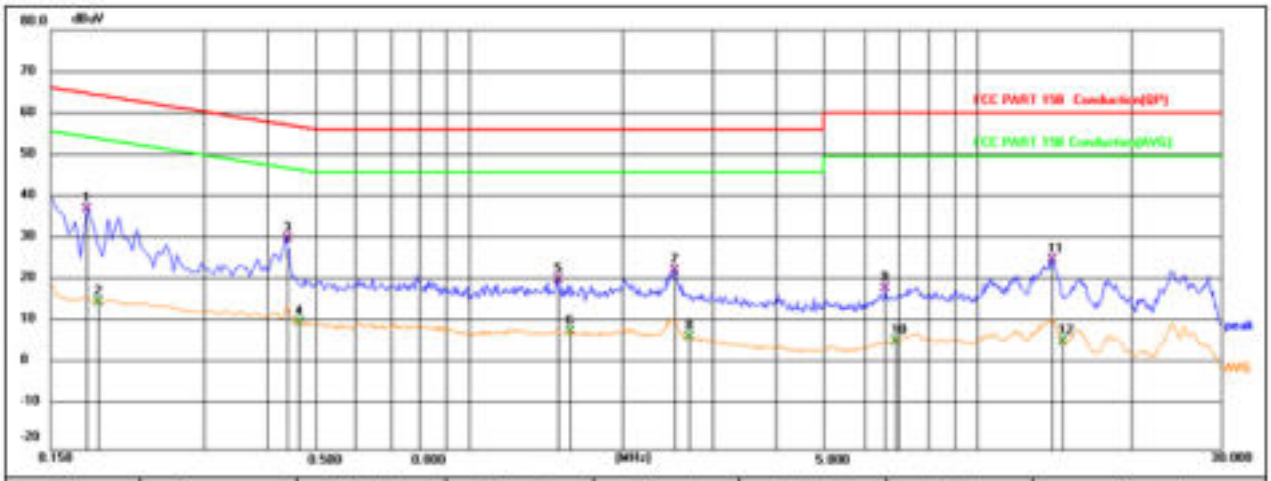
The bandwidth of the test receiver is set at 9kHz.
The frequency range from 150kHz to 30MHz is investigated

3.1.7.Test Results

PASS.

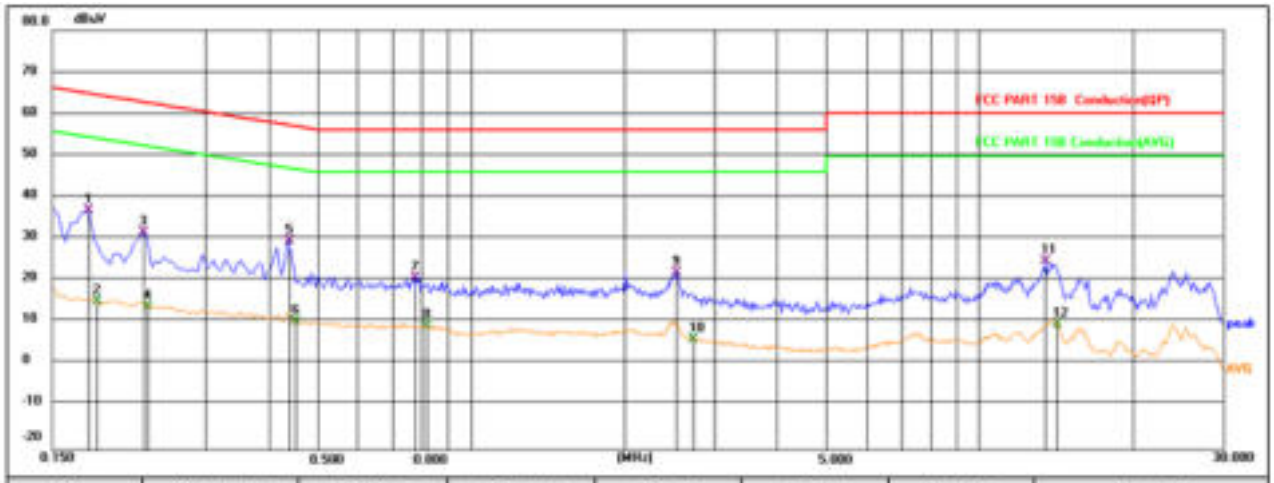
The test result please refer to the next page.

Test Model	SH01	Test Mode	Mode 1
Environmental Conditions	22.7℃, 53.7% RH	Test Engineer	Daiwei Dai
Pol	Line	Test Voltage	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1771	20.04	17.22	37.26	64.62	-27.36	QP
2	0.1861	-2.14	17.24	15.10	54.21	-39.11	AVG
3	0.4381	14.58	15.72	30.30	57.10	-26.80	QP
4	0.4612	-5.46	15.69	10.23	46.67	-36.44	AVG
5	1.4911	5.35	15.15	20.50	56.00	-35.50	QP
6	1.5766	-7.03	15.16	8.13	46.00	-37.87	AVG
7	2.5350	8.47	14.26	22.73	56.00	-33.27	QP
8	2.6971	-7.26	13.97	6.71	46.00	-39.29	AVG
9	6.5761	5.93	12.48	18.41	60.00	-41.59	QP
10	6.8686	-7.44	13.31	5.87	50.00	-44.13	AVG
11	13.9696	13.68	11.62	25.30	60.00	-34.70	QP
12	14.6131	-6.16	11.97	5.81	50.00	-44.19	AVG

Test Model	SH01	Test Mode	Mode 1
Environmental Conditions	22.7℃, 53.7% RH	Test Engineer	Daiwei Dai
Pol	Neutral	Test Voltage	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1771	19.74	17.22	36.96	64.62	-27.66	QP
2	0.1825	-1.92	17.24	15.32	54.37	-39.05	AVG
3	0.2266	14.56	17.08	31.64	62.57	-30.93	QP
4	0.2316	-3.02	17.04	14.02	52.39	-38.37	AVG
5	0.4381	14.15	15.72	29.87	57.10	-27.23	QP
6	0.4516	-5.16	15.70	10.54	46.85	-36.31	AVG
7	0.7711	4.45	16.60	21.05	56.00	-34.95	QP
8	0.8161	-7.13	16.65	9.52	46.00	-36.48	AVG
9	2.5350	7.86	14.26	22.12	56.00	-33.88	QP
10	2.7376	-7.60	13.89	6.29	46.00	-39.71	AVG
11	13.5196	12.56	12.31	24.87	60.00	-35.13	QP
12	14.1541	-1.85	11.67	9.82	50.00	-40.18	AVG

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

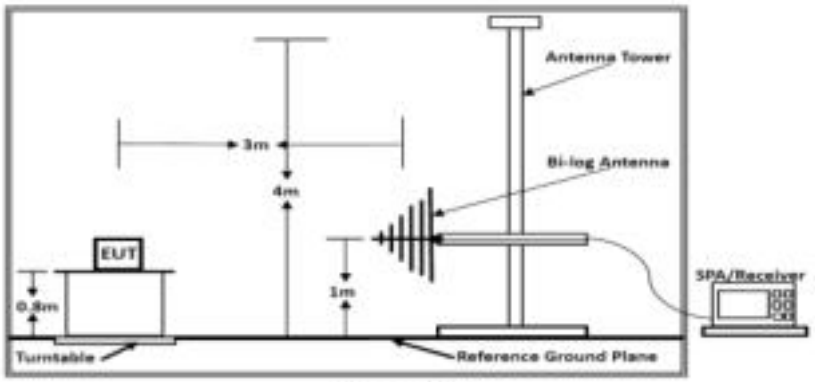
3.2. Radiated emission Measurement

3.2.1. Test Equipment

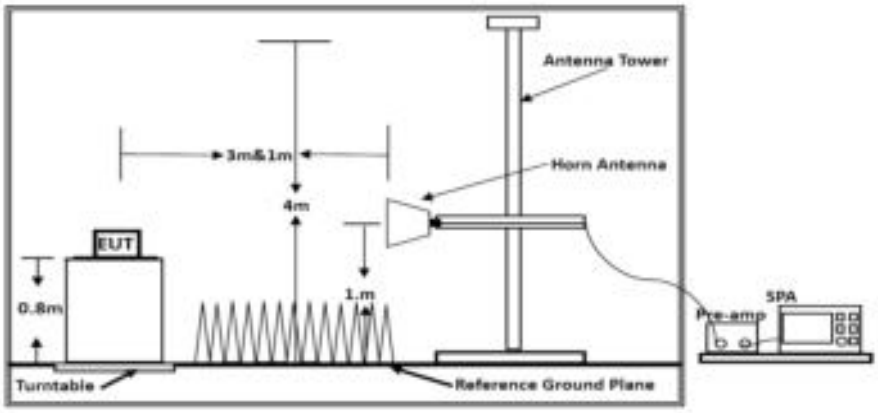
The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	E3	E3-EMC	/	N/A	N/A
2	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2018-07-26	2021-07-25
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02	2021-07-01
4	EMI Test Receiver	R&S	ESR 7	101181	2020-06-22	2021-06-21
5	Broadband Preamplifier	/	BP-01M18G	P190501	2020-06-22	2021-06-21

3.2.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz

3.2.3. Radiated Emission Limit (Class B)

Limits for Radiated Disturbance Below 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46
960 ~ 1000	3	500	54
Remark: (1) Emission level (dB)μV = 20 log Emission level μV/m (2) The smaller limit shall apply at the cross point between two frequency bands. (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.			

Limits for Radiated Emission Above 1GHz			
Frequency (MHz)	Distance (Meters)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
Above 1000	3	74	54
***Note: The lower limit applies at the transition frequency.			

3.2.4. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.2.5. Operating Condition of EUT

3.2.5.1.Setup the EUT as shown in Section 3.2.2.

3.2.5.2.Let the EUT work in test Mode 1 and measure it.

3.2.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.

3.2.7. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10^{th} carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

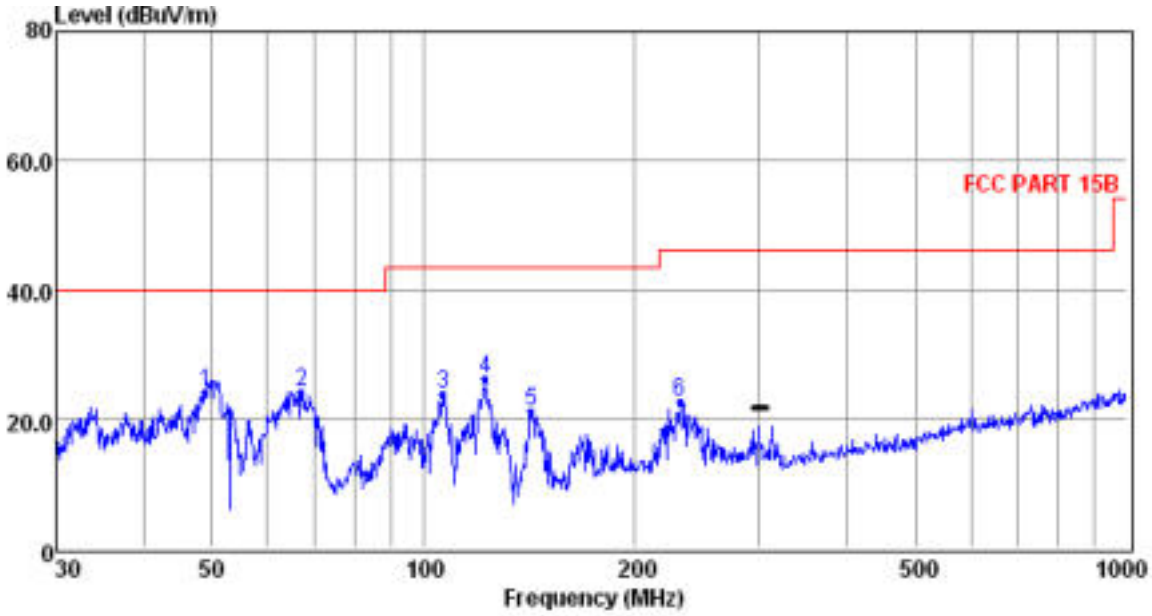
The frequency range from 30MHz to 1000MHz and above 1000MHz is checked.

3.2.8. Radiated Emission Noise Measurement Result

PASS.

The scanning waveforms please refer to the next page.

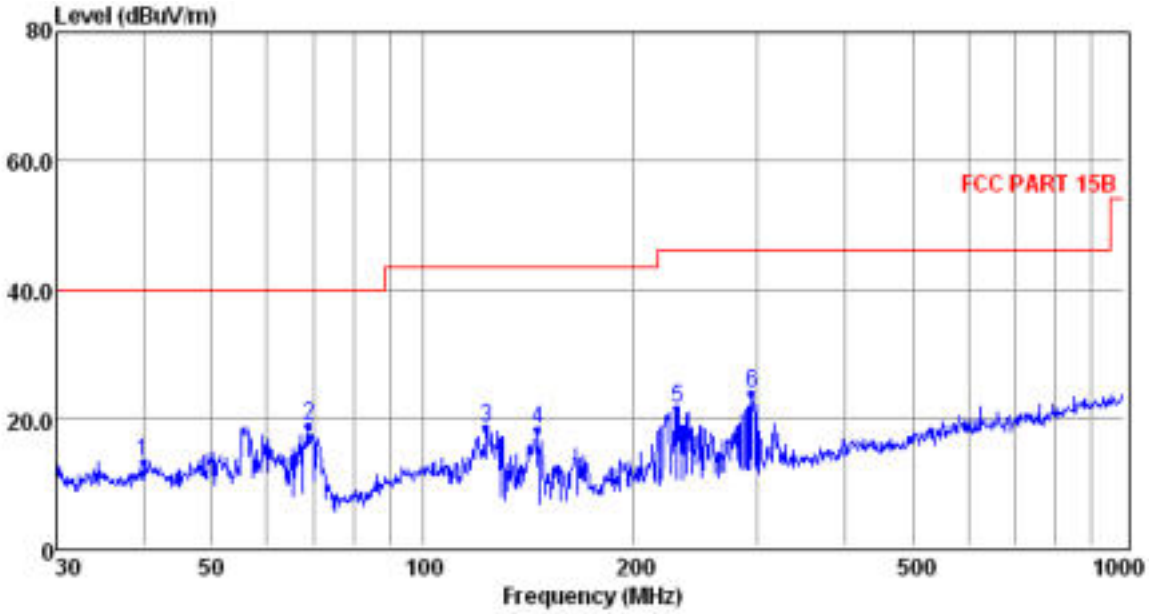
Test Model	SH01	Test Mode	Mode 1
Environmental Conditions	22.2℃, 53.3% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	Daiwei Dai	Test Voltage	AC 120V/60Hz



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	49.01	10.31	0.35	13.31	23.97	40.00	-16.03	QP
2	66.97	13.73	0.52	9.90	24.15	40.00	-15.85	QP
3	106.76	10.64	0.68	12.54	23.86	43.50	-19.64	QP
4	122.40	15.30	0.70	10.11	26.11	43.50	-17.39	QP
5	142.32	12.17	0.71	8.21	21.09	43.50	-22.41	QP
6	231.72	9.76	0.98	11.72	22.46	46.00	-23.54	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

Test Model	SH01	Test Mode	Mode 1
Environmental Conditions	22.2℃, 53.3% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Daiwei Dai	Test Voltage	AC 120V/60Hz



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	39.99	-0.93	0.38	13.58	13.03	40.00	-26.97	QP
2	68.87	9.17	0.51	9.11	18.79	40.00	-21.21	QP
3	123.27	7.76	0.70	9.97	18.43	43.50	-25.07	QP
4	145.86	9.21	0.77	8.23	18.21	43.50	-25.29	QP
5	230.91	8.78	0.98	11.69	21.45	46.00	-24.55	QP
6	295.15	9.77	1.08	12.97	23.82	46.00	-22.18	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

Remark: For above 1000MHz, Because the emission it too low to be reported.

4. PHOTOGRAPH

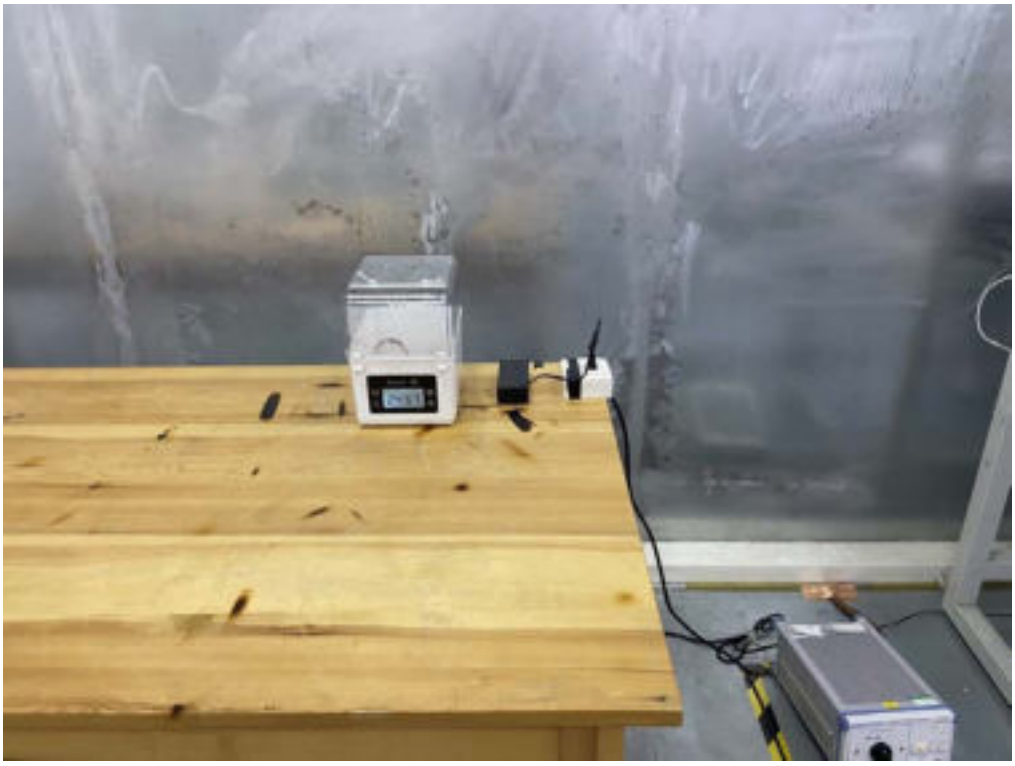


Photo of Power Line Conducted Measurement

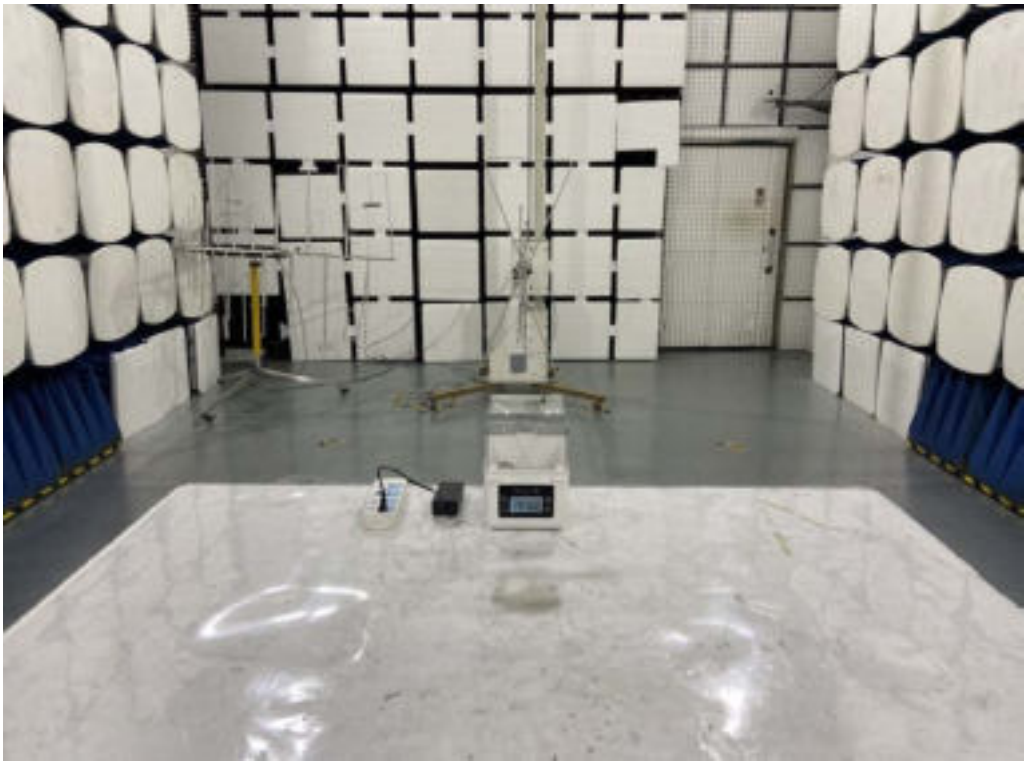


Photo of Radiated emission Measurement

5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

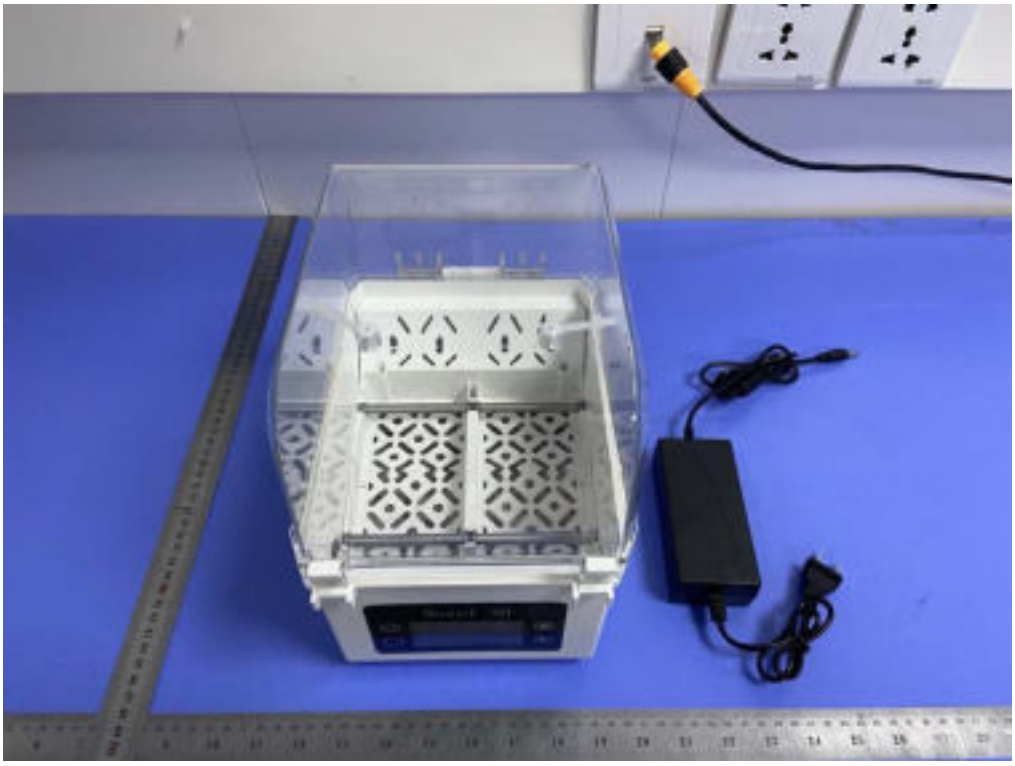


Fig. 1

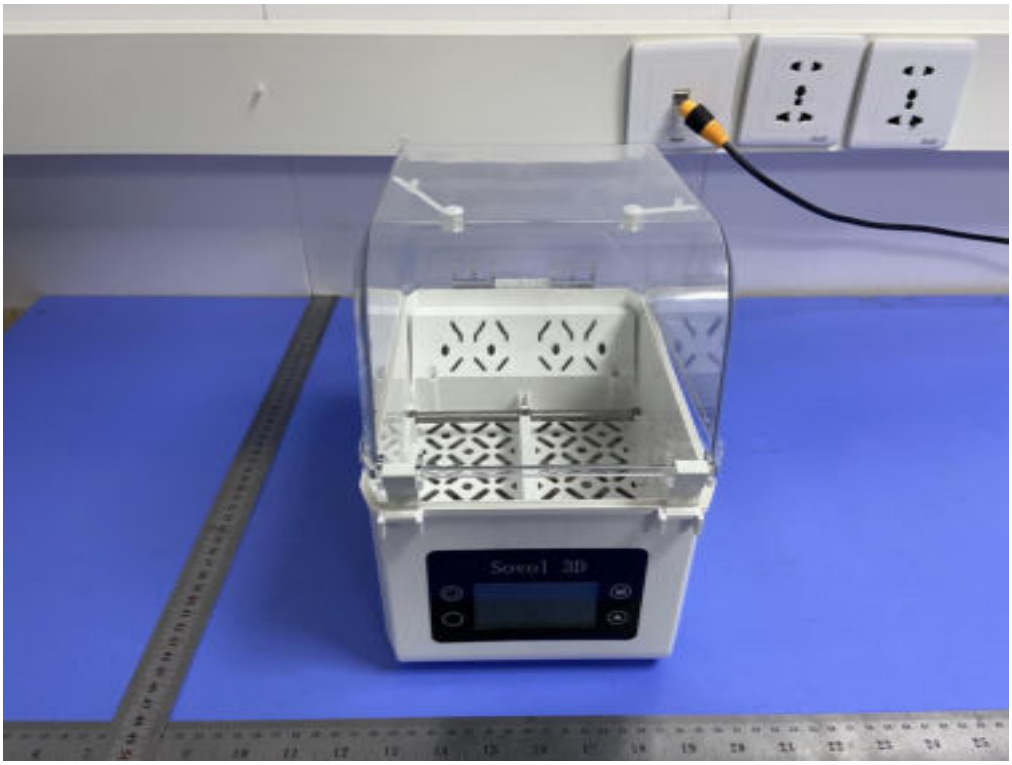


Fig. 2

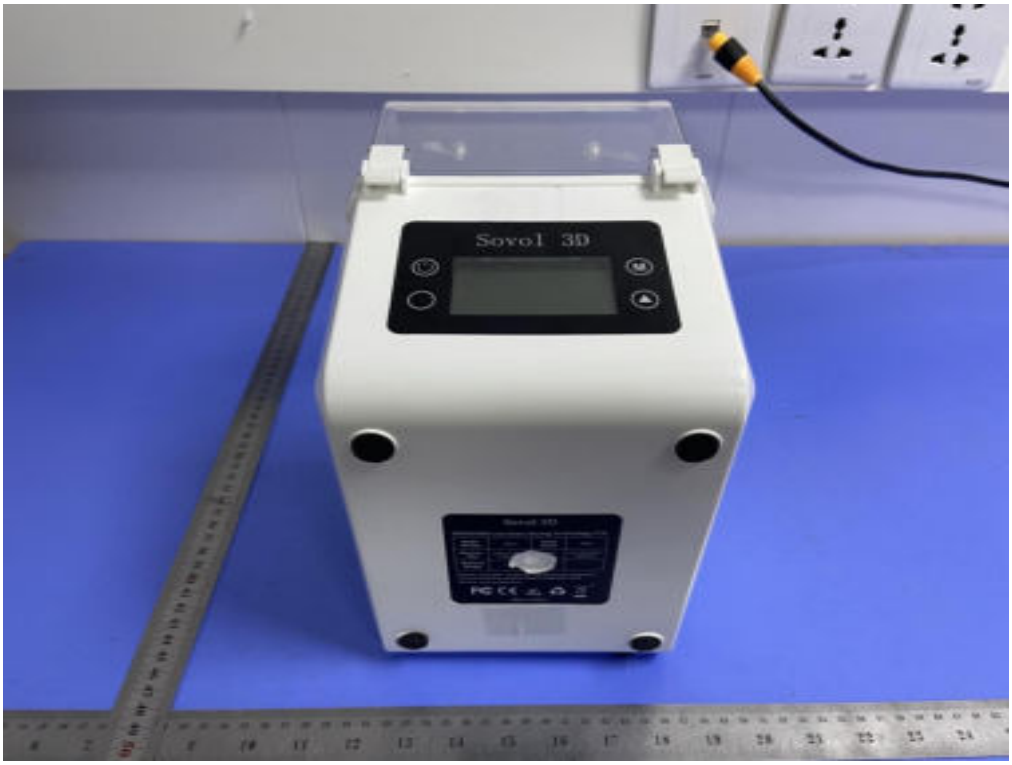


Fig. 3

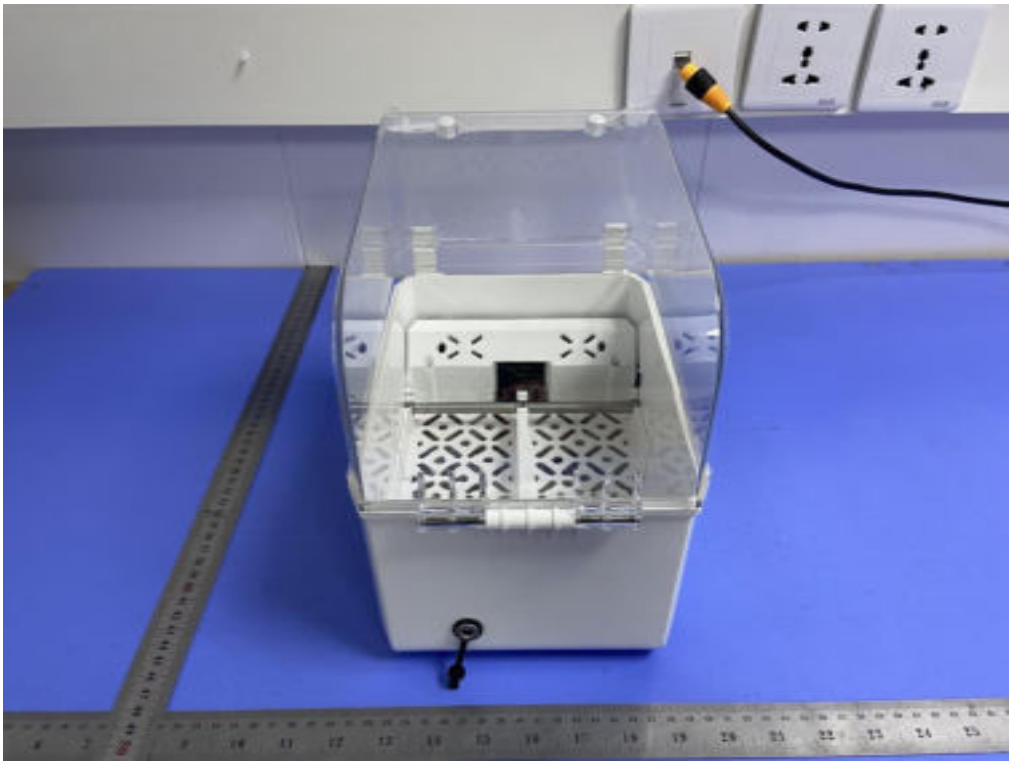


Fig. 4


AC/DC ADAPTOR
Switching Adapter
MODEL:JCY-1240
INPUT:AC100-240V
50/60Hz
OUTPUT:12V 4A
MADE IN CHINA

Fig. 5

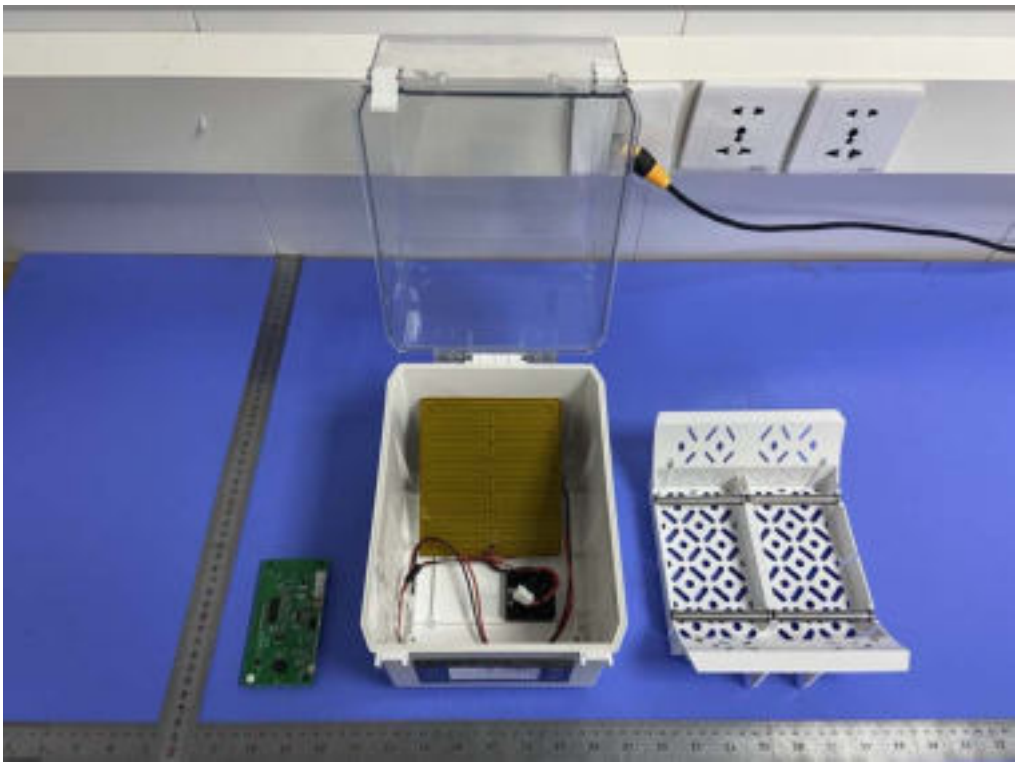


Fig. 6

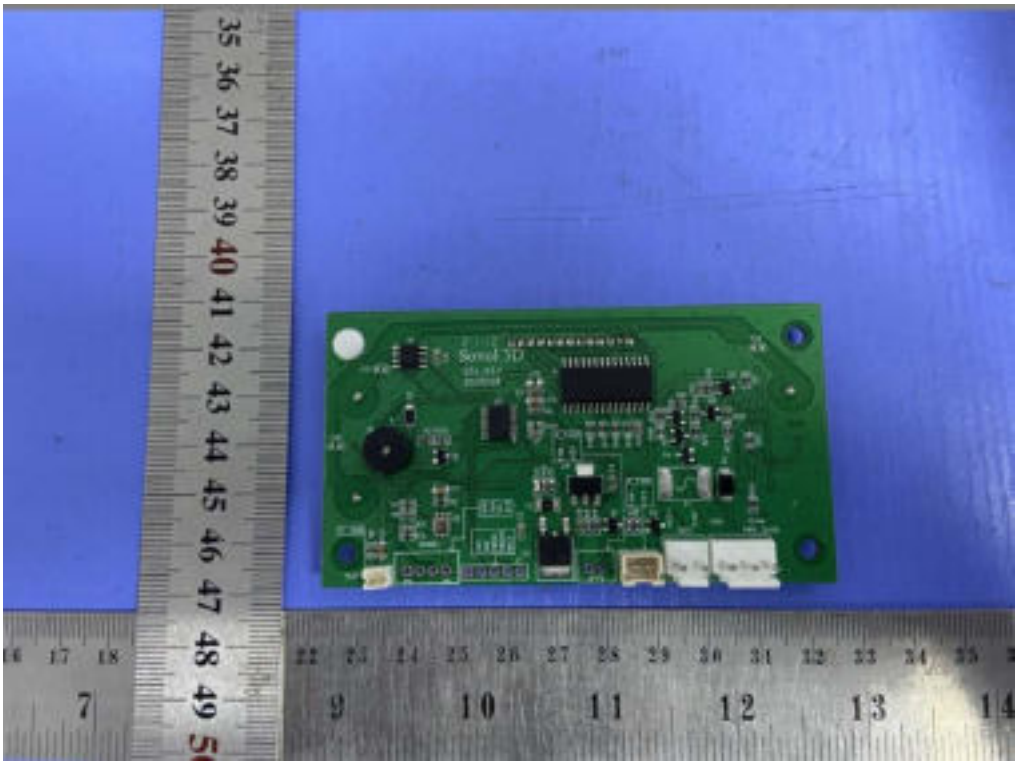
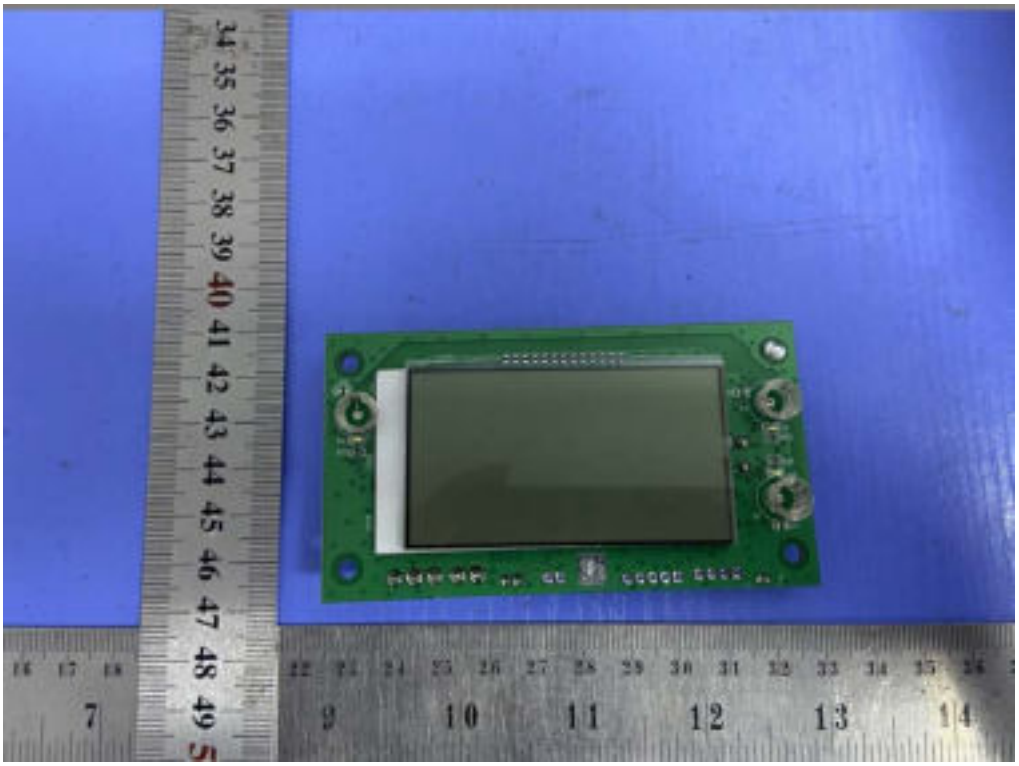


Fig. 7



----------THE END OF TEST REPORT----------

TEST REPORT
UL 499 & CSA C22.2 No. 64-10
Electric Heating Appliances

Report Number. .....:	LCS210510033AS
Date of issue .....:	May 21, 2021
Total number of pages.....:	88
Name of Testing Laboratory preparing the Report.....:	Shenzhen LCS Compliance Testing Laboratory Ltd. Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Applicant's name.....:	Shenzhen Liandianchuang Technology Co.,LTD
Address .....:	Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Test specification:	
Standard.....:	UL499:2017; CSA C22.2 No. 64-10 + Update #1 (2013)
Test procedure .....:	UL
Non-standard test method .....:	N/A
Test Report Form No.....:	
Test Report Form(s) Originator ....:	TÜV Rheinland (Shenzhen) Co., Ltd.
Master TRF.....:	Dated 2018-08-07

Shenzhen LCS Compliance Testing Laboratory Ltd.
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Test item description ..... :	Sovol Filament Dryer
Trade Mark ..... :	Sovol 3D, COMGROW
Manufacturer..... :	Shenzhen Jiexinhua Technology Co., Ltd. Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
Model/Type reference ..... :	SH01, SH02, SH03, SH04, SH05, SH06, SH07, SH08, SH09
Ratings ..... :	For power supply unit input: 100-240V~, 50/60Hz, 0.8A Max Output: 12V⎓, 4A For Sovol Filament Dryer: 12V⎓, 4A

Testing procedure and testing location:

Testing Laboratory:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Testing location/ address..... :	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Tested by..... :	Uic Wan / Test enginner
Checked by ..... :	Caps Li / Project enginner
Approved by ..... :	Hart Qiu / Project manager

List of Attachments:

Attachment No.1:

Photo documentation.

Summary of testing:

Full tests were carried out on models SH01

The tested models were complied with the test standards UL 499 and CSA C22.2 No. 64-10.

Tests performed (name of test and test clause):	**Testing location:**
The submitted samples were found to comply with the requirements of: ➢ Electrical safety UL 499:2017 R7. 18, CSA C22.2 No. 64-10	Shenzhen LCS Compliance Testing Laboratory Ltd. Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):

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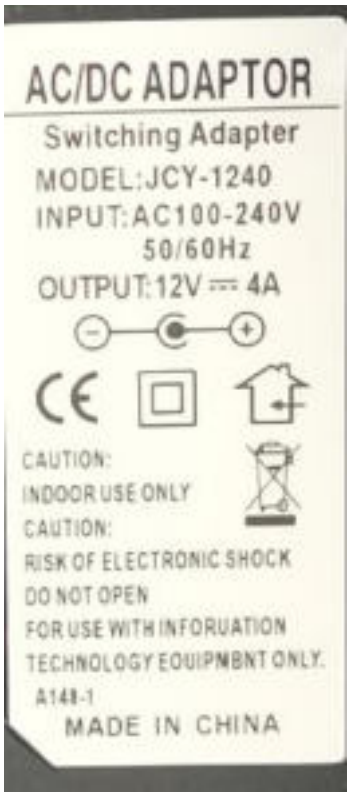
Tel: +(86) 0755-8259 1330 | Fax: +(86) 0755-8259 1332 | E-mail: webmaster@lcs-cert.com | http:// www.lcs-cert.com

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Power supply unit Label

Sovol 3D
Sovol Filament Dryer
Model: SH01
12V⎓, 4A
Shenzhen Jiexinhua Technology Co., Ltd.
MADE IN CHINA

COMGROW
Sovol Filament Dryer
Model: SH01
12V⎓, 4A
Shenzhen Jiexinhua Technology Co., Ltd.
MADE IN CHINA

Sovol Filament Dryer Label

Shenzhen LCS Compliance Testing Laboratory Ltd.
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Test item particulars.....:	
Classification of installation and use.....:	Portable appliance
Supply Connection.....:	Direct-in by a power supply unit
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	May 10, 2021
Date (s) of performance of tests.....:	From May 10, 2021 to May 21, 2021
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) .....:	Shenzhen Jiexinhua Technology Co., Ltd. Room 505, Building 3, Jinchengyuan Industrial Park, Tongsheng Community, Dalang Street, Longhua District, Shenzhen
General product information The appliance is Sovol Filament Dryer only used for household.	

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UL 499			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
1	**Scope**		P
2	**Glossary**		P
3	**Units of Measurement**		P
4	**Undated References**		P
	CONSTRUCTION		
5	**General**		
5.1	A heating appliance intended for use in a hazardous location is judged on the basis of its compliance with the requirements in this Standard, and appropriate examination and tests to determine whether it is acceptable for the purpose.	For household use, non-hazardous locations	N/A
5.2	Only materials that are acceptable for the particular use shall be used in a heating appliance. A heating appliance shall be made and finished with the degree of uniformity and grade of workmanship practicable in a well-equipped factory.		P
5.3	If the operation of a heating appliance involves the generation and confining under pressure of steam of other gas, consideration is to be given to the possibility of risk of explosion incident to such operation. This applies in the case of a product having immersed electrode, where the electrolysis of water may result in the accumulation of oxygen and hydrogen. The product is not acceptable unless its strength has been investigated with respect to any risk of explosion that may be involved.	Steam generated is not under pressure	N/A
5.4	Adhesive guns shall be constructed such that adhesive is not discharged on the user's hand during normal operation.	Baby bottle steam sterilizer	N/A
6	**Components**		P
6.1	**General**		P
6.1.1	Except as indicated in 6.1.2, a component of a product covered by this Standard shall comply with the requirements for that component as indicated in 6.2.		P
6.1.2	A component of a product covered by this standard is not required to comply with a specific requirement that:		P
	a) Involves a feature or characteristic not required in the application of the component in the product,		P
	b) Is superseded by a requirement in this standard, or		P
	c) Is separately investigated when forming part of another component, provided the component is used within its established rating and limitations.		P
6.1.3	A component shall be used in accordance with its rating established for the intended conditions of use.		P
6.1.4	A component that is also intended to perform other functions, such as over current protection, ground-fault circuit-interruption, surge suppression, any other similar functions, or any combination thereof, shall comply additionally with the requirements of the applicable Standard(s) that cover devices that provide those functions.		P

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UL 499			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
	Exception: Where the other functions are not required for the application and not identified as part of markings, instructions or packaging for the appliance, the additional Standard(s) need not be applied.		P
6.1.5	Unless they also comply with the requirements of 6.2, components complying with standards other than those cited are not acceptable.		N/A
	Exception: Other standards for components may fulfill these requirements provided that the standards:		N/A
	a) Are compatible with the ampacity and overcurrent protection requirements in the National Electrical Code, NFPA 70, where appropriate,		N/A
	b) Consider long-term thermal properties of polymeric insulating materials in accordance with the Standard for Polymeric Materials – Long Term Property Evaluations, UL 746B, and		N/A
	c) Any use limitations of the other standards are identified and appropriately accommodated in this application. For example, components intended for industrial use and complying with relevant standards may assume user expertise not common in consumer applications.		N/A
6.1.6	Components not anticipated by the requirements of this Standard, not specifically covered by a component standard of 6.2, and which pose a potential risk of electric shock, fire or casualty hazard shall be additionally investigated. Reference to other product standards is appropriate where those standards anticipate normal and abnormal use conditions consistent with the application of this Standard.		P
6.1.7	Components shall not contain mercury.		P
6.2	**Requirements for Components**		P
6.2.1	Insulated Wire, Cable and Cords		P
6.2.1.1	A cord set or power supply cord shall comply with the Standard for Cord Sets and Power Supply Cords, UL 817.		N/A
6.2.1.2	Flexible cord and cables shall comply with the Standard for Flexible Cords and Cables, UL 62. Flexible cord and cables are considered to fulfill this requirement when preassembled in a cord set or power supply cord complying with Standard for Cord Sets and Power Supply Cords, UL 817.		N/A
6.2.1.3	Internal wiring composed of insulated conductors shall comply with the Standard for Appliance Wiring Material, UL 758.	UL recognized internal wires	P
	Exception No. 1: Insulated conductors complying with the Standard for Thermoset-Insulated Wires and Cables, UL 44, the Standard for Thermoplastic-Insulated Wires and Cables, UL 83, or other types specified in Chapter 3 of the National Electrical Code, NFPA 70 complying with the appropriate standard, need not comply with UL 758.		N/A

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UL 499			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
	Exception No. 2: Insulated conductors complying with the Standard for Fixture Wire, UL 66, need not comply with UL 758.		N/A
	Exception No. 3: Insulated conductors for specialty applications (e.g. data processing or communications) need not comply with UL 758.		N/A
6.2.1.4	The requirements for film coated wire and Class 105 (A) insulation systems are not specified.	No such construction	N/A
6.2.1.5	Film coated wire in intimate combination with one or more insulators, and incorporated in an insulation system rated Class 120 (E) or higher, shall comply with the magnet wire requirements in the Standard for Systems of Insulating Materials – General, UL 1446.	No such construction	N/A
6.2.2	Attachment Plugs, Receptacles, Connectors and Terminals		P
6.2.2.1	Attachment plugs (including appliance and flat iron plugs) and receptacles that may be detached during use shall comply with the Standard for Attachment Plugs and Receptacles, UL 498, or as appropriate, the Standard for Plugs, Receptacles and Cable Connectors of the Pin and Sleeve Type, UL1692.	No such construction	N/A
	Exception No. 1: Attachment plugs that are integral to cord sets and power supply cords need not comply with UL 498 or UL 1692.		P
	Exception No. 2: Multi-pole connectors that may be detached during field wiring that comply with the Standard for Insulated Multi-Pole Splicing Wire Connectors, UL 2459 need not comply with UL 498 or UL1692.		N/A
6.2.2.2	Electrical splices and connections accomplished via devices complying with the Standard for Electrical Quick – Connect Terminals, UL 310.		N/A
	Exception: Electrical connections accomplished via devices complying with the Standard for Wire Connectors, UL 486A-486B, the Standard for Splicing Wire Connectors, UL 486C, the Standard for Sealed Wire Connector Systems, UL 486D, or the Standard for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors, UL 486E.	UL recognized wire connectors	P
6.2.2.3	Insulated splices complying with the Standard for Splicing Wire Connectors, UL 486C, (or the Standard for Electrical Quick-Connect Terminals, UL 310, are considered to fulfill the requirement of Section 16.		P
6.2.2.4	Terminal blocks shall comply with the Standard for Terminal Blocks, UL 1059, and where appropriate be indicated as suitable for field wiring.	No such constructions	N/A
6.2.3	Switches	No switch	N/A
6.2.3.1	Switches shall comply with the Standard for Switches for Appliances – Part 1: General Requirements, UL 61058-1. Switches that comply with the Standard for Special-Use Switches, UL 1054, are considered to fulfill this requirement.		N/A

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UL 499			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
	Exception No. 1: Switches that comply with UL 1054; the Standard for General Use Snap Switches, UL 20; the Standard for Clock-Operated Switches, UL 917; the Standard for Automatic Electrical Controls for Household and Similar Use; Part 1: General Requirements, UL 60730-1, with the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Timers and Time Switches, UL 60730-2-7; or the Standard for Nonindustrial Photoelectric Switches for Lighting Control, UL 733A, are considered to fulfill this requirement.		N/A
	Exception No. 2: Circuit breakers that comply with the Standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, UL 489, need not comply with UL 61058-1 or UL1054.		N/A
	Exception No. 3: Switching devices that comply with appropriate standards for specialty applications (e.g. transfer switch equipment), industrial use (e.g. contactors, relays, auxiliary devices) or are integral to another component (e.g. switched lampholder) need not comply with UL 61058-1 or UL 1054.		N/A
	Exception No. 4: Switching devices that comply with Sections 25 and 40 need not comply with UL 61058-1 or UL 1054.		N/A
6.2.4	Low-Voltage Circuit Transformers	No such constructions	N/A
6.2.4.1	A transformer complying with the Standard for Low Voltage Transformers: General Requirements, UL 5085-1 and the Standard for Low Voltage Transformers: Class 2 and Class 3 Transformers, UL 5085-3, need not comply with 14.4.2.		N/A
6.2.5	Light Sources and Associated Components		N/A
6.2.5.1	Lampholders and indicating lamps with integral lamp/lampholder (e.g. neon pilot lamp) shall comply with the Standard for Lampholders, UL 496. Lampholders forming part of a luminaire that complies with an appropriate luminaire standard are considered to fulfill this requirement.	No lampholder	N/A
6.2.5.2	Lighting ballasts shall comply with the Standard for Fluorescent-Lamp Ballasts, UL 935, or the Standard for High-Intensity Discharge Lamp Ballasts, UL 1029. Ballasts forming part of a luminaire that complies with an appropriate luminaire standard are considered to fulfill this requirement.	No ballast	N/A
	Exception: Ballasts for other light sources shall comply with the appropriate standard(s) and need not comply with UL 935 or UL 1029.		N/A
6.2.5.3	Light emitting diode (LED) light sources shall comply with the Standard for Light Emitting Diode (LED) Light Sources For Use In Lighting Products, UL 8750. LED light sources forming part of a luminaire that complies with an appropriate luminaire standard are considered to fulfill this requirement.	No LED light sources	N/A
	Exception: Individual LED light sources mounted on printed wiring boards and intended for indicating purposes need not comply with UL 8750.		N/A
6.2.6	Heating Devices		P

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UL 499			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
6.2.6.1	Insulated heating wire shall comply with the Standard for Appliance Wiring Material, UL 758.	Sheathed heating element test in appliance	N/A
6.2.6.2	Thermistor-type heaters (e.g. PTC heater) shall comply with the Standard for Thermistor-Type Devices, UL 1434.		N/A
6.2.6.3	A flexible heating device shall comply with applicable requirements in the Standard for Electric Heating Pads, UL 130.		N/A
6.2.7	Controls		P
6.2.7.1	A thermal cutoff shall comply with the Standard for Thermal-Links – Requirements and Application Guide, UL 60691.	UL recognized thermal fuse, complies with UL60691	P
6.2.7.2	Except where superseded in this standard, a temperature control that complies with the construction requirements of the Standard for Temperature-Indicating and -Regulating Equipment, UL 873; the Standard for Limit Controls, UL 353; or the Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1, and the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls, UL 60730-2-9, is considered to comply with the construction requirements of this standard. See Testing of Component Switches and Control Devices, Section 43 for performance requirements.	UL recognized thermostat, complies with UL873	P
6.2.8	Cord Reel	No such construction	N/A
6.2.8.1	A cord reel shall comply with ~~-s~~special use cord reel" requirements of the Standard for Cord Reels, UL 355.		N/A
6.2.9	Overcurrent Protection	No such construction	N/A
6.2.9.1	Fuses shall comply with the Standard for Low-Voltage Fuses – Part 1: General Requirements, UL 248-1, and the applicable subsequent part (e.g. UL 248-5). Defined use fuses that comply with UL 248-1 and another appropriate standard for the fuse are considered to fulfill this requirement.		N/A
6.2.9.2	Fuseholders shall comply with the Standard for Fuseholders – Part 1: General Requirements, UL 4248-1, and applicable subsequent part (e.g. UL 4248-9).		N/A
6.2.9.3	Circuit breakers shall comply with the Standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, UL 489.		N/A
	Exception: Circuit breakers used in telecommunications circuitry that comply with the Standard for Circuit Breakers For Use in Communications Equipment, UL 489A, need not comply with UL 489.		N/A

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6.2.9.4	Circuit breakers having integral ground fault circuit interrupter capability for protection against electrical shock shall additionally comply with the Standard for Ground-Fault Circuit-Interrupters, UL 943.		N/A
6.2.10	Ground-Fault, Arc-Fault and Leakage Current Detectors/Interrupters	No such constructions	N/A
6.2.10.1	Ground-fault circuit-interrupters (GFCI) for protection against electrical shock shall comply with the Standard for Ground-Fault Circuit-Interrupters, UL 943.		N/A
6.2.10.2	Appliance-leakage-current interrupters (ALCI) for protection against electrical shock shall comply with the Standard for Appliance-Leakage-Current Interrupters, UL 943B. An ALCI is not considered an acceptable substitute for a GFCI when a GFCI is required by the National Electrical Code, NFPA 70.		N/A
6.2.10.3	Equipment ground-fault protective devices shall comply with the Standard for Ground-Fault Sensing and Relaying Equipment, UL 1053, and applicable requirements of the Standard for Ground-Fault Circuit-Interrupters, UL 943.		N/A
6.2.10.4	Arc-fault circuit-interrupters (AFCI) shall comply with the Standard for Arc-Fault Circuit-Interrupters, UL 1699.		N/A
6.2.10.5	Leakage-current detector-interrupters (LCDI) and any shielded cord between the LCDI and appliance shall comply with the Standard for Arc-Fault Circuit-Interrupters, UL 1699.		N/A
6.2.11	Power Supplies		P
6.2.11.1	Power supplies that comply with the Standard for Class 2 Power Units, UL 1310, are considered to fulfill Class 2 output requirements of this Standard. They need not be additionally investigated if they comply with 6.1.3 when installed as intended in or on the appliance.		P
6.2.11.2	Power supplies that comply with Standard for Power Units Other Than Class 2, UL 1012, are considered to fulfill the requirements of this Standard. They need not be additionally investigated if they comply with 6.1.3 when installed as intended in or on the appliance.		P
6.2.12	Supplemental Insulation, Insulating Bushings and Assembly Aids		P
6.2.12.1	The requirements for supplemental insulation (e.g. tape, sleeving or tubing) are not specified unless the insulation or device is required to fulfill 14.3.3 or a performance requirement of this Standard. In such cases:		P
	a) Sleeving shall comply with the Standard for Coated Electrical Sleeving, UL 1441,	UL recognized fiberglass sleeving	P
	b) Tubing shall comply with the Standard for Extruded Insulating Tubing, UL 224.	UL recognized heat shrinkable tube	P
6.2.12.2	Wire positioning devices shall comply with Sections 15 and 17. A device that complies with the Standard for positioning Devices, UL 1565, is considered to fulfill this requirement.	No such constructions	N/A

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6.2.12.3	Insulating bushings that comply with the Standard for Insulating Bushings, UL 635, and 6.1.3 are considered to fulfill the requirements of this Standard. Tests specified in this standard (e.g. StrainRelief Test) may still need to be performed to confirm the combination of the insulating bushing and the supporting part are suitable.		N/A
6.2.13	Gaskets and Seals		N/A
6.2.13.1	Gaskets and seals that comply with the Standard for Gaskets and Seals, UL 157, are considered to fulfill the requirements of 36.1.4 and 36.1.5.		N/A
6.2.14	Printed Wiring Boards	No such constructions	N/A
6.2.14.1	Printed wiring boards shall comply with the Standard for Printed-Wiring Boards, UL 796. Unless otherwise specified, the flammability class shall be that specified for insulating materials.		N/A
7	**Frame and Enclosure**		P
7.1	The frame and enclosure of a heating appliance shall be strong and rigid to resist the abuses to be encountered during intended use. The degree of resistance inherent in the product shall preclude total and partial collapse with the attendant reduction of spacings, loosening or displacement of parts, and other defects which alone or in combination constitute an increase in the risk of fire, electric shock, or injury to persons.	Refer to Resistance to Impact test results	P
7.2	Pet heating mats/pads are evaluated as follows:		N/A
	a) Rigidly enclosed pet heating mats/pads are evaluated to the applicable requirements detailed in this Standard.		N/A
	b) Semi-rigid pet heating mats/pads are evaluated to the applicable requirements detailed in this Standard including the performance testing of 32.2, Sections 36.14 and 37; and the construction requirements for Envelope and Insulation in Sections 6 and 7 of the Standard for Electric Heating Pads, UL 130. These appliances are for indoor use only.		N/A
	c) Flexible pet heating mats/pads are evaluated to the applicable requirements of this Standard including the performance test of Section 37; and the Standard for Electric Heating Pads, UL 130. These appliances are for indoor use only.		N/A
	Exception: Flexible pet heating mats/pads are not required to comply with the marking requirements in 46.2 – 46.12 in the Standard for Electric Heating Pads, UL 130.		N/A
7.3	A vaporizer water reservoir of glass or similar material that might, upon breaking, causes skin lacerations shall be resistant to thermal-shock and impact.	Polymeric container only	N/A

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7.4	A heating appliance shall be provided with an enclosure of material acceptable for the application, that shall house all electrical parts, except a supply cord and a recessed open-wire-element unit as mentioned in 15.3, that may result in risk of electric shock or injury to persons under any condition of use. If a heater is for permanent installation (intended for permanent connection to the power supply), the enclosure shall be provided with means for mounting in the intended manner and shall be furnished with any necessary fittings, such as brackets, hangers, or the like.	Enclosure made of UL recognized polymeric material. Refer to critical component list for details	P
7.5	If openings for ventilation are provided in the enclosure of a heating appliance or in an externally mounted component intended for permanent connection to the power supply, they shall be so located that they will not vent into concealed spaces of a building structure, such as into false-ceiling space, into hollow spaces in the wall, and the like, when the product is installed.	Ventilation openings in the bottom	P
7.6	Among the factors when an enclosure is being considered for acceptability, are its: a), Physical strength; b), Resistance to impact; c), Moisture-absorptive properties; d), Combustibility; e), Resistance to corrosion; and f), Resistance to distortion at temperatures to which the enclosure may be subjected under conditions of use. For a nonmetallic enclosure, all of these factors are to be considered with respect to thermal aging.	Enclosure made of UL recognized polymeric material. File E140331, FB51(+), rated V-2, 130°C, File E107536, PP4210, rated V-2, 125°C File E248280, LUPOL GP-1007F(#), , rated V-2, 120°C	P
7.7	A polymeric enclosure of outdoor use equipment shall comply with requirements contained in the Standard for Polymeric Materials – Use in Electrical Equipment, UL 746C, outdoor use requirements.	Indoor use only	N/A
	Exception: Enclosures identified as 3R enclosures complying with the Standard for Enclosures for Electrical Equipment, UL 50, Non-Environmental Considerations or the Standard for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E, are considered to comply with this requirement.		N/A
7.8	Outdoor use equipment shall be subjected to the Insulation Resistance and Leakage Current as a Result of Moisture, Section 37, with acceptable results.		N/A
7.9	The enclosures of semi-rigid enclosed and flexible pet heating mats/pads shall have a minimum V-2 enclosure.		N/A
	Exception: Semi-rigid enclosed and flexible pet heating mats/pads may employ a HB enclosure material if they comply with alternative path requirements detailed in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.		N/A
7.10	Rigid molded enclosure parts of a semi-rigid enclosed or flexible pet heating mat/pad shall comply with the requirements in the Standard for Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C.		N/A

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7.11	Cast- and sheet-metal portions of the enclosure shall be no thinner than indicated in Table 7.1 unless the enclosure complies with 7.6 and 7.12	Polymeric enclosure only	N/A
7.12	In addition to the factors in 7.6, an enclosure of sheet metal is to be considered with respect to its size and shape, the thickness of metal and the intended use of the product.		N/A
7.13	Electrical parts of a heating appliance, including open-wire element, shall be so located or enclosed that protection against unintentional contact with uninsulated live parts will be provided (see also 25.6). Insulated motor brush caps do not require additional enclosure.	Heating element is enclosed inside enclosure	P
7.14	The enclosure shall be such that molten metal, burning insulation, flaming particles, or the like, is not likely to fall on combustible materials, including the surface upon which the enclosure is supported.		P
7.15	The requirement in 7.14 necessitates use of a barrier of metal, phenolic, urea, ceramic or similar material:		N/A
	a) under a motor unless:		N/A
	1) The structural parts of the motor or of the product provide the equivalent of such a barrier.		N/A
	2) The protection provided with the motor is such that no burning insulation or molten material falls to the surface that supports the product when 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		N/A
	3) The motor is provided with a thermal motor protector (a protective device that is sensitive to both temperature and current) that restricts the temperature of the motor windings from becoming more than 125℃ (257ºF) under the maximum load under which the motor runs without causing the protector to cycle, and from becoming more than 150ºC (302ºF) with the rotor of the motor locked.		N/A
	4) The motor complies with the requirements for impedance-protected motors		N/A
	b) Under wiring, unless it complies with the VW-1 (vertical-Specimen) Flame Test described in the Reference Standard for Electrical Wire, Cables, and Flexible Cords, UL1581.		N/A
7.16	The requirement in 7.14 also necessitates that a switch, transformer, relay, solenoid, or the like, be individually and completely enclosed except at terminals, unless it can be shown that malfunction of the component is not likely to result in a fire, or unless there are no openings in the bottom of the enclosure. An opening in the bottom of the enclosure is not acceptable if it is located directly below field- or factory-made splices or overload or overcurrent protective devices.	No such components	N/A

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7.17	The barrier mentioned in 7.15 shall be horizontal, shall be located as indicated in Figure 7.1, and shall not have an area less than that described in that illustration. Openings for drainage, ventilation, and the like, may be employed provided molten metal, burning insulation, or the like, is not likely to fall through the opening onto combustible material.	Ventilation openings in the bottom	P
7.18	The criteria for judging a heating appliance enclosure, other than as described in 7.13, are given in 7.20 and 7.21 and in the following items and related illustrations: a) An opening in the enclosure is acceptable if the probe (illustrated in Figure 7.2), when inserted into the opening, can not be made to touch any uninsulated live part of film-coated wire that involves a risk of electric shock. The probe is to be applied to any depth that the opening will permit; and shall be rotated and articulated in all possible configurations before, during and after insertion. b) An opening that will not prevent entrance of the probe as mentioned in (a) is acceptable under the conditions described in Figure 7.3.	Tested with articulate probe and cannot touch any uninsulated live parts	P
7.19	The opening illustrated in Figure 7.3 is acceptable if, within the enclosure, there is no uninsulated live part or enamel-insulated wire less than X distance perimeter of the opening, as well as within the volume generated by projecting the perimeter X distance perpendicular to its plane.		N/A
7.20	Although meeting the requirement in 7.18, an opening is unacceptable: a), Anywhere in the enclosure of a hand-supported product; or b) In any portion of a product hand-held during use if a probe as illustrated in Figure 7.4, when inserted point first a maximum distance of 2 inches (50.8mm) into the opening touches any uninsulated live part or touches any enamel-insulated wire.	Not hand-held product	N/A
7.21	If a marking draws the user's attention to a hole of any size in the enclosure for the adjustment of a thermostat or for a similar activity, it shall not be possible to damage insulation or contact uninsulated live parts through the hole with a 1/16 inch (1.6 mm) diameter rod.	No such constructions	N/A
7.22	During the examination of a heating appliance in connection with requirements in 7.13-7.18, a part of the outer enclosure that may be removed without the use of tools by the user of the product (for the attachment of accessories, for access to means for making operating adjustments, or for other reasons) is to be disregarded - that is, it is not to be assumed that the part in question affords protection against risk of electric shock. A warning marking, such as that specified in 53.6 is not considered to eliminate this risk of electric shock.	No enclosure parts can be removed without the use of tools	N/A
7.23	Any moving parts, such as rotors of motors, chains, pulleys, belts, and gears, shall be enclosed or guarded to reduce the risk of injury to persons.	No moving parts	N/A
7.24	With reference to the requirement in7.23, the degree of protection required of the enclosure depends upon the general design and intended use of the product.		N/A

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7.25	The door or cover of an enclosure shall be provided with a means for securing it is place in the closed position.		N/A
7.26	The door or cover of an enclosure shall be hinged or otherwise attached in an equivalent manner if it gives access to any overload protective device whose functioning requires renewal, or if it is necessary to open the cover in connection with the operation of the protective device.		N/A
7.27	A component of a heating appliance that is likely to need inspection, replacement, cleaning, or other servicing shall be as accessible as possible.	No user serviceable parts	N/A
7.28	If a product is intended primarily for use in public places, such as gas station, theaters, bus terminals , or the like: a) The construction may be such that special tools are required to gain access to components that are likely to need inspection, replacement, cleaning, adjustment, or other servicing. b) A door or cover giving access to an overload protective device need not be provided with a hinge, latch, or equivalent of the cover intended must be place to perform its function.		N/A
7.29	The bulb and capillary tube of a thermostat shall be protected from physical damage if such damage of the tube or bulb may result in a risk of fire.		P
7.30	The mounting means of a wall-mounted insecticide vaporizer shall be such that: a), The product will be secured against tipping or dislodgement as a result of unintentional contact with the body of the product itself or with the power-supply cord; and b), The remove of the vaporizer can be accomplished readily, if it is necessary that the vaporizer be removed from its mounting for cleaning, refilling, or other servicing.		N/A
7.31	With reference to the requirement in 7.30, a simple keyhole slot or hanger ring is not acceptable as a mounting means unless other provisions are made, such that spillage of the insecticide will not result from tipping or dislodgement of the product.		N/A
7.32	If the enclosure of an insecticide vaporizer for wall mounting is of porcelain, glass, or other similarly brittle material, it shall not break or crack to the extent that uninsulated live parts will be exposed to contact, when dropped on a hardwood surface. The height through which the product is to be dropped is to be 8 ft (2.44 m) for a commercial-type vaporizer, and 6 ft (1.83 m) for a household product.		N/A
7.33	The sheath employed to enclose the heating element of an immersion-type heater for use with fuel oil shall be of steel, stainless steel, or other metal resistant to corrosion is fuel oil; brass, bronze, or copper is not considered acceptable for this application. The sheath employed to enclose the heating element of an immersion-type water heater shall be of a metal resistant to corrosion in water.		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
7.34	Openings provided in a soldering tool, such as for ventilating purpose, shall be of such size and orientation with respect to the soldering tip that entry of falling or dripping molten solder, or unintentional insertion of solder wire is not likely to contact, bridge, or otherwise reduce the spacings between uninsulated live parts of opposite polarity, or uninsulated live parts and accessible dead metal parts. Consideration shall be given to the orientation of the soldering tool during use.		N/A
7.35	A cord-connected product that is provided with keyhole slots, notches, hanger holes, or the like, for mounting the product on a wall shall be constructed in such a manner that the mounting means shall not be accessible without removing the product from the supporting means.	No such constructions	N/A
7.36	When determining compliance with7.35, any part of the enclosure or barriers that can be removed without the use of tools to gain access to the mounting means are to be removed.		N/A
7.37	A keyhole slot, notch, or hanger hole shall be located so that the supporting screws or the like cannot damage any electrical insulation or contact uninsulated current-carrying parts of the product.		N/A
8	**Assembly**		P
8.1	A soldering iron, or other cord-connected heating appliance that is likely to be laid on combustible material shall be provided with a stand of noncombustible material upon which it may be placed when not in use, unless the temperature attained by the product is not high enough to cause the ignition of the combustible material.		N/A
8.2	The stand may be a separate device or attached to the product, except that an integral type of stand is required for a charcoal ignitor		N/A
8.3	A switch, lampholder, attachment-plug receptacle, or plug-type connector provided as a part of a heating appliance shall be secured so that it is not likely to turn.	No such components	N/A
8.4	Uninsulated live parts shall be so secured to the base or surface that they are not likely to turn or shift in position as the result of stresses if such motion results in a reduction of spacings below the minimum required in 27.1.1.1-27.1.1.4.	Components are secured by screws	P
8.5	Friction between surfaces is not acceptable as a means to keep live parts or components from shifting or turning. A lock washer, properly applied, is acceptable for this purpose.		P
9	**Stability**		P
9.1	The stability of a heating appliance shall be such that is will not be overturned readily during use.		P
9.2	A portable household heating appliance in which liquid is heated to a temperature greater than 115ºF (46ºC) is to be placed on a plane inclined at an angle of 15 degrees to the horizontal. The product is to contain at least 5 oz (148 mL) of liquid. The product is to be prevented from sliding on the inclined surface. The product shall not overturn as a result of this test.	See stability test results	P

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9.3	To determine if a vaporizer in which water is heated complies with the requirements of 9.1. The product shall not overturn when subjected to the test described in 9.4.		N/A
9.4	The vaporizer is to be placed at any position of use on a plane inclined at any angle of 30 degree to the horizontal.		N/A
10	**Corrosion Protection**		P
10.1	Except as noted in 10.2, iron and steel parts shall be protected against corrosion by enameling, galvanizing, plating, or other means, if the deterioration of such unprotected parts would be likely to result in risk of fire or electric shock.		P
10.2	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 operated in air and terminal parts attached directly to the heating element need not be protected against corrosion.		P
10.3	The aging characteristics of plating or other finish used in a heating appliance shall be such that deterioration of the finish will not result eventually in unacceptable performance of the product.		P
11	**Supply Connection – Permanently – Connected Products**	Cord-connected unit	N/A
12	**Supply Connection – Cord Connected Products**		P
12.1	**General**		P
12.1.1	A cord-connected heating appliance 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 cord shall be within the limits indicated in Table 12.1. All detachable power-supply cords and permanently-connected power-supply cords shall comply with the requirements of the Standard for Cord Sets and Power-Supply Cords, UL 817.	UL listed power supply cord set. Table top appliances, intended for household use. Attached cord.	P
12.1.2	A hand-supported indoor use heating appliance employing a detachable power-supply cord shall include a positive means for retaining the appliance coupler body to the appliance during use. Typical retaining means may include a friction type fit coupled with a rib-type construction, snap-type fit or similar techniques. Friction type fit alone does not meet the intent of the requirement.	Not hand-support unit	N/A
	Exception: A hand-supported indoor use heating appliance is not required to employ a retaining means if it complies with the requirements for Appliance Coupler Retention, Section 48.		N/A
12.1.3	A hand-supported outdoor use heating appliance shall employ a permanently attached supply cord.		N/A

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12.1.4	Hand-supported heating appliances provided with detachable power supply cords, including hand-supported appliances likely to be disconnected while under load, shall not pose a risk of electric shock, fire or injury when mated or disconnected under any orientation or polarity permitted by the construction. The mating connector shall be held securely in place and shall not be allowed to rotate. Compliance is determined by the connector current interruption test in Section 49.		N/A
12.1.5	A cord-connected heating product intended to be fastened in place or located in a dedicated space may be acceptable if provided with a short length of flexible cord and an attachment plug for supply connection.		N/A
12.1.6	For a cord-connected heating appliance, the rating (both current and voltage) of the cord and the fittings, for a product rated at 15 A or less, shall not be less than that of the product. For a product rated at more than 15 A, the ampacity of the cord and fittings shall not be less than the current rating of the product. The current rating of the attachment plug shall not be less than 125 percent of he current of the current rating of the product when the load will constitute a continuous load (3 hours or more), except that a 20-A attachment plug is acceptable for a product rated at no more than 4000 W at 240 V.	Product rated 120V, 1000W Cord rated 18AWG X 2C, 105°C, 300 V, Attachment plug NEMA 1-15P, Polarized, AC125V, 15A	P
12.1.7	The attachment plug of the power-supply cord of an appliance provided with a 15- or 20-ampere general-use receptacle shall be of the 3-wire grounding type. The attachment plug of the power-supply cord of an appliance provided with either a manually operated, line-connected, single pole switch for appliance on-off operation or an Edison-base lampholder shall be of the 2-wire polarized or 3-wire grounding type.	No receptacle was provided in the appliance	N/A
12.1.8	If a 3-wire grounding-type attachment plug or a 2-wire polarized attachment plug is provided, the attachment plug connections shall comply with Figure 12.1 and the polarity identification of the flexible cord shall comply with Table 12.2	2-wire polarized attachment plug, conforms with Fig. 12.1 and table 12.2	P
12.1.9	The connector of the power-supply cord that is intended to be grounded, identified by Table 12.2, shall have the following items connected to it:		N/A
12.1.10	A cord-connected product that is provided with keyhole slots, notches, hanger holes, brackets, or the like, for mounting to a wall shall be considered as not intended to be moved.	No such constructions	N/A
12.1.11	If a commercial-type heating appliance intended for cord connection does not have an attached cord, the male pins shall not accommodate a conventional flatiron or appliance plug, see 12.3.7 and Table 12.4, and a detachable power-supply cord shall be provided with the product.	Residential use appliance	N/A
12.1.12	An attached power-supply cord and the cord in a detachable power-supply cord that is provided with a heating appliance shall be of a type indicated in Table 12.3, or shall have such properties that it will be at least as serviceable for the particular application.	Residential use, indoor only, SPT-2	P

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12.1.13	A vaporizer intended for use with glycol shall not employ thermoplastic-insulated flexible cord if the construction is such that the cord likely to be exposed to the vapor.		N/A
12.1.14	The flexible cord provided with a stock tank de-icer, poultry water heater, or comparable heating appliance intended or likely to be used out of doors shall be suitable for outdoor use and have a type letter suffix of ~~-W~~".		N/A
12.1.15	Supplementary insulation, if employed on a flexible cord, shall not extend more than 1/2 inch (13 mm) outside the product – unless provided with additional mechanical protection – shall not fray or unravel, and shall not affect adversely the means for providing strain relief.	The fiber glass sleeving inside the enclosure	P
12.1.16	An attachment plug having an Edison screw shell shall not be supplied with a cord-connected product rated at more than 6 A or 660 W.		N/A
12.1.17	If the power source for a product is electrically separable from the product, both the power source and the product shall be marked in accordance with 53.30.		N/A
12.1.18	In addition to the requirement in 12.1.17, if the power source is not provided with a special connector, or if it is not permanently attached to the product, the power source shall comply with the applicable requirements for that power equipment.		N/A
12.1.19	Stock tank deicers, pond deicers, heated pet mats, bucket heaters, bucket deicers and heated pet bowls may be provided with a special use detachable power supply cord provided all the following conditions are met:		N/A
	a) The special use detachable power supply cord is found to comply with the Standard for Cord Sets and Power-Supply Cords, UL 817, and is suitable for outdoor use;		N/A
	b) The special use detachable power supply cord is constructed such that there is a barrier or equivalent to prevent ingress of moisture, rain, snow and ice from coming into contact with electrical connection including the mating point between the power supply cord plug of the appliance and the special use detachable power supply cord. The combination of the special use power supply cord and appliance is to be tested in accordance with 37.3, 37.6, 37.13, and Section 40;		N/A
	c) Thermoplastic constructions used to comply with item (b) shall additionally comply with the following requirements detailed in the Standard Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, Table 4.1 as summarized in Table 12.5;		N/A
	d) Thermoplastic materials used to comply with item (b) above shall be constructed of a plastic material designated f(1) or evaluated in accordance with the Standard Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C, UV Resistance per 25.1 and Water Exposure and Immersion, Section 26;		N/A

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	e) The special use detachable power supply cord connection point to the appliance power supply cord shall be provided with a means for mounting the connection point off the ground, such as a minimum 3/8 inch (9.5 mm) diameter mounting hole, detachable type stake with a minimum length of 12 inches (305 mm) and maximum length of 32 inches (813 mm) or equivalent means found suitable for the purpose. After completion of installation, the connector shall be maintained a minimum of 6 inches (152 mm) above the ground. Installation instructions shall be provided describing the intended use and mounting means. The instructions shall comply with 47. 15.1 and should include the following or equivalent –After complete installation, the connector shall be maintained a minimum of 6 inches above the ground.”;		N/A
	f) Gasket and Seals employed to meet item (b) shall comply with the applicable requirements of the Standard Polymeric Materials – Use in Electrical Equipment Evaluations, UL 746C and be suitable for use in the application;		N/A
	g) The special use detachable power supply cord and appliance shall be provided with the markings and instructions of 53.15, 53.16 and53.18;		N/A
	h) The length of the special use detachable supply cord shall not exceed 25 ft for household application and 100 ft for other than household use;		N/A
	i) A special use detachable power supply cord longer than 25 ft shall also be provided with the markings and instructions of 53.19;		N/A
	j) The gauge of the special use detachable supply cord shall comply with the requirements for Outdoor-Use Cord Sets – Flexible Cords in the Standard for Cord Sets and Power-Supply Cords, UL 817.		N/A
12.2	**Strain relief**		P
12.2.1	Strain relief shall be provided to restrict a mechanical stress on an attached power-supply cord from being transmitted to terminals, splices, or interior wiring.	See Strain Relief test results	P
12.2.2	If wood, pressed board, or other fibrous material is used to secure the strain-relief assembly, the fibrous material shall be secured to the product by a pin, setscrew, or other positive means.	No such constructions	N/A
12.2.3	Means shall be provided to restrict an attached power-supply cord from being pushed into the enclosure of a product through the cord-entry hole. To determine compliance, the supply cord shall be tested in accordance with the Push-back Relief test, Section 45.	See Push-Back Relief Test results	N/A
12.2.4	If a knot serves as strain relief in an attached power-supply cord, any surface with which the knot may come in contact shall be free from projections, sharp edges, burrs, fins, and the like, that may cause abrasion of the insulation on the conductors.	Contact surface are free from sharp edges, burrs, fins.	P
12.3	**Pin terminals**	No such constructions	N/A
12.4	**Bushings**		P

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12.4.1	At a point where a flexible cord passes through an opening in a wall, barrier, or enclosing case, there shall be a bushing or the equivalent that shall be secured in place, and shall have a smooth, well-rounded surface against which the cord may bear. If type SP-1, SPT-1, SPT-2, SP-2, or other cord lighter than type HSJ is employed. If the wall or barrier is of metal, and if the construction is such that the cord may be subjected to strain or motion, an insulating bushing shall be provided. The heat- and moisture-resistant properties of the bushing material shall be such that the bushing is acceptable for the particular application.	Bushing is provided in the supply cord entrance of enclosure	P
12.4.2	If the cord hole is in wood, porcelain, phenolic composition, or other nonconducting material, a smooth, well-rounded surface is considered to be equivalent to a bushing.		P
12.4.3	Ceramic materials and some molded compositions are acceptable generally for insulating bushings, but a separate bushing of wood, hot-molded shellac and tar composition, or rubber material (other than in a motor) is not acceptable. Vulcanized fiber may be employed if the bushing is not less than 3/64 inch (1.2 mm) thick and if it is so formed and secured in place that it will not be affected adversely by moist conditions.		N/A
12.4.4	A separate soft-rubber, neoprene, or polyvinyl chloride bushing may be employed in the frame of a motor or in the enclosure of a capacitor physically attached to a motor – but not elsewhere in a heating appliance, except as indicated in 12.4.5 – provided that:		N/A
	a) The bushing is not less that 3/64 inch (1.2 mm) thick; and		N/A
	b) The bushing is so located that it will not be exposed to oil, grease, oily vapor, or other substance having a deleterious effect on the compound employed.		N/A
12.4.5	A bushing of any of the material mentioned in 12.4.4 may be employed at any point in a product if used in conjunction with a type of cord for which an insulating bushing is not required, and if the edges of the hole in which the bushing is mounted are smooth and free from burrs, fins, and the like.		N/A
12.4.6	An insulated metal grommet is acceptable in place of an insulating bushing if the insulating material used is not less than 1/32 inch (0.8 mm) thick, and completely fills the space between the grommet and the material in which is mounted.		N/A
13	**Current-Carrying Parts**		P
13.1	Each current-carrying part shall be made of metal that is acceptable for the particular application.	Copper	P
13.2	Current-carrying parts made of corrosion-resistant alloys, for example, stainless steel, are acceptable regardless of temperature. Current-carrying parts made of ordinary iron and steel are not acceptable unless they are rendered corrosion-resistant by a coating and , even then, they are acceptable only as follows:		P
	a) Pin terminals.		N/A
	b) Terminals and other parts of a motor and its governor (if any).		N/A

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	c) Parts whose normal operating temperature is higher than 100ºC (212ºF).		N/A
	d) Parts of a component that the requirements referred to in 6.1.1 indicate as being acceptable with coated iron and steel parts.		N/A
13.3	A heating appliance that is provided with a reservoir (intended to hold a liquid), shall have all live parts so located or otherwise protected so that they will not be subject to wetting if the reservoir were to leak.		P
	Exception: Live parts need not be so located or protected if the reservoir:		P
	a) Is resistant to corrosion from the liquid intended for use in it; and	Polymeric material	P
	b) Complies with the applicable requirements in Resistance to Impact, Section 40.	See resistance to impact test results	P
14	**Internal Wiring**		P
14.1	**General**		P
14.1.1	The internal wiring of a heating appliance shall consist of wires of a size and type or types that are acceptable for the particular application, when considered with respect to:	Style 3122, 200degC, 300Vac, 18 and 24 AWG	P
	a) The temperature and voltage to which the wiring is likely to be subjected;		P
	b) Its exposure to oil or grease, and	Not exposure to oil or grease	N/A
	c) Other conditions of service to which it is likely to be subjected.		P
14.1.2	There is no temperature limit applicable to glass fiber, beads of inorganic material, or the equipvalent employed as conductor insulation.		P
14.1.3	Thermoplastic-insulated wire employed for the internal wiring of a heating appliance shall be standard building wire, fixture wire, or appliance-wiring material acceptable for the particular application.	UL recognized AWM	P
14.2	**Protection of wiring**		P
14.2.1	The wiring and connection between parts of a heating appliance shall be protected or enclosed, except that a length of flexible cord may be employed for external connections, or for internal connections that may be exposed during servicing. If flexibility of the wiring is essential. A bare conductor or a conductor with beads for insulation shall not be used outside an enclosure.		P
14.2.2	Internal wiring which is exposed through an opening is the enclosure of a heating appliance is considered to be protected as required in 14.2.1 if, when judged as if it were enamel-insulated wire, the wiring would be acceptable according to 7.8 - 7.13. Internal wiring within an enclosure is acceptable if, even though it can be touched with the probe, it is so protected or guarded that it can not be grasped or hooked in such a manner that it could be subjected to stress.	No such constructions	N/A

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14.2.3	Internal terminals and wiring of a vaporizer may be adversely affected by the steam spray or careless filling of the reservoir. Accordingly, the items mentioned in 12.3.8 should be given consideration.		N/A
14.2.4	If the wiring of a heating appliance is so located that is may be in proximity to combustible material or may be subjected to mechanical injury, it shall be armored cable or in rigid metal conduit, electrical metallic tubing, metal raceway, or shall otherwise be protected.		N/A
14.2.5	Wires within an enclosure, compartment, raceway, or the like, shall be so located or protected that damage to conductor insulation can not result from contact with any rough, sharp, or moving part.		P
14.2.6	A hole by means of which insulated wires pass through a sheet-metal wall within the overall enclosure of a heating appliance shall be provided with a smooth, well-rounded bushing or shall have smooth, well-rounded surfaces upon which the wires may bear, so as not to abrade the insulation. A flexible cord used for external interconnection as mentioned in 14.2.1 shall be provided with a strain relief and bushings in accordance with 12.2.1 – 12.2.4 and 12.4.1 – 12.4.6 unless the construction is such that the cord will be protected from stress or motion.	Polymeric enclosure only	N/A
14.2.7	Insulated wires may be bunched and passed through a single opening in a metal wall within the enclosure of a heating appliance.		N/A
14.3	**Splices**		P
14.3.1	All splices and connection shall be mechanically secure and shall provide good electrical contact. A soldered connection shall be made mechanically secure before being soldered if breaking or loosening of the connection may result in risk of fire or electric shock.		P
14.3.2	A splice shall be provided with insulation equivalent to that of the wires involved if permanence of spacing between the splice and other metal parts of the product is not reliably maintained.		P
14.3.3	Insulation consisting of two layers of friction tape, two layers of thermoplastic tape, or of one layer of friction tape on top of one layer of rubber tape, is acceptable on a splice if the voltage involved is not more than 250 V. In determining whether splice insulation consisting of coated fabric, thermoplastic, or other type of tubing is acceptable, consideration is to be given to such factors as its dielectric properties, heat-resistant and moisture-resistant characteristics. Thermoplastic tape wrapped over a sharp edge is not acceptable.		N/A

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14.3.4	Where stranded internal wiring is connected to a wire-binding screw, loose strands of wire shall not contact any other uninsulated live part that is not always of the same polarity as the wire, and shall not contact any dead metal part. This may be accomplished by the use of pressure terminal connectors, soldering lugs, crimped eyelets, soldering all strands of the wire together, or other reliable means.	No such constructions	N/A
14.4	**Separation of circuits**		N/A
14.4.1	General		N/A
14.4.1.1	Unless provided with insulated rated for the highest voltage involved, insulated conductors of circuits connected to separate sources of supply shall be separated by barriers or segregated. Except as described in 14.4.1.3, an insulated conductor of one circuit shall be separated or segregated from any uninsulated live parts of a different circuit.	Single source of supply only	N/A
14.4.1.2	Segregation of insulated conductors may be accomplished by clamping, routing, or an equivalent means that provides permanent separation, from insulated or uninsulated live parts of a different circuit.		N/A
14.4.1.3	Field-installed conductors of any circuit shall be segregated by barriers from:		N/A
	a) Field-installation and factory-installed conductors connected to any other circuit, unless the conductor of both circuits are or will be insulated for the maximum voltage of either circuit; and		N/A
	b) Uninsulated live parts of any other circuit of the product, and from any uninsulated live parts whose short-circuiting would result in a risk of fire or electric shock except that:		N/A
	1) Type THHN, TF, or equivalent conductors		N/A
	2) Low-voltage wiring terminals		N/A
14.4.1.4	With respect to 14.4.1.3(a), if the intended uses of a product are such that in some applications a barrier is required, a removable barrier or one having opening for the passage of conductors may be employed provided instructions for the use of the barrier are a permanent part of the product, and complete instructions in conjunction with a wiring diagram may be acceptable instead of a barrier if, upon investigation, the combination is found to be adequate.		N/A

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14.4.1.5	Segregation of field-installation conductors from other field-installation conductors and from uninsulated live parts of a product connected to different circuits may be accomplished by arranging the location of the openings in the enclosure for the various conductors - with respect to the terminals or other uninsulated live parts – so that there is no likelihood of the intermingling of the conductors or parts of different circuits. If the number of opening in the enclosure does not exceed the minimum required for the proper wiring of the product, and if each opening is located opposite a set of terminals, it is to be assumed – for the purpose of determining whether the product complies with the requirement in 14.4.1.3 – that the conductors entering each opening will be connected to the terminals opposite the opening. If more than opposite the terminals to which they are intended to be connected and contacting insulated conductors or uninsulated current-carrying parts connected to a different circuit is to be investigated. To determine whether the product complies with the requirement in 14.4.1.3, it is to be wired as it would be in service, and in doing so, a reasonable amount of slack is to be left in each conductor, within the enclosure, and no more than average care is to be exercised in slowing this slack in the wiring compartment.		N/A
14.4.2	Low-voltage circuit		N/A
14.4.2.1	A low-voltage circuit is one involving a potential of not more than 30 V (42.2 volts peak) and supplied by a primary battery, by a standard class 2 transformer, or by an impedance which, as a unit, complies with all of the performance requirements for a class 2 transformer.		N/A
14.4.2.2	A circuit derived from a source of supply classified in 14.4.3.1 as a line-voltage circuit, by connecting resistance in series with the supply circuit as a means of limiting the voltage and current, is not considered to be a low-voltage circuit as described in 14.4.2.1.		N/A
14.4.3	Line-voltage circuit		N/A
14.4.3.1	A line-voltage circuit is one involving a potential of not more than 600 V and having circuit characteristics in excess of those of a low-voltage circuit.		N/A
14.4.4	Barriers		N/A
14.4.4.1	If a barrier is used to provide separation between the wiring of different circuits, it shall be of metal or of insulating material, of adequate mechanical strength if exposed or otherwise likely to be subjected to mechanical damage, and reliably held in place. Unclosed openings in a barrier for the passage of conductors shall not be larger in diameter than 1/4 inch (6.4 mm) and shall not exceed in number, on the basis of one opening per conductor, the number of wires that will need to pass through the barrier. The closure for any other opening shall present a smooth surface wherever an insulated wire may be in contact with it, and the area of any such opening, with the closure removed, shall not be larger than required for the passage of the necessary wires.		N/A

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14.4.4.2	A metal barrier shall have a thickness at least as great as the minimum acceptable thickness of the enclosure metal. A barrier of insulating material shall not be less than 0.028 inch (0.71 mm) thick and shall be of greater thickness if its deformation may be readily accomplished so as to defeat its purpose.		N/A
15	**Heating Elements**		P
15.1	A heating element shall be supported in an acceptable manner. It shall be protected against mechanical damage and contact with outside objects.		P
15.2	In determining whether a heating element is acceptably supported, consideration is to be given to sagging, loosening, and other adverse conditions of the element resulting from continuous heating.		P
15.3	An open-wire element – that is, uninsulated resistance wire – may be used in heating appliances provided it is enclosed or protected by barriers or covers that require tools for removal, and it complies with the accessibility of live parts requirements outlined in 7.18-7.22	Sheathed heating element	N/A
15.4	An instantaneous water heater with an open-wire element immersed in water shall additionally comply with the requirements of Sections 11, 27, 29 and 35. It shall not employ a power supply cord or plug.		N/A
15.4	A heating appliance in which the heating element is constructed for use only in an air blast shall be so wired or controlled that the element can be operated only while under the cooling effect of the blast. A product in which the cooling effect of the motion of a part is necessary to limit temperatures shall be so wired or controlled that the element can not be operated without such motion.	Not for this application	N/A
16	**Electrical Insulation**		P
16.1	Insulating washers, bushings, and the like, that are integral parts of a heating appliance and bases or supports for the mounting of current-carrying 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 so constructed that they will have the mechanical strength and rigidity necessary to withstand the stresses of actual service.		P

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16.2	Insulating material employed in a heating appliance is to be judged with respect to its acceptability for the 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 acceptable for general use, such as magnesium oxide, may be acceptable if used in conjunction with other more acceptable insulating materials or if so located and protected such that it is not subject to mechanical damage and the absorption of moisture is minimized. When it is necessary to investigate a material to determine whether it is acceptable, consideration is to be given to its mechanical strength, dielectric properties, insulation resistance, heat-resistant qualities, the degree to which it is enclosed or protected, and any other features having a bearing on the risk of fire or electric shock involved, in conjunction with conditions of actual service. All of these factors are considered with respect to thermal aging.	UL recognized heat shrinkable tube	P
16.3	In the mounting or supporting of small, fragile insulating parts, screws or other fastenings should not be tight enough to cause cracking or breaking of these parts with expansion and contraction. Generally, such parts should be slightly loose.		P
17	**Thermal Insulation**	No such constructions	N/A
17.1	Thermal insulation, if employed, shall be of such a nature and so located and mounting or supported that it will not be affected by any intended operation of the product. See 36.1.22.		N/A
17.2	Combustible or electrically conductive thermal insulation shall not make contact with uninsulated live parts of a heating appliance.		N/A
17.3	Some types of mineral-wool thermal insulation contain conductive impurities in the form of slag, which make its use unacceptable if in contact with uninsulated live parts. See 37.1		N/A
18	**Motors**	No such constructions	N/A
18.1	A motor shall be acceptable for the particular application, and shall be capable of handling its maximum intended load without risk of fire, electric shock, or injury to persons.		N/A
18.2	A motor winding shall resist the absorption of moisture and shall be formed and assembled in a workmanlike manner.		N/A
18.3	With reference to the requirement in 18.2, enameled wire is not required to be additionally treated, but fiber lot liners, cloth coil wrap, and similar moisture-absorptive materials should be provided with impregnation or otherwise treated.		N/A
19	**Overcurrent protection of Conductors and Heating Elements**		P

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19.1	Except as noted in 19.2 and 19.3, each bus bar and insulated wire, including those in heater, motor, and control circuits, in a heating appliance rated at more than 40A shall be protected by an overcurrent protective device provided as a part of the product. If the product is intended for connection to more than one branch circuit, each section of the product intended for connection to a different branch circuit is to be considered individually in applying the foregoing requirement. The rating of the overcurrent protective device shall be in accordance with table 19.1	The appliance is rated 120 V, 1000W only (8.4A)	N/A
19.2	The requirement in 19.1 does not apply to a conductor:		N/A
	a) That is not longer than 10 ft (3.05 m);		N/A
	b) That is completely within the enclosure of the product;		N/A
	c) That terminated at its load end in one or more overcurrent protective devices; and		N/A
	d) that has an ampacity according to the 60ºC (140ºF) table in the ANSI/NFPA 70, not less than 80 percent of the combined ratings of the one or more overcurrent protective devices supplied by the conductor.		N/A
19.3	No overcurrent protective device is required as a part of the product if it is determined that equivalent or better protection will be obtained from the branch-circuit overcurrent protective device through which the product will be supplied.	Connected to branch circuit with overcurrent protective device rated 15A	P
19.4	The rating of the branch-circuit overcurrent protective device shall be 150 percent of the rating of the product unless the product is marked to specify the use of a protective device having a lower rating standard ampere rating for overcurrent protective devices are 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 110, 125, 150, 175 and 200. If 150 percent of the rating of the product does not equal one of the standard overcurrent-protective-device ratings mentioned above, then the next lower rating or setting of overcurrent protective device shall be employed.	150% of 8.4 A = 12.5 A < 15A	P
19.5	The overcurrent protection mentioned in 19.1-19.4, 19.6, 19.7 shall be of a type intended for branch-circuit protection, A fuse used for this purpose shall be a class CC, G, H, J, K, R, or T cartridge fuse or a plug fuse.		P
19.6	A product that employs resistance-type heating elements and is rated at more than 48A shall have the heating elements subdivided. Each subdivided load shall not exceed 48A and shall be protected at not more than 60A.		N/A
	Exception No. 1: Open coil or exposed sheathed-coil types of surface elements in commercial-type heating appliances shall be protected by overcurrent protective devices at not more than 50 A.		N/A
	Exception No. 2: Infrared lamp commercial and industrial heating appliances shall have overcurrent protection not exceeding 50 A.		N/A

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	Exception No. 3: Water heaters employing resistance-type immersion electric heater elements contained in an ASME-rated and stamped vessel or listed instantaneous water heaters shall be permitted to be subdivided into circuits not exceeding 120 A and protected at not more than 150 A.		N/A
19.7	The overcurrent protective devices required in 19.6 shall be provided as an integral part of the product or shall be provided by the product manufacturer as a separate assembly, for independent mounting, for use with the product. See 53.31		N/A
19.8	The supplementary overcurrent protective devices required in 19.6 shall be factory-installed within or on the heater enclosure or provided as a separate assembly by the heating appliance manufacturer, shall be accessible, and shall be suitable for branch circuit protection.		N/A
19.9	The main conductors supplying these overcurrent protective devices required in 19.6 shall be considered to be branch-circuit conductors		N/A
20	**Motor-Running Overload Protection**	No motor in the appliance	N/A
20.1	The following heating appliances in which a 1 hp or smaller motor is used shall incorporate thermal or overload protection so that the motor shall not attain excessively high temperatures under any operating conditions: a) A remotely or automatically controlled product. b) A permanently connected, continuous-duty, manually started product. An impedance-protected motor is not required to have additional thermal or overload protection.		N/A
20.2	A heating appliance intended to be automatically or remotely controlled and employing a motor rated at more than 1 hp shall incorporate thermal or overcurrent protection.		N/A
20.3	Fuse shall not be used in motor-overload-protective devices unless the motor is protected by the largest size of fuse that can be inserted in the fuse holder.		N/A
21	**Motor and Power-Transformer Short-Circuit and Ground-Fault Protection**	No motor or transformer in the appliance	N/A
21.1	A motor or power transformer in a heating appliance rated at more than 16 A shall be protected against short circuit and grounding by an overcurrent device having a maximum ampere rating in accordance with the ANSI/NFPA 70. Such overcurrent protection shall be provided as a part of the heating appliance unless it can be determined in accordance with 19.3 that equivalent overcurrent protection would be incorporated as the branch-circuit protective device.		N/A
21.2	The overcurrent protection mentioned in 21.1 shall be of a type indicated as being acceptable for branch-circuit protection.		N/A
22	**General (Short-Circuit and Ground-Fault) Overcurrent Protection**		N/A

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22.1	Overcurrent protection at not more than 20 A shall be provided by means of a circuit breaker or fuse, as a part of a heating appliance, for each general-use receptacle circuit and each lampholder circuit independent of a heating element, included in the product, unless the product would be properly connected to a branch circuit at 20 A or less.	No general use receptacle or lampholder in appliance	N/A
22.2	The overcurrent protection mentioned in 22.1 shall be of a type indicated as being acceptable for branch-circuit protection.		N/A
22.3	A fuseholder or circuit breaker provided as a part of a heating appliance shall not be accessible without opening a door or cover. However, the operating handle of a circuit breaker, and a removable end cap of a fuseholder, except on a household product, see 22.4, may project outside of the enclosure. A fuseholder shall be so installed that no uninsulated live parts other than the screw shell or clips of the fuseholder are exposed to contact by a person removing or replacing a fuse. If the fuse holder is intended to be accessible only to service personnel, uninsulated live parts other than the screw shell or clips may be exposed if they are guarded or the fuseholder is so located such that these live parts shall not be subjected to unintentional contact.		N/A
22.4	A removable end cap of a fuseholder in a product intended for household use shall not be accessible from the outside of the product.		N/A
23	**Thermal Cutoffs**		P
23.1	If a heating appliance is provided with a thermal cutoff, it shall be secured in place and shall be so located that it will be accessible for replacement without damaging other connections or internal wiring.	The thermal fuse is non-replaceable	N/A
23.2	If a heating appliance is provided with a thermal cutoff, it shall be capable of opening that circuit in the intended manner without causing the short-circuiting of live parts and without casing live parts to become grounded to the enclosure when the product is connected to a circuit of voltage in accordance with 36.1.13, and operated in a normal position to cause abnormal heating.		P
23.3	To determine whether a thermal cutoff complies with the requirement in 23.2, the product is to be operated with separate cutoffs five times as described above while any other thermally operated control devices in the product are short-circuited. Each cutoff is required to perform acceptably. During the test, the enclosure is to be connected through a 3-A fuse to a supply conductor not containing the cutoff.		P
24	**Lampholders**	No lampholder in appliance	N/A
24.1	If a heating appliance intended for permanent connection to the power supply or a heating appliance equipped with a polarized attachment plug is intended to be connected to the identified (grounded) conductor of a power-supply circuit, a lampholder supplied as a part of the product shall be so wired that the screw shell is connected to the identified conductor.		N/A

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24.2	Except as noted in 24.3, a lampholder shall be so constructed and installed that uninsulated live parts other than the screw shell will not be exposed to contact by persons removing or replacing lamps.		N/A
24.3	The requirement in 24.2 does not apply if, in order to remove or replace a lamp, it is necessary to dismantle the product by means of tools.		N/A
24.4	A medium-base lampholder or screw-shell receptacle shall not be used as a holder for a heating element rated at more than 6 A or 660 W, except that a screw shell with a left-handed thread may be used with a heating element rated not more than 10A.		N/A
24.5	Except as noted in 24.6, a screw-shell lampholder for an infrared lamp shall be of the unswitched, medium-base type and shall be used with a 300-W or smaller lamp.		N/A
24.6	A lamp-and lampholder combination need not comply with the requirement in 24.5 if no unacceptable temperature is produced on any of the components in the normal-temperature test, and if the switching mechanism of a switched lampholder is capable of performing acceptably without undue burning, pitting, and the like.		N/A
24.7	A female screwshell used as a holder for a heating element shall be of copper or of a copper-base alloy and shall be plated with nickel or equivalent oxidation-resistant metal.		N/A
	Exception: Aluminum (plated or unplated), unplated copper, or unplated copper alloy may be used provided the temperature rise does not exceed 175°C (315°F), based upon a room ambient temperature of 25°C (77°F), as measured with the product operating under the most adverse conditions of normal operation until thermal equilibrium is attained. All temperature regulating controls, if provided, shall be set at the maximum setting. Unplated aluminum shall only be used in equipment intended for indoor dry locations.		N/A
25	**Switches**	No switch in appliance	N/A
25.1	A switch or other control device provided as a part of a heating appliance shall be of a type intended for the particular application and shall have a current and voltage rating not less than that of the circuit (load) that it controls.		N/A
25.2	A switch employed on a heating appliance shall be so located or protected that is will not be subjected to mechanical damage during use.		N/A
25.3	It is recommended that all switches be of an indicating type.		N/A
25.4	A switch on a cord-connected heating appliance incorporating an open-wire heating element construction shall be of such a type and so connected that it will disconnect the element or elements that it controls from all conductors of the supply circuit.		N/A
	Exception: The switch need not disconnect the open-wire heating element from all conductors if:		N/A
	a) The construction is such that the open-wire element cannot be made to contact user accessible metal under normal conditions;		N/A

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	b) In the event of a breakage of the element, no part of the open-wire element is able to contact user accessible metal parts; and		N/A
	c) The open-wire element is secured in place by reliable means.		N/A
25.5	The requirement in 25.4 applies to a switch in the off position or any other setting in which the element is not heated, and also to a through-cord switch or a plug in which a switch is incorporated in an attached or detachable power-supply cord that is provided with such a heating appliance.		N/A
25.6	A switch or other device controlling one or more elements of a heating appliance intended for permanent connection to the power supply shall be so arranged that the opening of the switch will disconnect all of the ungrounded conductors of the supply circuit, unless there will be no live parts exposed to unintentional contact when the switch is open or unless the fact that such parts are alive is definitely apparent.		N/A
25.7	A switch or other means of control intended to provide for the use of a limited number of elements at one time shall be so located or of such a type that the user can not change the connections to energize more elements than intended.		N/A
25.8	A switch controlling a lampholder shall be acceptable for use with tungsten-filament lamps		N/A
25.9	Except as noted in 25.10, a switch shall not be incorporated in a wooden handle or in other combustible material unless enclosed in metal or insulating material.		N/A
25.10	In a small, low-wattage product such as a wood burning pencil, a switch may be acceptable in a wooden handle.		N/A
25.11	If a heating appliance that is intended for connection to the supply circuit by means of flexible cord and an attachment plug employs a motor rated at more then 1/3 hp, a manually operated motor controller shall be provided in the product.		N/A
25.12	A manually operated, line-connected, single pole switch, or other control device, intended for appliance on-off operation shall be connected to the ungrounded conductor of the power-supply cord. Table 12.2 specifies the polarity identification of the power-supply cord conduction.		N/A
26	**Automatic Controls and Control Circuits**		P
26.1	A control Circuit shall comply with the requirements in 14.4.1.1 – 14.4.2.2.		P
26.2	The operation of an auxiliary control device in a heating appliance shall disconnect the elements that is controls from all ungrounded conductors of the supply circuit, unless there will be no live parts exposed to unintentional contact when the auxiliary control device is open or unless the fact that such parts are alive is apparent.	Thermostat is connected grounded side of supply circuit, and there will be no live parts exposed to unintentional contact when the thermostat is open.	P
26.3	An auxiliary control is considered to be one that is intended primarily for time, temperature or pressure regulation, and the like, under conditions of intended operation, and not for protection against overload or excessive temperature conditions resulting from abnormal operation.		P

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26.4	A device intended to reduce the risk of fire or electric shock shall be operative whenever the product is connected to its power supply. Except for the inherent thermal protector of a motor, the control of a product intended to be permanently connected electrically that has exposed live parts shall disconnected the element or elements it controls from all ungrounded conductors of the supply circuit. The operation of such a control shall comply with the requirements in 26.2. A controlled contactor shall comply with the endurance requirement for a limiting control if it is a part of the limiting-control circuit.		P
26.5	A control device shall not be constructed to deliberately overload the branch-circuit protective device as a means of disconnecting the product from the supply.	Thermostat is used to open the circuit when the appliance exceeds the cutoff temperature	P
26.6	A contactor or similar device, such as a silicon controlled rectifier, required for use with a limit control shall be provided by the manufacture of the product, but need not be mounted on the product. See 53.31.		N/A
26.7	The terminals of device mentioned in 26.4 within the enclosure of a heating appliance shall be so located or further enclosed that they will be protected against unintentional short circuiting and damage.	The terminal of the thermostat is wrapped with heat shrinkable tube	P
26.8	Except where superseded in this standard, a temperature control that complies with the construction requirements of:		P
	a) the standard for Temperature-Indicating and –Regulating Equipment, UL873; or	UL recognized thermostat, complies with UL873	P
	b) the standard for Limit Controls, UL353; or		N/A
	c) the standard for Automatic Electrical Controls for Household and Similar Use, as UL60730-1A, UL60730-2-9		N/A
	Is considered to comply with the construction requirements of this standard. See section 40 for performance requirements.		P
26.9	Instantaneous water heaters shall be equipped with a temperature-limiting means in addition to its control thermostat to disconnect all ungrounded conductors. Such temperature-limiting means shall be installed to sense maximum water temperature and be a trip-free, manually reset type.		N/A
	Exception: Instantaneous water heaters with a capacity of 4 liters or less that comply with all applicable requirements of this standard are not required to be provided with a temperature-limiting means.		N/A
27	**Spacings**		P
27.1	**Line-voltage circuits**		P
27.1.1	General		P

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27.1.1.1	Except as noted in 27.1.1.2 – 27.1.1.4, the spacings in a heating appliance shall be in accordance with Tables 27.1 and 27.2.	Not field-wiring, 120Vac, From terminal of thermostat to dead metal part, through air and over surface spacing = 5 mm. Thermal fuse is insulated by coated fiber glass sleeving. Fiber glass sleeving is UL recognized.	P
27.1.1.2	Inherent spacings of a component part of a heater		P
27.1.1.3	The spacings within a motor shall comply with the requirements in the Standard for Electric Motors, UL 1004-1	No motor in appliance	N/A
27.1.1.4	At closed-in points only, such as the screw-and-washer construction of an insulated terminal mounted in metal, a spacing of 3/64 inch (1.2 mm) is acceptable in a product rated at 250 V or less. Within a thermostat, except at contacts, the spacings between uninsulated live parts on opposite sides of the contacts are to be not less than 1/32 inch (0.8 mm) through air and 3/64 inch (1.2 mm) over the surface of insulating material, and the construction is to be such that the spacings will be maintained permanently.		N/A
27.1.2	Barriers	No such construction	N/A
27.1.2.1	Except as noted in 27.1.2.2, an insulating liner or barrier of fiber or similar material employed where spacings would otherwise be unacceptable shall not be less than 1/32 inch (0.8 mm) thick and shall be so located or of such material that it cannot be affected by arcing, except that fiber not less than 1/64 inch (0.4 mm) thick may be used in conjunction with an air spacing of not less than 50 percent of the spacing required for air alone.		N/A
27.1.2.2	Insulating material having a thickness less than specified in 27.1.2.1 may be used if it is equivalent in appropriate properties.		N/A
27.1.2.3	Unless protected from mechanical abuse during assembly and intended functioning of a product, a barrier of mica shall be 0.010 inch (0.25 mm) or thicker.		N/A
27.2	**Low-voltage circuits**	No low voltage circuits	N/A
27.2.1	Limiting controls		N/A
27.2.1.1	The spacings in a low-voltage limiting control shall comply with the requirements in 27.1.1.1 – 27.1.2.3 and Tables 27.1 and 27.2.		N/A
27.2.2	Other than limiting controls		N/A
27.2.2.1	The spacing between uninsulated live parts of opposite polarity and between such parts and dead metal that may be grounded in service is not specified for parts of circuits that are classified as low-voltage in 14.4.2.1.		N/A
28	**Grounding**		N/A

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28.1	Permanent connection to the power supply by a metal-enclosed wiring system.	Cord-connected appliance	N/A
28.2	Intended for permanent connection to the power supply by means other than a metal-enclosed wiring system, such as nonmetallic-sheathed cable:		N/A
	a) An equipment-grounding terminal or lead shall be provided (see 11.2.13 and 11.2.14); and		N/A
	b) All exposed dead metal parts and all dead metal parts inside the enclosure that are exposed to contact during any servicing operation – including maintenance and repair – that are likely to become energized shall be conductively connected to such terminal or lead.		N/A
28.3	On a portable product where grounding is required or provided, the power-supply cord or cord set shall include a grounding conduct that shall be:	Grounding is not required in appliance	N/A
	a) Green with or without one or more yellow stripes;		N/A
	b) Connected to the grounding blade of an attachment plug of a grounding type; and		N/A
	c) Connected to the enclosure of the product by means of a screw not likely to be removed during servicing, or by other equivalent means. Solder alone is not acceptable for making this connection.		N/A
28.4	If any accessible dead metal part of a product is grounded, all accessible dead metal parts that are likely to become energized, including those exposed during any servicing operation – including maintenance and repair – shall be grounded.		N/A
28.5	A cord-connected heating appliance constructed for operation on a circuit involving a potential of more than 150 V to ground shall have provision for grounding, in accordance with 28.3, of all exposed dead metal parts, and all dead metal parts exposed during any servicing operation – including maintenance and repair – that are likely to be energized.	Voltage to ground = 120 Vac only	N/A
28.6	A cord-connected stock-tank de-icer, poultry-water heaters, branding iron, dehorning iron, poultry cauterizer, charcoal ignitor, incubator, and brooder, or similar device intended for outdoor use, and a refrigerator defroster and heat gun shall either:		N/A
	a) Be double insulated; or		N/A
	b) Have provision for grounding dead metal parts in the form of a grounding conductor in the cord and a grounding type of attachment plug, in accordance with 28.3		N/A
	Grounding shall not be used if the product is marked as being provided with double insulation		N/A
28.7	A cord-connected, 2-wire heating appliance intended to operate at a nominal potential of 240 V and similarly any other potential within the 220-250 V range – is considered as requiring provision for grounding in accordance with 28.3 unless the marked rating on the product is 120.240 V or unless the product is otherwise marked to indicate that is to be connected only to a 120/240 V circuit with a grounded neutral.	120Vac only	N/A
28.8	Sheet metal screws shall not be used for:		N/A

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	a) Field connection of equipment grounding conductors to an enclosure; and		N/A
	b) Connection of a factory-provided grounding lead to an enclosure.		N/A
	For the purposes of this requirement, a sheet metal screw is defined as a screw with a thread pitch that exceeds the thickness of the sheet metal and is designed to engage an unextruded, unthreaded hole in the metal.		N/A
29	**Leakage Current Collectors**		N/A
30	**Pressure Vessels and Parts Subject to Pressure**		N/A
30.1	Except as noted in 30.2, a pressure vessel having an inside diameter of more than 6 inches (152 mm) and subject to a pressure of more than 15 lbf/in² (103kN/m²) shall be certified by the National Board of Boller and Pressure-Vessel Inspectors and marked in accordance with the appropriate boiler and pressure vessel code symbol (~~H~~", ~~M~~", ~~S~~", or ~~U~~") of the ASME for a working pressure no less than the pressure determined by applying 30.3		N/A
30.2	If a pressure vessel, because of its application, is not covered under the inspection procedures of the ASME code, it shall be so designed and constructed that it will comply with the requirements in 30.3		N/A
30.3	Except as noted in 30.4 and 30.5, a part that is subject to air or vapor pressure, including the vapor pressure in a vessel containing only a superheated fluid, during normal or abnormal operation shall withstand without bursting of leaking a pressure equal to the highest of the following that is applicable:		N/A
	a) Five times the pressure corresponding to the maximum setting of a pressure-reducing valve provided as part of the assembly, but not more than five times the marked maximum supply pressure from an external source and not more than five times the pressure setting of a pressure-relief device provided as part of the assembly.		N/A
	b) Five times the marked maximum supply pressure from an external source, except as provided in a).		N/A
	c) Five times the pressure setting of a pressure-relief provided as part of the assembly.		N/A
	d) Five times the maximum pressure that can be developed by an air compressor that is part of the assembly, unless the pressure is limited by a pressure-relief device in accordance with a)		N/A
	e) Five times the working pressure marked on the part.		N/A
30.4	A test need not be performed to determine whether a part complies with the requirement in 30.3 if study and analysis of the material and dimensions indicate that the part has the strength acceptable for the application		N/A
30.5	A pressure vessel bearing the ASME code inspection symbol (~~H~~", ~~M~~", ~~S~~", or ~~U~~") is considered to comply with the requirement in 30.3 if the vessel is marked with a value of working pressure not less than that to which it is subject during normal or abnormal operation.		N/A

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30.6	If a test is necessary to determine whether a part complies with the requirement in 30.3, two samples of the part are to be subjected to a hydrostatic-pressure test. Each sample is to be so filled with water as to exclude air and is to be connected to 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 sample bursts or leaks, except as indicated in 30.7		N/A
30.7	Leakage at a gasket during the hydrostatic-pressure test is acceptable if it does not occur at a pressure 40 percent or less of the required test value.		N/A
30.8	A means for relieving pressure shall be provided for all parts in which pressure might be generated in the event of fire.		N/A
30.9	Pressure-relief devices, fusible plugs, soldered joints, nonmetallic tubing, or other pressure-relief means or the equivalent may be employed to comply with the requirements in 30.8		N/A
30.10	There shall be no shut-off value between the pressure-relief means and the parts that it is intended to protect.		N/A
30.11	A vessel having an inside diameter of more than 3.0 inches (76.2 mm) and subject to air or steam pressure marked on the vessel. The discharge rate of the device shall be capable of relieving the pressure.		N/A
30.12	The start-to-discharge pressure setting of the pressure-relief device shall not be higher than the working pressure marked on the vessel. The discharge rate of the device shall be capable of relieving the pressure.		N/A
30.13	A pressure-relief device shall comply with all four of the following:		N/A
	a) It shall be connected as close as possible to the pressure vessel or parts of the system that it is intended to protect.		N/A
	b) It shall be so installed that it is read**d**ily accessible for inspection and repair and cannot be readily rendered inoperative.		N/A
	c) It shall have its discharge opening so located and directed that the risk of scalding is reduced to a minimum.		N/A
	d) It shall have its discharge opening so located and directed that operation of the device will not deposit moisture on bare live parts or on insulation or components affected by moisture.		N/A
30.14	A pressure-relief device having an adjustable setting is judged on the basis of its maximum setting unless the adjusting means is sealed at a lower setting		N/A
30.15	A pressure-relief device is considered to be a pressure-actuated valve or rupture member constructed to relieve excessive pressure automatically.		N/A
30.16	Where a pressure-relief device is required, the control responsible for limiting the pressure in the vessel shall be capable of performing under rated load for 100,000 cycles of operation and the control shall limit the pressure so that it does not exceed 90 percent of the relief device setting under any condition of intended operation.		N/A
31	**Protection Against Injury to Persons**		P

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31.1	Material employed in the construction of the product that reduce the risk of injury to persons shall be acceptable for the particular use.		P
31.2	All heating appliances, or any items furnished with the product, shall have no sharp edges, burrs, points or spikes inside or outside the product, that may present a risk of injury to persons during use including cleaning operation.		P
31.3	The temperature of a surface that is likely to be contacted by the user – other than a heating function surface and an adjacent surface known to be hot because of its proximity to a heating function surface – shall not be more than the value specified in Table 36.2 when measured in accordance with the applicable requirements in the Normal Temperature test.		P
	Exception: Accessible surfaces, other than handles or knobs, may have temperatures that exceed those shown in Table 36.2 if marked in accordance with 53.40.	Marked according to 53.40, see temperature test results	P
	PERFORMANCE		P
32	**General**		P
33	**Power Input Test**	Refer to test results	P
34	**Leakage Current**	Refer to test results	P
35	**Escape Current Test**		N/A
36	**Normal Temperature Test**	Refer to test results	P
36.1	**General**	Refer to test results	P
36.2	**Ceramics-baking kilns and ovens**		N/A
36.3	**Charcoal ignitors**		N/A
36.4	**Stock-tank de-icers, stock waterers, and the like**		N/A
36.5	**Liquid heaters and vaporizers, cord-connected**	Refer to test results	P
36.6	**Poultry and livestock brooders**		N/A
36.7	**Soldering irons and soldering guns and desoldering tools**		N/A
36.8	**Solder pots, nonautomatic**		N/A
36.9	**Warming trays**		N/A
36.10	**Water heater of the side-arm type**		N/A
36.11	**Refrigerator defrosters**		N/A
36.12	**Heat guns**		N/A
36.13	**Hybrid adhesive guns**		N/A
36.14	**Semi-rigid enclosed pet heating mat/pad**		N/A
37	**Test of Insulation Resistance and Leakage Current as a Result of Moisture**		N/A
38	**Dielectric Voltage-Withstand Test**	Refer to test results	P
39	**Mechanical Endurance Test**		N/A
40	**Resistance to Impact**	Refer to test results	P
41	**Overflow Test**		N/A
42	**Abnormal Operating Test**	Refer to test results	P
42.1	**General**	Refer to test results	P
42.2	**Products with breakable exterior surfaces**		N/A
42.3	**Products with breakable surface**		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
42.4	**Heat guns**		N/A
42.5	**Ceramics-baking kilns and ovens**		N/A
42.6	**Charcoal ignitors**		N/A
42.7	**Stock-tank de-icers, stock waterers, and the like**		N/A
42.8	**Warming trays**		N/A
42.9	**Immersion heaters**		N/A
42.10	**Liquid heaters**	Refer to test results	P
42.11	**Ovens**		N/A
42.12	**Poultry and livestock brooders**		N/A
42.13	**Solder pots, nonautomatic**		N/A
42.14	**Soldering irons**		N/A
42.15	**Hot plates**		N/A
42.16	**Ceramic products**		N/A
42.17	**Vaporizers of the resistance-wire type**		N/A
42.18	**Heating appliances employing fans or blowers**		N/A
42.19	**Hybrid adhesive guns**		N/A
43	**Testing of Component Switches and Control Devices**		N/A
43.1	**Overload test for motor switches**		N/A
43.2	**Overload test for automatic controls**	UL recognized thermostat	N/A
43.3	**Endurance test for thermostats**	UL recognized thermostat	N/A
43.4	**Limited short circuit test for motor-control device**		N/A
44	**Strain Relief Test**	Refer to test results	P
45	**Push-Back Relief test**		N/A
46	**Test for Permanence of Cord Tag for Outdoor-Use Heating Appliances with Power-Supply Cords less than 6 feet (1.8 m)**		N/A
47	**Crushing Resistance for Flexible Pet Heating Mats/Pads**		N/A
48	**Appliance Coupler Retention**		N/A
49	**Connector Current Interruption**		N/A
	MANUFACTURING AND PRODUCTION-LINE TESTS		P
50	**Product-Line Dielectric Voltage-Withstand Test**		P
51	**Polarization and Grounding Continuity Tests**	Polarization checking	P
51.1	**Continuity of grounding connection test**		N/A
51.2	**Polarization continuity test**		P
51.3	**Electrical indicating device**		N/A
	RATING		P
52	**Details**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
52.1	A heating appliance shall be rated in amperes, volt-amperes, or watts, and also in volts, and may be rated for alternating current only. The rating shall include the number of phases if the product is constructed for use on a polyphase circuit, and shall include the frequency if necessary because of motors, relay coils, or other control devices. The voltage rating shall be in accordance with any appropriate single voltage or range of voltages, such as 100 – 120, 208, 220 – 240, 254 – 277, 416, 440 – 480, 550, 575, and 600.	Rated 120Vac, 60 Hz, 1000W	P
52.2	A heating appliance having provision for permanent connection to the electrical supply and incorporating a motor load of more than 1/20 hp shall also be marked in accordance with 53.2.		N/A
52.3	When a heating appliance includes an attachment-plug receptacle that is not intended as a disconnecting means for any part of the product or necessary accessory, and that serves as a general-use outlet, the added load that the receptacle imposes on the product and its supply connections – not less than 660 W or 6 A – shall be taken into consideration in determining the electrical rating of the product.		N/A
52.4	A liquid-heating appliance in which live parts are in contact with the liquid shall be rated for alternating current only.		N/A
52.5	The rating of a liquid-heating appliance of the immersed-electrode type may include a current or wattage range to indicate the general variations that may be anticipated when the product is used with water of different conductivity.		N/A
	MARKINGS		P
53	**Details**		P
53.1	manufacturer's name, trade name, trademark, or other descriptive marking by which the organization responsible for the product may be identified, the catalog number or the equivalent, and the electrical ratings, alternating current only or direct current only shall be so marked		P
53.2	motor load in amperes and volts.		N/A
53.3	appliances at more than one factory, each finished product shall have a distinctive marking		N/A
53.4	heating element or unit that is a part of a heating appliance and replaceable in the field		N/A
53.5	acceptable performance depends upon its proper location or position		N/A
53.6	appliance contemplates disassembly by means of a tool for the purpose of cleaning or similar servicing by the user, and, if such disassembly involves the exposure of persons to unintentional contact with any usually enclosed or protected live part		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
53.7	any point within a terminal box or wiring compartment of a permanently connected heating appliance attains a temperature higher than 60°C (140°F) during the normal-temperature test		N/A
53.8	outlet box provided with an immersion heater intended for use in water		N/A
53.9	If a specific spacing between a heating appliance intended to be either permanently connected electrically or fastened in place or located in a dedicated space and an adjacent surface is necessary to limit the temperature to not more than 90°C (194°F) on the latter when the product is operated as intended.		N/A
53.10	A cord-connected heating appliance that is required to have provision for grounding through the cord and plug	No grounding in appliance	N/A
53.11	appliance provided with a 2-wire polarized attachment plug shall be provided with the instructions or the equivalent	Provided in the instruction manual	P
53.12	A household heating appliance or a commercial soldering station provided with a power-supply cord, attached or detachable, that is less than 4-1/2 ft (1.4 m) in length		P
53.13	The instructions required in 53.12 are to include the following information	The contents are included in the instruction manual	P
53.14	A stock-tank water heater, bucket heater, de-icer, and similar type product that is used out of doors and is provided with a power-supply cord		N/A
53.15	For stock tank deicers, pond deicers, heated pet mats, bucket heaters, bucket deicers and heated pet bowls intended for and fitted with means to attach a special use detachable power supply cord of 11.1.16		N/A
53.16	Stock tank deicers, pond deicers, heated pet mats, bucket heaters, bucket deicers and heated pet bowls intended to be used with special use detachable power supply cord		N/A
53.17	The instructions mentioned in 53.14 shall include a cautionary paragraph		N/A
53.18	For bucket heaters per 12.1.19, stock tank deicers, pond deicers, heated pet mats, bucket deicers and heated pet bowls intended for and fitted with a means to attach a special use detachable power supply cord the instructions of 53.15 are modified as follows		N/A
53.19	A detachable power supply cord of a length greater than 25 ft shall include the statement		N/A
53.20	A detachable power supply cord of a length greater than 25 ft shall have instructions packaged with the cord. The instructions shall repeat the packaging instruction required by 53.18 and include the following additional instructions		N/A
53.21	Heating appliances intended for outdoor use with power-supply cords less than 6 ft (1.8 m), other than as mentioned in 53.14, shall be provided with instructions	Indoor use only	N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
53.22	If the normal-temperature test of a ceramics-baking oven (kiln) is concluded when the internal temperature of the oven has reached a specified value as described in 36.2.1		N/A
53.23	An insecticide vaporizer shall be provided with a warning statement		N/A
53.24	A heating appliance of the type that can be expected to be immersed in water for cleaning purposes shall be marked "Do not immerse in water" or with an equivalent wording,	Marked –DO NOT IMMERSE IN WATER OR IN ANY OTHER LIQUID"	P
53.25	If the normal-temperature test of a poultry or livestock brooder is conducted with the product mounted at a greater height above the supporting surface than the minimum permitted by its construction		N/A
53.26	If the guard of a poultry or livestock brooder is removed for shipment, the product shall be marked with a visible, legible marking cautioning against using the product unless the guard is in place.		N/A
53.27	A heating appliance that is intended for installation by a nonmetal-enclosed wiring system only		N/A
53.28	A product having provision for permanent connection to multiple power supplies	Cord-connected unit	N/A
53.29	A product that is intended for use with a thermostatically controlled appliance plug		N/A
53.30	A product intended for use with a power source as described in 12.1.17 and 12.1.18		N/A
53.31	If required overcurrent protective devices or contactors are provided as a separate assembly		N/A
53.32	A drying heater that is intended for paint drying in auto repair and paint shops		N/A
53.33	A product that is to be installed or used in conformity with provisions of the National Electrical Code and where there may be some question to the installer or user, shall be provided with information to identify the acceptability of the product for the specific application, purpose, or environment.		N/A
53.34	A refrigerator defroster shall be permanently and legibly marked where visible to the user		N/A
53.35	Marking for heat gun		N/A
	Exception: The marking specified in 53.30 need not be provided if the heat gun is marked "FOR INDOOR USE ONLY" or with an equivalent wording.		N/A
53.36	The instruction manual for a heat gun		N/A
53.37	The marking provided on an electrically energized product that generates steam		P
53.38	A cord-connected outdoor-use heating appliance with a power-supply cord less than 6 ft (1.8 m)	Indoor use only	N/A
53.39	The marking described in 53.33 may be provided on a tag that is permanently attached to the power-supply cord.		N/A
53.40	An appliance whose surface temperatures exceed the limits specified in Table 36.2	Marked –CAUTION – hot surface avoid contact". Located on Lid and body	P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
53.41	A product that passes water through a filter media before consumption		N/A
53.42	Steam generating products provided with multiple vessels shall be permanently marked adjacent to each steam outlet	No such constructions	N/A
53.43	A hybrid adhesive gun		N/A
53.44	Semi-rigid enclosed and flexible pet heating mat/pads		N/A
53.45	In addition to the requirement of 53.42, flexible pet heating mat/pads shall be marked		N/A
53.46	With respect to 53.43 (f), the user instructions shall identify a cover that is to be used to reduce risk of puncturing a flexible pet heating mat/pad enclosure (enclosure).		N/A
53.47	A hand-supported appliance provided with a detachable power supply cord		N/A
53.48	A hand-supported appliance provided with a detachable power supply cord		N/A
53.49	Insect and rodent control equipment intended for outdoor		N/A
	Exception: In lieu of this required marking, this statement may be provided in the use instructions in the Instruction Manual.		N/A
53.50	An instantaneous water heater with a bare-element water heater of 2.3 shall be marked where visible during installation with the following or equivalent: a) "CAUTION: DO NOT INSTALL IN A BATH ENCLOSURE OR SHOWER STALL OR CONNECT TO A SALT-REGENERATED WATER SOFTENER OR A WATER SUPPLY OF SALT WATER"; and b) "For use on an individual branch circuit only."		N/A
53.51	Equipment employing a leakage current collector of 29.1 shall also include the following safety instruction: "Supply this appliance only from a grounded system. A green terminal (or a wire connector marked "G", "GR", "GROUND", OR "GROUNDING") is provided for wiring the appliance. To reduce the risk of electric shock, connect this terminal or connector to the grounding terminal of the electric service or supply panel with a continuous copper wire in accordance with the electrical installation code".		N/A
54	**Instructions**		P
54.1	A product that requires warning, cautionary, or other specific markings as indicated in Markings, Details, Section 53 shall be provided with instructions that duplicate the texts of the required markings and elaborate on the potential risks involved.		P
	Exception: The information specified in 53.1 and 53.2 need not be provided in the instruction booklet.		P
54.2	The instructions provided with the hybrid adhesive gun shall indicate intended use, including positioning during user operation and warm up. They shall indicate the battery size and type and instruct on battery replacement, including polarity and the substance of the following content:		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
	a) Use of battery chemistries other than those specified by the manufacturer,		N/A
	b) Mixing of fully recharged and partially charged batteries,		N/A
	c) Use of non-rechargeable batteries, and		N/A
	d) Mixing non-rechargeable and rechargeable batteries.		N/A
54.3	Hand-supported appliances provided with a detachable power supply cord shall be provided with additional user instructions concerning insertion and removal of the detachable power supply cord, its storage, use and replacement information.		N/A
54.4	For hand-supported appliances provided with a detachable power supply cord, the cord replacement information contained in the instructions shall include the following statement or equivalent as applicable:		N/A
	a) “Contact ++ for a replacement cord,” where ++ can be either the manufacturer of the appliance or their authorized repair center.		N/A
	ELECTRODE-TYPE HEATING APPLIANCES		N/A
55	**Scope**		N/A
56	**General**		N/A
57	**Construction**		N/A
58	**Operation Test**		N/A
59	**Vaporize-Operation Test**		N/A
60	**Leakage Current Test**		N/A
61	**Disassembly and Reassembly Test**		N/A
62	**Markings**		N/A
63	**Operating Instructions**		N/A
64	**Label Adhesion Tests**		N/A
	THERMOSTAT OVERRIDE UNITS		N/A
65	**General**		N/A
66	**Temperature Test**		N/A
67	**Overload Tests**		N/A
	STEAM-BATH GENERATORS		N/A
68	**Scope**		N/A
69	**General**		N/A
70	**Construction**		N/A
71	**Performance**		N/A
72	**Markings**		N/A
73	**Instructions**		N/A
	METAL SHEATHED HEATING ELEMENTS COMPONENTS – GENERAL		P
74	**Scope**		P
74.1	These requirements cover metal-sheathed heating elements intended for use in appliances and equipment where the elements are factory installed and protected against mechanical damage.		P
74.2	These requirements cover sheathed heating elements rated 600 V or less	Rated 120 V, 1000W	P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
74.3	These requirements do not cover sheathed heating elements for use in equipment for use in hazardous locations as defined in the National Electric Code, NFPA 70.	Use in non-hazardous locations	N/A
75	**General**		P
75.1	The product shall comply with applicable requirements of this standard, except where superceded in Sections 76 – 86.		P
76	Glossary		P
	METAL SHEATHED HEATING ELEMENTS COMPONENTS – CONSTRUCTION		P
77	**Construction**		P
77.1	The acceptability of a sheathed heating element in any equipment or appliance depends on its ability to withstand continued use under the conditions that prevail in actual service. In addition to the requirements contained herein, further considerations and investigations may be necessary, based upon the intended installation and use of the sheathed heating element		P
77.2	A sheathed heating element shall employ materials and components throughout that meet the intent of 71.1, and shall be made and finished with the degree of uniformity and grade of workmanship practicable in a well-equipped factory.		P
77.3	If a material or alloy not included in Table 84.1, a material provided with a coating, or a composition sheath utilizing dissimilar materials inside and outside is used, it shall be investigated to determine that the material is acceptable for the purpose and that it affords protection equivalent to that of the materials included in Table 84.1.	Stainless steel heating plate, type SUS304 Aluminum sheath	P
77.4	After being formed, the sheath of a heating element protected against mechanical damage shall have a thickness no less than 0.013 inch (0.33 mm).	Aluminum, 1 mm thick	P
77.5	The thickness in 77.4 is intended to specify a minimum thickness for a sheath made of steel, titanium, copper, copper-clad steel, or steel and nickel alloys. Increased thickness may be required, based upon the particular end-use application of the sheathed heating element. A sheath made of aluminum or aluminum alloy and a sheath having a thickness less than required in 77.4 is to be investigated under conditions of actual service to determine if it has the necessary mechanical properties and will withstand the most severe conditions likely to be met in service.		P
78	**Insulation**		P
78.1	An insulating washer, a bushing, or the like, that is an integral part of a sheathed heating element shall be of a material resistant to moisture, such as porcelain, and shall be acceptable for use at the maximum temperature to which it will be subjected under conditions of actual use. Such parts shall have adequate mechanical strength and rigidity to withstand the stress of actual service.	No such construction	N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
78.2	Insulating material employed in an integral part of a sheathed heating element, such as a terminal block, or the like, shall be strong, not easily ignited, and resistant to moisture. A material other than porcelain, phenolic, or one that is known to be acceptable for the support of current-carrying parts shall be investigated under conditions of actual service to determine if it has the necessary electrical and mechanical properties and will withstand the most severe conditions likely to be met in service.		P
78.3	The thickness of magnesium oxide (MgO) or other similar insulating material between the resistance element and the inside of the sheath, and the material of an end seal between the terminal pin and the inside of the sheath shall not be:	MgO	P
	a) Less than 0.016 inch (0.41 mm) for elements rated 300 volts or less, and	1.5mm	P
	b) Less than 0.031 inch (0.79 mm) for elements rated more than 300 volts.		N/A
79	**Spacings**		P
79.1	A spacing, through air and over surface, of not less than 1/16 inch (1.6 mm) between live parts of opposite polarity and between live parts and dead metal parts shall be maintained at or near the end of the sheath of a sheathed heating element rated 300 volts or less. For an element rated more than 300 volts, the spacings at the end of the sheath shall not be less than 1/4 inch (6.4 mm).	Heating element rated 120V. Terminal pin is 6 mm apart from the metal sheath (through air and oversurface)	P
	Exception No. 1: When exact centering of a terminal pin is required to maintain the 1/16 inch spacing, a spacing of 3/64 inch (1.2 mm) in one location meets the intent of the requirement.		N/A
	Exception No. 2: For an element rated 300 volts or less, a spacing not less than 3/64 inch measured between a terminal pin and the sheath is acceptable at a closed-in void, such as between an end seal and the element insulating material. See Figure 73.1.		N/A
	Exception No. 3: For an element rated more than 300 volts, a spacing not less than 3/64 inch measured between terminal pin and sheath is acceptable when a closed-in void is not present between an end seal and element insulation of dissimilar materials.		N/A
	METAL SHEATHED HEATING ELEMENTS COMPONENTS – PERFORMANCE		P
80	**General**		P
81	**Power Input Test**	See test results	P
82	**Dielectric Voltage-Withstand Test**	See test results	P
83	**Leakage Current Test**	See test results	P
84	**Temperature Test**	See test results	P
	METAL SHEATHED HEATING ELEMENTS COMPONENTS – RATING		P
85	**Details**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
85.1	A sheathed heating element shall be rated in volts and volt-amperes or watts. The voltage rating shall be any appropriate single voltage or range of voltage such as 100 – 120, 208, 220 – 240, 257 – 277, 416, 440 – 480, 550, 575, and 600.	Rated 120V, 1000W	P
	METAL SHEATHED HEATING ELEMENTS COMPONENTS – MARKING		P
86.1	A sheathed heating element shall be legibly and permanently marked with:		P
	a) The manufacturer's name, trade name, or trademark or other descriptive marking by which the organization responsible for the sheathed heating element may be identified;		P
	b) A distinctive ″catalog″ or ″model″ number or the equivalent; and		P
	c) The electrical rating.		P
	Exception No. 1: The manufacturer's identification may be in a traceable code when the sheathed heating element is identified by the brand or trademark owned by a private labeler.		N/A
	Exception No. 2: The electrical rating may be omitted when a separate identifying designation is assigned for each rating.		N/A
86.2	A sheathed heating element intended for use in a household or similar cord-connected appliance, or the container in which the element is shipped shall be marked to indicate such use.	The heating element is assembled in the appliance and not separately shipped,	N/A
86.3	When a manufacturer produces or assembles sheathed heating elements at more than one factory, each finished sheathed heating element shall have a distinctive marking, which may be in code, by which it may be identified as the product of a particular factory.		N/A
86.4	When the sheathed portion of the sheathed heating element is marked, the marking shall not be located on the outside diameter of a bend, and the element shall comply with the performance requirements in the standard after the marking is applied.		P
86.5	A sheathed heating element not intended for use in free air, or the container in which the element is shipped, shall be marked with the word ″CAUTION ″ and the specific use for which it is intended, such as ″For use only submersed in water ″ or ″For use only in a metal heat sink. ″	The heating element is assembled in the appliance and not separately shipped,	N/A
86.6	The marking specified in 86.2, 86.3, and 86.5 shall appear on the sheathed heating element or shipping container. The marking may also be included in the installation instructions but shall be separated in format from the installation instructions.		N/A
	DIRECT PLUG-IN HEATING APPLIANCES		N/A
87	**General**		N/A
88	**Construction**		N/A
89	**Performance**		N/A
90	**Markings**		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
	Appliances Generating Ultraviolet (UV) Radiation		N/A
91	**Appliances generating ultraviolet (UV) radiation**		
91.1	**General**		
91.2	**Construction**		
91.3	**Protection against injury to persons**		
91.4	**Performance**		
91.5	**Markings**		
91.6	**Instructions**		
	Electric Soap Kettles		
92	**Additional Requirements for Electric Soap Kettles**		
92.1	**General**		
92.2	**Construction**		
92.3	**Performance**		
92.4	**Markings and instructions**		
93	**Vivarium Heaters (Reptile Tank Heater) Employing Thin Film Resistance Heating Elements**		
93.1	**General**		
93.2	**Construction**		
93.3	**Performance**		
93.4	**Markings**		
93.5	**Instructions**		
	SUPPLEMENT SA – ELECTRIC HEATER GUNS FOR GOVERNMENT USE		N/A
	INTRODUCTION		N/A
SA1	**Scope**		N/A
	CONSTRUCTION		N/A
SA2	**Switches**		N/A
SA3	**Power-Supply Cord**		N/A
SA4	**Accessories**		N/A
SA5	**Heat Regulation**		N/A
SA6	**Dimensions and Tolerances**		N/A
SA7	**Finish**		N/A
SA8	**Workmanship**		N/A
	REGULATORY REQUIREMENTS		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
SA9	**Recovered Materials**		N/A
	PERFORMANCE		N/A
SA10	**Temperature and Air Flow Tests**		N/A
SA10.1	**General**		N/A
SA10.2	**Temperature test**		N/A
SA10.3	**Air flow test**		N/A
	RATINGS		N/A
SA11	**Details**		N/A
	MARKINGS		N/A
SA12	**Details**		N/A
	PROCUREMENT		N/A
SA13	**Government Procurement and Acquisition Notes**		N/A
SA13.1	**Part identification number (PIN)**		N/A
SA13.2	**Ordering data**		N/A
SA13.3	**National Stock Numbers (NSNs)**		N/A
	Supplement SB – Heat Guns Operating from Rechargeable Battery Power		N/A

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CSA C22.2 No. 64-10			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
1	**Scope**		P
1.1	This Standard applies to cord-connected and permanently connected cooking and liquid-heating appliances* rated for use on nominal single-phase system voltages of 240 V and less and designed to be used in nonhazardous locations in household and similar applications in accordance with the Rules of the Canadian Electrical Code, Part I.	Cord connected unit	P
1.2	The Standard applies to kitchen-type cooking and liquid-heating appliances such as bottle warmers; bun warmers; broilers; chafing dishes; coffee-, crepe-, and doughnut-makers; coffee stoves; corn poppers; deep-fat fryers; egg-, hamburger-, hot-dog-, pressure-, and slow-cookers; frypans; griddles; grills; hot carts; hotplates; kettles; liquid heaters; rangettes; sandwich toasters; table ovens; toaster ovens; toasters; tureens; waffle irons; warming trays and plates; and similar appliances.	Bottle sterilizer	P
1.3	This Standard applies to miscellaneous equipment such as aquarium heaters, barbecues, barbecue lighters, facial saunas, incineration and humus (or chemical) types of electric toilets, poultry water heaters, stock water heaters, vaporizers, water heaters (other than the storage type), water distillers, and similar equipment.		N/A
1.4	This Standard does not apply to electric ranges, instrument sterilizers, commercial cooking appliances, storage-tank-type water heaters, insecticide vaporizers, industrial liquid heaters, hair-dressing equipment, or equipment covered by other Standards under the Canadian Electrical Code, Part II.		N/A
1.5	In CSA standards, —shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; —should" is used to express a recommendation or that which is advised but not required; and —may" is used to express an option or that which is permissible within the limits of the standard. Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material. Notes to tables and figures are considered part of the table or figure and may be written as requirements. Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.		P
1.6	The values given in SI units are the units of record for the purposes of this Standard. The values given in parentheses are for information and comparison only.		P
2	**Reference publications**		P
3	**Definitions**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
4	**General requirements**		P
	General requirements applicable to this Standard are given in CAN/CSA-C22.2 No. 0.		P
5	**Construction**		P
5.1	**General**		P
5.1.1	Electric component parts of appliances shall be of types specifically approved for the intended use or shall be investigated as an integral or separate part of the appliance.		P
5.1.2	Electric components of appliances shall conform to the particular Canadian Electrical Code, Part II Standard covering such components and shall be suitable for the application.		P
5.1.3	Closed-in cooking areas that are not vented external to the appliance to prevent undue accumulation of moisture, grease, etc., shall be the subject of investigation with respect to fire and shock hazards due to the deterioration of insulation in electric parts.		N/A
5.1.4	The maximum rating marked on cord-connected appliances for use on nominal 120 V branch circuits protected by overcurrent devices rated or set at not more than 15 A shall not exceed 1500 W at 115 V (see Clause 7.2). Exception: the maximum rating shall not exceed the values listed in Table 9 under either of the following conditions: (a) it is apparent from the usage of the appliance that the load presented by the appliance is not continuous; or (b) the duty cycle of the appliance is marked as specified in Clause 6.21.	120VAC, 60Hz, 1000W	P
5.1.5	**Water supply connections**		N/A
	Appliances having provision for connection to a water supply shall incorporate an air gap or vacuum breaker complying with the requirements of Clause 7.14 that will ensure an air gap between the water supply connection and the liquid contained in the appliance.		N/A
5.2	**Enclosures**		P
5.2.1	**General**		P

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5.2.1.1	Appliances shall have enclosures of moisture-absorption-resistant material that enclose all live parts. These enclosures shall be formed and assembled such that they (a) have the strength and rigidity necessary to resist the abuses to which they might be subjected without increasing the fire or accident hazard due to deformation of the enclosure and the resultant reduction of spacings, loosening, or displacement of parts, etc.; (b) afford protection against accidental contact with live parts, except in the case of open-wire heating elements in toasters; and (c) afford protection for electrical components against the deleterious effects of moisture, steam, grease, or other injurious material that might be encountered in normal operation.	UL approved polymeric material as enclosure: FB51(+), V-2, 130°C, UL E140331, or PP4210, V-2, 125°C, UL E107536 File E248280, LUPOL GP-1007F(#), , rated V-2, 120°C	P
5.2.1.2	A glass enclosure for the heating element and/or thermostat for aquarium heaters shall have resistance to thermal shock as determined by the test in Clause 7.16.	No such construction	N/A
5.2.1.3	Appliances (frypans, coffee makers, etc.) having electrical components, insulation, or spacing that would be adversely affected by water and might be immersed for washing shall be capable of meeting the requirements of Clause 7.12 or shall be marked as required by Clause 6.4.	Not for immerse in water	N/A
5.2.1.4	Appliances intended for use outdoors, such as stock waterers, barbecues, etc., shall meet the Type 3R enclosure requirements in CAN/CSA-C22.2 No. 94.2.	Indoor use only	N/A
5.2.1.5	Enclosures of appliances shall comply with the applicable physical abuse tests of Clause 7.13.	See test results	P
5.2.2	**Metallic enclosures**		N/A
	The thickness of metal for enclosures shall comply with Table 1.	Polymeric enclosure	N/A
5.2.3	**Nonmetallic enclosures, supports, and decorative parts**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.2.3.1	Nonmetallic materials for enclosures and supports of electrical components shall (a) have suitable mechanical strength and aging and moisture-resistant properties; (b) have limiting temperatures* not less than the maximum temperatures to which they could be exposed during normal operation, except that (i) thermoset materials may exceed their limiting temperatures if the materials comply with the test requirements of Clause 7.19; and (ii) thermoplastic materials may exceed their limiting temperatures by not more than 10% if the materials comply with the test requirements for thermoset materials specified in Clause 7.19; and (c) comply with the flammability requirements for 5 VA materials as specified in CSA C22.2 No. 0.17, or the appliance shall comply with the requirements of Clause 5.2.3.2. *The limiting temperature for plastic material is the maximum continuous-use temperature recommended by the plastic supplier.	UL approved polymeric material as enclosure: FB51(+), V-2, 130°C, UL E140331, or PP4210, V-2, 125°C, UL E107536 File E248280, LUPOL GP-1007F(#), , rated V-2, 120°C Refer to temperature test results	P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.2.3.2	Appliances that do not comply with the flammability requirements specified in Clause 5.2.3.1(c) shall (a) comply with the abnormal test requirements of Clause 7.4 (abnormal test), with all cycling-type temperature-limiting, temperature-regulating, and combination temperature-limiting-regulating devices shorted out of the circuit; manual reset and one-shot thermal devices shall remain in the circuit; and (b) employ plastic material that (i) for enclosures of heater elements, complies with the flammability requirements for V-1 materials in CSA C22.2 No. 0.17; and Note: A resistor, rated 5 W or less, functioning as a heating medium, is not considered a heater element for the purposes of this requirement. (ii) for enclosures of live parts other than heater elements, complies with the flammability requirements for V-2 materials in CSA C22.2 No. 0.17, except that the material may have a flammability classification of HB as determined in accordance with CSA C22.2 No. 0.17 provided that the following conditions are met: (1) the appliance complies with the overheating protection requirements of Clause 5.13; (2) all enclosure parts, including ribs, grills, and similar parts are spaced not less than 12.7 mm (1/2 in) from bare live parts; (3) the material resists ignition for a period not less than 7 s when subjected to the hot wire ignition (HWI) test of CSA C22.2 No. 0.17; and (4) the material resists ignition when subjected to 60 arcs of the high-current arc ignition (HAI) test of CSA C22.2 No. 0.17.	See results of abnormal test	P
5.2.3.3	Decorative parts and those intended for illumination purposes that do not meet the requirements of Clause 5.2.3.1 shall (a) not be a support for electrical components; (b) not enclose bare live or arcing parts; (c) not be in contact with incandescent lamps; and (d) be of a material that complies with the flammability requirements for HB materials in CSA C22.2 No. 0.17.	HB grade polymeric material for baffle, basket, rod, lid and button	P
5.2.4	**Openings in enclosures**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.2.4.1	Openings in external enclosures shall not be located directly below (a) terminals; (b) heater elements other than those with metal sheaths that are cast in, brazed on, or swaged to external enclosures; (c) wiring; and (d) other live parts, unless baffled in order to prevent molten metal, flaming particles, etc., from falling through to the supporting surface, except as specified in Clause 5.2.4.7. Insulated wiring protected by a suitable sleeving, power supply cords fixed in place, and metal-sheathed heater elements of hand-held barbecue lighters shall be exempt from this requirement. The sleeving shall be retained in position and be non-fraying, suitable for the temperatures encountered, and in compliance with the requirements of Clause 7.18.1.		P
5.2.4.2	Openings in external enclosures shall be constructed, located, or baffled to prevent a probe, as shown in Figure 1, from being inserted and touching live parts. The probe shall be applied in any direction after removal of all parts that can be removed without the use of a tool.	Articulate probe cannot touch live parts through openings	P
5.2.4.3	For toasters, the radiating portion of the open wire heating elements and the immediately adjacent terminals and a short portion of the internal wiring connected to the terminals may be accessible through the top opening of the bread slot, provided that the toaster is equipped with a double-pole switch to disconnect both lines of the power supply at the input terminals when the toaster is not energized. For toasters with a bottom-hinged cover serving also as a crumb tray that can be opened for cleaning, internal live parts and internal wiring may be accessible when the crumb tray is opened, provided that the toaster is equipped with a double-pole switch to disconnect both lines of the power supply at the input terminals when the toaster is not energized and provided that the cover is marked as specified in Clause 6.9.		N/A
5.2.4.4	Covers required to enclose wiring, bare live parts, etc., that open for cleaning (e.g., toaster crumb tray) and do not require the use of a tool (e.g., screwdriver) for opening or removal shall be permanently secured to the frame or enclosure by means of hinges, chains, or other equivalent means, unless the openings comply with Clauses 5.2.4 .1, 5.2.4.2, and 5.2.4.3. These covers shall incorporate an interlock or shall be marked as specified in Clause 6.9.	No such construction	N/A

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5.2.4.5	Rangettes, hotplates, and similar appliances provided with surface cooking elements shall have provision for the removal of food, etc., that might drop through the heater element.		N/A
5.2.4.6	Except as specified in Clauses 5.2.4.5 and 5.2.4.9, openings shall be located so that spillage occurring during the normal use of the equipment is not likely to enter the enclosure.	Located in the bottom	P
5.2.4.7	Stock waterers intended to have the bottom enclosed by a supporting surface need not comply with Clause 5.2.4.1 but shall be marked as required by Clause 6.7.		N/A
5.2.4.8	**Supporting legs**		N/A
	Supporting legs or the equivalent shall be permanently secured to the enclosure and shall have adequate strength to maintain the required spacing between the enclosure and the supporting surface under all conditions of normal use, unless the appliance meets the test requirements of this Standard with one or more legs removed.	No such constructions	N/A
5.2.4.9	**Drainage opening**		N/A
	A drainage opening shall be provided in liquid-heating appliances for liquid that can cause a shock hazard by becoming entrapped as a result of leaking, filling, or overflowing.		N/A
5.3	**Protection against corrosion**		P
5.3.1	Iron and steel parts shall be protected against corrosion as required by CAN/CSA-C22.2 No. 0.		P
5.3.2	The surfaces of metal parts shall be protected, if necessary, against scaling, flaking, or other effects of corrosive action that might cause subsequent reduction in the dielectric strength of appliances or reduce the spacings to less than those required by Clause 5.19 while in normal use.		P
5.4	**Mechanical assembly**		P
5.4.1	Parts used in the construction of appliances shall have adequate strength and be assembled and secured in position to ensure proper and nonhazardous functioning under conditions of normal use.		P
5.4.2	Switches, lampholders, thermostats, etc., shall be fastened securely and rigidly to maintain the required clearances. Components held by a single screw and lockwasher (e.g., stem-mounted controls) shall be prevented from turning by a key or the equivalent if movement can result in a hazardous condition.		P

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5.4.3	The operating mechanism of switches or controls shall not subject electrical parts to undue strain.		P
5.4.4	Screws or other fastenings of fragile insulating parts shall not be so tight as to result in cracking or breaking of such parts due to expansion and contraction, unless the insulating material is completely retained. Generally, such parts shall be slightly loose or shall be provided with cushioning material.		P
5.4.5	Adhesives shall not be employed as the sole means of securing enclosures or materials supporting live parts.	No adhesives are used.	N/A
5.4.6	A handle used on a steam mop shall withstand a force of four times the empty weight of the steam mop without damage to the handle, its securing means, or that portion of the enclosure to which the handle is attached. See Clause 7.28.		N/A
5.5	**Stability**		P
	Appliances shall meet the requirements of Clause 7.15. A floor-standing appliance may be provided with a bracket or other device for securing it to a floor or wall to obtain the necessary stability and shall be marked as required by Clause 6.14.	See test results.	P
5.6	**Supply connections**		P
5.6.1	**Permanently connected appliances**	Cord-connected unit	N/A
5.6.1.1	An appliance intended to be permanently connected shall have a suitable terminal box, or the equivalent, for conduit connection to the supply.		N/A
5.6.1.2	Where openings for conduit connection are provided in sheet metal enclosures, the metal thickness around such openings shall be not less than (a) 0.78 mm (0.0309 in) for sheet steel; (b) 1.11 mm (0.0438 in) for aluminium; or (c) 1.08 mm (0.0428 in) for other nonferrous metal.		N/A

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5.6.1.3	The location of terminal boxes or wiring compartments in which supply connections are made shall be such that connections will be accessible for inspection. In a household-type appliance, including a built-in appliance, the supply connections shall be accessible for inspection from the front or top of the appliance when it is installed as intended, unless the appliance is provided with approximately 1.8 m (6 ft) of one of the following in order to extend the point of supply to an accessible location: (a) Type SJ, SJT, SPT-3, HSJO, or equivalent flexible cord with a suitable attachment plug; (b) flexible metallic conduit with conductors; or (c) armoured cable.		N/A
5.6.2	**Terminal parts**	No wiring terminals or terminal box	N/A
5.6.2.1	Wire-binding terminal parts and the identification of terminal parts and leads shall comply with the requirements of CAN/CSA-C22.2 No. 0.		N/A
5.6.2.2	Rigid wiring terminals shall thread into metal and shall be prevented by means other than friction from turning or shifting, which can result in reducing the spacings required by Clause 5.19.		N/A
5.6.2.3	Permanently connected appliances requiring connection to an identified conductor shall have one terminal or lead marked for the connection of the identified conductor of the supply circuit if they have lampholders, element holders of the screwshell type, single-pole switches, or automatic controls having a manually operable single-pole switch.		N/A
5.6.2.4	Where leads in the terminal box are intended for connection to the power supply conductors at the time of installation, they shall (a) be of suitable ampacity and not less than 150 mm (6 in) in length; (b) be No. 18 AWG or larger; and (c) have insulation suitable for the conditions, e.g., voltage and temperature.		N/A
5.6.3	**Cord-connected appliances – Power supply cords, cord sets, and appliance terminal pins**		P
5.6.3.1	A cord-connected appliance intended for use with a cord set shall be provided with male terminals of the pin or blade type that will accommodate a suitable plug.	Non-detachable power supply cord	N/A

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5.6.3.2	Attachment plugs shall conform to the requirements of CSA C22.2 No. 42. Cord sets shall meet the requirements for heater cord sets specified in CSA C22.2 No. 21.	NEMA 1-15P, Polarized attachment plug. Power supply cord complies with C22.2 No. 21	P
5.6.3.3	Power supply cords, cord sets, and interconnecting cords shall have a voltage rating not less than the rated voltage of the appliance and shall have an ampacity at least equal to the input in amperes corresponding to maximum normal load conditions. The type of supply cord shall be in accordance with Table 2 or the equivalent.	Type SPT-2, 18AWG X 2C, 105 °C, 300 V	P
5.6.3.4	Appliances intended for use outdoors shall have outdoor-type cords as specified in Table 2.	Indoor use only	N/A
5.6.3.5	Guards or an equivalent type of protection shall be provided to prevent accidental contact with terminals of the pin or blade type when they are live (see Clause 5.2.4) or to protect them from mechanical injury, or both. The guard shall prevent a straight edge placed in any position across the guard from touching any terminal, including the ground terminal. Guards shall afford protection equivalent to that of steel with a thickness not less than 0.68 mm (0.0269 in) and shall be fastened independently of the terminals, unless investigation shows that no hazard is present.	No such construction	N/A
5.6.3.6	Appliances that make use of plugs other than those specified in CSA C22.2 No. 57 shall be subject to investigation. Consideration shall be given to the configuration, the nature of the materials used, and the likelihood of use with appliances other than those for which the plug was originally intended. See Clause 5.21.	NEMA 1-15P, Polarized attachment plug.	N/A
5.6.3.7	For all appliances, the length of the power supply cord and attachment plug, as measured from where the cord enters the appliance to the face of the attachment plug, or the overall length of a cord set supplied with the appliance shall be not less than 0.6 m (2 ft) nor greater than 2.1 m (7 ft). Deep fryer, cooker/fryer, or oil fondue type appliances shall be provided with a detachable power supply cord having a cord length greater than 0.6 m (2 ft) but less than 0.9 m (3 ft).		P
5.6.3.8	Cord sets having a thermostatic control shall be provided with a cord having an ampacity not less than 15 A.	No such construction	N/A
5.6.3.9	The supply cord on a cord reel shall meet the requirements of Clause 7.24.	No such construction	N/A
5.6.4	**Strain relief**		P

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5.6.4.1	Strain relief shall be provided so that mechanical strain on the power supply cord will not be transmitted to terminals, splices, or interior wiring.	Cord clamp is provided.	P
5.6.4.2	The strain relief shall (a) withstand a steady pull in any direction of 90 N (20 lb); and (b) prevent the cord from being pushed into the equipment through the cord entry hole if such displacement is liable to (i) subject the cord to mechanical injury; (ii) expose it to a temperature higher than that for which it is rated; or (iii) reduce spacings to less than those specified in Clause 5.19. Note: In the case of flat cords (e.g., SPT/HPN) having parallel conductors that can be separated, the strain relief may be applied to the separated conductors provided that the separated portion of the cord does not extend outside the appliance enclosure or bushing.	Refer to results of strain relief test and push back relief test	P
5.6.5	**Flexing**		P
5.6.5.1	The power supply cord or cord set of cord-connected appliances shall withstand a flexing test as specified in Clause 7.6 without causing exposure or breakage of the conductors or displacement or breakage of the anti-kink device.	Refer to results of flexing test	P
5.6.5.2	Wiring routed between the handle and the base of a steam mop that can be subjected to the flexing or movement during normal operation of the appliance shall comply with the wire flexing requirements in Clause 7.7.4		N/A
5.6.6	**Bushing**		P
5.6.6.1	Where cords or wiring pass through walls or barriers or change direction, there shall be smooth, well-rounded surfaces upon which the cord or conductors can bear, or a bushing shall be provided that is suitable for the conditions at the location (e.g., temperature, oil, etc.).	A bushing is provided	P

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5.6.6.2	A bushing of noncombustible moisture-absorption-resistant insulating material shall be provided where (a) the cord is inferior in serviceability to Type HSJO; (b) the wall, barrier, etc., is of metal; and (c) the construction and use of the appliance are such that the cord can be subjected to strain or motion. Note: Insulated metal grommets may be used in lieu of insulating bushings provided that the insulating material used is not less than 0.8 mm (1/32 in) in thickness and that it completely fills the space between the grommet and the metal in which it is mounted.	Polymeric enclosure	N/A
5.7	**Electrical insulation**		P
5.7.1	Bare live parts shall be supported on heat-resistant moisture-absorption-resistant insulating material that is suitable for the particular application and capable of withstanding the most severe conditions likely to be encountered in service. Note: Materials such as mica, porcelain, phenolic composition, and cold-moulded and certain refractory materials generally may be used as the sole support of live parts. Other materials that are not suitable for general use may be acceptable if used in conjunction with other more suitable materials or if located and protected to prevent mechanical damage and to minimize the absorption of moisture.		P
5.7.2	Determination of the acceptability of insulating material shall include consideration of (a) mechanical strength; (b) dielectric strength; (c) insulation resistance; (d) heat- and moisture-resistant properties; (e) the degree of enclosure or protection; (f) any other factors that might have a bearing on fire and accident hazards under conditions of actual use; and (g) the suitability of sleeving over bare live parts (but not as insulation over internal wiring) as judged under the requirements of Clause 7.18.		P
5.8	**Thermal insulation**	No thermal insulation is used.	N/A
5.8.1	Thermal insulating material shall be suitable for the particular application and shall be adequately enclosed and retained to prevent loss and shifting.		N/A

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5.8.2	Thermal insulation (e.g., mineral wool) that could contain conductive impurities shall not contact bare live parts.		N/A
5.9	**Current-carrying pars**		P
5.9.1	Current-carrying parts shall have the mechanical strength and ampacity for the intended service and shall be of metal suitable for the particular application.		P
5.9.2	Stainless steel and other corrosion-resistant alloys may be used for current-carrying parts without temperature restriction. Suitably plated iron or steel may be used for current-carrying parts.		P
5.9.3	Bare current-carrying parts shall be rigidly supported to maintain the spacings required by Clause 5.19.		P
5.10	**Wiring**		P
5.10.1	Wiring connections and wires between parts of appliances shall be adequately protected or enclosed.	All wirings are enclosed within enclosure.	P
5.10.2	Raceways shall be smooth and entirely free from sharp edges, burrs, moving parts, etc., which can cause abrasion of the insulation on conductors.	No raceway	N/A
5.10.3	Holes in sheet-metal walls through which insulated conductors pass shall be provided with smoothly rounded bushings or shall have smooth, well-rounded surfaces upon which the wires can bear. Note: Insulated conductors may be bunched and passed through a single opening.	Polymeric enclosure	N/A
5.10.4	The movement of drip pans, drawers, trays, etc., shall not damage the insulation of conductors.		N/A
5.10.5	Wiring shall be so located that it will not be exposed to vapours from a vented oven or spillage from cooking operation.		P
5.10.6	Wiring subjected to flexing in the normal use of equipment (e.g., to hinged surface elements) shall have sufficient stranding of the conductors for the movement encountered as determined by the flexing test of Clause 7.6.	Refer to test results	P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.10.7	The internal wiring of appliances shall consist of wire of a type or types suitable for the particular application when considered with respect to (a) the temperature and voltage to which the wire is likely to be subjected; (b) exposure to oil, grease, or other substances likely to have a deleterious effect on the insulation; (c) ampacity; (d) exposure to moisture; and (e) other conditions of service to which the wire is likely to be subjected.	Style 3122, 18 and 24 AWG, 200°C, 300 V	P
5.10.8	Connectors and joints in conductors and the insulation thereon shall comply with the requirements of CAN/CSA-C22.2 No. 0.		P
5.10.9	Soldered connections shall be made mechanically secure before soldering.		P
5.11	**Heating elements and heating elements**		P
5.11.1	Heating elements shall be supported in a substantial and reliable manner and shall be protected against mechanical injury and contact with outside objects. Note: Coiled-wire heating elements may be supported on porcelain-hook-type insulators, depending on the stiffness of the element, the spacing between hooks, the shape of the hook, etc.		P
5.11.2	Heating elements of the open-coil type shall be supported such that, if appliances are subjected to extreme conditions of operation, including element breakage at any point, short-circuits cannot occur between turns, between sections of the heating elements, or between bare live and non-current-carrying metal parts, with the appliance mounted in its normal operating position. Compliance shall be determined in accordance with the test of Clause 7.25.	Shealthed heating element	N/A
5.11.3	Appliances, other than toasters, shall not have open-wire elements unless the elements are enclosed or are guarded to meet the requirements of Clause 5.2.4.	Shealthed heating element	P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.11.4	Means shall be provided for the collection and removal of spilled food and liquids that can accumulate. For cooking top elements, a removable tray or trays shall be provided. If individual trays are used, they shall have a minimum capacity of 70 mL (2.5 fl. oz). If a tray serves more than one element, the capacity shall be increased by 25% for each additional element. In porcelain-brick-type elements, if food and liquids do not contact live parts and do not accumulate within the enclosure, a tray is not required. The maximum opening in the top enclosure between the heater element cover and the enclosure shall be 1.6 mm (1/16 in) in order to prevent the entry of solid food particles into the enclosure.	No such construction	N/A
5.11.5	Lower heater elements of ovens, broilers, etc., shall be protected against food, utensils, racks, etc., falling on bare live parts by a metal baffle plate that, if removable for cleaning, shall be marked as required by Clause 6.12.		N/A
5.11.6	Heater elements shall be constructed such that turning or movement that can occur in normal service will neither put strain on electrical connections nor cause reduction of the spacings required by Clause 5.19.	The position of heater element is fixed.	N/A
5.11.7	Heater elements of the porcelain-brick-type that are required to bear the weight of a cooking utensil shall be supported to prevent breakage. Note: It is not necessary that the support be solid metal or that it cover the entire under-surface of the porcelain. For bricks less than 150 mm (6 in) in diameter, four large tabs can give sufficient support. For larger bricks, additional support to that provided by tabs should be provided.		N/A
5.11.8	A heater element having terminals that can be connected to the supply circuit by means of a cord set or a permanently attached power supply cord shall not be of the removable type unless the element meets the applicable requirements of Clauses 5.21 and 7.24.	No such construction	N/A
5.11.9	Aluminum-sheathed elements shall not be used in appliances where the elements are immersed in liquid during normal use.	A stainless heating plate on top of the heating element, the sheathed element is not directly immersed in water.	P
5.11.10	Open-coil heater element insulators and supports shall be fixed in position independently of the heating element.		N/A
5.11.11	Element sheaths for barbecue lighters shall be constructed from at least No. 304 stainless steel alloy having a minimum thickness of 0.45 mm (0.018 in).		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.11.12	Heater elements in rotisserie broilers, barbecues, and similar appliances need not be permanently mounted to the body of the appliance. The appliance shall comply with the applicable requirements of Clauses 7.4.18.3 to 7.4.18.5.		N/A
5.11.13	An appliance with a rope heater element shall not become a shock hazard when subjected to the thermal endurance test specified in Clause 7.23.		N/A
5.11.14	The heating elements of an automatic toaster shall de-energize independently of the movement of a simulated toast load, as determined by Clause 7.4.8.		N/A
5.12	**Overcurrent protection**		N/A
5.12.1	Overcurrent protection for circuits and auxiliary devices, if provided in appliances, shall comply with the requirements of the Canadian Electrical Code, Part I.	No such constructions	N/A
5.12.2	Receptacles and lampholders for other than pilot duty in appliances rated more than 15 A shall have overcurrent protection not exceeding 15 A as part of the appliance. Note: Lampholders may be grouped with one receptacle, or two receptacles may be grouped.	No such construction	N/A
5.12.3	Overcurrent devices shall be of types recognized as suitable for the particular application and shall be readily accessible from the outside of appliances, but not without opening a door or cover that is hinged or attached in an equivalent manner.		N/A
5.12.4	Fuseholders shall be constructed and installed so that bare live parts other than the screwshell in plug fuses will not be exposed to contact by persons removing or replacing fuses, i.e., they shall be dead-front.		N/A
5.12.5	The screwshells of plug fuseholders and the contact of extractor-post-cartridge-type fuseholders adjacent to the mounting surface shall be connected to the load side of the circuit.		N/A
5.12.6	Plug fuses shall be used only in circuits not exceeding 150 volts-to-ground.		N/A
5.13	**Protection against overheating**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.13.1	Unless they can operate safely when dry, appliances intended to heat liquids that might be inadvertently operated when dry shall be provided with a protective device or devices that will open the power supply or reduce the power input to the heating element to prevent unsafe temperatures from being reached when the appliance is operated at the test voltage under such abnormal conditions. Heating elements shall not be considered as protective devices.	Thermal fuse is provided to protect the unit when the unit operates in dry operation	P
5.13.2	Vaporizers of the resistance-wire type that are provided with a thermostat or the equivalent shall be constructed so that the protective device is inaccessible and not readily adjustable by the user.	No such construction	N/A
5.13.3	**Appliance using oils, fats, etc.**		N/A
5.13.3.1	Appliances such as deep fryers and frypans that use oils, fats, and similar flammable substances in normal operation and that are capable of raising the temperature of the oil or fat to the ignition point shall be provided with suitable overheat protection, the adequacy of which is determined by compliance with the applicable normal and abnormal tests specified in Clauses 7.3 and 7.4, respectively.		N/A
5.13.3.2	Deep-fat fryers that employ two cycling-type thermostats to comply with the requirements of Clause 5.13.3.1 shall provide an indication (such as a warning light) to the user when the appliance is cycling on its temperature-limiting thermostat (see also Clauses 7.3.3.7 and 7.4.3).		N/A
5.13.4	Fusible links provided in appliances to prevent hazardous temperatures due to abnormal operation of the appliances shall (a) be constructed or enclosed to prevent tampering; (b) operate without the short-circuiting or grounding of live parts; and (c) comply with the performance requirements specified in Clause 7.11.		N/A
5.13.5	Reset levers or buttons of manually reset protective devices shall be recessed or guarded to prevent resetting of the protective device by accidental means.		N/A
5.13.6	The setting, construction, and location of protective devices shall be investigated with respect to the nature of the substance being heated and any other feature bearing on the shock and fire hazards involved in actual service.		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.13.7	A manual or automatic control of an automatic toaster with an elevating carriage shall operate to open the heating circuit with a full load of bread, as required by Clause 7.3.3.4.		N/A
5.13.8	Appliances using PTC heaters shall be subjected to the performance test specified in Clause 7.22. During or upon completion of this test, the heater elements shall not crack, short, or open.		N/A
5.14	**Receptacles**	No such construction	N/A
	In equipment intended for connection to a 15 A branch circuit, a receptacle that will accommodate a parallel blade (15 A, 125 V) attachment plug shall have switching to disconnect all other loads while the receptacle is energized, unless (a) the receptacle is provided for a special load not exceeding 100 W and is so marked; and (b) the total electrical load, including the receptacle load, meets the requirements of Clause 5.1.4.		N/A
5.15	**Lampholders and lamps**	No such construction	N/A
5.15.1	Lampholders and lamps shall be protected from mechanical injury.		N/A
5.15.2	Lampholders of appliances, including cord-connected appliances equipped with a polarized attachment plug, shall have the screwshells connected to the identified conductor (if one is used) of the branch circuits.		N/A
5.15.3	Lampholders shall be designed and located such that no bare live parts other than the screwshell are exposed to contact by persons replacing lamps, unless the lamps are not readily accessible, i.e., a tool is required for removing a cover.		N/A
5.15.4	Lampholders having an aluminum screwshell or a paper liner shall not be exposed to moisture (e.g., by being used in an oven).		N/A
5.15.5	Unless they are of the unswitched, medium-base porcelain type, lampholders intended for use with infrared heating lamps and with lamps rated 375 W or less shall be subject to investigation.		N/A
5.15.6	Screwshells used as holders for open-wire heater elements shall be of copper or copper alloy and shall be plated with nickel or an equivalent oxidation-resistant metal.		N/A
5.16	**Switches and controls**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.16.1	Switches and controls shall comply with the applicable requirements of CSA C22.2 Nos. 24, 55, and 111 and the additional requirements specified in Clauses 5.16.3 and 5.16.10.	UL recognized thermostat, complies with C22.2 No. 24	P
5.16.2	Switches and controls shall have current and voltage ratings not less than those of the circuits they control when the appliance is operated as described in Clause 7.3.2.	Cl. 7.3.2, appliance was operated at 1085 W, 128 V (approx. 8.5A) Thermostat rated 250 V, 10A	P
5.16.3	Switches and controls shall be capable of meeting the requirements of the overload and endurance tests specified in Clause 7.9.	UL recognized thermostat	N/A
5.16.4	Switches and controls shall be located or protected such that they are not subjected to mechanical damage or adversely affected by spillage from cooking or pouring and the collection of grease.		N/A
5.16.5	If appliances have live parts exposed to contact during operation or cleaning, the live parts shall be de-energized by a manually operated switch or control* (e.g., thermostat, timer) that can be turned to an OFF position. Such switches shall (a) in permanently connected appliances, disconnect all ungrounded conductors; (b) in cord-connected appliances, be of the double-pole type and arranged so that both supply conductors are disconnected simultaneously when the switch or control is in the OFF position. Single-pole switches, including those of auxiliary controls, may be used in addition to a double-pole switch to control lamps or a motor or for heat selection or control, except that the heating element, or one of the elements if more than one is provided, shall be controlled by the double-pole switch only; and (c) have an OFF position, which shall be marked or clearly indicated (e.g., the OFF position of a toaster control handle). *Includes timers that are automatically turned off and the contacts controlled by the bread carriage mechanism of an automatic toaster.		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.16.6	If a switch or a control that can be turned manually to an OFF position is used to control one or more heat settings of a heater element, its OFF position, at minimum, shall be indicated on or adjacent to the switch. Alternatively, keys or legends may be used for showing the operating positions of switches; they shall indicate at minimum the OFF position and shall appear in a conspicuous, permanent location. No additional marking need appear if the handle is of such shape or design that the OFF position of the switch is clearly indicated. A low-temperature setting on a thermostat shall not be considered as a true OFF position and shall not be marked as such unless the thermostat does not reclose when cooled to a temperature of –35 °C.		N/A
5.16.7	Switches located in handles of wood or other combustible material shall be enclosed in metal or other noncombustible material.		N/A
5.16.8	Rangettes, table rangettes, and non-integral hotplates shall have at least one readily visible* long-life†indicating light, which shall be ON while any surface heating element control is in any position other than OFF. *"Readily visible" means visible anywhere between 120 cm (4 ft) and 180 cm (6 ft) above the floor and on a line 6 cm (2 in) in front of, and parallel with, the front of the appliance and within 120 cm (4 ft) of either side of a position directly in front of the centre of the appliance. †A long-life light is a neon lamp or the equivalent.		N/A
5.16.9	The OFF position only may be marked by the symbol ~~O~~".		N/A
5.16.10	Automatic temperature controls shall comply with the performance tests specified in Clause 7.10.	UL recognized thermostat	N/A
5.17	**Motors**	No motor	N/A
5.17.1	Motors shall be suitable for the particular application and shall comply with the applicable requirements of CSA C22.2 No. 100.		N/A
5.17.2	Openings in motor enclosures shall comply with Clause 5.2.4. Motors within the appliance enclosure may be of the open type.		N/A
5.18	**Electromagnetic interference (EMI) filters**	No EMI filters	N/A
5.18.1	EMI filters shall comply with the requirements of CSA C22.2 No. 8.		N/A
5.18.2	EMI filters shall not be connected between live parts and exposed conductive parts of an ungrounded appliance.		N/A
5.19	**Spacings**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
5.19.1	Spacings in components of appliances (e.g., switches, lampholders, and thermostats) shall comply with the requirements of the applicable Standard of the Canadian Electrical Code, Part II. If no such Standard exists, spacings shall be the subject of investigation. See also Clause 5.1.2.		P
5.19.2	Except as otherwise specified in Clauses 5.19.1 and 5.19.3, the spacings in appliances shall be not less than those specified in Table 3. If a bare live part is not rigidly supported, or if a movable non-current-carrying metal part is in proximity to a bare live part, the construction shall be such that the minimum spacing specified will be maintained under all conditions of use.	Not field-wiring, 120Vac, From terminal of thermostat to dead metal part, through air and over surface spacing = 5 mm. Thermal fuse is insulated by coated fiber glass sleeving. Fiber glass sleeving is UL recognized.	P
5.19.3	An insulating barrier or liner may be used to obtain the required spacings provided that it meets all the following requirements: (a) it is of adequate dielectric strength and resistant to moisture; (b) it is not adversely affected by arcing and is suitable for the temperature encountered; (c) it is of adequate mechanical strength and permanently retained in place by means other than adhesives; (d) it is not less than 0.66 mm (0.026 in) thick, except that it may be not less than (i) 0.33 mm (0.013 in) thick if used in conjunction with a spacing not less than one-half of that required; or (ii) 0.25 mm (0.010 in) thick if it is of mica or other equivalent insulating material of suitable thickness. An insulating barrier or liner shall be held in position between the parts involved by mechanical means (no spacing required). Adhesive shall not be relied upon to fix such insulation in place; and (e) it meets the applicable requirements of Clause 7.20.		N/A
5.19.4	Insulating material (such as mica washers in depressions in metal) that is depended upon for maintaining spacings of live parts shall closely fit a well-defined depression in the metal at least 0.8 mm (1/32 in) deep. Other equivalent means may be used.	No such construction	N/A
5.20	**Leakage current**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
	The leakage current for single-phase cord-connected appliances shall not exceed 0.5 mA when tested in accordance with Clause 7.8, except that for appliances having sheathed heater elements the leakage current shall not exceed 4 mA for the first 10 min after power is first applied and 0.5 mA after the 10 min interval.	Refer to test results	P
5.21	**Grounding and bonding**		N/A
5.21.1	An appliance that is intended to be grounded shall comply with the requirements of CSA C22.2 No. 0.4.	Grounding is not required.	N/A
5.21.2	The following cord-connected appliances shall be grounded: (a) appliances (other than the electrode type) that are designed to be immersed in water for cleaning and/or during use (e.g., frypans, casseroles, deep fryers, grills, pail and tank heaters, poultry and stock water heaters); (b) hamburger cookers, doughnut makers, crepe makers, waffle irons with nonremovable grids, slow cookers with nonremovable liners, and similar types of appliances (other than the electrode type) that are not designed to be immersed in water but might be immersed or partially immersed for cleaning and/or during use; (c) appliances designed for outdoor use (e.g., barbecue lighters, spit motors); (d) hotplates; (e) rangettes; and (f) electric toilets.		N/A
5.21.3	Electric kettles shall be grounded or double-insulated. If double-insulated, the requirements in Clause 8 shall be met.		N/A
5.21.4	Stock water heaters shall have a grounding terminal suitable for the connection of a No. 6 AWG or larger copper conductor.		N/A
5.21.5	Materials used to mount heater elements in livestock watering equipment shall be noncorrosive (e.g., galvanized or stainless steel). Metal-sheath-type heater elements that are friction-mounted shall be subjected to the impedance test of CSA C22.2 No. 0.4.		N/A
5.21.6	Immersible appliances having a thermostatically controlled cord set shall be provided with a spring-loaded ground contact to ensure that positive contact pressure is exerted on the grounding probe of the cord set at all times. The resting of one metal part on another shall not be acceptable.		N/A
5.21.7	An appliance having pins and contacts that are used solely for the purpose of grounding shall be subjected to the insertion endurance test of Clause 7.17.		N/A

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5.22	**Induction-heating hot plate**	Not induction –heating hot plate	N/A
5.22.1	An induction-heating hot plate shall be constructed such that a cast iron disc, 3 mm thick and 50 mm in diameter, must be placed 20 mm or closer, directly above the area of the working coil, before the appliance can be energized.		N/A
5.22.2	Automatic shut-off means shall be provided to de-energize the appliance when a cooking vessel is removed, even though the switch is in the ON position. The shut-off means shall incorporate a manual reset feature that requires a deliberate resetting action to re-energize the appliance when the vessel is replaced.		N/A
5.22.3	Induction-heating hot plates shall have no breakage or cracking of the cooking surfaces when subjected to the thermal shock test of Clause 7.26.2 nor shall they become a fire or shock hazard when subjected to the abnormal tests of Clauses 7.26.3 and 7.26.4.		N/A
5.23	**Belt-type fermentation heaters**		N/A
5.23.1	A belt-type fermentation heater shall not show signs of cracking of the outer surface material when subjected to the flexing test specified in Clause 7.27.		N/A
5.23.2	Belt-type fermentation heaters shall be marked as specified in Clause 6.20.		N/A
5.24	**Electrical rating**		P
	The marked electrical input of an appliance shall be in accordance with Clause 7.2.	See nameplate of electrical rating marking	P
5.25	**Temperature (normal)**		P
	When tested as specified in Clause 7.3, an appliance shall not reach a temperature at any point high enough to constitute a fire hazard nor show temperatures at specific points greater than those specified in Table 4.	Refer to temperature test results	P
5.26	**Dielectric strength**		P
	Immediately following the temperature test of Clause 5.25, the appliance shall be capable of withstanding for a period of 1 min without breakdown the dielectric strength test specified in Clause 7.5.	Refer to test result	P
6	**Marking**		P

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
6.1	Appliances shall be plainly marked, in a permanent manner, in a location where the details will be readily seen after installation, except as otherwise specified in Clause 6.13, with the following: (a) the manufacturer's name, trademark, or other recognized symbol of identification; (b) the catalogue, style, or model, or other type designation; (c) the voltage; (d) if not suitable for dc use and the letters ~~-~~ac" after the voltage, the symbol —", or the frequency in hertz, if necessary; and (e) the rated input in amperes or watts. For appliances with PTC heaters, only the steady-state rating shall be marked.	See nameplate of marking	P
6.2	The month and year of manufacture, at minimum, shall be marked on the appliance in a location accessible without the use of tools. Date coding, serial numbers, or equivalent means may be used.	Date code is marked	P
6.3	Markings shall comply with CAN/CSA-C22.2 No.0.	Marking is on the bottom surface	P
6.4	Cord-connected appliances, except aquarium water heaters, that might be immersed or partially immersed for washing, heating, or other purposes and are not capable of meeting the requirements of Clause 7.12 when totally immersed shall be clearly marked with the following: DO NOT IMMERSE and NE PAS IMMERGER	Marked –~~D~~O NOT IMMERSE IN WATER OR IN ANY OTHER LIQUID"	P
6.5	Liquid-heating appliances in which bare live parts are immersed in liquids shall be marked for use with ac only. The input shall be expressed as follows to indicate the general variation that occurs when such devices are used either with waters of different conductivity or with some liquid whose conductivity changes with temperature: ... WATTS OR LESS and ... WATTS OU MOINS Note: Instructions concerning the use of baking soda or the equivalent in soft water areas may appear on the nameplate or in a separate booklet, or both.	Heating element is sheathed	N/A

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6.6	Unless obvious, permanently connected appliances whose performance depends on proper location or position shall be marked to indicate proper installation (e.g., ~~t~~top" or ~~b~~bottom").		N/A
6.7	Stock waterers constructed as specified in Clause 5.2.4.7 shall be marked with the following: INSTALL ON A NONCOMBUSTIBLE SURFACE and INSTALLER SUR UNE SURFACE INCOMBUSTIBLE		N/A
6.8	Bottle warmers of the electrode type shall be marked with the following: DO NOT PLACE METAL CANS OR OTHER METAL OBJECTS IN THIS WARMER and NE PAS PLACER DES BOITES OU AUTRES OBJETS METALLIQUES DANS CE CHAUFFE-BIBERON		N/A
6.9	If the construction of an appliance makes allowance for cleaning or similar servicing by the user (see Clauses 5.2.4.3 and 5.2.4.4) that involves the exposure of any normally enclosed or protected live part to accidental contact, the appliance shall be clearly and permanently marked with a warning that such servicing should be done with the appliance disconnected from the supply circuit.		N/A
6.10	If fuses are provided, the maximum size, in amperes, of the fuse to be used in each circuit shall be marked on or adjacent to its respective fuseholder. The marking may be on a paper sticker or some suitable equivalent, subject to investigation that shall consider the effects of temperature, moisture, fumes, etc.	No fuse is provided	N/A
6.11	The following shall be permanently marked near the supply entrance or on the nameplate if the temperature in the terminal box or the compartment intended for the supply connections exceeds 60 °C in the normal temperature test: USE SUPPLY WIRES SUITABLE FOR... ℃ and EMPLOYER DES FILS D'ALIMENTATION ADEQUATS POUR... ℃ The temperature to be specified in the marking shall be 75 °C, 90 °C, or 110 °C for temperatures of 61 to 75 °C, 76 to 90 °C, or 91 to 110 °C, respectively.	No such construction	N/A

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CSA C22.2 No. 64-10			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
6.12	Removable baffle plates as described in Clause 5.11.5 shall be marked with the following: KEEP THIS COVER IN PLACE OVER ELEMENT and GARDER CE COUVERCLE EN PLACE PAR-DESSUS L'ELEMENT	No such construction	N/A
6.13	Markings shall not be located on the backs of permanently connected appliances, on those likely to be installed adjacent to a wall, or on stock waterers because of the difficulty in seeing such markings after the appliance is installed. Markings may, however, be placed on the inside surface of a door or in some similar location, such as a terminal box, but not on parts such as drawers that can be removed.		N/A
6.14	Rangettes and similar floor-standing devices needing a bracket to provide the stability required by Clause 5.5 shall be marked to indicate the purpose and location of the bracket. The marking may appear on a paper label.		N/A
6.15	Glass-enclosed aquarium heaters shall be marked in a permanent manner with the following readily visible warning: DO NOT OPERATE DRY and NE PAS UTILISER A SEC		N/A
6.16	Cord-connected barbecues or similar appliances that do not meet the requirements of Clause 7.4.18 shall be marked in letters not less than 6.0 mm (1/4 in) high with the following (see Clause 5.2.1.4): USE OUTDOORS ONLY and EMPLOYER SEULEMENT A L'EXTERIEUR		N/A
6.17	Appliances with cord sets having an integral thermostatic control or similar control shall be plainly marked in a permanent manner with the following: FOR USE WITH CONTROL No.... and EMPLOYER AVEC COMMANDE No...	No such construction	N/A

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CSA C22.2 No. 64-10			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
6.18	Immersed-electrode-type appliances (e.g., bottle warmers, facial saunas, and egg cookers) used for heating, vaporizing, etc., and containing for the conductance of heat a liquid or solid medium that is likely to be exposed to contact shall be given special consideration with respect to the likelihood of a hazardous condition resulting from careless or improper use. Such equipment shall be marked where readily visible with specific instructions regarding the proper amount of medium to be used (e.g., the correct liquid level), the method of filling, and the proper care and operation of the appliance in order to minimize the possibility of a shock hazard resulting from contact with the energized medium. Such equipment shall also be marked with the following: CAUTION: FOR PREVENTION OF POSSIBLE SHOCK HAZARD DO NOT TOUCH THE * WITH FINGERS OR METAL OBJECTS and ATTENTION : AFIN DE PREVENIR LES RISQUES DE CHOC ELECTRIQUE, NE PAS TOUCHER...* AVEC LES DOIGTS OU UN OBJET EN METAL. *Insert the applicable word: liquid (le liquide), water (l'eau), solid (les matières solides), or food (les aliments).	Not immersed electrode type appliance	N/A
6.19	The maximum temperature of PTC heaters shall be identified on the heater or the PTC heating element by a specific temperature marking.	No such construction	N/A
6.20	As required by Clause 5.23.2, belt-type fermentation heaters shall be shipped with complete use and care instructions and marked with wording to indicate the intended use as a fermentation heater and with the following: CAUTION: USE INDOORS ONLY and ATTENTION : EMPLOYER UNIQUEMENT A L'INTERIEUR		N/A
6.21	As required by Clause 5.1.4, the duty cycle of the appliance shall be clearly marked with the following: xx MINUTES ~~O~~N" IN A TWO HOUR PERIOD and xx MINUTES EN ≪MARCHE≫ DANS UNE PERIODE DE DEUX HEURES The number of minutes marked shall not exceed 60 min.		N/A
7	**Tests**		P
7.1	General		P
7.2	Rating	See test results	P

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CSA C22.2 No. 64-10			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
7.3	Temperature (normal)	See test results	P
7.3.1	General	See test results	P
7.3.2	Test voltage	See test results	P
7.3.3	Load conditions	See test results	P
7.4	Temperature (abnormal)	See test results	P
7.5	Dielectric strength	See test results	P
7.6	Flexing (power supply cords and cord sets) and detachment		P
7.7	Flexing (internal wiring)		N/A
7.8	Leakage current	See test results	P
7.9	Performance of manually operated switches		N/A
7.9.1	Overload		N/A
7.9.2	Endurance		N/A
7.10	Performance of automatic temperature controls		N/A
7.10.1	General		N/A
7.10.2	Calibration		N/A
7.10.3	Overload		N/A
7.10.4	Endurance		N/A
7.11	Performance of fusible links		N/A
7.12	Aging of water seals		N/A
7.13	Physical abuse	See test results	P
7.14	Backflow		N/A
7.15	Stability		P
7.16	Aquarium heaters		N/A
7.17	Insertion endurance		N/A
7.18	Investigation of fibreglass sleeving (over bare conductors used as wiring)		N/A
7.18.1	Flame Test		N/A
7.18.2	Heat-resistant properties		N/A
7.18.3	Dielectric strength after heating		N/A
7.19	Thermoset material aging		N/A
7.20	Insulating liner investigation		N/A
7.20.1	Humidity and cold-bend dielectric strength		N/A

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Clause	**Requirement – Test**	**Result – Remark**	**Verdict**
7.20.2	Thermal aging		N/A
7.21	Electric toilets – Spillage		N/A
7.22	Performance of appliance having PTC heaters		N/A
7.22.1	General		N/A
7.22.2	Thermal cycling		N/A
7.23	Thermal endurance (rope heater element)		N/A
7.24	Mechanical endurance (cord reels)		N/A
7.25	Open-coil heating element breakage		N/A
7.26	Tests for induction-heating hot plates		N/A
7.26.1	General		N/A
7.26.2	Thermal shock test		N/A
7.26.3	Transient surge test		N/A
7.26.4	Selective component failure test		N/A
7.27	Flexing (belt-type fermentation heaters)		N/A
7.28	Strength of handles		N/A
8	**Cord –connected double-insulated household cooking and liquid-heating appliance**		N/A
9	**Requirements for bare element water heaters**		N/A
Annexes A	**Food colour charts**		N/A

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CSA C22.2 No. 64-10			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**

List of Critical Components:

Object/part no.	Manufacturer/ Trademark	Type/Model	Technical Data	Standard	Mark(s) of Conformity
Main Body	Samsung Total Petrochemicals Co Ltd	FB51(+)	PP, V-2, 130°C, min. 1.5 mm thick	UL94, UL746A, UL746B	UL E140331
Main Body (Alternative)	Shinkong Synthetic Fibers Corp	PP4210	PP, V-2, 125°C, min. 1.5 mm thick	UL94, UL746A, UL746B	UL E107536
Main Body (Alternative)	LG Chemical (Guangzhou) Engineering Plastics Co Ltd	LUPOL GP-1007F(#)	PP, V-2, 120 °C, Min. 1.5 mm thick	UL94, UL746A, UL746B	UL E248280
Base	Samsung Total Petrochemicals Co Ltd	FB51(+)	PP, V-2, 130°C, min. 1.5 mm thick	UL94, UL746A, UL746B	UL E140331
Baffle	LG Chem Ltd	H1500	PP, HB, 65 °C	UL94, UL746A, UL746B	UL E140737
Basket	LG Chem Ltd	H1500	PP, HB, 65 °C	UL94, UL746A, UL746B	UL E140737
Lid Cover	Formosa Plastics Corp	Yungsox 5090T	PP, HB, 65 °C	UL94, UL746A, UL746B	UL E216959
Lever Bracket	Kingfa Sci & Tech Co Ltd	PA6-G30	PA6, HB, 100 °C, min. 1.6 mm thick	UL94, UL746A, UL746B	UL E171666
Button	Samsung Total Petrochemicals Co Ltd	HJ730+	PP, HB, 115°C, min. 1.5 mm thick	UL94, UL746A, UL746B	UL E140331
Button (Alternative)	Korea Petrochemical Ind Co Ltd	HJ4012	PP, HB, 120°C, min. 1.5 mm thick	UL94, UL746A, UL746B	UL E93311
Button (Alternative)	Exxonmobil Chemical Co	PP7033 E7	PP, HB, 120°C, min. 1.5 mm thick	UL94, UL746A, UL746B	UL E31790
Cord Bracket	Kingfa Sci & Tech Co Ltd	PA6-G30	PA6, HB, 100 °C	UL94, UL746A, UL746B	UL E171666
Heating Element	Foshan City Shunde Jiajun Plastic & Hardware Products Co., Ltd.	10382B	120 Vac, 1000W	UL499	Test in appliance
Heating Element (Alternative)	Foshan City Shunde Jiajun Plastic & Hardware Products Co., Ltd.	10382B-1	120 Vac, 1000W	UL499	Test in appliance
Thermostat	Foshan Tianpeng Thermostats Co Ltd	T1M/11	250 V, 10A Open temp: 120 °C	UL873, C22.2 No. 24	UL E202192
Neon Bulb	--	--	120 Vac, 0.35 mA	--	--

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CSA C22.2 No. 64-10			
Clause	**Requirement – Test**	**Result – Remark**	**Verdict**

Object/part no.	Manufacturer/ Trademark	Type/Model	Technical Data	Standard	Mark(s) of Conformity
Internal Wiring, connected to neon bulb	Wuxi Huacheng Cable Co Ltd	3122	24 AWG, 200°C, 300 Vac	UL758, C22.2 No. 210	UL E206992
Internal Wiring (Alternative)	Various	3122	24 AWG, 200°C, 300 V	UL758, C22.2 No. 210	UL and CSA Recognized
Internal Wiring Wiring, connected to thermal fuse, thermostat, and heating element	Wuxi Huacheng Cable Co Ltd	3122	18 AWG, 200°C, 300 Vac	UL758, C22.2 No. 210	UL E206992
Internal Wiring (Alternative)	Various	3122	18 AWG, 200°C, 300 V	UL758, C22.2 No. 210	UL and CSA Recognized
Fiberglass sleeving	Shenzhen Wahchangwei Industrial Co Ltd	SRS-70	200°C, 600 V	UL1441, C22.2 No. 198.3	UL E233803
Heat Shrinkable tube	Shenzhen Woer Heat-Shrinkable Material Co Ltd	RSFR-H	125°C, 600 V	UL224, C22.2 No. 198.1	UL E203950
Wire connectors	Heavy Power Co Ltd	CE2	105°C, 300 V	UL486A-486B, UL486C, C22.2 No. 65, C22.2 No. 188	UL E113650
Fan	COOLCOX CORPORATION	4010L12S	DC12V, 0.04A	UL 507	UL E493507
PCB	Biing Chern Technology Corp	ML-1	V-0, 130°C	UL 94, UL 746	UL E339220
Power supply unit	Shenzhen Longhua New District Deliang electronics factory	SCY-1240	Input: 110-240V~, 50/60Hz, 0.8A Output: DC12V, 4A	/	Test with appliance

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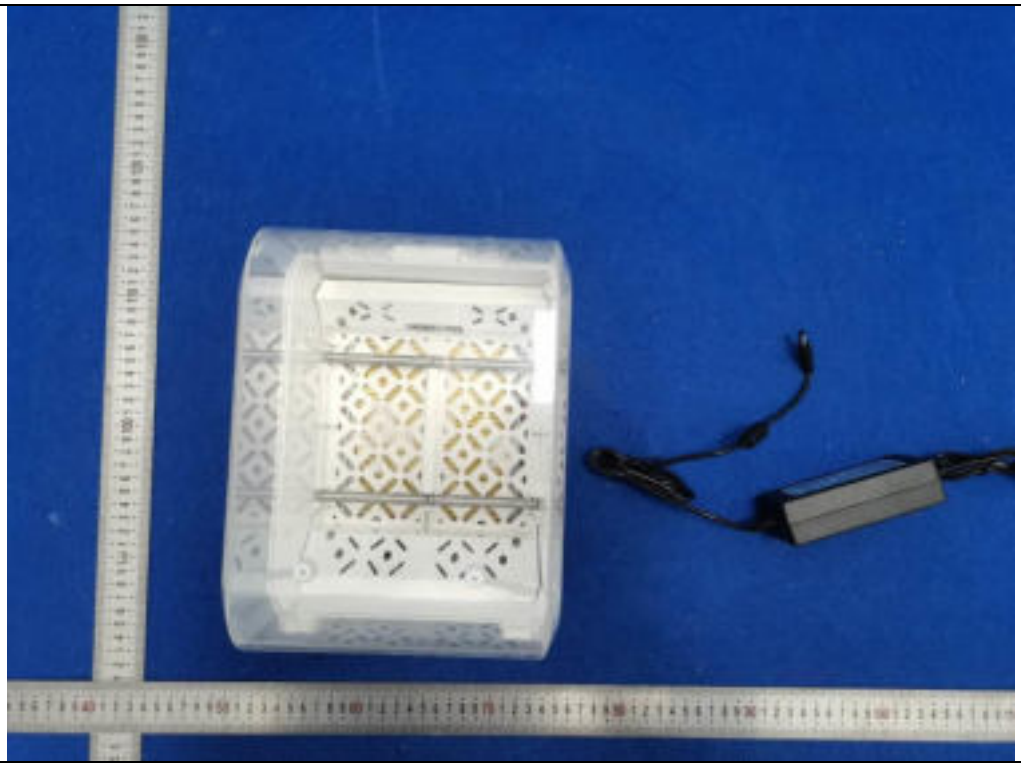
Attachment No.1 **Photo Documentation**

Details of: Over view for model SH01



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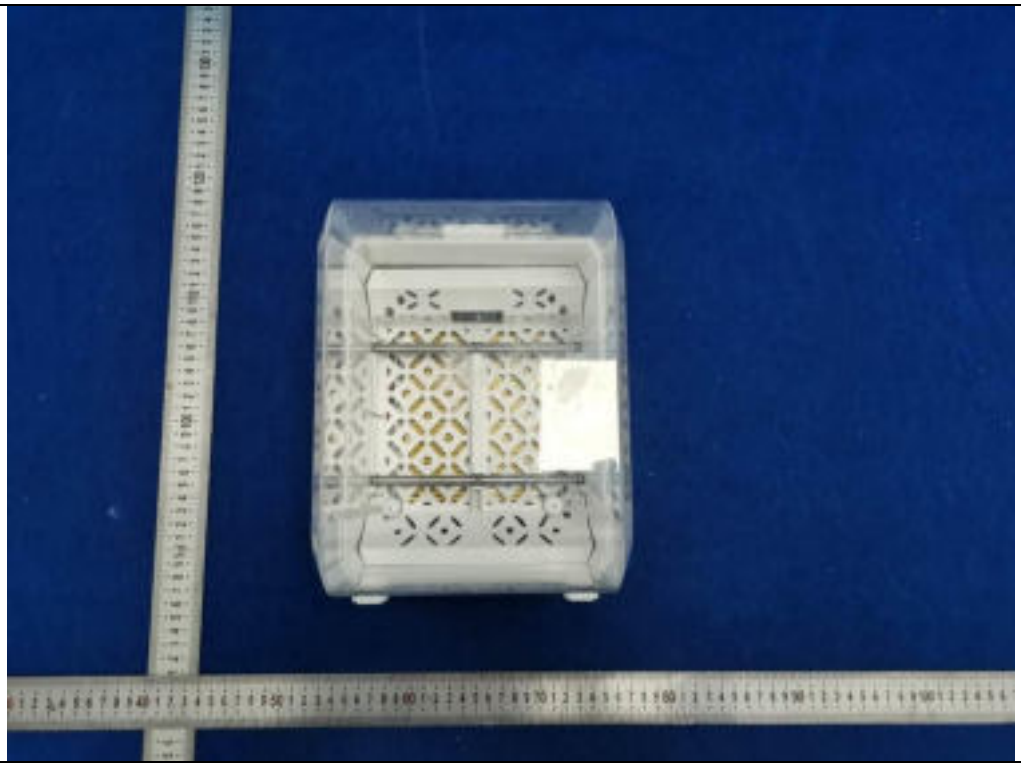
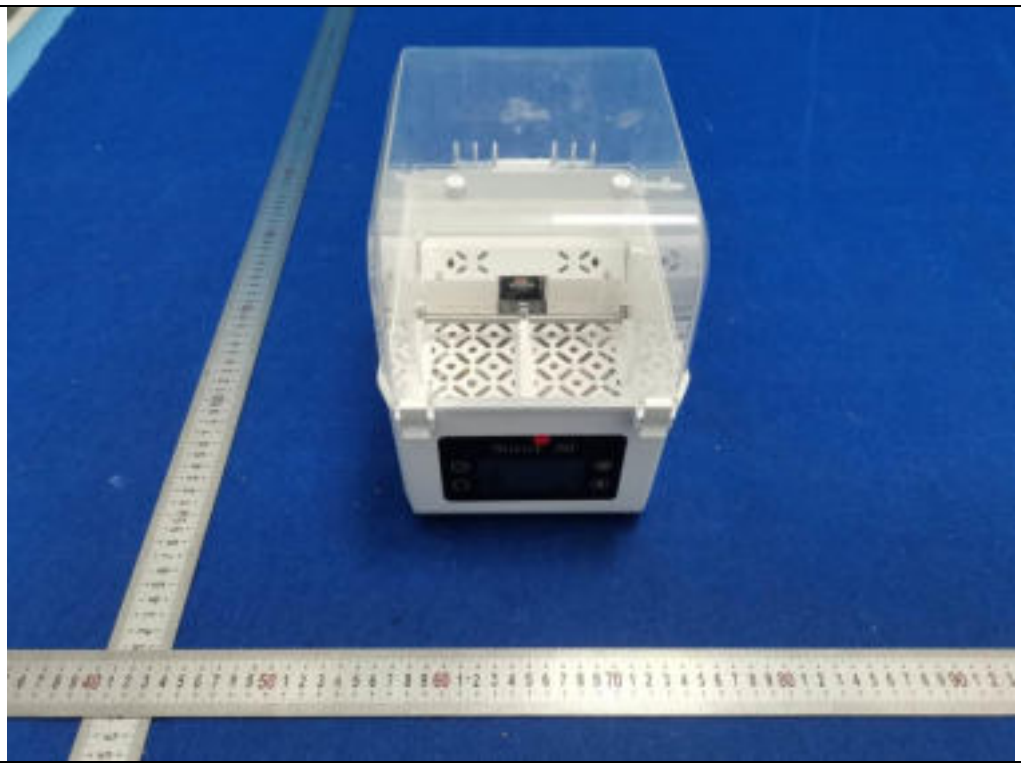


Details of: Over view model SH01



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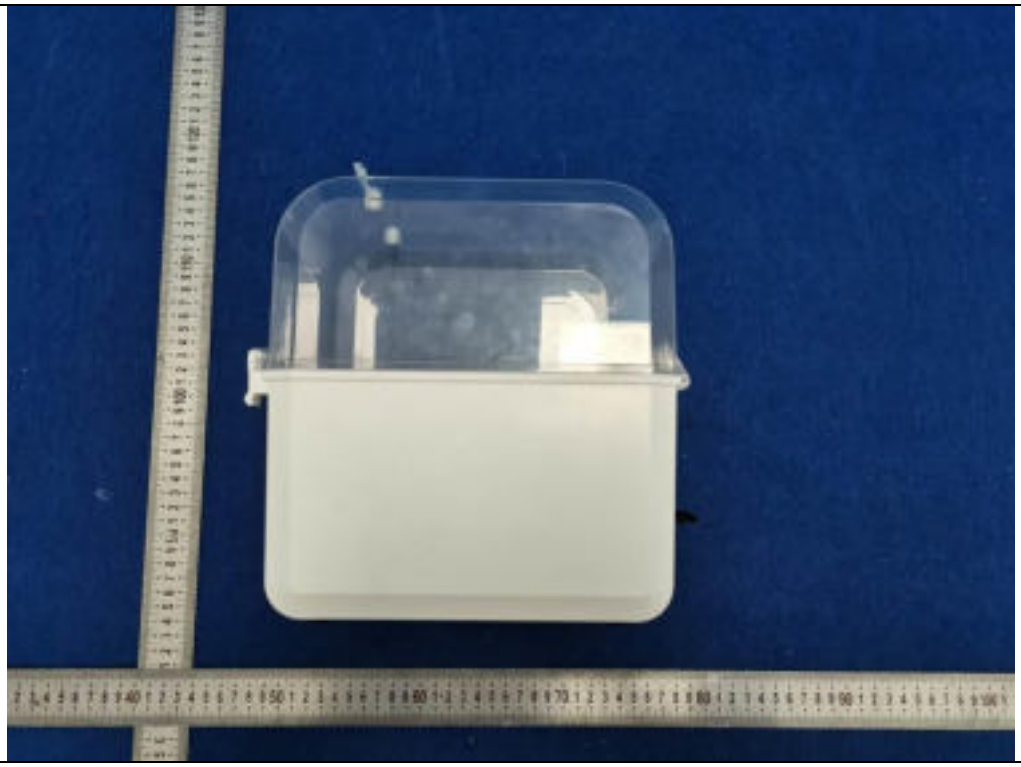

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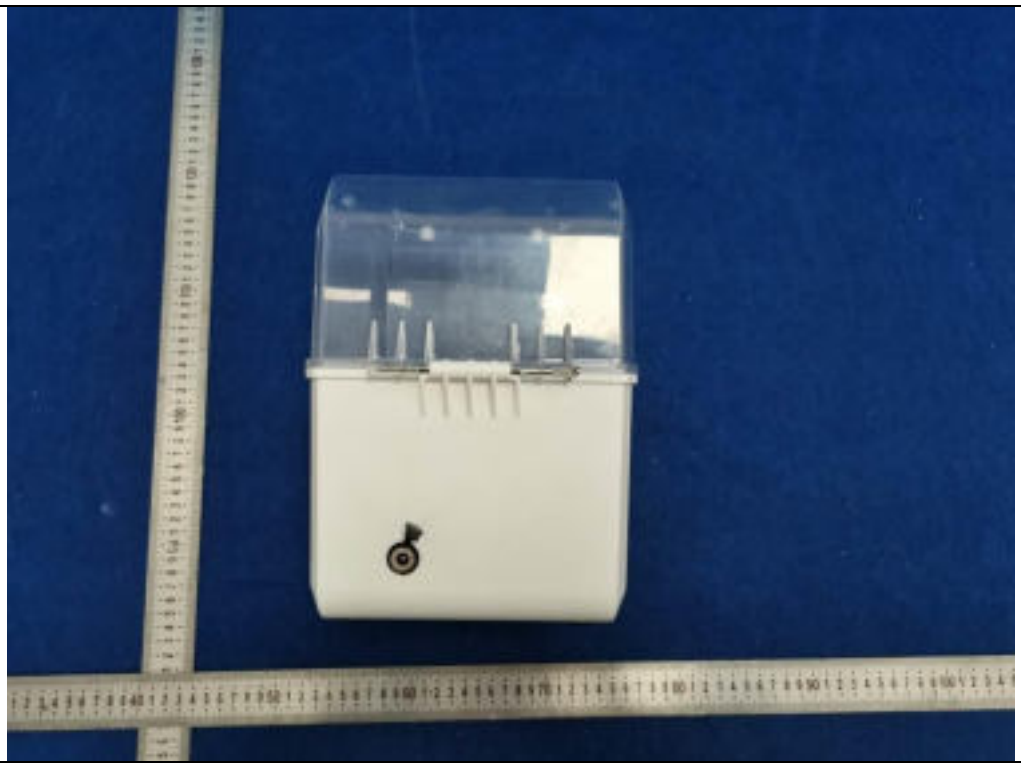

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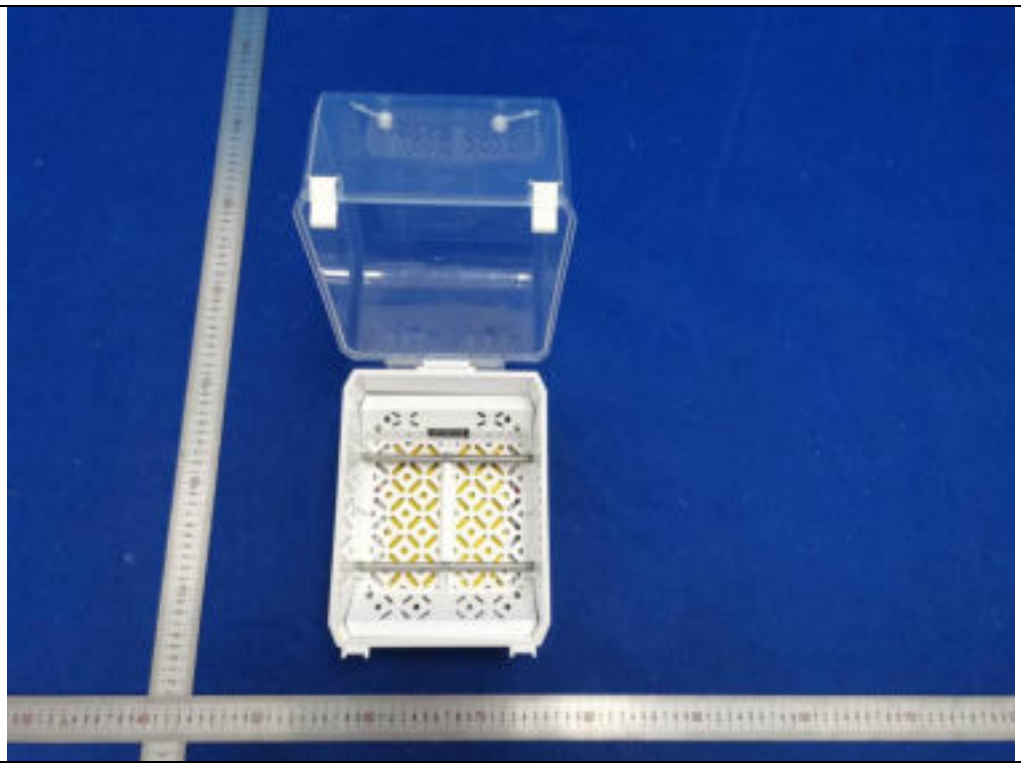
Details of: Detail view for model SH01



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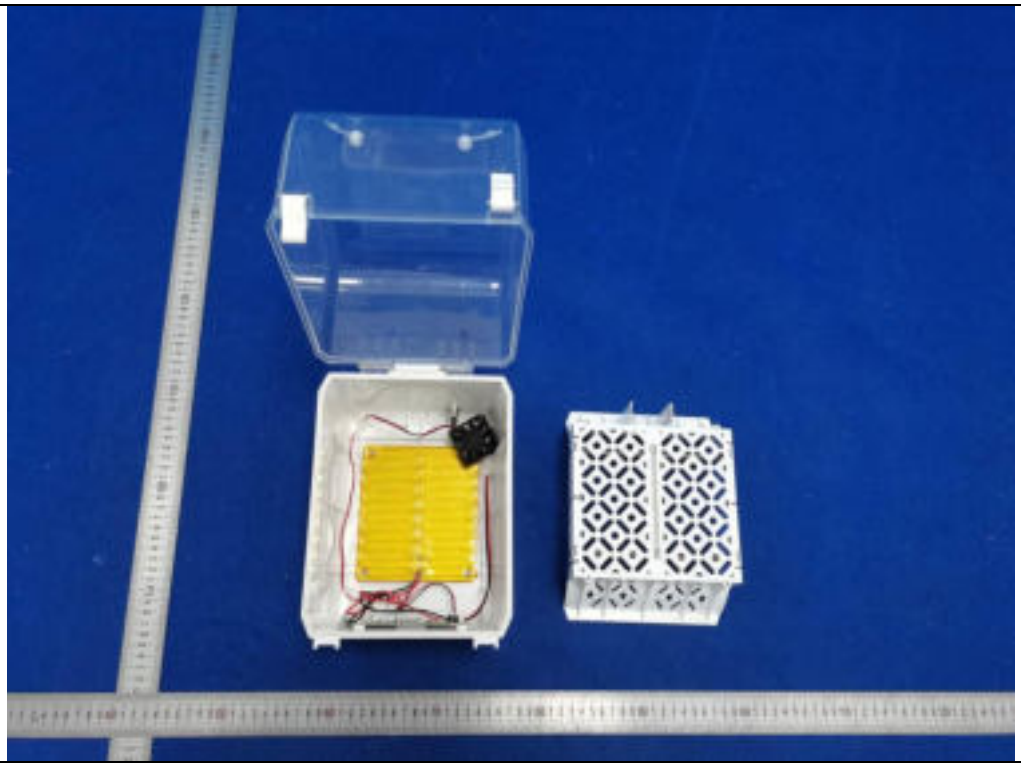
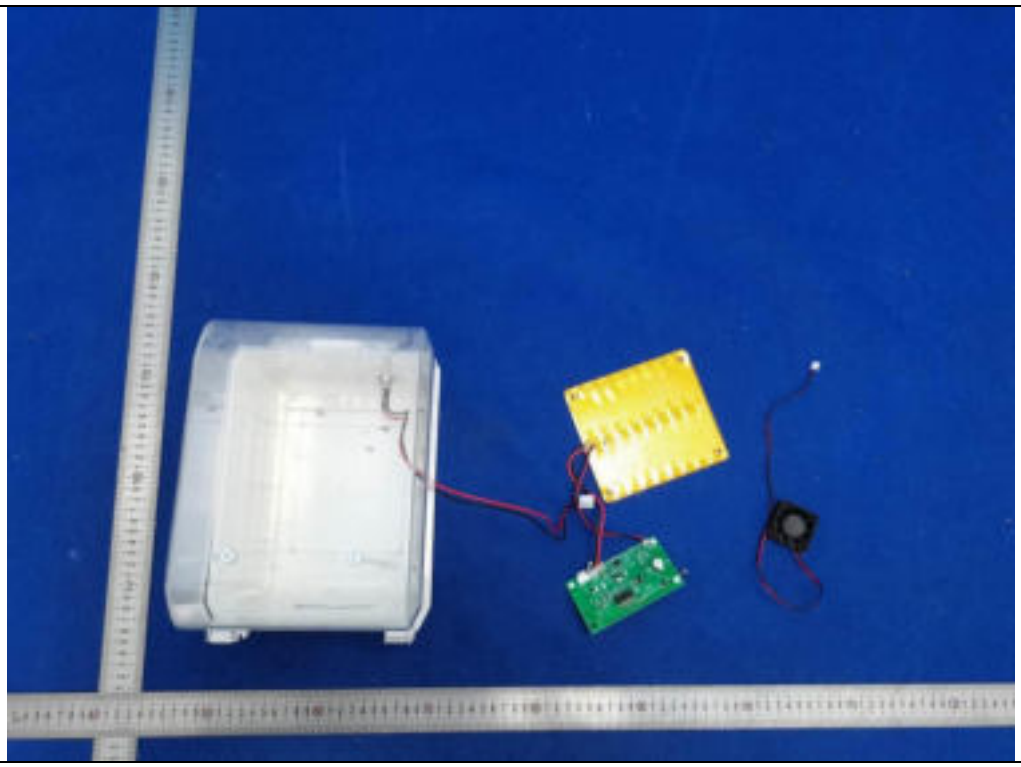
Details of: Internal view for model SH01



Details of: Internal view for model SH01



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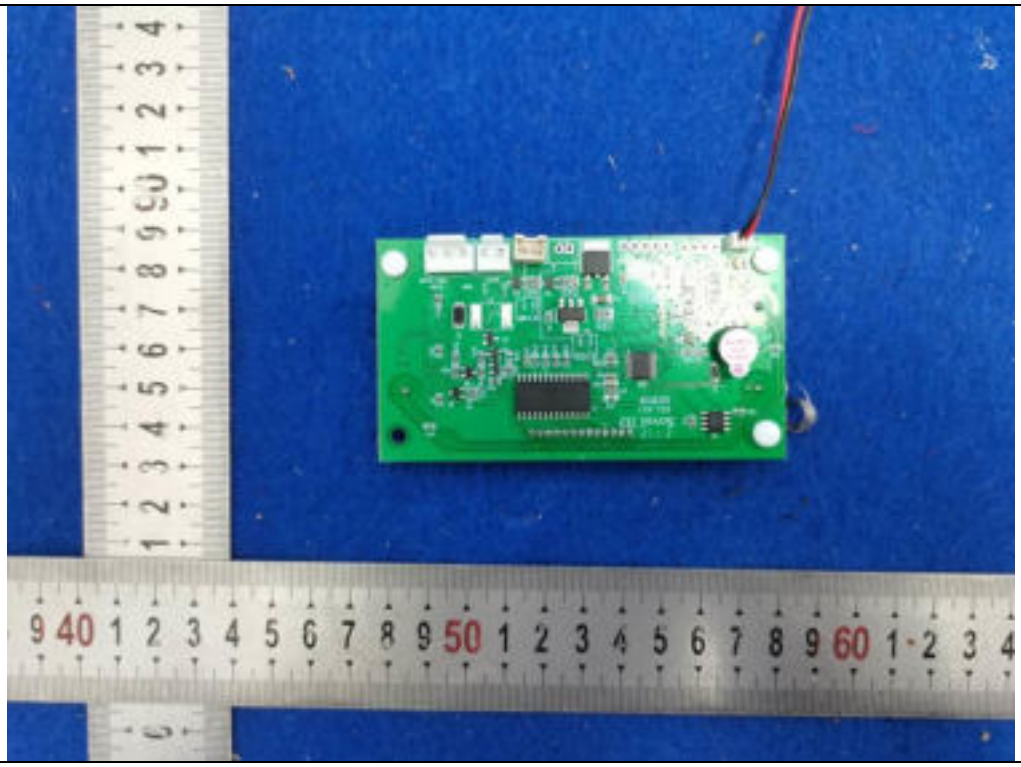

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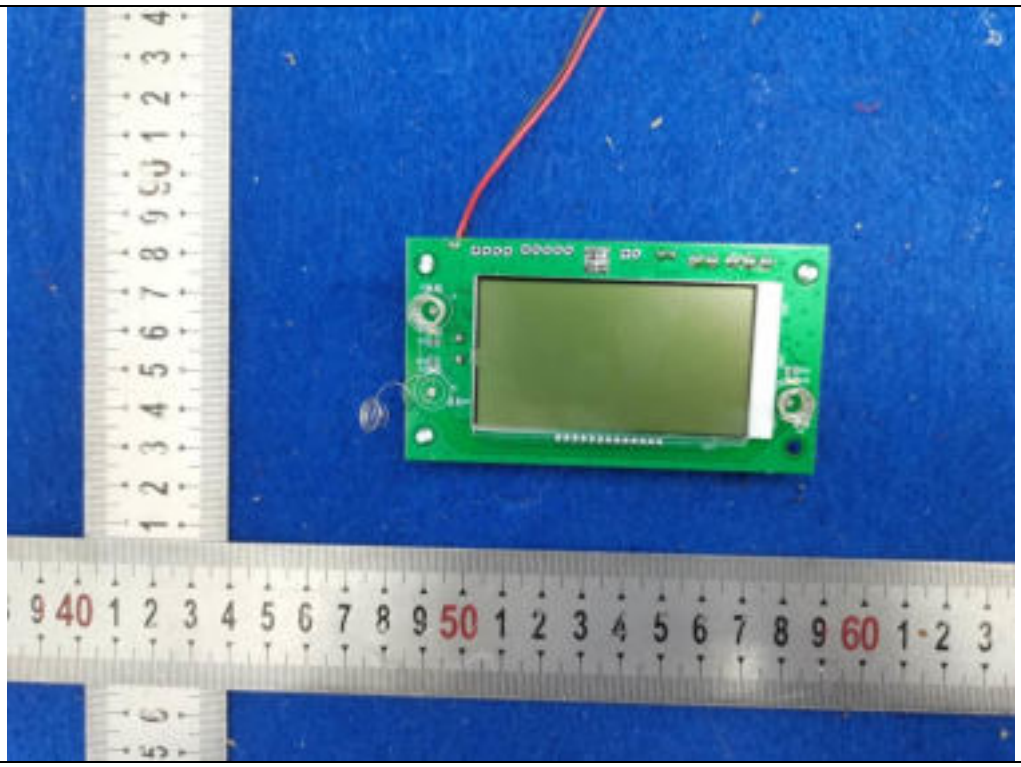

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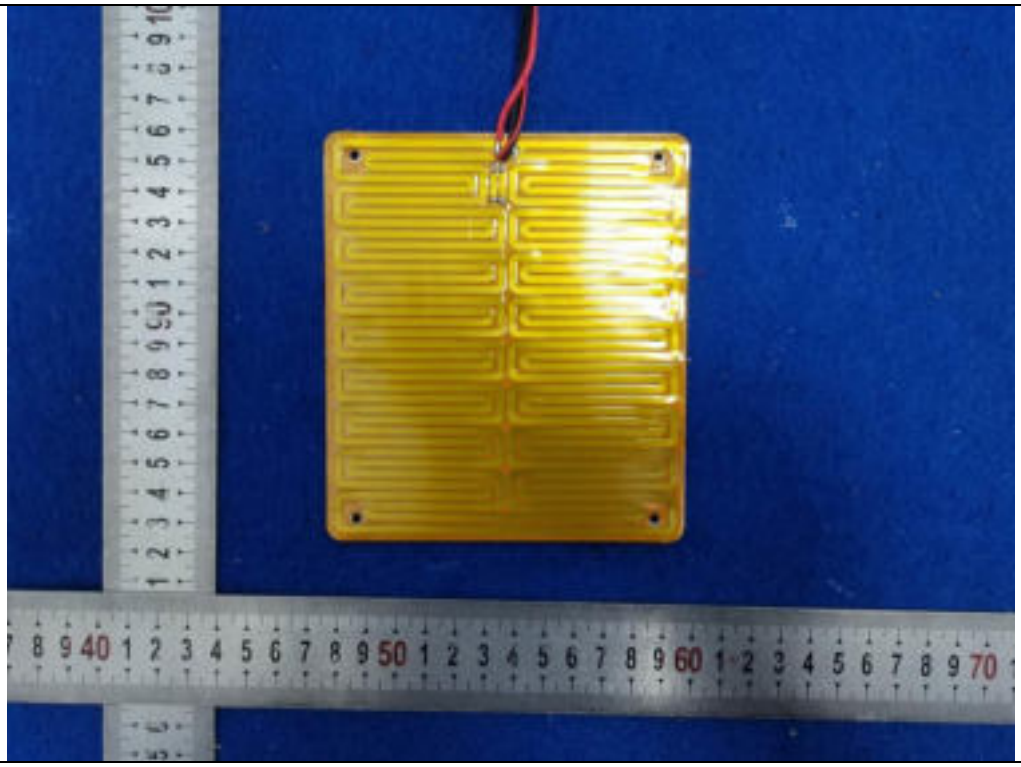

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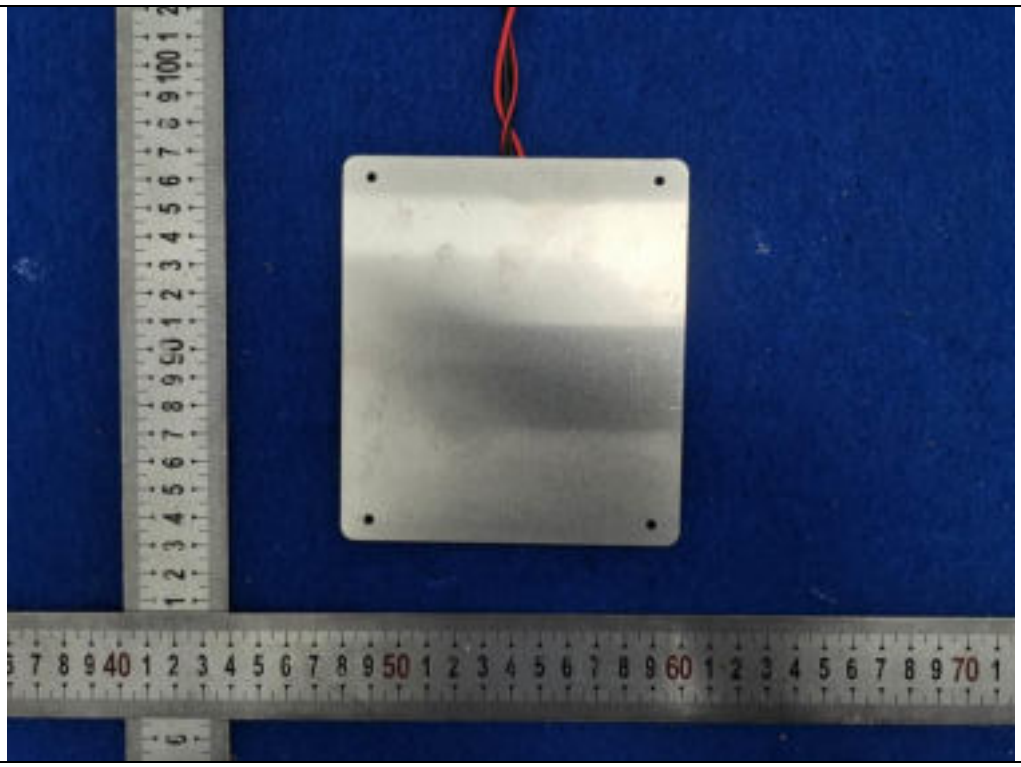

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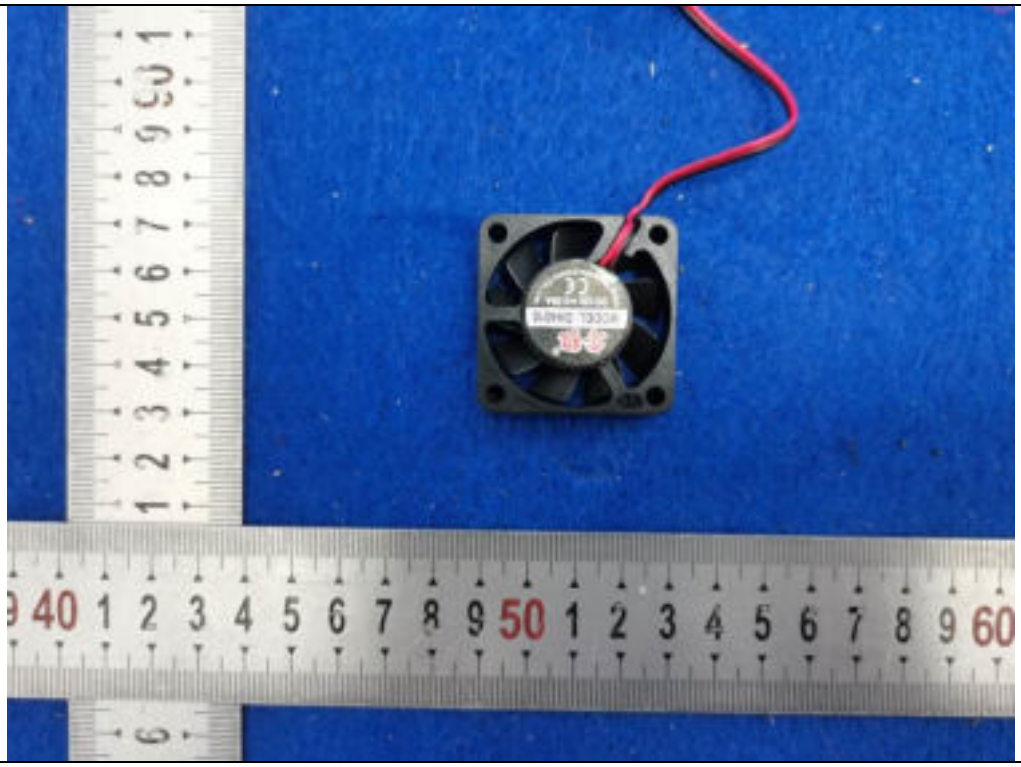

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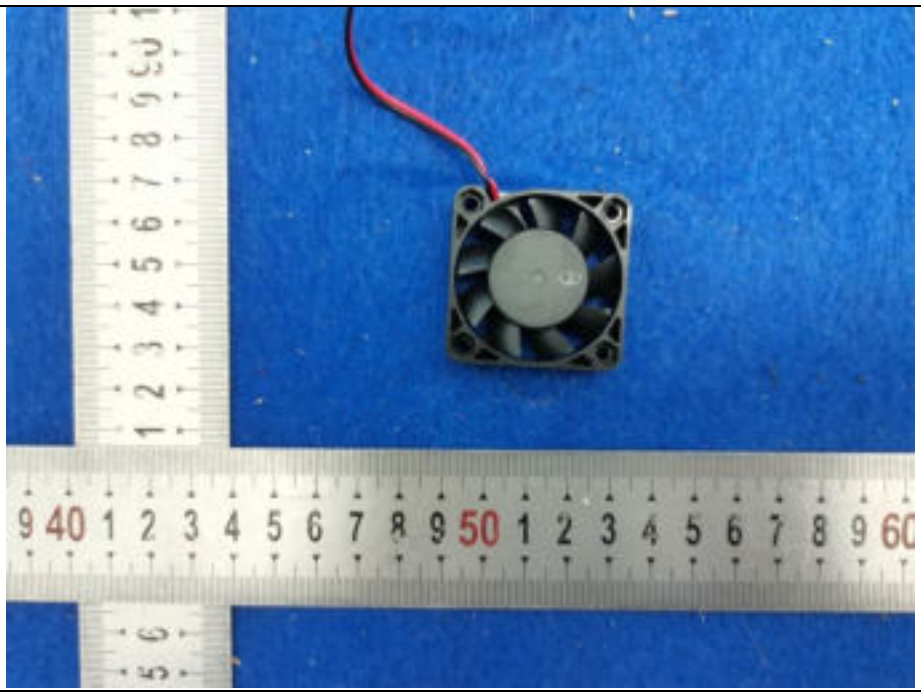

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