



**CENTRE OF TESTING SERVICE  
INTERNATIONAL**

**OPERATE ACCORDING TO ISO/IEC 17025**

# **LVD TEST REPORT**

**TEST REPORT NUMBER : CNB3160328-00205-L**



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## 1 General Information

### 1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has Passed all the relevant tests conforms to a specification (only telecommunication products).

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

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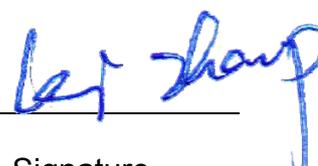
Date: 07 April 2016

**1.2 Tester****Tested by:**07 April 2016Sonlynn Tian

Date

Name

Signature

**Reviewed by:**07 April 2016Lei Zhang

Date

Name

Signature

**Approved by:**07 April 2016Jun Yang

Date

Name

Signature



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## 1.3 Testing laboratory

### 1.3.1 Location

CTS (Ningbo) Testing Service Technology Co., Ltd.  
Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd.,Hi-Tech Zone, Ningbo, Zhejiang, China  
Tel: +86-574-87912121  
Fax: +86-574-87907993

### 1.3.2 Test location, where different from CTS:

Name: ./.  
Street: ./.  
Town: ./.  
Country: ./.  
Telephone: ./.  
Fax: ./.  
Teletex: ./.

## 1.4 Client details

### 1.4.1 Details of applicant

Name : Ningbo Zhongdi Industry & Trade Co.,Ltd  
Street : Jishigang Industry Zone, Yinzhou District,  
Town : Ningbo 315171,  
Country : P. R. China  
Telephone : +86- 574-88036108  
Fax : +86- 574-88036107  
Teletex : ./.

Contact : Li Yaozong  
Telephone : +86- 574-88036108

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Date: 07 April 2016

**1.4.2 Details of manufacturer**

Name : Ningbo Zhongdi Industry & Trade Co.,Ltd  
Street : Jishigang Industry Zone, Yinzhou District,  
Town : Ningbo 315171,  
Country : P. R. China  
Telephone : +86- 574-88036108  
Fax : +86- 574-88036107  
Teletex : ./.

Contact : Li Yaozong  
Telephone : +86- 574-88036108

**1.4.3 Details of factory**

Name : Ningbo Zhongdi Industry & Trade Co.,Ltd  
Street : Jishigang Industry Zone, Yinzhou District,  
Town : Ningbo 315171,  
Country : P. R. China

**1.4.4 Dates of application**

Date of receipt of application : 28 March 2016  
Date of receipt of test item : 28 March 2016  
Date of test : 28 March —07 April 2015

**1.5 Test item Description****1.5.1 Description of test item**

Type of product : Portable heating tools and similar appliances  
Model/Type reference : ZD-932  
Serial number : ---



### 1.5.2 Test item particulars

Test item.....:	SOLDER STATION
Trade Mark.....:	---
Appliance Mobility.....:	<input type="checkbox"/> Portable Appliance; <input checked="" type="checkbox"/> Hand-held Appliance; <input type="checkbox"/> Stationary Appliance; <input type="checkbox"/> Fixed Appliance; <input type="checkbox"/> Built-in Appliance
Protection Class.....:	<input type="checkbox"/> Class 0; <input checked="" type="checkbox"/> Class I; <input type="checkbox"/> Class 0I; <input type="checkbox"/> Class II; <input type="checkbox"/> Class III;
Rated Voltage(Range).....:	220-240V
Rated Frequency.....:	<input checked="" type="checkbox"/> 50Hz; <input type="checkbox"/> 60Hz; <input type="checkbox"/> 50/60Hz; <input type="checkbox"/> DC; <input type="checkbox"/> Other:
Rated Power(Current).....:	40W-48W
Degree of Protection.....:	<input checked="" type="checkbox"/> IP20; <input type="checkbox"/> IP24; <input type="checkbox"/> Other:
Supply Connection.....:	<input type="checkbox"/> Type X; <input checked="" type="checkbox"/> Type Y; <input type="checkbox"/> Type Z; <input type="checkbox"/> Pins; <input type="checkbox"/> Appliance inlet; <input type="checkbox"/> Permanently connected to fixed wiring; <input type="checkbox"/> Other:
Mass of Equipment.....:	---
Instructions language.....:	<input checked="" type="checkbox"/> English; <input type="checkbox"/> French; <input type="checkbox"/> Other:

(all informations was provided by the applicant or detected at the sample)  
Please see also attachment

### 1.6 Test standards

<p><b>EN 60335-1: 2012+A11:2014</b> Household and similar electrical appliances - Safety - Part 1: General requirements (IEC 60335-1: 2010)</p> <p><b>EN 60335-2-45: 2002 + A1: 2008 + A2: 2012</b> Household and similar electrical appliances — Safety — Part 2-45: Particular requirements for portable heating tools and similar appliances (IEC 60335-2-45: 2002+ A1: 2008 + A2: 2011)</p> <p><b>EN 62233:2008</b> Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure</p>
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## 2 Technical test

### 2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



### 2.2 Test environment

Temperature:	15 ... 25 °C
Relative humidity content:	20 ... 75 %
Air pressure:	86 ... 103 kPa
Details of power supply:	20 ... 280 V, AC
Other parameters:	---



### 2.3 Conformity verification - Summary of inspection

Clause	Summary of inspection	Test result		
		N.A.	Pass	Fail
6	Classification	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	Marking and instructions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	Protection against access to life parts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	Starting of motor-operated appliances	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Power input and current	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11	Heating	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12	Void			
13	Leakage current and electric strength at operating temperature	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14	Transient overvoltages	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Moisture resistance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16	Leakage current and electrical strength	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17	Overload protection of transformers and associated circuits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Endurance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	Abnormal operation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20	Stability and mechanical hazards	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21	Mechanical strength	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
22	Construction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
23	Internal wiring	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
24	Components	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
25	Supply connection and external flexible cords	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
26	Terminals for external conductors	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
27	Provision for earthing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
28	Screws and connections	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
29	Clearances, creepage distances and solid insulation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
30	Resistance to heat and fire	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
31	Resistance to rusting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
32	Radiation, toxicity and similar hazards	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Annexes		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

#### Test case verdicts

N.A.: Test case does not apply to the test object

Pass: Test item does meet the requirement

Fail: Test item does not meet the requirement



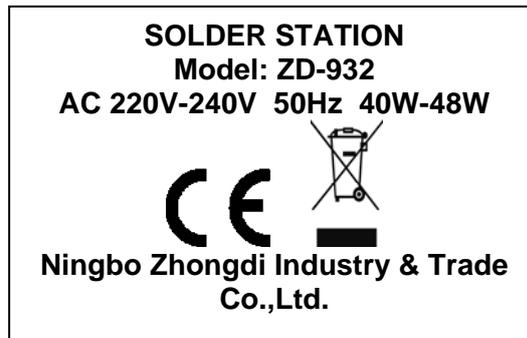
### 3 Test results basic standard(s)

#### 3.1 Particulars: test item vs. Test requirements

<b>IEC 60335-2-45 and/or EN 60335-2-45</b>	
<b>Household and similar electrical appliances — Safety — Part 2: Particular requirements for portable heating tools and similar appliance</b>	
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object .....: N(N/A)	
- test object does meet the requirement.....: P(Pass)	
- test object does not meet the requirement.....: F(Fail)	
<b>Test specification:</b>	
Standard.....:	<input checked="" type="checkbox"/> EN 60335-2-45:2002+A1:2008+A2:2012, used in conjunction with EN 60335-1: 2012+A11:2014
	<input checked="" type="checkbox"/> EN 62233:2008
Test procedure .....	LVD DOC approval.
Non-standard test method.....:	N/A
<b>Test Report Form No</b> .....:	IEC60335_2_45F
Test Report Form(s) Originator .....	Centre of Testing Service
Master TRF .....	Dated Jan 2015
Copyright blank test report	Centre of Testing Service

<b>General remarks:</b>
“(see remark #)” refers to a remark appended to the report.
“(see appended table)” refers to a table appended to the report.
Throughout this report a comma is used as the decimal separator.
The test results presented in this report relate only to the object tested.
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Copy of marking plate:





### 3.2 General requirements and results

IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		—
	Tests performed according to cl. 5, e.g. nature of supply, sequence of testing, etc.		P
Addition	An additional sample of a contact firelighter is required for the test of 21.102.		N

6	CLASSIFICATION		—
6.1	Protection against electric shock: Class I, II, III .....	Class I	P
6.2	Protection against harmful ingress of water	IP20	P
Modification	Dehorning tools shall be class II or class III.		N
	Other appliances shall be class I, class II or class III.	Class I	P
Addition	Class II dehorning tools and transformers for class III dehorning tools shall be at least IPX4.		N
	Conduit-soldering tools and thermoplastic conduit-welding tools shall be at least IPX4.		N
	Hand-held paint strippers for outdoor use shall be at least IPX4, unless the instructions state they are not to be stored or left outdoors, in which case they may be IPX0.	indoor use only	N

7	MARKING AND INSTRUCTIONS		—
7.1	Rated voltage or voltage range (V) .....	220-240V	P
	Nature of supply .....	~	N
	Rated frequency (Hz).....	50Hz	P
	Rated power input (W).....	40-48W	P
	Rated current (A) .....		N
	Manufacturer's or responsible vendor's name, trademark or identification mark .....	Ningbo Zhongdi Industry & Trade Co.,Ltd	P
	Model or type reference.....	ZD-932	P
	Symbol 5172 of IEC 60417, for Class II appliances	Class I appliances	N
	IP number, other than IPX0 .....	IPX0	N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Symbol IEC 60417-5180, for class III appliances, unless		N
	the appliance is operated by batteries only		N
	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		N
Addition	Contact firelighters shall be marked with the limit of insertion into the fuel.		N
	Contact firelighters that are not at least IPX4 shall be marked with the substance of the following: Do not expose to rain or moisture.		N
	Thermoplastic conduit-welding tools shall be marked with the types of fittings with which they are to be used and with the corresponding settings.		N
	Each fitting shall be marked with the type of appliance with which it is to be used and with its own type reference.		N
7.2	Warning for stationary appliances for multiple supply		N
	Warning placed in vicinity of terminal cover		N
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		N
	Different rated values marked with the values separated by an oblique stroke		N
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible		N
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
	the power input is related to the mean value of the rated voltage range		N
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N
7.6	Correct symbols used		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		—
	- marking of terminals exclusively for the neutral conductor (N)		N
	- marking of protective earthing terminals (symbol 5019 of IEC 60417)		P
	- marking not placed on removable parts		P
7.9	Marking or placing of switches which may cause a hazard		N
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means..... :		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
	The instructions state that:		—
	- the appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction		P
	- children being supervised not to play with the appliance		P
	- the instructions for appliances having a part of class III construction supplied from a detachable power supply unit shall state that the appliance is only to be used with the power supply unit provided with the appliance.		N
	- the instructions for class III appliances shall state that it must only be supplied at safety extra low voltage corresponding to the marking on the appliance. This instruction is not necessary for battery-operated appliances if the battery is a primary battery or secondary battery charged outside of the appliance.		N
7.12.1	Sufficient details for installation supplied		N
	If an appliance is intended to be permanently connected to the water mains and not connected by a hose-set, this shall be stated.		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
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	Not Stationary appliances	N
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions stating that the fixed wiring must be protected		N
7.12.4	Instructions for built-in appliances:		—
	- dimensions of space		N
	- dimensions and position of supporting means		N
	- distances between parts and surrounding structure		N
	- dimensions of ventilation openings and arrangement		N
	- connection to supply mains and interconnection of separate components		N
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N
	a switch complying with 24.3		N
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N
	Replacement cord instructions, type Y attachment	Type Y	P
	Replacement cord instructions, type Z attachment		N
7.12.6	Caution in the instructions for heating appliances with a non-self-resetting thermal cut-out		N
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		N
7.12.8	Instructions for appliances connected to the water mains:		—
	- max. inlet water pressure (Pa) .....		N
	- min. inlet water pressure, if necessary (Pa).....		N
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
Addition	The instructions for appliances having a separate stand and not incorporating a biased-off switch shall include the substance of the following:  WARNING: This tool must be placed on its stand when not in use.		P
	The instructions for class III dehorning tools shall include the substance of the following:  WARNING: Only use the transformer provided.		N
	The instructions for heat guns and hand-held paint strippers shall include .....		N
	The instructions for firelighters shall include .....		N
	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.		N
7.13	Instructions and other texts in an official language	In English	P
7.14	Marking clearly legible and durable		P
7.15	Marking on a main part		P
	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
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		N
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N
	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		N
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		N



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

8	PROTECTION AGAINST ACCESS TO LIVE PARTS		—
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N
	Use of test probe B of IEC 61032: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts	Class II constructions	P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts	No such parts	N
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032: no contact with live parts of visible glowing heating elements	No visible glowing heating elements	N
8.1.4	Accessible part not considered live if:		—
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N
	- safety extra-low d.c. voltage: not exceeding 42.4 V		N
	- or separated from live parts by protective impedance		N
	If protective impedance: d.c. current not exceeding 2 mA, and		N
	a.c. peak value not exceeding 0.7 mA		N
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 µF		N
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 µC		N
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N
Addition	Parts of thermoplastic conduit-welding tools operating at safety extra-low voltage exceeding 12 V are also considered to be live parts.		N
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		—

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- built-in appliances		N
	- fixed appliances		N
	- appliances delivered in separate units		N
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	Class II constructions	P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P

9	STARTING OF MOTOR-OPERATED APPLIANCES		—
	Requirements and tests are specified in part 2 when necessary		N

10	POWER INPUT AND CURRENT		—
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
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)	N

11	HEATING		—
11.1	No excessive temperatures in normal use		P
11.2	Placing and mounting of appliance as described		P
Modification	Appliances are tested away from the walls of the test corner		P
11.3	Temperature rises, other than of windings, determined by thermocouples	By thermocouples	P
	Temperature rises of windings determined by resistance method, unless		N
	the windings makes it difficult to make the necessary connections		N
11.4	Heating appliances operated under normal operation at 1.15 times rated power input:	48W × 1,15=55,2W	P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
Modification	Soldering guns and other appliances operated through a transformer are supplied at 1,06 times rated voltage.		N
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage .....		N
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage .....		N
11.7	Operation duration corresponding to the most unfavourable conditions of normal use		P
Addition	Contact firelighters are operated for 30 min.		N
	Hot-air firelighters are operated for 10 min.		N
	Other appliances are operated until steady conditions are established.		P
11.8	Temperature rises not exceeding values in table 3	(see appended tables)	P
	Protective devices do not operate, except	No such parts	N
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4		N
	Sealing compound does not flow out		N
Modification	The temperature rise limit specified in Table 3 for pure mica and tightly sintered ceramic material is increased to 600 K.		P

13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		—
13.1	Leakage current not excessive and electric strength adequate		P
	Heating appliances operated at 1.15 times rated power input.....	48W × 1,15=55,2 W	P
	Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage .....		N
	Protective impedance and radio interference filters disconnected before carrying out the tests		N
Addition	Appliances supplied by a transformer are tested as motor-operated appliances.		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
13.2	For class 0 appliances, class II appliances and class III appliances, the leakage current measured by means of the circuit described in figure 4 of IEC 60990		P
	For other appliances, a low impedance ammeter capable of measuring the true r.m.s. value of the leakage current may be used.		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		—
	Appliances withstand the transient overvoltages to which they may be subjected		N
	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
	No flashover during the test, unless of functional insulation		N
	In case of flashover of functional insulation, the appliance complies with clause 19 with the clearance short circuited		N

15	MOISTURE RESISTANCE		—
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	IPX0	N
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		N
	No trace of water on insulation which can result in a reduction of clearances and creepage distances below values specified in clause 29		N
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529..... :	IPX0	N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Water valves in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		N
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N
	Built-in appliances installed according to the instructions		N
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		N
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube		N
	However, 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
	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		N
	For IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		N
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N
	Appliances with type X attachment fitted with a flexible cord as described		N
	Detachable parts tested as specified		N
15.2	Spillage of liquid does not affect the electrical insulation		N
	Appliances with type X attachment fitted with a flexible cord as described		N



IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N
	Detachable parts removed		N
	Overfilling test with additional amount of water, over a period of 1 min (l)..... :		N
	The appliance withstands the electric strength test of 16.3		N
	No trace of water on insulation that can result in a reduction of clearances and creepage distances below values specified in clause 29		N
15.3	Appliances proof against humid conditions		P
	Humidity test for 48 h in a humidity cabinet	25°C, R.H.93%	P
	The appliance withstands the tests of clause 16		P
15.101	Household film-welding appliances having a suction device shall be constructed so that suction of liquid does not impair electrical insulation.		N

16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		—
16.1	Leakage current not excessive and electric strengt No Protective impedanceh adequate		P
	Protective impedance disconnected from live parts before carrying out the tests	No Protective impedance	N
Addition	Appliances supplied by a transformer are tested as motor-operated appliances.		N
16.2	Single-phase appliances: test voltage 1.06 times rated voltage .....	254,4V	P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by $\sqrt{3}$ ..... :		N
	For measuring the leakage current, a low impedance ammeter capable of measuring the true r.m.s. value of current may be used.		N
	Leakage current measurements	(see appended table)	P
16.3	Electric strength tests according to table 7	(see appended table)	P
	No breakdown during the tests		P

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

17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		—
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use	(see appended table)	N
	Appliance supplied with 1.06 or 0.94 times rated voltage and the most unfavourable short-circuit or overload likely to occur in normal use applied .....		N
	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
	Temperature of the winding not exceeding the value specified in table 8,		N
	however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N
Addition	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.		N

18	ENDURANCE		—
	Requirements and tests are specified in part 2 when necessary		N

19	ABNORMAL OPERATION		—
19.1	The risk of fire or mechanical damage under abnormal or careless operation obviated		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe		N
	Appliances incorporating contactors or relays are subjected to the test of 19.14		N
	Appliances incorporating voltage selector switches are subjected to the test of 19.15.		N
Addition	For heat guns and hot-air firelighters, compliance is also checked by the test of 19.101		N
19.2 Replace- ment	Appliances are operated under the conditions specified in Clause 11 but supplied at 0,94 times rated voltage.		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	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.		N
	Firelighters are operated for 2 h without adding fuel.		N
	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.		N
19.3 Replace- ment	The test of 19.2 is repeated but with the appliance supplied at 1,06 times rated voltage.	254,4V	P
19.4	Test conditions as in cl. 11, any control limiting the temperature during tests of cl. 11 short-circuited		N
Addition	Thermoplastic conduit-welding tools are operated with the fastest possible sequence of welding operations.		N
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 elements sheath		N
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N
	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
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N
	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		N
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts of other appliances		N
	Locked rotor, motor capacitors open-circuited or short-circuited, if required		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Locked rotor, capacitors open-circuited one at a time		N
	Test repeated with capacitors short-circuited one at a time, if required		N
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		N
	Other appliances supplied with rated voltage for a period as specified		N
	Winding temperatures not exceeding values specified in table 8	(see appended table)	N
19.8	Three-phase motors operated at rated voltage with one phase disconnected		N
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously		N
	Winding temperatures not exceeding values as specified	(see appended table)	N
19.10	Series motor operated at 1.3 times rated voltage for 1 min..... :		N
	During the test, parts not being ejected from the appliance		N
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 they comply with the conditions specified in 19.11.1		P
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.3 and 19.11.4		N
	Appliances having a switch with an off position obtained by electronic disconnection, or a switch placing the appliance in a stand-by mode, subjected to the tests of 19.11.4		N
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8		N
19.11.1	Before applying the fault conditions a) to f) in 19.11.2, it is checked if circuits or parts of circuit meet both of the following conditions:		—
	- 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

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction in other parts of the appliance does not rely on the correct functioning of the electronic circuit		N
19.11.2	Fault conditions applied one at a time, the appliance operated under conditions specified in cl. 11, but supplied at rated voltage, the duration of the tests as specified:		—
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in 29		P
	b) open circuit at the terminals of any component		P
	c) short circuit of capacitors, unless they comply with IEC 60384-14		P
	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		P
	e) failure of triacs in the diode mode		N
	f) failure of an integrated circuit		N
	g) failure of an electronic power switching device		N
19.11.3	If the appliance incorporates a protective electronic circuit which operates to ensure compliance with clause 19, the relevant test is repeated with a single fault simulated, as indicated in a) to f) of 19.11.2		N
	During and after each test the following is checked:		—
	- the temperature rise of the windings do not exceed the values specified in table 8		N
	- the appliance complies with the conditions specified in 19.13		N
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		N
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided all three of the following conditions are met:		—
	- the material of the printed circuit board withstands the burning test of annex E		N
	- any loosened conductor does not reduce the clearances or creepage distances between live parts and accessible metal parts below the values specified in cl. 29		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- the appliance withstands the tests of 19.11.2 with open-circuited conductor bridged		N
19.11.4	Appliances having a switch with an off position obtained by electronic disconnection, or		N
	a switch that can be placed in the stand-by mode,		N
	subjected to the tests of 19.11.4.1 to 19.11.4.7		N
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, except that		N
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		N
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		N
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3		N
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		N
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		N
	Earthed heating elements in class I appliances disconnected		N
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		N
19.11.4.6	The appliance is subjected to voltage dips and interruptions in accordance with IEC 61000-4-11		N
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		N
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduces to a level such that the appliance ceases to respond or a programmable component cease to operate.		N
	The appliance continues to operate normally or requires a manual operation to restart		N



IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
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) .....	No such parts	N
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
	Enclosures not deformed to such an extent that compliance with cl. 8 is impaired		P
	If the appliance can still be operated it complies with 20.2		N
	Insulation, other than of class III appliance, withstand the electric strength test of 16.3, the test voltage specified in table 4:		—
	- basic insulation .....	1000V	P
	- supplementary insulation.....		N
	- reinforced insulation .....	3000V	P
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstanding the electric strength test of 16.3. the test voltage being twice the working voltage		N
	The appliance does not undergo a dangerous malfunction, and		N
	no failure of protective electronic circuits, if the appliance is still operable		N
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		—
	- do not become operational, or	No such mode	N
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		N
	In an appliance containing lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that both of the following conditions are fulfilled:		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	– the lid or door does not move automatically to an open position when the interlock is released;		N
	– the appliance will not restart after the cycle in which the interlock was released.		N
19.14	Appliances operated under the conditions of Clause 11. Contactors or relays contacts operating under the conditions of clause 11 short-circuited		N
	Any relay or contactor which operates only in order to ensure that the appliance is energized for normal use and that does not otherwise operate in normal use is not short-circuited.		N
	If more than one relay or contactor operates in Clause 11, each such relay or contactor is short-circuited in turn.		N
19.101	Heat guns and hot-air firelighters are operated as specified in Clause 11 until steady conditions are established.	Not Heat guns and hot-air firelighters	N
	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.		N
	The voltage is decreased at		—
	– 1 V per minute, for motors having a working voltage not exceeding 30 V;		N
	– 5 V per minute, for motors having a working voltage exceeding 30 V		N

20	STABILITY AND MECHANICAL HAZARDS		—
20.1	Adequate stability		P
	Tilting test through an angle of 10° (appliance placed on an inclined plane/horizontal plane); appliance does not overturn		P
	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
Addition	Hand-held appliances are subjected to the test while placed on their stands.	Placed on the stand	P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury	No such parts	N
	Protective enclosures, guards and similar parts are non-detachable		N
	Adequate mechanical strength and fixing of protective enclosures		N
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure		N
	Not possible to touch dangerous moving parts with test probe		N
20.101	Contact firelighters shall have adequate stability		N

21	MECHANICAL STRENGTH		—
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	Checked by applying blows to the appliance in accordance with test Ehb of IEC 60068-2-75, spring hammer test, impact energy 0,5 J	0,5 J	P
	If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N
	If necessary, repetition of groups of three blows on a new sample		N
Addition	For hand-held appliances, compliance is also checked by the tests of 21.101.		P
	For contact firelighters, compliance is also checked by the test of 21.102.		N
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	The insulation is tested as specified, unless		P
	the thickness of supplementary insulation is at least 1 mm and reinforced insulation is at least 2 mm		P
21.101	Drop test as described, and after test:		P
	The appliance shall not be damaged to such an extent that compliance with this standard is impaired, in particular live parts shall not become accessible.		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
21.102	a mass of 4,5 kg is suspended at the end of the heating element for 1 min, and after the test,		N
	the live parts shall not be accessible and		N
	the firelighter shall withstand the electric strength test of 16.3		N

22	CONSTRUCTION		—
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	IPX0	P
22.2	Stationary appliance: means to provide all-pole disconnection from the supply provided, the following means being available:		—
	- a supply cord fitted with a plug		N
	- a switch complying with 24.3		N
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided		N
	- an appliance inlet		N
	Single-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
22.3	Appliance provided with pins: no undue strain on socket-outlets		N
	Applied torque not exceeding 0.25 Nm		N
	Pull force of 50N to each pin after the appliance has been placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating unless rotating does not impair compliance with the standard		N
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		N
22.5	No risk of electric shock when touching the pins of the plug, the appliance being disconnected from the supply at the instant of voltage peak.	No capacitors used	N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
22.6	Electrical insulation not affected by condensing water or leaking liquid		N
	Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak		N
22.7	Adequate safeguards against the risk of excessive pressure in appliances provided with steam-producing devices		N
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
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances		P
	Adequate insulating properties of oil or grease to which insulation is exposed		N
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		N
	Non-self resetting thermal motor protectors have a trip-free action, unless		N
	they are voltage maintained		N
	Location or protection of reset buttons of non-self-resetting controls is so that accidental resetting is unlikely		N
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		N
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N
	Tests as described		P
22.12	Handles, knobs etc. fixed in a reliable manner	Handles, knobs	P
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		P
22.13	Unlikely that handles, when gripped as in normal use, make the operators hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		P
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 etc., liable 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		N
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands, no undue wear of contacts		N
	Cord reel tested with 6000 operations, as specified		N
	Electric strength test of 16.3, voltage of 1000 V applied		N
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N
22.18	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use		P
22.19	Driving belts not used as electrical insulation		N
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless material used is non-corrosive, non-hygroscopic and non-combustible		N
	Compliance is checked by inspection and, if necessary, by appropriate test		N
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless impregnated		P
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		N
22.22	Appliances not containing asbestos		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
22.23	Oils containing polychlorinated biphenyl (PCB) not used	No such parts	N
22.24	Bare heating elements adequately supported		N
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N
22.25	Sagging heating conductors cannot come into contact with accessible metal parts		N
22.26	The insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		N
22.27	Parts connected by protective impedance separated by double or reinforced insulation	No such parts	N
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
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
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	Clearances and creepage distances over supplementary and reinforced insulation not reduced below values specified in clause 29 as a result of wear		P
	Clearances and creepage distances between live parts and accessible parts not reduced below values for supplementary insulation, if wires, screws etc. become loose		P
22.32	Supplementary and reinforced insulation designed or protected against deposition of dirt or dust		P
	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

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation		N
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N
	Insulating material in which heating conductors are embedded is considered to be basic insulation and not reinforced insulation		N
	This requirement is not applicable to heating conductors in PTC heating elements.		N
22.33	Conductive liquids that are or may become accessible in normal use are not in direct contact with live parts	No such parts	N
	Electrodes not used for heating liquids		N
	For class II constructions, conductive liquids that are or may become accessible in normal use, not in direct contact with basic or reinforced insulation unless the reinforced insulation consists of at least 3 layers.		N
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation unless the reinforced insulation consists of at least 3 layers.		N
22.34	Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed		P
22.35	Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault		P
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of an insulation fault, they are either adequately covered by insulation material, or their accessible parts are separated from their shafts or fixings by supplementary insulation		N
	This requirement does not apply to handles, levers and knobs on stationary appliances other than those of electrical components, provided they are either reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Insulating material covering metal handles, levers and knobs shall withstand the electric strength test of 16.3 specified for supplementary insulation.		N
22.36	Handles continuously held in the hand in normal use are so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless they are separated from live parts by double or reinforced insulation		P
22.37	Capacitors in Class II appliances not connected to accessible metal parts, unless complying with 22.42	Class I appliances	N
	Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42		N
22.38	Capacitors not connected between the contacts of a thermal cut-out	No such parts	N
22.39	Lamp holders used only for the connection of lamps	No such parts	N
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	No such parts	N
	Unless the appliance can operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation shall be fitted with a switch for stopping the operation of the appliance. The actuating member of this switch shall be easily visible and accessible		N
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components	No such parts	N
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur	No such parts	N
22.44	Appliances shall not have an enclosure that is shaped or decorated like a toy		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.4 due to deformation as a result of an external force applied to the enclosure		N
22.46	If programmable protective electronic circuits are used to ensure compliance with this standard, the software shall contain measures to control the fault/error conditions specified in Table R.1.	No such parts	N
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use	No such parts	N
	No leakage from any part, including any inlet water hose		N
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water	No such parts	N
22.49	For remote operation, the duration of operation shall be set before the appliance can be started, unless		N
	the appliance switches off automatically or can operate continuously without hazard		N
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		N
22.51	A control on the appliance being manually adjusted to the setting for remote operation before the appliance can be operated in this mode		N
	There is a visual indication showing that the appliance is adjusted for remote operation		N
	Manual setting and visual indication not necessary on appliances that can operate as follows, without giving rise to a hazard:		N
	- operate continuously,		N
	- operate automatically, or		N
	- be operated remotely		N
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
22.101	Hand-held appliances intended to be used away from a workshop shall incorporate a stand		P
	Hand-held appliances intended to be used on a table or similar surface shall incorporate a stand or be provided with a separate stand.		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	These requirements do not apply to appliances complying with test of Clause 11 without a stand.		N
22.102	Desoldering irons shall incorporate a device for collecting the solder		N
22.103	Soldering guns shall incorporate a biased-off switch.	Not Soldering guns	N
22.104	If a drain hole is provided in household film-welding appliances, it shall be at least 5 mm in diameter or 20 mm <sup>2</sup> in area with a width at least 3 mm.	No such parts	N
22.105	Thermoplastic conduit-welding tools shall incorporate a timer that provides allpole disconnection of the welding circuit and has to be reset before a further operation.		N
	Repetition of the welding operation on the same fitting shall be prevented.		N
22.106	Thermoplastic conduit-welding tools shall be constructed so that the connecting terminals are supplied with extra-low voltage not exceeding 24 V when the appliance is operated without fittings.		N
22.107	Fittings for thermoplastic conduit-welding tools shall be constructed so that at least basic insulation is provided on surfaces that are only accessible before the fitting is placed on the conduit.		N
22.108	Class III dehorning tools shall be supplied with a transformer.		N

23	INTERNAL WIRING		—
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
	Wiring effectively prevented from coming into contact with moving parts		N
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges or corners		N
	Beads inside flexible metal conduits contained within an insulating sleeve		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N
	Flexible metallic tubes not causing damage to insulation of conductors		N
	Open-coil springs not used		N
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N
	No damage after 10 000 flexings for conductors flexed during normal use or 100 flexings for conductors flexed during user maintenance		N
	Electric strength test, 1000 V between live parts and accessible metal parts		N
	not more than 10 % of the strands of any conductor of the internal wiring between the main part of the appliance and the movable part shall be broken.		N
	if the wiring supplies circuits that consume no more than 15 W, then no more than 30 % of the strands shall be broken.		N
23.4	Bare internal wiring sufficiently rigid and fixed	No such parts	N
23.5	The insulation of internal wiring withstanding the electrical stress likely to occur in normal use		P
	No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends or be such that it can only be removed by breaking or cutting.		N
23.7	The colour combination green/yellow used only for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	No soldering where they are subjected to contact pressure, unless		P
	the contact pressure is provided by spring terminals.		N
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

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
24	COMPONENTS		—
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components	(see appended table)	P
	Components not tested and found to comply with relevant IEC standard for the number of cycles specified are tested in accordance with 24.1.1 to 24.1.9		P
	Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		N
	Lampholders and starterholders that have not been previously tested and found to comply with the relevant IEC standard are tested as a part of the appliance and shall additionally comply with the gauging and interchangeability requirements of the relevant IEC standard under the conditions occurring in the appliance		N
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, or		N
	tested according to annex F		N
24.1.2	Safety isolating transformers complying with IEC 61558-2-6, or		N
	tested according to annex G		N
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000, or		N
	tested according to annex H		N
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N
Addition	Switches incorporated in the hand-held part of appliances not intended exclusively for household use are subjected to 50 000 cycles of operation.		N
24.1.4	Automatic controls complying with IEC 60730-1 with relevant part 2. The number of cycles of operation being:		—
	- thermostats: 10 000		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- temperature limiters: 1 000		N
	- self-resetting thermal cut-outs: 300		N
	- voltage maintained non-self-resetting thermal cut-outs: 1000		N
	- other non-self-resetting thermal cut-outs: 30		N
	- timers: 3 000		N
	- energy regulators: 10 000		N
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D		N
	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
24.1.5	Appliance couplers complying with IEC 60320-1		N
	However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		N
	Interconnection couplers complying with IEC 60320-2-2		N
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		N
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 are EN 41003 and EN 60950-1:2006, Subclause 6.3.		N
24.1.8	The relevant standard for thermal links is IEC 60691. Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		N
24.1.9	Relays, other than motor starting relays, tested as part of the appliance		N
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of operations in 24.1.4 selected according to the relay function in the appliance..... :		N
24.2	Appliances not fitted with:		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- switches or automatic controls 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		N
	the solder has a melting point of at least 230 °C		P
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and having a contact separation in all poles, providing full disconnection under overvoltage category III conditions		N
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance and used accordingly		N
	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
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 42V.		N
	In addition, the motors are complying with the requirements of Annex I		N
24.7	Detachable hose-sets for connection of appliances to the water mains, complying with IEC 61770 and supplied with the appliance		N
	Appliances intended to be permanently connected to the water mains shall not be connected by a detachable hose-set.		N
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 shall not cause a hazard in the event of a capacitor failure.		N
	The requirement is considered to be met by one or more of the following conditions:		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	– the capacitors are of class of safety protection P2 according to IEC 60252-1;		N
	– the capacitors are housed within a metallic or ceramic enclosure that will prevent the emission of flame or molten material resulting from failure of the capacitor;		N
	– the distance of separation of the outer surface of the capacitor to adjacent non-metallic parts exceeds 50 mm;		N
	– adjacent non-metallic parts within 50 mm of the outer surface of the capacitor withstand the needle-flame test of Annex E;		N
	– adjacent non-metallic parts within 50 mm of the outer surface of the capacitor are classified as at least V-1 according to IEC 60695-11-10, provided that the test sample used for the classification was no thicker than the relevant part of the appliance.		N
	Compliance is checked by inspection, measurement or the appropriate flammability requirement.		N

25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		—
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		—
	- supply cord fitted with a plug		P
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance		N
	- pins for insertion into socket-outlets		N
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	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
25.3	Connection of supply conductors for appliance intended to be permanently connected to fixed wiring possible after the appliance has been fixed to its support		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Appliance provided with a set of terminals for the connection of cables or fixed wiring, cross-sectional areas specified in 26.6		N
	Appliance provided with a set of terminals allowing the connection of a flexible cord		N
	Appliance provided with a set of supply leads accommodated in a suitable compartment		N
	Appliance provided with a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate type of cable or conduit		N
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 10		N
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in 29		N
25.5	Method for assemble supply cord with the appliance:		—
	- type X attachment		N
	- type Y attachment	Type Y	P
	- type Z attachment, if allowed in part 2		N
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N
	For multi-phase appliances that are supplied with a supply cord and that are intended to be permanently connected to the fixed wiring, the supply cord shall be assembled to the appliance by a type Y attachment.		N
Addition	Type Z attachment is allowed for		—
	– class III appliances;		N
	– other appliances, unless they have a polyvinyl chloride sheathed cord and the temperature rise of accessible metal parts exceeds 75 K		N
25.6	Plugs fitted with only one flexible cord		P
	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 60083:1975:		—
	- for Class I appliances: standard sheet C2b, C3b or C4 .....	C4	P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- for Class II appliances: standard sheet C5 or C6.:		N
25.7	Supply cords being one of the following types for appliances other than class III appliances:		—
	- rubber sheathed (at least 60245 IEC 53)		N
	- polychloroprene sheathed (at least 60245 IEC 57)		N
	- cross-linked polyvinyl chloride sheathed (at least 60245 IEC 87)		N
	Polyvinyl chloride sheathed: Not used if they are likely to touch metal parts having a temperature rise exceeding 75K during the test of Clause 11.		—
	- light polyvinyl chloride sheathed cord (at least 60227 IEC 52), appliances not exceeding 3 kg		N
	- ordinary polyvinyl chloride sheathed cord (at least 60227 IEC 53), other appliances	H03VV-F	P
	Heat resistant polyvinyl chloride sheathed: Not used for type X attachment other than specially prepared cords.		—
	- Heat-resistant light polyvinyl chloride sheathed cord (at least 60227 IEC 56), appliances not exceeding 3 kg		N
	- heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), other appliances		N
	Supply cords for class III appliances shall be adequately insulated.		N
	Compliance is checked by inspection, by measurement, and for class III appliances that contain live parts by the following test.		N
	A voltage of 500 V is applied for 2 min between the conductor and metal foil wrapped around the insulation, the insulation being at the temperature measured during the test of Clause 11.		N
	There shall be no breakdown during this test.		N
Addition	Light polyvinyl chloride sheathed cords may be used for class III appliances and other handheld appliances, regardless of the mass of the appliance.		P
	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,		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	and for appliances provided with a biased-off switch, regardless of the temperature rise of external metal parts.		N
	Polyvinyl sheathed cords are not allowed for thermoplastic conduit-welding tools and firelighters		N
	The supply cord of class II dehorning tools shall be polychloroprene sheathed and be not lighter than heavy polychloroprene sheathed cord (60245 IEC 66).		N
25.8	Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area (mm <sup>2</sup> )..... :	0,20A, 3x0,5mm <sup>2</sup>	P
Addition	The length of the supply cord shall be at least		—
	– 1,5 m, for firelighters;		N
	– 6 m, for class II dehorning tools.		N
25.9	Supply cord not in contact with sharp points or edges		P
25.10	Green/yellow core for earthing purposes in Class I appliance		P
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N
25.12	Moulding the cord to part of the enclosure does not damage the insulation of the supply cord		N
25.13	Inlet opening so shaped as to prevent damage to the supply cord		P
	Unless the enclosure at the inlet opening is of insulation material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		P
	If unsheathed supply cord, a similar additional bushing or lining is required, unless		N
	the appliance is class 0		N
25.14	Supply cords adequately protected against excessive flexing		P
	Flexing test:		—
	- applied force (N) ..... :	5N	P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- number of flexings .....	10000	P
	The test does not result in:		—
	- short circuit between the conductors		P
	- breakage of more than 10% of the strands of any conductor		P
	- separation of the conductor from its terminal		P
	- loosening of any cord guard		P
	- damage, within the meaning of the standard, to the cord or the cord guard		P
	- broken strands piercing the insulation and becoming accessible		P
25.15	Conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord, values shown in table 10: pull (N); torque (not on automatic cord reel) (Nm) .....	0.30kg 15N, 0,05Nm	P
	Max. 2 mm displacement of the cord, and conductors not moved more than 1 mm in the terminals	0,75 mm	P
	Creepage distances and clearances not reduced below values specified in 29.1		P
25.16	Cord anchorages for type X attachments constructed and located so that:		—
	- replacement of the cord is easily possible		N
	- it is clear how the relief from strain and the prevention of twisting are obtained		N
	- they are suitable for different types of cord		N
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless separated from accessible metal parts by supplementary insulation		N
	- the cord is not clamped by a metal screw which bears directly on the cord		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- at least one part of the cord anchorage securely fixed to the appliance, unless part of a specially prepared cord		N
	- screws which have to be operated when replacing the cord do not fix any other component, if applicable		N
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N
	- for Class 0, 0I and I appliances: they are of insulating material or are provided with an insulating lining, unless a failure of the insulation of the cord does not make accessible metal parts live		N
	- for Class II appliances: they are of insulating material, or if of metal, they are insulated from accessible metal parts by supplementary insulation		N
25.17	Adequate cord anchorages for type Y and Z attachment	Type Y	P
25.18	Cord anchorages only accessible with the aid of a tool, or		N
	so constructed that the cord can only be fitted with the aid of a tool		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N
	Tying the cord into a knot or tying the cord with string not used		N
25.20	Conductors of the supply cord for type Y and Z attachment adequately additionally insulated		P
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed to permit checking of conductors with respect to correct positioning and connection before fitting any cover, no risk of damage to the conductors when fitting the cover, no contact with accessible metal parts if a conductor becomes loose, etc.		N
	For portable appliances, the uninsulated end of a conductor prevented from any contact with accessible metal parts, unless the end of the cord is such that the conductors are unlikely to slip free		N
25.22	Appliance inlet:		—
	- live parts not accessible during insertion or removal		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- connector can be inserted without difficulty		N
	- the appliance is not supported by the connector		N
	- is not for cold conditions if temp. rise of external metal parts exceeds 75 K, unless the supply cord is not likely to touch such metal parts		N
25.23	Interconnection cords comply with the requirements for the supply cord, except as specified		N
	If necessary, electric strength test of 16.3		N
Addition	The length of the interconnection cord of class III dehorning tools shall be at least 4 m.	Not of class III dehorning tools	N
25.24	Interconnection cords not detachable without the aid of a tool if compliance with the standard is impaired when they are disconnected		N
25.25	Dimensions of pins compatible with the dimensions of the relevant socket-outlet. Dimensions of pins and engagement face in accordance with the relevant plug in IEC 60083		N

26	<b>TERMINALS FOR EXTERNAL CONDUCTORS</b>		—
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, other than terminals in class III appliances that do not contain live parts		N
	However, 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
26.2	Appliances with type X attachment and appliances for connection to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless the connections are soldered		N
	Screws and nuts serve only to clamp supply conductors, except		N
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone		N
	Soldering alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free at the soldered joint		N
26.3	Terminals for type X attachment and for connection to fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure and without damaging the conductor	Not for type X attachment	N
	Terminals for type X attachment and those for connection to fixed wiring so fixed that when tightening or loosening the clamping means:		—
	- the terminal does not loosen		N
	- internal wiring is not subjected to stress		N
	- clearances and creepage distances are not reduced below the values in 29		N
	Compliance checked by inspection and by the test of subclause 8.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified. Nominal diameter of thread (mm); screw category; torque (Nm) .....		N
26.4	Terminals for type X attachment, except those with a specially prepared cord, and those for connection to fixed wiring, no special preparation of conductors required, and so constructed or placed that conductors prevented from slipping out		N
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
	Stranded conductor test, 8 mm insulation removed		N
	No contact between live parts and accessible metal parts and, for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N
26.6	Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm <sup>2</sup> ) .....		N
	Terminals only suitable for a specially prepared cord		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
26.7	Terminals for type X attachment accessible after removal of a cover or part of the enclosure, other than those in class III appliances that do not contain live parts,		N
26.8	Terminals for the connection to fixed wiring, including the earthing terminal, located close to each other		N
26.9	Terminals of the pillar type constructed and located as specified		N
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless conductors ends fitted with a device suitable for screw terminals		N
	Pull test of 5 N to the connection		N
26.11	For type Y and Z attachment: soldered, welded, crimped and similar connections may be used		P
	For Class II appliances: the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N
	For Class II appliances: soldering, welding or crimping alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free		N

27	PROVISION FOR EARTHING		—
27.1	Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal or contact of the appliance inlet		P
	Earthing terminals not connected to neutral terminal		P
	Class 0, II and III appliance have no provision for earthing	Class I appliance	N
	Safety extra-low voltage circuits not earthed, unless protective extra-low voltage circuits	No Safety extra-low voltage circuits	N
27.2	Clamping means adequately secured against accidental loosening		P
	Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm <sup>2</sup> , and		N
	do not provide earthing continuity between different parts of the appliance		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Conductors cannot be loosened without the aid of a tool		N
Addition	Class II soldering irons and class II soldering guns used for soldering electronic equipment may have an equipotential bonding terminal for which the dimensional requirements are not applicable.		N
27.3	For detachable parts that are plugged into another part of the appliance, and having an earth connection, the earth connection made before and separated after current-carrying connections when removing the part		N
	For appliances with supply cord, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		P
27.4	No risk of corrosion resulting from contact between metal of earthing terminal and other metal		P
	Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure		P
	Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5 µm		N
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N
	In case of aluminium alloys precautions taken to avoid risk of corrosion		N
27.5	Low resistance of connection between earthing terminal and earthed metal parts		P
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided that clearances of basic insulation are based on the rated voltage of the appliance		N
	Resistance not exceeding 0,1 Ω at the specified low-resistance test	0,045Ω	P
27.6	The printed conductors of printed circuit boards shall not be used to provide earthing continuity in hand-held appliances.		N

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

28	<b>SCREWS AND CONNECTIONS</b>		—
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		P
	Screws of insulating material not used for any electrical connection or connections providing earthing continuity		P
	Screws used for electrical connections or connections providing earthing continuity screw into metal		P
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		P
	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 can impair basic insulation		N
	For screws and nuts; test as specified	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure not transmitted through non-ceramic insulating material liable to shrink or distort, unless shrinkage or distortion compensated		P
	This requirement does not apply to electrical connections in circuits of appliances for which		N
	- 30.2.2 is applicable and that carry a current not exceeding 0,5 A;		N
	- 30.2.3 is applicable and that carry a current not exceeding 0,2 A.		N
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	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
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		N
	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:		—
	- in normal use,		N
	- during user maintenance,		N
	- when replacing a supply cord having a type X attachment, or		N
	- during installation		N
	At least two screws being used for each connection providing earthing continuity, unless		N
	the screw forms a thread having a length of at least half the diameter of the screw		N
	Thread-cutting and space-threaded screws may be used in connections providing earthing continuity, provided unnecessary to disturb the connection and at least two screws are used for each connection		N
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		P
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion		N

29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		—
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (type 1 protection) or to provide basic insulation (type 2 protection), annex J applies .....		N
	The microenvironment is pollution degree 1 under type 1 protection		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	For type 2 protection, the spacing between the conductors before the protection is applied shall not be less than the values as specified in Table 1 of IEC 60664-3		N
	These values apply to functional insulation, basic insulation, supplementary insulation as well as reinforced insulation.		N
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		P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		N
	However, if the construction is 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		P
	Impulse voltage test not applicable:		—
	- when the microenvironment is pollution degree 3		N
	- for basic insulation of class 0 and class 0I appliances		N
	Appliances are in overvoltage category II	overvoltage category II	P
	Clearances less than specified in table 16 not allowed for basic insulation of class 0 and class 0I appliances,		N
	or if pollution degree 3 is applicable		N
	Compliance is checked by inspection and measurements as specified		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1mm if the microenvironment is pollution degree 1		N
	Lacquered conductors of windings considered to be bare conductors		N
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, but using the next higher step for rated impulse voltage		P
29.1.4	For functional insulation, the values of table 16 are applicable, unless		P
	the appliance complies with clause 19 with the functional insulation short-circuited		N
	Lacquered conductors of windings considered to be bare conductors		N
	However, clearances at crossover points are not measured		N
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N
29.1.5	Appliances having higher working voltage than rated voltage, the clearances for basic insulation are the largest values determined from		N
	– Table 16 based on the rated impulse voltage;		N
	– Table F.7a in IEC 60664-1 based on the steady-state voltage or recurring peak voltage expected to occur across it, if the frequency of the steady-state voltage or recurring peak voltage does not exceed 30 kHz;		N
	– Clause 4 of IEC 60664-4 based on the steady-state voltage or recurring peak voltage expected to occur across it, if the frequency of the steady-state voltage or recurring peak voltage exceeds 30 kHz.		N
	If the clearances applied for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, then the clearances of supplementary insulation shall be not less than those specified for basic insulation.		N
	If the clearances applied for basic insulation are selected from Table F.7a of IEC 60664-1, then the clearances of reinforced insulation shall be dimensioned as specified in Table F.7a to withstand 160 % of the withstand voltage required for basic insulation.		N
	If the clearances applied for basic insulation are selected from Clause 4 of IEC 60664-4, then the clearances of reinforced insulation shall be twice the value required for basic insulation.		N

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IEC 60335-2-45			
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
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation based on the working voltage used as the rated voltage in table 15		N
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree		P
	Pollution degree 2 applies, unless	Pollution degree 2	P
	precautions taken to protect the insulation; pollution degree 1		N
	insulation subjected to conductive pollution; pollution degree 3		N
	Compliance is checked by inspection and measurements as specified		P
29.2.1	Creepage distances of basic insulation not less than specified in table 17		P
	If the working voltage is periodic and has a frequency that exceeds 30 kHz, the creepage distances shall also be determined from Table 2 of IEC 60664-4. These values shall be used instead if they exceed the values in Table 17.		N
	Except for pollution degree 1, 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
29.2.2	Creepage distances of supplementary insulation at least as specified for basic insulation in table 17 or Table 2 of IEC 60664-4, as applicable.		P
29.2.3	Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17 or Table 2 of IEC 60664-4, as applicable.		P
29.2.4	Creepage distances of functional insulation not less than specified in table 18		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	If the working voltage is periodic and has a frequency that exceeds 30 kHz, the creepage distances shall also be determined from Table 2 of IEC 60664-4. These values shall be used instead if they exceed the values in Table 18.		N
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N
29.3	Supplementary and reinforced insulation having adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked by:		—
	- measurement, in accordance with 29.3.1, or		P
	- 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 by		N
	- an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3 and for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N
	- as specified in Subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency that exceeds 30 kHz.		N
29.3.1	Supplementary insulation having a thickness of at least 1 mm		P
	Reinforced insulation having a thickness of at least 2 mm		P
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		N
	Supplementary insulation consisting of at least 2 layers		N
	Reinforced insulation consisting of at least 3 layers		N
Addition	If natural mica in thin sheet form is used,		P
	–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

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	–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
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N
	the electric strength test of 16.3		N
	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

30	RESISTANCE TO HEAT AND FIRE		—
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		N
	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: 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) .....	Enclosure:75°C	P
	Parts supporting live parts: 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).....		P
	Parts of thermoplastic material providing supplementary or reinforced insulation, 25°C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C) .....		P
30.2	Parts of non-metallic material adequately resistant to ignition and spread of fire	(see appended table)	P
	The requirement does not apply to parts having a mass not exceeding 0,5 g which are considered insignificant parts, provided the cumulative effect of insignificant parts located within 3 mm of each other is unlikely to propagate flames that originate inside the appliance by propagating flames from one insignificant part to another.		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	This requirement does not apply to decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		N
	Compliance checked by the test of 30.2.1. In addition:		P
	- attended appliances, 30.2.2 applies		P
	- unattended appliances, 30.2.3 applies		N
	Appliances for remote operation, 30.2.3 applies		N
	Base material of printed circuit board, 30.2.4 applies		N
30.2.1	Glow-wire test of IEC 60695-2-11 at 550 °C, unless	Enclosure	P
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index (GWFI) according to IEC 60695-2-12 of at least 550 °C.		N
	If the glow-wire flammability index (GWFI) is not available for a sample with a thickness within $\pm 0,1$ mm of the relevant part, then the test sample shall have a thickness equal to the nearest preferred value specified in IEC 60695-2-12 that is no thicker than the relevant part.		N
	the material is classified at least HB40 according to IEC 60695-11-10		N
	Parts for which the glow-wire test cannot be carried out meet the requirements in ISO9772 for category HBF material		N
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and parts of non-metallic material within a distance of 3mm of such connections, are subjected to the glow-wire test of IEC 60695-2-11.		P
	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:		—
	-750°C, for connections carrying a current exceeding 0,5A during normal operation		N
	-650°C, for other connections		N
	Test as specified for an interposed shielding material		N
	When the glow-wire test of IEC 60695-2-11 is carried out, the temperatures are:		—

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	-750°C, for connections carrying a current exceeding 0,5A during normal operation		N
	-650°C, for other connections		P
	Test not applicable to conditions as specified		P
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2	attended appliances	N
	Tests not applicable to conditions as specified		N
30.2.3.1	Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and		N
	parts of non-metallic material within a distance of 3mm,		N
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850°C		N
	Glow-wire test not carried out on parts of material classified as having a glow-wire flammability index of at least 850°C according to IEC 60695-2-12		N
	Glow-wire test not carried out on small parts that comply with the needle-flame test of Annex E or on small parts of material classified as V-0 or V-1 according to IEC 60695-11-10		N
	Test as specified for an interposed shielding material		N
30.2.3.2	Parts of non-metallic material supporting current-carrying connections, and		N
	parts of non-metallic material within a distance of 3mm,		N
	subjected to glow-wire test of IEC 60695-2-11		N
	Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N
	-775°C, for connections carrying a current exceeding 0,2A during normal operation		N
	-675°C, for other connections		N
	When the glow-wire test of IEC 60695-2-11 is carried out, the temperatures are:		—
	-750°C, for connections carrying a current exceeding 0,2A during normal operation		N
	-650°C, for other connections		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Parts that during the test produce a flame persisting longer than 2 s, tested as specified		N
	If a flame persists longer than 2 s during the test, parts above the connection, as specified, subjected to the needle-flame test of annex E, unless		N
	the material is classified as V-0 or V-1 according to IEC 60695-11-10		N
30.2.4	Base material of printed circuit boards subjected to needle-flame test of annex E		N
	Test not applicable to conditions as specified		N

31	RESISTANCE TO RUSTING		—
	Relevant ferrous parts adequately protected against rusting		P

32	RADIATION, TOXICITY AND SIMILAR HAZARDS		—
	Appliance shall not emit harmful radiation, present a toxic or similar hazard due to their operation in normal use		P
	Appliance does not present a toxic or similar hazard		P



### 3.3 Annex as stated in the standards

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

A	ANNEX A (INFORMATIVE) ROUTINE TESTS		—
	Description of routine tests to be carried out by the manufacturer		N

B	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES		—
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N
	This annex does not apply to battery chargers		N
3.1.9	Appliance operated under the following conditions:		—
	-the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		N
	-the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N
	-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
	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
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N
5.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N
7.12	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Details about how to remove batteries containing materials hazardous to the environment given		N
7.15	Markings placed on the part of the appliance connected to the supply mains		N
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
	If the appliance can be operated without batteries, double or reinforced insulation required		N
11.7	The battery is charged for the period described		N
19.1	Appliances subjected to tests of 19.101, 19.102 and 19.103		N
19.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N
19.102	Short-circuiting of the terminals of the battery, being fully charged, for appliances having batteries that can be removed without the aid of a tool		N
19.103	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
21.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength, checked according to procedure 2 of IEC 68-2-32		N
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-32, the number of falls being:		—
	- 100, the mass of part does not exceed 250 g		N
	- 50, the mass of part exceeds 250 g		N
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N
25.13	An additional lining or bushing not required for interconnection cords operating at safety extra-low voltage		N
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N
	For other parts, 30.2.2 applies		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		—
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N
D	ANNEX D (NORMATIVE) THERMAL MOTOR PROTECTORS		—
	Applicable to appliances having motors that incorporate thermal motor protectors		N
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		—
	Needle-flame test carried out in accordance with IEC 60695-2-2, with the following modifications:		N
5	Severities		—
	The duration of application of the test flame is 30 s ± 1 s		N
8	Test procedure		—
8.2	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
8.4	The first paragraph does not apply		N
	If possible, the flame is applied at least 10 mm from a corner		N
8.5	The test is carried out on one specimen		N
	If the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N
10	Evaluation of test results		—
	The duration of burning not exceeding 30 s		N
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
F	ANNEX F (NORMATIVE) CAPACITORS		—
	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
1.5	Terminology		—
1.5.3	Class X capacitors tested according to subclass X2		N
1.5.4	This subclause is applicable		N
1.6	Marking		—
	Items a) and b) are applicable		N
3.4	Approval testing		—
3.4.3.2	Table II is applicable as described		N
4.1	Visual examination and check of dimensions		—
	This subclause is applicable		N
4.2	Electrical tests		—
4.2.1	This subclause is applicable		N
4.2.5	This subclause is applicable		N
4.2.5.2	Only table IX is applicable		N
	Values for test A apply		N
	However, for capacitors in heating appliances the values for test B or C apply		N
4.12	Damp heat, steady state		—
	This subclause is applicable		N
	Only insulation resistance and voltage proof are checked		N
4.13	Impulse voltage		—
	This subclause is applicable		N
4.14	Endurance		—
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
4.14.7	Only insulation resistance and voltage proof are checked		N
	Visual examination, no visible damage		N
4.17	Passive flammability test		—
	This subclause is applicable		N
4.18	Active flammability test		—
	This subclause is applicable		N

G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		—
	The following modifications to this standard are applicable for safety isolating transformers:		N
7	Marking and instructions		—
7.1	Transformers for specific use marked with:		—
	-name, trademark or identification mark of the manufacturer or responsible vendor		N
	-model or type reference		N
17	Overload protection of transformers and associated circuits		—
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N
22	Construction		—
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N
29	Clearances, creepage distances and solid insulation		—
29.1, 29.2 and 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N

H	ANNEX H (NORMATIVE) SWITCHES		—
	Switches comply with the following clauses of IEC 61058-1, as modified:		—
	-The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N
	-Before being tested, switches are operated 20 times without load		N

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
8	Marking and documentation		—
	Switches are not required to be marked		N
	However, switches that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N
13	Mechanism		—
	The tests may be carried out on a separate sample		N
15	Insulation resistance and dielectric strength		—
15.1	Not applicable		N
15.2	Not applicable		N
15.3	Applicable for full disconnection and micro-disconnection		N
17	Endurance		—
	Compliance is checked on three separate appliances or switches		N
	For 17.2.4.4, the number of cycles is 10 000, unless otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335		N
	Switches for operation under no load and which can be operated only by a tool and switches operated by hand that are interlocked so that they cannot be operated under load, are not subjected to the tests		N
	Subclauses 17.2.2 and 17.2.5.2 not applicable		N
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1		N
	Temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1		N
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		—
	This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in table 24		N



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		—
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		N
8	Protection against access to live parts		—
8.1	Metal parts of the motor are considered to be bare live parts		N
11	Heating		—
11.3	Temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N
11.8	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
16	Leakage current and electric strength		—
16.3	Insulation between live parts of the motor and its other metal parts not subjected to the test		N
19	Abnormal operation		—
19.1	The tests of 19.7 to 19.9 not carried out		N
19.101	Appliance operated at rated voltage with each of the following fault conditions:		—
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N
	- short circuit of each diode of the rectifier		N
	- open circuit of the supply to the motor		N
	- open circuit of any parallel resistor, the motor being in operation		N
	Only one fault simulated at a time, the tests carried out consecutively		N
22	Construction		—
22.101	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

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Compliance checked by the tests specified for double and reinforced insulation		N

J	ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS		—
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		N
6.6	Climatic sequence		—
	When production samples are used, three samples of the printed circuit board are tested		N
6.6.1	Cold		—
	The test is carried out at -25°C		N
6.6.3	Rapid change of temperature		—
	Severity 1 is specified		N
6.8.6	Partial discharge extinction voltage		—
	Type A coatings not subjected to a partial discharge test		N
6.9	Additional tests		—
	This subclause is not applicable		N

K	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		—
	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
	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
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		P

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N
	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

L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		—
	Sequences for the determination of clearances and creepage distances		P

M	ANNEX M (NORMATIVE) POLLUTION DEGREE		—
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		—
	The microenvironment determines the effect of pollution on the insulation, taking into account the microenvironment		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		—
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		—
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected	pollution degree 2	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

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N

N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		—
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		P
7	Test apparatus		N
7.3	Test solutions		—
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		—
10.1	Procedure		—
	The proof voltage is 100V, 175V, 400V or 600V .....	175V	P
	The last paragraph of Clause 3 applies		P
	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
10.2	Report		—
	The report stating if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N

O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		—
	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 WARM DAMP EQUABLE CLIMATES		—
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WDaE		—

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IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WdaE, if liable to be connected to a supply mains that excludes the protective earthing conductor		—
5	General conditions for the tests		—
5.7	The ambient temperature for the tests of Clauses 11 and 13 is 40 <sup>+3</sup> / <sub>0</sub>		N
7	Marking and instructions		—
7.1	The appliance marked with the letters WDaE		N
7.12	The instructions state that the appliance is to be supplied through a RCD having a rated residual operating current not exceeding 30 mA		N
	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
11	Heating		—
11.8	The values of Table 3 are reduced by 15 K		N
13	Leakage current and electric strength at operating temperature		—
13.2	The leakage current for class I appliances not exceeding 0,5 mA		N
15	Moisture resistance		—
15.3	The value of t is 37 °C		N
16	Leakage current and electric strength		—
16.2	The leakage current for class I appliances not exceeding 0,5 mA		N
19	Abnormal operation		—
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		N
Q	ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS		—
	Description of tests for appliances incorporating electronic circuits		—



IEC 60335-2-45			
Clause	Requirement - Test	Result - Remark	Verdict
R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION		—

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### 3.4 Tables

10.1	TABLE: Power input deviation					P
Input deviation of/at:	P rated (W)	P measured (W)	dP	Required dP	Remark	
240V 50Hz	48W	46.84	-2,41%	±10%	---	
220V 50Hz	40W	40,50	+1,25%	±10%	---	

10.2	TABLE: Current deviation					N
Current deviation of/at:	I rated (A)	I measured (A)	dI	Required dI	Remark	
---	---	---	---	---	---	

11.8	TABLE: Heating test, thermocouples			P
	Test voltage (V) .....	251,4V(55,2W)		---
	Ambient (°C) .....	23.0		---
Thermocouple locations	dT (K)		Max. dT (K)	
Internal wire	32,2		50	
supply cord	14,7		50	
Mica	454,3		600	
Surface of handle	32,2		60	
insulating material	101,6		For clause 30	
Enclosure	33,7		For clause 30	
Test corner	11,7		65	

11.8	TABLE: Heating test, resistance method					N
	Test voltage (V) .....	---			---	
	Ambient, t <sub>1</sub> (°C) .....	---			---	
	Ambient, t <sub>2</sub> (°C) .....	---			---	
Temperature rise of winding	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	dT (K)	Max. dT (K)	Insulation class	
---	---	---	---	---	---	

13.2	TABLE: Leakage current			P
	Heating appliances: 1.15 x rated input .....	55,2W		---

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	Motor-operated and combined appliances: 1.06 x rated voltage.....:	---	—
Leakage current between		I (mA)	Max. allowed I (mA)
Live and accessible metal part		0,270	0,75
Neutral and accessible metal part		0,100	0,75
Live and handle surface		0,010	0,35
Neutral and handle surface		0,005	0,35

13.3	TABLE: Electric strength			P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)	
Live part and surface of handle		3000	No	
Live part and accessible metal part		1000	No	

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

16.2	TABLE: Leakage current			P
	Single phase appliances: 1.06 x rated voltage.....:	254,4V		—
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$ : .....	---		—
Leakage current between		I (mA)	Max. allowed I (mA)	
Live part and accessible metal part		0,440	0,75	
Live part and handle surface		0,015	0,25	

16.3	TABLE: Electric strength			P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)	
Live part and surface of handle		3000	No	
Live part and accessible metal part		1250	No	

17	TABLE: Overload protection, temperature rise			N
Temperature rise of part/at:		dT (K)	Max. dT (K)	
---		---	---	

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19.7	TABLE: Abnormal operation, locked rotor/moving parts					N
	Test voltage (V) .....	---			---	
	Ambient, t <sub>1</sub> (°C) .....	---			---	
	Ambient, t <sub>2</sub> (°C) .....	---			---	
	Temperature of winding	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	dT (K)	T (°C)	Max. T (°C)
	---	---	---	---	---	---

19.9	TABLE: Abnormal operation, running overload					N
	Test voltage (V) .....	---			---	
	Ambient, t <sub>1</sub> (°C) .....	---			---	
	Ambient, t <sub>2</sub> (°C) .....	---			---	
	Temperature of winding	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	dT (K)	T (°C)	Max. T (°C)
	---	---	---	---	---	---

19.13	TABLE: Abnormal operation, temperature rises		P
	Thermocouple locations	dT (K)	Max. dT (K)
	Insulation of supply cord (19.2)	11,4	150
	Insulation of supply cord (19.3)	18,3	150
	Test corner (19.2)	29,1	150
	Test corner (19.3)	44,7	150
	Enclosure(19.2)	33,5	For clause 30
	Enclosure (19.3)	36,6	For clause 30
	insulating material	90,8	For clause 30
	insulating material	111,2	For clause 30
	Ambient temperature	23,0	---

24	TABLE: components					P
object/part No.	Manufacturer /trademark	type/model	technical data	standard	mark(s) of conformity	
Plug	Yuyao Senglong Electrical Appliance Co.,Ltd	SL003	AC250V;16A	DIN VDE0620	VDE 40013673	
Alt.	NINGBO LIGHT-HEAVY ElectricTechnology Co.ltd	FE-03P	AC250V;16A	DIN VDE 0620	VDE 40012926	
Alt.	Ningbo Qiaopu Electric Co.,Ltd.	D03	AC250V;16A	DIN VDE 0620	VDE 40002872	

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Power cord	NINGBO LIGHT-HEAVY ElectricTechnology Co.ltd	H03VV-F	3G0, 5mm <sup>2</sup>	DIN VDE0281	VDE 40035166
Alt.	Yuyao Senglong Electrical Appliance Co.,Ltd	H03VV-F	3G0, 5mm <sup>2</sup>	DIN VDE0281	VDE 40009710
Alt.	Ningbo Qiaopu Electric Co.,Ltd.	H03VV-F	3G0, 5mm <sup>2</sup>	DIN VDE0281	VDE 40035976
Mica	MICA ELECTRIC MATERIAL (LU HE) CO LTD	HP5	--	EN60335-1 EN60335-2-45	UL E332023
Heat-shrinkable bush	SHENZHEN WOLIDA TRADING CO LTD	RSFR-H	600V; T125	EN60335-1 EN60335-2-45	UL E329530
Alt.	Shenzhen Woer Heat-Shrinkable Material Co.,Ltd.	RSFR-x	600V;T125	EN60335-1 EN60335-2-45	UL E203950
Internal wire	Xiangshan Haoguang Electric Wire & Cable Co.,Ltd.	H05V-K	1G0.5mm <sup>2</sup>	---	VDE 126062
Switch	Ningbo yinxian lihe switch factory	RL3-3	AC250V;6(2)AT1 25;1E4	EN61058-1	ENEC 1010760
X2 capacitor	Jiangsu Xinghua huayu Electronics Co.,Ltd.	MPX-Series	AC275V;0.1uF; 40/100/21	DIN EN 60384-14	VDE 40022417
Alt.	Dain Electronics Co.,Ltd.	MEX	AC275V;0.1uF; 40/110/21	DIN EN 60384-14 IEC 60384-14	VDE 40018798
Plastic enclosure	ZHEN JIANG CHI MEI CHEMICAL CO LTD	ABS	---	---	UL E194560
PCB	Leuchttec Electronics(Zhejiang) Co.,Ltd.	PFR-1	V-0	EN 60335-1 EN 60335-2-45	UL E199273

28.1	TABLE: Threaded part torque test			P
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque ( Nm )	
fixing screw	2,88	II	0,5	
Screw for earthing	2,89	II	0,5	

29.1	TABLE: Clearances					P
	Overvoltage category...	II			---	
Type of insulation:						
Rated impulse voltage (V):	Min. cl (mm)	Basic	Functional	Supplementary	Reinforced	Verdict / Remark
330	0,5*	---	---	---	---	N
500	0,5*	---	---	---	---	N

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800	0,5*	---	---	---	---	N
1 500	0,5*/**	---	---	---	---	N
2 500	1,5**	3,6mm	4,0mm	6,6mm	---	P
4 000	3,0**	---	---	---	12,2mm	P
6 000	5,5**	---	---	---	---	N
8 000	8,0**	---	---	---	---	N
10 000	11,0**	---	---	---	---	N

\*) The value is increased to 0,8mm for pollution degree 3

\*) If the construction is affected by wear, distortion, movement of the parts or during assembly, the value is increased by 0,5 mm

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm)							Type of insulation			Verdict
	Pollution degree										
	1	2			3						
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb	B*)	S*)	R*)	
≤50	0,2	0,6	0,9	1,2	1,5	1,7	1,9	—	—	—	N
≤50	0,2	0,6	0,9	1,2	1,5	1,7	1,9	—	—	—	N
≤50	0,4	1,2	1,8	2,4	3,0	3,4	3,8	—	—	—	N
>50 and ≤125	0,3	0,8	1,1	1,5	1,9	2,1	2,4	—	—	—	N
>50 and ≤125	0,3	0,8	1,1	1,5	1,9	2,1	2,4	—	—	—	N
>50 and ≤125	0,6	1,6	2,2	3,0	3,8	4,2	4,8	—	—	—	N
>125 and ≤250	0,6	1,3	1,8	<b>2,5</b>	3,2	3,6	4,0	3,6	—	—	P
>125 and ≤250	0,6	1,3	1,8	2,5	3,2	3,6	4,0	—	8,9	—	P
>125 and ≤250	1,2	2,6	3,6	<b>5,0</b>	6,4	7,2	8,0	—	—	16,7	P
>250 and ≤400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—	—	—	N
>250 and ≤400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—	—	—	N
>250 and ≤400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—	—	N
>400 and ≤500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—	—	—	N
>400 and ≤500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—	—	—	N
>400 and ≤500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—	—	N
>500 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—	—	—	N
>500 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—	—	—	N

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>500 and ≤800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—	—	N
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—	—	—	N
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—	—	—	N
>800 and ≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—	—	N
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—	—	—	N
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—	—	—	N
>1000 and ≤1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0	—	—	—	N
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—	—	—	N
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—	—	—	N
>1250 and ≤1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0	—	—	—	N
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	—	—	—	N
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	—	—	—	N
>1600 and ≤2000	11,2	16,0	22,0	32,0	40,0	44,0	50,0	—	—	—	N
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—	—	—	N
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—	—	—	N
>2000 and ≤2500	15,0	20,0	28,0	40,0	50,0	56,0	64,0	—	—	—	N
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—	—	—	N
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—	—	—	N
>2500 and ≤3200	20,0	25,0	36,0	50,0	64,0	72,0	80,0	—	—	—	N
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—	—	—	N
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—	—	—	N
>3200 and ≤4000	25,0	32,0	44,0	64,0	80,0	90,0	100,0	—	—	—	N
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—	—	—	N
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—	—	—	N
>4000 and ≤5000	32,0	40,0	56,0	80,0	100,0	112,0	126,0	—	—	—	N
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—	—	—	N
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—	—	—	N
>5000 and ≤6300	40,0	50,0	72,0	100,0	126,0	142,0	160,0	—	—	—	N
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—	—	—	N
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—	—	—	N
>6300 and ≤8000	50,0	64,0	90,0	126,0	160,0	180,0	200,0	—	—	—	N
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—	—	—	N
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—	—	—	N

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

\*) , B=Basic, S=Supplementary and R=Reinforced

29.2	TABLE: Creepage distances, functional insulation								P
Working voltage (V)	Creepage distance (mm)							Verdict / Remark	
	Pollution degree								
	1	2			3				
		Material group			Material group				
		I	II	IIIa/IIIb	I	II	IIIa/IIIb		
≤50	0,2	0,6	0,8	1,1	1,4	1,6	1,8	N	
>50 and ≤125	0,3	0,7	1,0	1,4	1,8	2,0	2,2	N	
>125 and ≤250	0,4	1,0	1,4	<b>2,0</b>	2,5	2,8	3,2	P/3,6mm	
>250 and ≤400	0,8	1,6	2,2	3,2	4,0	4,5	5,0	N	
>400 and ≤500	1,0	2,0	2,8	4,0	5,0	5,6	6,3	N	
>500 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	N	
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	N	
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	N	
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	N	
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	N	
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	N	
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	N	
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	N	
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	N	
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	N	
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	N	
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	N	
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	N	



30.1	TABLE: Ball pressure			P
Part	Test temperature (°C)	Impression diameter (mm)	Allowed impression diameter (mm)	
insulating material	141,6	1,65	2	
Enclosure	75	1,12	2	
switch	125	1,37	2	

30.2	TABLE: Glow wire test		P
Part	Test temperature (°C )	Verdict	
Enclosure	550	P	
insulating material	550	P	
switch	650	P	

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### 3.5 Deviation of standard in EUROPEAN GROUP

<b>ATTACHMENT TO TEST REPORT IEC 60335-2-45 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b>	
Household and similar electrical appliances — Safety — Part 2-45: Particular requirements for portable heating tools and similar appliances	
<b>Differences according to</b>	: EN 60335-1:2012+A11:2014 EN 60335-2-45: 2002 + A1: 2008 + A2: 2012 EN 62233:2008 + C1:2005
<b>Attachment Form No.</b>	: EU_GD_IEC60335_2_45F
<b>Attachment Originator</b>	: Dekra Certification B.V.
<b>Master Attachment</b>	: 2014-05
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CENELEC COMMON MODIFICATIONS			
6.1	Delete "class 0" and "class 01"	Class: I	P
7.1	Single-phase appliances to be connected to the supply mains: 230 V covered		P
	Multi-phase appliances to be connected to the supply mains: 400 V covered		N
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.		P
	An indication that the device has been operated is given by:		P
	• a tactile feedback, or		P
	• an audible and visual feedback		N
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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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		P
	The force on the probe in the straight position is increased to 10 N when probe 18 is used		P
	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
20.2	When using the test probe similar to test probe B with a circular stop face, the accessories and detachable covers are removed		P
	Test probe 18 applied with a force of 2,5N on the appliance fully assembled		P
24.1	Components comply with the safety requirements specified in the relevant standards as far as they reasonably apply		P
	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
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		N
	- 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
	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		P
	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,		P
	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
	Where the relevant standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used		N
	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		N
	with connectors and appliance inlets complying with the standard sheets of IEC 60320-1,		N

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	if direct supply to these parts from the supply mains gives rise to a hazard		N
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
	Compliance with Clause 8 of this standard is not impaired by connecting the appliance to a device covered by EN 41003		N
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
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:		P
	- for Class I appliances: standard sheet C2b, C3b or C4 .....	C4	P
	- for Class II appliances: standard sheet C5 or C6 .....		N
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
	Halogen-free thermoplastic compound sheathed supply cords have properties at least those of:		N
	<ul style="list-style-type: none"> <li>halogen-free thermoplastic compound sheathed cords (H03Z1Z1H2-F or H03Z1Z1-F), for appliances having a mass not exceeding 3 kg</li> </ul>		N
	<ul style="list-style-type: none"> <li>halogen-free thermoplastic compound sheathed cords (H05Z1Z1H2-F or H05Z1Z1-F), for other appliances</li> </ul>		N
	Cross-linked halogen-free compound sheathed supply cords have properties at least those of cross-linked halogen-free compound sheathed cords (H07ZZ-F)		N
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



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
32	Compliance regarding electromagnetic fields is checked according to EN 62233		P
Annex I, 19.1.101	The appliance is supplied at rated voltage and operated under normal operation with each of the fault conditions specified		N
	The duration of the test is as specified in 19.7		N

<b>ZA</b>	<b>ANNEX ZA (NORMATIVE) SPECIAL NATIONAL CONDITIONS</b>		N
	<b>Norway</b>		N
19.5	The test is also applicable to appliances intended to be permanently connected to fixed wiring		N
	<b>Norway</b>		N
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
	<b>All CENELEC countries</b>		N
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
	<b>Ireland and United Kingdom</b>		N
25.8	In the table, the lines for 10 A and 16 A are replaced by:		N
	> 10 and ≤ 13 1,25		N
	> 13 and ≤ 16 1,5		N
<b>ZB</b>	<b>ANNEX ZB (INFORMATIVE) A-DEVIATIONS</b>		N
	<b>Ireland</b>		N

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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 complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances		N
	<b>United Kingdom</b>		N
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
<b>ZC</b>	<b>ANNEX ZC (NORMATIVE) NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</b>		P
	A list of referenced documents in this standard		P
<b>ZD</b>	<b>ANNEX ZD (INFORMATIVE) IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS</b>		P
	A table with IEC and CENELEC code designations for flexible cords		N
<b>ZE</b>	<b>ANNEX ZE (INFORMATIVE) SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE</b>		N
7.1	Business name and full address of the manufacturer and, where applicable, his authorized representative.....:		N
	Model or type reference .....		N
	Serial number, if any .....		N
	Production year		N
	Designation of the appliance .....		N
7.12	Instructions provided with the appliance so that the appliance can be used safely		N
	The instructions contain at least the following information:		N
	- the business name and full address of the manufacturer and, where applicable, his authorized representative		N

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	- model or type reference of the appliance as marked on the appliance itself, except for the serial number		N
	- the designation of the appliance together with its explanation in case it is given by a combination of letters and/or numbers		N
	- the general description of the appliance, when needed due to the complexity of the appliance		N
	- specific precautions if required during installation, operation, adjusting, user maintenance, cleaning, repairing or moving		N
	- when needed drawings, diagrams, descriptions and explanations necessary for the safe use and user maintenance of the appliance		N
	- the possible reasonably foreseeable misuse and, whenever relevant, a warning against the effects it may have on the safe use of the appliance		N
	The words "Original instructions" appear on the language version(s) verified by the manufacturer or by the authorized representative		N
	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
	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
	The instructions indicate the type and frequency of inspections and maintenance required for safe operation including the preventive maintenance measures		N
7.12.ZE1	If needed for specific appliances, the following information to be given:		N
	<ul style="list-style-type: none"> <li>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</li> </ul>		N



	<ul style="list-style-type: none"> <li>on how to maintain adequate mechanical stability when in use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance</li> </ul>		N
	<ul style="list-style-type: none"> <li>on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided</li> </ul>		N
	<ul style="list-style-type: none"> <li>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</li> </ul>		N
	<ul style="list-style-type: none"> <li>on the specifications on the spare parts to be used, when these affect the health and safety of the operator</li> </ul>		N
	<ul style="list-style-type: none"> <li>on airborne noise emissions, determined and declared in accordance with the relevant Part 2, which includes:</li> </ul>		N
	- the A-weighted emission sound pressure level at workstations, where this exceeds 70dB(A) .....		N
	- where this level does not exceed 70 dB(A), this fact is indicated		N
	- the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 µPa) .....		N
	- 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
7.12.ZE2	The instructions includes a warning to disconnect the appliance from its power source during service and when replacing parts		N
	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
	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
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 manual operation is required to restart it		N

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20.1	Appliances and their components and fittings have adequate mechanical stability during transportation, assembly, dismantling and any other action involving the appliance		N
20.2	Dangerous moving transmission parts safeguarded either by design or guards		N
	When guards are used, they are fixed guards, interlocking movable guards or protective devices		N
	Moving parts directly involved in the function of the appliance which cannot be made completely inaccessible fitted with:		N
	- fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and		N
	- adjustable guards restricting access to those sections of the moving parts where access is necessary		N
	Interlocking movable guards used where frequent access is required		N
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
22.ZE.1	For appliances provided with a seat, the seat gives adequate stability		N
	The distance between the seat and the control devices capable of being adapted to the operator		N
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
	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
22.ZE.3	Appliances designed in such a way that incorrect mounting is avoided, if this can lead to an unsafe situation		N
	If this is not possible, information on the correct mounting is given directly on the part and/or the enclosure		N
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

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	so designed that they can be fitted with such attachments, or		N
	be shaped in such a way that standard lifting gear can easily be used		N
	Appliances to be moved manually are constructed or equipped so that they can be moved easily and safely		N
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
	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
	Where possible, guards are incapable of remaining in place without their fixings		N
	This does not apply if, after removal of the screws, or if the component is incorrectly repositioned, the appliance becomes inoperative		N
	Movable guards are interlocked		N
	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
	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
	- prevents the start of hazardous appliance functions until the guard is closed and locked, and		N
	- keeps the guard closed and locked until the risk of injury from the hazardous appliance functions has ceased		N
	Interlocking movable guards remain attached to the appliance when open, and		N
	they are designed and constructed in such a way that they can be adjusted only by means of an intentional action		N
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
	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

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	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
	After these tests the interlock system is fit for further use		N
22.ZE.7	Adjustable guards restricting access to areas of the moving parts strictly necessary for the work are:		N
	- adjustable manually or automatically, depending on the type of work involved, and		N
	- readily adjustable without the use of tools		N
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
	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
22.ZE.9	Appliances fitted with means to isolate them from all energy sources		N
	Such isolators are clearly identified, and		N
	they are capable of being locked if reconnection endanger persons		N
	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
ZF	<b>ANNEX ZF (INFORMATIVE) CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD</b>		P
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive).....:		P
ZG	<b>ANNEX ZG (NORMATIVE) UV APPLIANCES</b>		N
	The following modifications to this standard apply to appliances having UV emitters		N
	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

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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
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
<b>ZZ</b>	<b>ANNEX ZZ (INFORMATIVE) COVERAGE OF ESSENTIAL REQUIREMENTS OF EC DIRECTIVES</b>		N
	Description of the relation between this European standard and the LVD (Low Voltage Directive, 2006/95/EC) and the MD (Machinery Directive, 2006/42/EC)		N

<b>Annex EN 62233:2008</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>EMF- ELECTROMAGNETICS FIELDS</b>			
	The tested product also complies with the requirements of EN 62233:2008		P
	Limit .....100%	Measured max. :.....5,232%	P

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## Attachments

- Photo document
- BOM
- CDF (critical data form)
- Copies of certificates of certified components
- Instruction manual
- Circuit diagram
- Explosion block
- Other if necessary

-----end of report-----

**Type Designation:** SOLDER STATION; ZD-932  
**Report Number:** CNB3160328-00205-L



Figure 1 (External view-total)



Figure 2 ( External view-iron-front)

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Figure 3 (External view-iron-rear )



Figure 4 (Internal view of controller )

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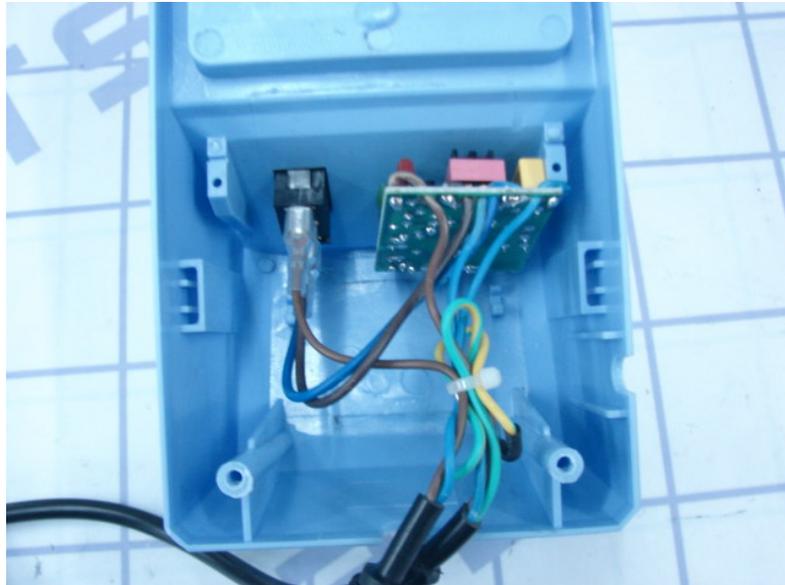


Figure 5 (PCB layout of controller)



Figure 6 (PCB of controller)

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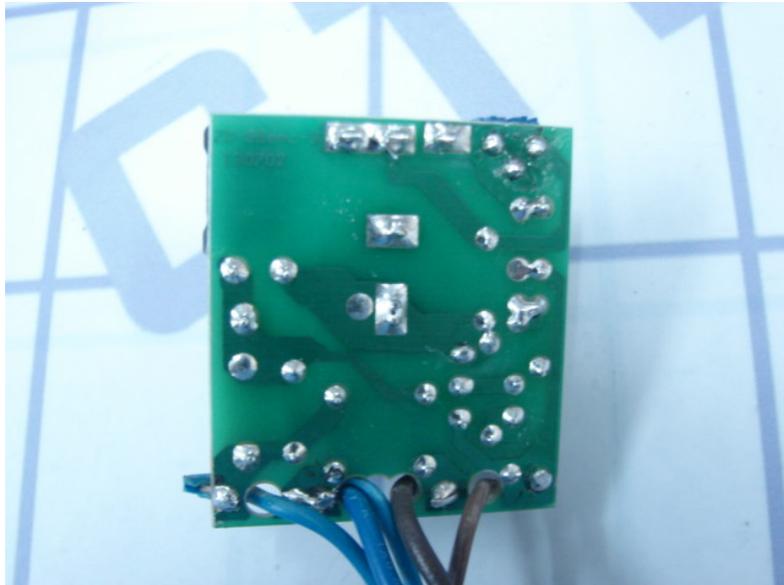


Figure 7 (Internal view of iron)



Figure 8 (Internal view of iron-earth connection)

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Figure 9 (Internal view of iron)