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Certificate of Conformity

NO.: ES140708068S-1

The following product has been tested by us with the listed standards and found in conformity with the council LVD directive 2014/35/EU. It is possible to use CE marking to demonstrate the conformity with this LVD Directive.

Applicant : GUANGZHOU YIHUA ELECTRONIC EQUIPMENT CO., LTD.
Address : No.7 Shajing East Road, Yongxing Industrial District, Longgui, Guangcong Road, Guangzhou, Guangdong, China.
Manufacturer : GUANGZHOU YIHUA ELECTRONIC EQUIPMENT CO., LTD.
Address : No.7 Shajing East Road, Yongxing Industrial District, Longgui, Guangcong Road, Guangzhou, Guangdong, China.
Trademark : **W.E.P. YIHUA® YH**
EUT : Rework Station
M/N : 995D+, 852, 852D, 852D+, 852D++, 872D, 862D+, 862DA, 892D+, 862DA+, 882D, 862BD+, 995D, 996D, 996D+, 878, 878D, 898D, 898D+, 898BD, 898BD+, 8786D, 902A, 902D, 857, 857D, 952D+.
Technical Data : Input: 220-240V~, 50/60Hz, 850W Max. Class I (Reference to test report for the detail)
Test Standards : EN 60335-1: 201 2
 EN 60 335-2-45: 2003 + A1: 2008 + A2: 2012

This CE certificate is only valid for NO.Z17-0015-Z20181102




 (Manager)
 February 11, 2015


The certificate is based on a single evaluation of one sample of above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab. logo.

APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

GUANGZHOU YIHUA ELECTRONIC EQUIPMENT CO., LTD.

Rework Station

**Model(s): 995D+, 852, 852D, 852D+, 852D++, 872D, 862D+, 862DA, 892D+, 862DA+,
882D, 862BD+, 995D, 996D, 996D+, 878, 878D, 898D, 898D+, 898BD, 898BD+, 8786D,
902A, 902D, 857, 857D, 952D+**

Prepared For : GUANGZHOU YIHUA ELECTRONIC EQUIPMENT CO., LTD.

**No.7 Shajing East Road, Yongxing Industrial District, Longgui,
Guangcong Road, Guangzhou, Guangdong, China.**

Prepared By : SHENZHEN EMTEK CO., LTD.

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Shenzhen, Guangdong, China**

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TEST REPORT

EN 60335-2-45 / IEC 60335-2-45

Household and similar electrical appliances – Safety –

Part 2-45: Particular requirements for portable heating tools and similar appliances

Report Reference No.....: ES140708068S-1
 Compiled by (name + signature): Sam Wang
 Approved by (name + signature): Jesse Liu
 Date of issue.....: February 10, 2015
 Total number of pages.....: 99 pages

Testing Laboratory.....: SHENZHEN EMTEK CO., LTD.
 Address.....: Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China
 Testing location / address.....: Same as above

Applicant's name.....: GUANGZHOU YIHUA ELECTRONIC EQUIPMENT CO., LTD.
 Address.....: No.7 Shajing East Road, Yongxing Industrial District, Longgui, Guangcong Road, Guangzhou, Guangdong, China.

Test specification:
 Standard.....: IEC 60335-2-45:2002 + A1:2008 + A2: 2011 use in conjunction with IEC 60 335-1: 2010
 EN 60 335-2-45: 2003 + A1:2008 + A2: 2012 in conjunction with EN60335-1: 2012
 Test procedure.....: Compliance with EN 60 335-2-45: 2003 + A1:2008 + A2: 2012 in conjunction with EN 60335-1: 2012
 Non-standard test method.....: N/A

Test Report Form No.....: IEC 60335-2-45h
 Test Report Form(s) Originator.....: LCIE
 Master TRF.....: Dated 2012-08

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Test item description.....: Rework Station
 Trade Mark.....: **W.E.R.® YIHUA® YH**
 Manufacturer.....: GUANGZHOU YIHUA ELECTRONIC EQUIPMENT CO., LTD.
 Address.....: No.7 Shajing East Road, Yongxing Industrial District, Longgui, Guangcong Road, Guangzhou, Guangdong, China.

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Model/Type reference..... :	995D+, 852, 852D, 852D+, 852D++, 872D, 862D+, 862DA, 892D+, 862DA+, 882D, 862BD+, 995D, 996D, 996D+, 878, 878D, 898D, 898D+, 898BD, 898BD+, 8786D, 902A, 902D, 857, 857D, 952D+.							
Ratings..... :	Input: 220-240V~, 50/60Hz, 850W Max. Class I (See model difference list for detail)							
Test item particulars								
Classification of installation and use	Class I equipment							
Supply Connection	Appliance inlet used.							
Possible test case verdicts:								
- test case does not apply to the test object	N(/A)							
- test object does meet the requirement	Pass (P)							
- test object does not meet the requirement	Fail (F)							
Testing								
Date of receipt of test item	July 09, 2014							
Date (s) of performance of tests.....	July 09, 2014 to July 16, 2014							
General remarks:								
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma (point) is used as the decimal separator.</p>								
General product information:								
<p>1. The Twenty-six model are identical except the model name, power and appearance, all test on model 995D+</p> <p>2. model difference list</p>								
Model	995D+	852	852D	852D+	852D++	872D	862D+	862DA
Power (W)	850	800	800	800	800	800	850	850
Model	892D+	862DA+	882D	862BD+	995D	996D	996D+	878
Power (W)	850	850	800	850	800	800	850	800
Model	878D	898D	898D+	898BD	898BD+	8786D	902A	902D
Power (W)	800	800	850	800	850	800	800	800
Model	857	857D	952D+					
Power (W)	800	800	750					
Electric circuit	Same							
Input voltage	220-240V~, 50/60Hz							

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Summary of testing:

The product has been tested according to standard EN 60 335-2-45: 2003 + A1:2008 + A2: 2012 in conjunction with EN 60335-1: 2012

- Tests performed on the bench
- Maximum ambient temperature: +25°C
- Tested for moderate conditions
- EUT is designed for altitudes not exceeding 2000 m.

This report is not valid without using in conjunction with the original test report ES140708068S.

History of modification:

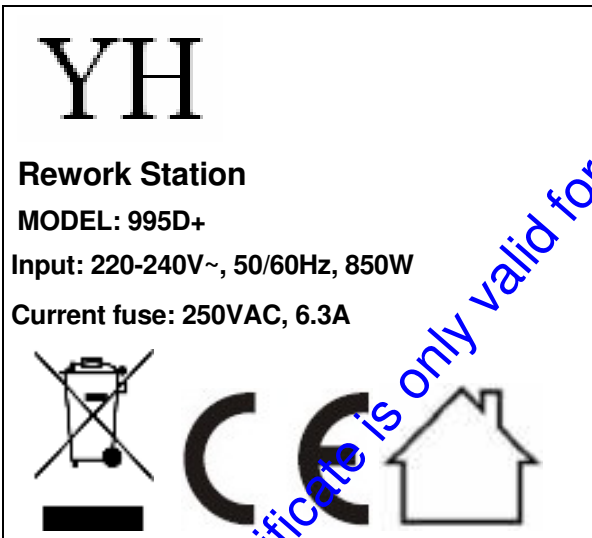
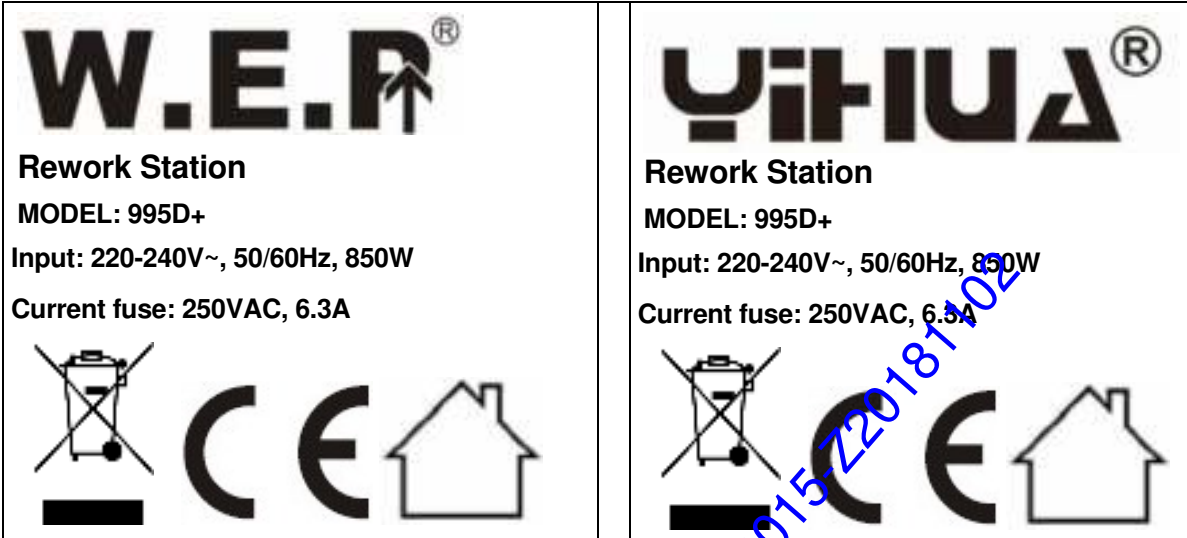
- 2014-July-17: original report;(ES140708068S)
- 2015-February-10: modification 1.(ES140708068S-1)

1) Adding the components is BS power plug, power cord and photo.

2) Adding the model 952D+, Different from the original model is rating power and model mane.

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Copy of marking plate:



Remark: The label of all models: 995D+, 852, 852D, 852D+, 852D++, 872D, 862D+, 862DA, 892D+, 862DA+, 882D, 862BD+, 995D, 996D, 996D+, 878, 878D, 898D, 898D+, 898BD, 898BD+, 8786D, 902A, 902D, 857, 857D, 952D+ are identical, except the model name and rating power, All test on model 995D+.

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EN 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.	50/60Hz	P
	NOTE 101 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 0, 0I, I, II, III	Class I	P
	Dehorning tools shall be class II or class III . (IEC 60335-2-45)		N
	Other appliances shall be class I, class II or class III. (IEC 60335-2-45)	Class I	P
6.2	Protection against harmful ingress of water	IPX0	N
	Class II dehorning tools and transformers for class III dehorning tools shall be at least IPX4 (IEC 60335-2-45)		N
	Conduit-soldering tools and thermoplastic conduit-welding tools shall be at least IPX4 (IEC 60335-2-45)		N
	Hand-held paint strippers for outdoor use shall be at least IP X4 unless the instructions for use state they are not to be stored outdoors or left outdoors, in which case they may be IPX0 (IEC 60335-2-45)		N

7	MARKING AND INSTRUCTIONS		--
7.1	Rated voltage or voltage range (V)	220-240V	P
	Nature of supply	~	P
	Rated frequency (Hz)	50/60Hz	P
	Rated current (A)		N
	Manufacturer's or responsible vendor's name, trademark or identification mark	See label	P
	Model or type reference	See rating label and model list	P
	Symbol 5172 of IEC 60417, for Class II appliances	Class I appliance	N
	IP number, other than IPX0	IPX0	N
	Symbol IEC 60417-5180, for class III appliances, unless	Class I appliance	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

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	Contact fire lighters shall be marked with the limit of insertion into the fuel (IEC 60335-2-45)		N
	Contact fire lighters which are not at least IP X4 shall be marked with (IEC 60335-2-45):		N
	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. Each fitting shall be marked with the type of appliance with which it is to be used and with its own type reference (IEC 60335-2-45)		N
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	220-240V	P
	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		P
	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
	Symbol for nature of supply placed next to rated voltage	220-240V~	P
	Symbol for class II appliances placed unlikely to be confused with other marking		N
	Units of physical quantities and their symbols according to international standardized system		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		N
	correct mode of connection is obvious		N
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

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EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	- 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		P
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means.....:		P
	If figures are used, the off position indicated by the figure 0		P
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		P
7.11	Indication for direction of adjustment of controls		P
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance		P
	The instructions state that:		--
	- 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
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided		N
	Instructions for class III appliances state that it must only be supplied at SELV, unless		N
	it is a battery-operated appliance, the battery being charged outside the appliance		N
	The instructions for use for appliances having a separate stand and not incorporating a biased-off switch shall include the substance of the following warning (IEC 60335-2-45):		P
	WARNING - This tool must be placed on its stand when not in use		P
	The instructions for use for class III dehorning tools shall include the substance of the following warning (IEC 60335-2-45):		N

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EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	WARNING - Only use the transformer provided		N
	The instructions for use for heat guns and hand-held paint strippers shall include the substance of the following (IEC 60335-2-45):		P
	A fire may result if the appliance is not used with care, therefore:		P
	- be careful when using the appliance in places where there are combustible materials. Do not apply to the same place for a long time		P
	- do not use in presence of an explosive atmosphere		P
	- heat may be conducted to combustible materials which are out of sight		P
	- place on its stand after use and follow to cool before storage		P
	The instructions for use for fire lighters shall include the substance of the following (IEC 60335-2-45):		N
	- ensure that the fire lighter is properly positioned		N
	- unplug before removal from the fire		N
	- allow to cool before storage		N
	- do not allow the hot parts of the fire lighter to touch the cord or other flammable materials		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 (IEC 60335-2-45)		N
7.12.1	Sufficient details for installation supplied		N
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		N
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules		N
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:		N
	- dimensions of space		N
	- dimensions and position of supporting means		N
	- distances between parts and surrounding structure		N

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	- dimensions of ventilation openings and arrangement		N
	- connection to supply mains and interconnection of separate components		N
	- plug accessible after installation, unless		N
	a switch in the fixed wiring in accordance with the wiring rules, unless		N
	a switch complying with 24.3		N
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord	AC inlet	N
	Replacement cord instructions, type Y attachment		N
	Replacement cord instructions, type Z attachment		N
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		N
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		N
	- 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
7.13	Instructions and other texts in an official language.. :		P
	Languages :	English	P
7.14	Marking clearly legible and durable, rubbing test as specified	After the test , no 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		P
	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		P

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EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link	6.3A, AC250V	P

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
	Lamps behind a detachable cover not removed, if conditions met		N
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		P
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		N
8.1.4	Accessible part not considered live if:		N
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V	Can touch terminals measurement voltage is 14.5Vpeak	P
	- 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
	Parts operating at safety extra-low voltage exceeding 12 V in thermoplastic conduit-welding tools are also considered to be live parts (IEC 60335-2-45)		N
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		--

EN 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		P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P

9	STARTING OF MOTOR-OPERATED APPLIANCES		N
	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
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N
	the rated power input is related to the arithmetic mean value		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		N
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N
	the rated current is related to the arithmetic mean value of the range		N

11	HEATING		--
11.1	No excessive temperatures in normal use		P
11.2	The appliance is held, placed or fixed in position as described.....:		P
	Appliances are tested away from the walls of the test corner (IEC 60335-2-45)		P
11.3	Temperature rises, other than of windings, determined by thermocouples		P
	Temperature rises of windings determined by resistance method, unless		P

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	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 (W)		P
	Soldering guns, induction soldering irons and other appliances operated with a transformer are supplied at 1,06 times rated voltage (IEC 60335-2-45)		N
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V).....		N
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V).....	240V X 1.06 = 254.4V	P
11.7	Operation duration corresponding to the most unfavourable conditions of normal use	(see appended tables)	P
	Contact fire lighters are operated for 30 min. Hot-air fire lighters are operated for 10 min (IEC 60335-2-45)		N
	Other appliances are operated until steady conditions are established (IEC 60335-2-45)		P
11.8	Temperature rises monitored continuously and not exceeding the values in table 3	(see appended tables)	P
	If the temperature rise of a motor winding exceeds the value of table 3, or		N
	if there is doubt with regard to classification of insulation,		N
	tests of Annex C are carried out		N
	Sealing compound does not flow out		P
	Protective devices do not operate, except		P
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4		N
	The temperature rise limit specified in Table 3 for pure mica and tightly sintered ceramic material is increased to 600K (IEC 60335-2-45)		N

13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		--
13.1	Leakage current not excessive and electric strength adequate		P
	Appliances operated with a transformer and induction soldering irons are tested as motor-operated appliances (IEC 60335-2-45)		P
	Heating appliances operated at 1.15 times the rated power input (W).....		N

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	Motor-operated appliances and combined appliances supplied at 1.06 times the rated voltage (V).....:	240V X 1.06=254.4V~	P
	Protective impedance and radio interference filters disconnected before carrying out the tests		N
13.2	For class 0, class II and class III appliances, leakage current measured by means of the circuit described in figure 4 of IEC 60990		N
	For other appliances, a low impedance ammeter may be used		N
	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		N
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N

15	MOISTURE RESISTANCE		P
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		N
	Water valves containing live parts 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

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	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, and		N
	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, and		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
	Appliances with type X attachment fitted with a flexible cord as described		N
	Detachable parts subjected to the relevant treatment with the main part		N
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		N
15.2	Spillage of liquid does not affect the electrical insulation		N
	Appliances with type X attachment fitted with a lightest flexible cord as described		N
	Appliances incorporating an appliance inlet tested with or without an connector in position, whichever is most unfavourable		N
	Detachable parts removed		N
	The appliance withstands the electric strength test of 16.3		N
	No trace of liquid 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	25°C,93%,48h	P
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		P

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EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part		N
	Humidity test for 48 h in a humidity cabinet		P
	Reassembly of those parts that may have been removed		N
	The appliance withstands the tests of clause 16		P
15.101	Household film-welding appliances provided with a suction device shall be constructed so that suction of liquid does not impair electrical insulation (IEC 60335-2-45)		N

16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		--
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		N
	Tests carried out at room temperature and not connected to the supply		P
	Appliances supplied by a transformer and induction soldering irons are tested as motor-operated appliances (IEC 60335-2-45)		P
16.2	Single-phase appliances: test voltage 1.06 times rated voltage	240VX1.06	P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by $\sqrt{3}$		N
	Leakage current measurements	(see appended table)	P
	Limit values doubled if:		N
	- all controls have an off position in all poles, or		N
	- the appliance has no control other than a thermal cut-out, or		N
	- all thermostats, temperature limiters and energy regulators do not have an off position, or		N
	- the appliance has radio interference filters		N
	With the radio interference filters disconnected, the leakage current do not exceed limits specified	(see appended table)	N
16.3	Electric strength tests according to table 7	(see appended table)	P
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified	(see appended table)	P
	No breakdown during the tests		P

17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		--
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Clause	Requirement – Test	Result – Remark	Verdict
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use	(see appended table)	P
	Appliance supplied with 1.06 or 0.94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V).....:	240V X1.06=254.4V~	P
	Basic insulation is not short-circuited		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		P
	Temperature of the winding not exceeding the value specified in table 8,		P
	The test is not carried out on soldering guns and other appliances in which the heating element is part of the secondary circuit of a transformer (IEC 60335-2-45)		P
	however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N
18	ENDURANCE		--
	Requirements and tests are specified in part 2 when necessary		N
19	ABNORMAL OPERATION		--
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe	(see appended table)	P
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and		P
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and		P
	if applicable, to the test of 19.5		N
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6		N
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable		P
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		N
	Appliances incorporating voltage selector switches subjected to the test of 19.15		N
	Unless otherwise specified, the tests are continued until a non-self-resetting thermal cut-out operates, or		N
	until steady conditions are established		P
	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		N
	For heat guns and hot-air fire lighters, compliance is also checked by the test of 19.101 (IEC 60335-2-45)		P
19.2	Appliances are operated under the conditions specified in clause 11 but supplied at 0,94 times rated voltage. However, appliances in which the heating element is part of the secondary circuit of a transformer are operated continuously for 30 min unless they incorporate a biased-off switch, in which case they are operated for 5 min. Fire lighters are operated for 2 h without adding fuel (IEC 60335-2-45)	0.94 X 220V=206.8V	P
	Paint strippers incorporating integral scrapers are held horizontally in a clamp over the entire length of the handle. A force of 70 N is exerted on the scraper edge in the direction corresponding to normal use (IEC 60335-2-45)		N
19.3	The test of 19.2 is repeated with the appliance supplied at 1,06 times rated voltage (IEC 60335-2-45)	1.06 X 240V=254.4V	P
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited	Until temperature steady, No any hazards.	P
	Thermoplastic conduit-welding tools are operated with the fastest possible sequence of welding operations (IEC 60335-2-45)		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

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Clause	Requirement – Test	Result – Remark	Verdict
	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 (V)		N
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or		P
	locking moving parts of other appliances		P
	Locked rotor, capacitors open-circuited one at a time		N
	Test repeated with capacitors short-circuited one at a time, unless		N
	capacitor is of class P2 of IEC 60252-1		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)	P
19.8	Multi-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
	Motor operated and combined appliances for which 302.3 is applicable and that use overload protective devices relying on electronic circuits to protect the motor windings, are also subjected to the test		N
	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 (V).....		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		P

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Clause	Requirement – Test	Result – Remark	Verdict
	they comply with the conditions specified in 19.11.1		N
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless		N
	restarting does not result in a hazard		N
	Appliances having a device with an off position obtained by electronic disconnection, or a device placing the appliance in a stand-by mode, subjected to the tests of 19.11.4		P
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		P
	During and after each test the following is checked:		P
	- the temperature of the windings do not exceed the values specified in table 8		P
	- the appliance complies with the conditions specified in 19.13		P
	- any current flowing through protective impedance not exceeding the limits specified in 8.14		P
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		--
	- the base material of the printed circuit board withstands the test of Annex E		P
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29		P
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to circuits or parts of circuits meeting both of the following conditions:		--
	- 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
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit		N
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	(see appended table)	P
	c) short circuit of capacitors, unless	(see appended table)	P

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Clause	Requirement – Test	Result – Remark	Verdict
	they comply with IEC 60384-14		P
	d) short circuit of any two terminals of an electronic component, other than integrated circuits.		N
	This fault condition is not applied between the two circuits of an optocoupler		N
	e) failure of triacs in the diode mode		P
	f) failure of an integrated circuit		N
	g) failure of an electronic power switching device		N
	Each low power circuit is short-circuited by connecting the low-power point to the pole of the supply source from which the measurements were made		N
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 g) of 19.11.2		N
19.11.4	Appliances having a switch with an off position obtained by electronic disconnection, or		P
	a switch that can be placed in the stand-by mode,		P
	subjected to the tests of 19.11.4.1 to 19.11.4.7, the device being set in the off position or in the stand-by mode		P
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, the tests being carried out after the protective electronic circuit has operated, except that		N
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		N
	Surge protective devices disconnected, unless		P
	They incorporate spark gaps		P
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		P
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3		P
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		P
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		P
	Earthed heating elements in class I appliances disconnected		P

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Clause	Requirement – Test	Result – Remark	Verdict
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		P
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		P
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		P
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		P
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is 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		N
	requires a manual operation to restart		N
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)	Repeat tests, measured current: 20A, rated current of fuse: 6.3A.	P
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9.....:	(see appended table)	P
	Compliance with clause 8 not impaired		P
	If the appliance can still be operated it complies with 20.2.		P
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4:		--
	- basic insulation	1000V	P
	- supplementary insulation	1750V	P
	- 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		P
	no failure of protective electronic circuits, if the appliance is still operable		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		P
	- do not become operational		P
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		P
	If the appliance contains lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that:		N
	- the lid or door does not move automatically to an open position when the interlock is released, and		N
	- the appliance does not start after the cycle in which the interlock was released		N
	The temperature rise of the windings of induction soldering irons shall not exceed the values specified in 19.7. (IEC 60335-2-45)		N
	The electric strength test of induction soldering irons is carried out immediately after switching off the appliance. (IEC 60335-2-45)		N
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited		N
	For a relay or contactor with more than one contact, all contacts are short-circuited at the same time		N
	A relay or contactor operating only to ensure the appliance is energized for normal use is not short-circuited		N
	If more than one relay or contactor operates in clause 11, they are short-circuited in turn		N
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied		N
19.101	Heat guns and hot-air fire lighters are operated as specified in clause 11 until steady conditions are established. The voltage at the terminals of the motor is then reduced until the running speed of the motor is just sufficient to prevent the the thermal cut-out from operating, the power input to the heating element being maintained at 1,15 times rated power input (IEC 60335-2-45)		P
	The voltage is decreased at		--
	- 1 V per minute for motors having a working voltage not exceeding 30 V	24V	P
	- 5 V per minute for motors having a working voltage exceeding 30 V		N
	The appliances are then operated until steady conditions are established		P

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Clause	Requirement – Test	Result – Remark	Verdict
20	STABILITY AND MECHANICAL HAZARDS		--
20.1	Adequate stability		P
	Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn		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
	Hand-held appliances are subjected to the test while placed on their stands (IEC 60335-2-45)		P
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury	No such moving parts	N
	Protective enclosures, guards and similar parts are non-detachable, and		N
	have adequate mechanical strength		N
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		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
	Contact fire lighters shall have adequate stability (IEC 60335-2-45).		N

21	MECHANICAL STRENGTH		--
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 0,5 J		P
	The appliance shows no damage impairing compliance with this standard, and		P
	compliance with 8.1, 15.1 and clause 29 not impaired		P
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N
	If necessary, repetition of groups of three blows on a new sample		N

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Clause	Requirement – Test	Result – Remark	Verdict
	For hand-held appliances, compliance is also checked by the tests of 21.101 (IEC 60335-2-45)	Only for hand-part	P
	For contact fire lighters, compliance is also checked by the test of 21.102 (IEC 60335-2-45)		N
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	The insulation is tested as specified, unless		N
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		N
21.101	The supply cord of hand-held appliances is cut to a length of 100 mm, measured from the point where the cord, or cord guard, enters the appliance (IEC 60335-2-45)		P
	The appliance is dropped from a height of 1 m on to a hardwood base having a thickness of 50 mm		P
	This test is made five times, the appliance being in a position such that its major axis is horizontal and so that a different part of the appliance is exposed to the impact each time		P
	The appliance is then dropped five times with its major axis vertical and with the soldering tip, or corresponding part of other appliances, pointing downwards		P
	The appliance shall not be damaged to such an extent that compliance with this standard is impaired; in particular live parts shall not have become accessible		P
21.102	The handle of a new contact fire lighter is held firmly between two lightly padded surfaces with the heating element in a horizontal plane. The fire lighter is supplied at rated voltage. After 3 min a mass of 4,5 kg is suspended at the end of the heating element for 1 min. This mass is removed and the element is allowed to cool. If the element has been bent, it is straightened to its original position (IEC 60335-2-45)		N
	After the test, the live parts shall not be accessible and the fire lighter 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	N

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Clause	Requirement – Test	Result – Remark	Verdict
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	Not stationary appliance	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 I appliances, connected in 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		N
	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	No such X-capacitance	N
	The appliance is supplied at rated voltage. Any switch is then placed in the off position and the appliance is disconnected from the supply mains at the instant of voltage peak. One second after disconnection, the voltage between the pins of the plug is measured with an instrument that does not appreciably affect the value to be measured.		N
	The voltage did not exceed 34 V.		N
22.6	Electrical insulation not affected by condensing water or leaking liquid		N
	Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks		N
	In case of doubt, test as described		N
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices		N

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Clause	Requirement – Test	Result – Remark	Verdict
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, unless		P
	the substance has adequate insulating properties		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, if:		N
	- a non-self-resetting thermal cut-out is required by the standard, and		N
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		N
	Non-self-resetting thermal motor protectors have a trip-free action, unless		N
	they are voltage maintained		N
	Reset buttons of non-self-resetting controls so located or protected 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	50N push and pull force and applied to enclosure;	P
22.12	Handles, knobs etc. fixed in a reliable manner		P
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		P
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied	15N on power switch knob	P
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied	30N on adjust temperature switch knob	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

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Clause	Requirement – Test	Result – Remark	Verdict
	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		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless		N
	constructed to prevent inappropriate replacement		N
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		N
	material used is non-corrosive, non-hygroscopic and non-combustible		N
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless		P
	impregnated		N
	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
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported		P
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		P
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		P
22.26	For class III constructions the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		N

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Clause	Requirement – Test	Result – Remark	Verdict
22.27	Parts connected by protective impedance separated by double or reinforced insulation		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	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		P
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		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
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation		N
	Insulating material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		N
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts		N
	Electrodes not used for heating liquids		N

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Clause	Requirement – Test	Result – Remark	Verdict
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless		N
	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		N
	the reinforced insulation consists of at least 3 layers		N
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		N
22.34	Shafts of operating knobs, handles, levers etc. not live, unless		P
	the shaft is not accessible when the part is removed		N
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation		N
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		N
	This requirement does not apply to handles, levers and knobs on stationary appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N
	Insulation material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless		P
	they are separated from live parts by double or reinforced insulation		N
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N
	the capacitors comply with 22.42		N

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Clause	Requirement – Test	Result – Remark	Verdict
22.38	Capacitors not connected between the contacts of a thermal cut-out		N
22.39	Lamp holders used only for the connection of lamps		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		N
	If the appliance cannot operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation being fitted with a switch for stopping the operation. The actuating member of the switch being easily visible and accessible		N
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		N
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open circuited		N
	Resistors checked by the test of 14.1(a) in IEC 60065		N
	Capacitors checked by the test for class Y capacitors in IEC 60384-14		N
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.4 due to deformation as a result of an external force applied to the enclosure		N
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1		N
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		N

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Clause	Requirement – Test	Result – Remark	Verdict
	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		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
	These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard:		N
	- continuously, or		N
	- automatically, or		N
	- 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 have an integral stand (IEC 60335-2-45)	For hand-part	P
	Hand-held appliances intended to be used on a table or similar surface shall have an incorporated stand or be provided with a separate stand (IEC 60335-2-45)	For hand-part	P
	These requirements do not apply to appliances if they withstand the test of clause 11 without a stand (IEC 60335-2-45)		N
22.102	Desoldering irons shall incorporate a device for collecting the solder (IEC 60335-2-45)		N
22.103	Soldering guns shall incorporate a biased-off switch (IEC 60335-2-45)		N
22.104	If a drain hole is provided in appliances which are likely to suck liquid in normal use, it shall be at least 5 mm in diameter or have an area of 20 mm ² with a minimum width of 3 mm (IEC 60335-2-45)		N

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Clause	Requirement – Test	Result – Remark	Verdict
22.105	Thermoplastic conduit-welding tools shall incorporate a timer which provides all-pole disconnection of the welding circuit and has to be reset before further operation (IEC 60335-2-45)		N
	Repetition of the welding operation on the same fitting shall be prevented (IEC 60335-2-45)		N
22.106	Thermoplastic conduit-welding tools shall be constructed so that, when they are operated without fittings, the voltage at the connecting terminals is extra-low voltage and does not exceed 24 V (IEC 60335-2-45)		N
22.107	Fittings for thermoplastic conduit-welding tools shall be constructed so that at least basic insulation is provided on surfaces which are only accessible before the fitting is placed on the conduit (IEC 60335-2-45)		N
22.108	Class III dehorning tools shall be supplied with a transformer (IEC 60335-2-45)		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		P
	Wiring effectively prevented from coming into contact with moving parts		P
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges or corners	No such materials	N
	Beads inside flexible metal conduits contained within an insulating sleeve		N
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		P
	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	10 000 flexings	P
	100 flexings for conductors flexed during user maintenance		N
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Not more than 10% of the strands of any conductor broken, and		P
	not more than 30% for wiring supplying circuits that consume no more than 15W		P
23.4	Bare internal wiring sufficiently rigid and fixed		P
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		P
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		N
	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		P
	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	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		N
	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

24	COMPONENTS		--
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components	(see appended table)	P
	If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		P
	For components mentioned in 24.1.1 to 24.1.9 no additional tests specified in the relevant component standard are necessary other than those specified in 24.1.1 to 24.1.9		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Components not tested and found to comply with relevant IEC standard and components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard		N
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		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		N
	If the capacitors have to be tested, they are tested according to Annex F		N
24.1.2	Safety isolating transformers complying with IEC 61558-2-6		N
	If they have to be tested, they are tested according to Annex G		P
24.1.3	Switches complying with IEC 601058-1, the number of cycles of operation being at least 10 000		N
	If they have to be tested, they are tested according to Annex H		N
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N
	If the switch only operates a motor starting relay complying with IEC 60730-2-10 with the number of cycles of at least 10 000 as specified, the complete switching system need not be tested		N
	Switches incorporated in the hand-held part of appliances not intended exclusively for household use are subjected to 50 000 cycles of operation (IEC 60335-2-45)		N
24.1.4	Automatic controls complying with IEC 60730-1 with relevant part 2. The number of cycles of operation being:		N
	- thermostats: 10 000		N
	- temperature limiters: 1 000		N
	- voltage maintained non-self-resetting thermal cut-outs 1000		N
	- other non-self-resetting thermal cut-outs : 30		N
	- timers: 3 000		N

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Clause	Requirement – Test	Result – Remark	Verdict
	- energy regulators: 10 000		N
	The number of cycles for controls operating during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited		N
	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		P
	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 is IEC 62151		N
24.1.8	The relevant standard for thermal links is IEC 60691		P
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		P
24.1.9	Contactors and 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 cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance		N
24.2	Appliances not fitted with:		P
	- 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		P
	the solder has a melting point of at least 230 °C		N

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Clause	Requirement – Test	Result – Remark	Verdict
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/TR 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 42 V		N
	In addition, the motors comply with the requirements of Annex I		N
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770		N
	They are supplied with the appliance		N
	Appliances intended to be permanently connected to the water mains not 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, not causing a hazard in event of a failure		N
	One or more of the following conditions are to be met:		N
	- the capacitors are of class P2 according to IEC 60252-1		N
	- the capacitors are housed within a metallic or ceramic enclosure		N
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		N
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N

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EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		--
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		P
	- supply cord fitted with a plug		N
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance	AC inlet provided	P
	- 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	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains:		N
	- a set of terminals allowing the connection of a flexible cord		N
	- a fitted supply cord		N
	- a set of supply leads accommodated in a suitable compartment		N
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm)		N
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		N
25.5	Method for assemble supply cord with the appliance:		—

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Clause	Requirement – Test	Result – Remark	Verdict
	- type X attachment	AC inlet provided	N
	- type Y attachment		N
	- type Z attachment, if allowed in part 2		N
	Type Z attachment is allowed for (IEC 60335-2-45):		N
	- class III appliances		N
	- other appliances, unless they are provided with a polyvinyl chloride sheathed cord and the temperature rise of external metal parts exceeds 75 K		N
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		N
25.6	Plugs fitted with only one flexible cord		P
25.7	Supply cords for appliances other than class III appliances shall be one of the following types		—
	- rubber sheathed cord (60245 IEC 53)		N
	- Polychloroprene sheathed cords (60245 IEC 57)		N
	- crosslinked PVC insulated and sheathed cord (60245 IEC 88)		N
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		N
	<ul style="list-style-type: none"> light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances ≤ 3 kg 		N
	<ul style="list-style-type: none"> ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances 	H05VV-F	P
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		N
	heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances ≤ 3 kg		N
	<ul style="list-style-type: none"> heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances 		N
	Supply cords for class III appliances adequately insulated		N
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N
	Light polyvinyl chloride sheathed cords may be used for class III appliances and other hand-held appliances, regardless of the mass of the appliance (IEC 60335-2-45)		N

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	Polyvinyl chloride sheathed cords may be used for hand-held appliances having a rated power input not exceeding 100 W and a mass not exceeding 100 g, and for appliances provided with a biased-off switch, regardless of the temperature rise of external metal parts (IEC 60335-2-45)		N
	Polyvinyl sheathed cords are not allowed for thermoplastic conduit- welding tools and fire lighters (IEC 60335-2-45)		N
	The supply cord of class II dehorning tools shall be polychloroprene sheathed and be not lighter than heavy polychloroprene sheathed cord (code designation 245 IEC 66) (IEC 60335-2-45)		N
25.8	Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area (mm ²).....:	≤6A; 2x0.75 mm ²	P
	The length of the supply cord shall be at least (IEC 60335-2-45):		--
	- 1,5 m for fire lighters		N
	- 6 m for class II dehorning tools		N
25.9	Supply cord not in contact with sharp points or edges		P
25.10	Supply cord of class I appliances have a green/yellow core for earthing		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	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		N
25.13	Inlet opening so constructed as to prevent damage to the supply cord		P
	If the enclosure at the inlet opening is not of insulating material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided	Insulation material used	P
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is	sheathed supply cord	N
	class 0, or		N
	a class III appliance not containing live parts		N
25.14	Supply cords moved while in operation adequately protected against excessive flexing		N
	Flexing test:		N
	- applied force (N)		N
	- number of flexings		N

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Clause	Requirement – Test	Result – Remark	Verdict
	The test does not result in:		N
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		N
	- breakage of more than 10% of the strands of any conductor		N
	- separation of the conductor from its terminal		N
	- loosening of any cord guard		N
	- damage to the cord or the cord guard		N
	- broken strands piercing the insulation and becoming accessible		N
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage	AC inlet provided	N
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		N
	Pull and torque test of supply cord, values shown in table 12: pull (N); torque (not on automatic cord reel) (Nm) (first line of table 12: IEC 60335-2-45)..... :		N
	Cord not damaged and max. 2 mm displacement of the cord		N
25.16	Cord anchorages for type X attachments constructed and located so that:		N
	- 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		N
	they are 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
	- at least one part of the cord anchorage securely fixed to the appliance, unless		N
	it is part of a specially prepared cord		N
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		N
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N

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Clause	Requirement – Test	Result – Remark	Verdict
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		N
	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		N
	if of metal, they are insulated from accessible metal parts by supplementary insulation		N
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		N
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance		N
25.18	Cord anchorages only accessible with the aid of a tool, or		N
	Constructed so that the cord can only be fitted with the aid of a tool		N
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	The insulated conductors of the supply cord for type Y and Z attachment additionally insulated from accessible metal parts		N
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		N
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		N
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		N
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		N
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		N
25.22	Appliance inlet:		P
	- live parts not accessible during insertion or removal		P
	Requirement not applicable to appliance inlets complying with IEC 60320-1		P
	- connector can be inserted without difficulty		P

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Clause	Requirement – Test	Result – Remark	Verdict
	- the appliance is not supported by the connector		P
	- is not for cold conditions if temp. rise of external metal parts exceeds 75 K, unless		P
	the supply cord is not likely to touch such metal parts		P
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		N
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		N
	- the thickness of the insulation may be reduced		N
	The length of the interconnection cord of class III dehorning tools shall be at least 4 m (IEC 60335-2-45)		N
	If necessary, electric strength test of 16.3		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 that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		N
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		N

26	TERMINALS FOR EXTERNAL CONDUCTORS		--
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors	Y attachment	N
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts		N
	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 the connection of cables to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless		N
	the connections are soldered		N
	Screws and nuts not used to fix any other component, except		N

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Clause	Requirement – Test	Result – Remark	Verdict
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N
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		N
	Terminals fixed so that when the clamping means is tightened or loosened:		N
	- 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 9.6 of IEC 60999-1 the torque applied being equal to two-thirds of the torque specified (Nm)		N
	No deep or sharp indentations of the conductors		N
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		N
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		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,		N
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N

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Clause	Requirement – Test	Result – Remark	Verdict
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 ²)		N
	If a specially prepared cord is used, terminals need only be suitable for that cord		N
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		N
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		N
	conductors ends fitted with means 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 or 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
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		N

27	PROVISION FOR EARTHING		--
27.1	Accessible metal parts of Class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet		P
	Earthing terminals and earthing contacts not connected to the neutral terminal		P
	Class 0, II and III appliances have no provision for earthing		N
	Safety extra-low voltage circuits not earthed, unless		N
	protective extra-low voltage circuits		N
27.2	Clamping means adequately secured against accidental loosening		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm ² , and		P
	do not provide earthing continuity between different parts of the appliance		P
	Conductors cannot be loosened without the aid of a tool		P
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		P
	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 parts of the earthing terminal and the copper of the earthing conductor or other metal		P
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		P
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm		P
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		P
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		P
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 the clearances of basic insulation are based on the rated voltage of the appliance		P
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω)	0.063 < 0.1Ω	P
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.		N
	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	SCREWS AND CONNECTIONS	--
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Clause	Requirement – Test	Result – Remark	Verdict
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm		N
	Screws of insulating material not used for any electrical connection or connections providing earthing continuity		N
	Screws used for electrical connections or connections providing earthing continuity screw into metal		N
	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; torque-test as specified in table 14	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless		N
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		N
	This requirement does not apply to electrical connections in circuits of appliances for which:		N
	<ul style="list-style-type: none"> 30.2.2 is applicable and that carry a current not exceeding 0,5 A 		N
	<ul style="list-style-type: none"> 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
	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:		N

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Clause	Requirement – Test	Result – Remark	Verdict
	- 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
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		P
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		P
	if an alternative earthing circuit is provided		N
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are 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) or to provide basic insulation (Type 2), Annex J applies		N
	The microenvironment is pollution degree 1 under type 1 protection		N
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		N
	These values apply to functional, basic, supplementary and 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 distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable		P

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Clause	Requirement – Test	Result – Remark	Verdict
	Impulse voltage test not applicable:		--
	- when the microenvironment is pollution degree 3		N
	- for basic insulation of class 0 and class 01 appliances		N
	Appliances are in overvoltage category II		P
	A force of 2 N is applied to bare conductors, other than heating elements		N
	A force of 30 N is applied to accessible surfaces		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	The values of table 16 or the impulse voltage test of clause 14 are applicable	(see appended table)	P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		N
	Lacquered conductors of windings considered to be bare conductors		P
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16	(see appended table)	P
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage	(see appended table)	P
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		N
29.1.4	Clearances for functional insulation are the largest values determined from:		P
	- table 16 based on the rated impulse voltage	(see appended table)	P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		P
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		N
	the microenvironment is pollution degree 3, or		N
	the distances can be affected by wear, distortion, movement of the parts or during assembly		N
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		N

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Clause	Requirement – Test	Result – Remark	Verdict
	Lacquered conductors of windings considered to be bare conductors		P
	However, clearances at crossover points are not measured		P
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		P
	- table 16 based on the rated impulse voltage.....:		P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation		N
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160% of the withstand voltage required for basic insulation		N
	If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation		N
	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 are 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	(see appended table)	P
	Pollution degree 2 applies, unless		P
	- precautions taken to protect the insulation; pollution degree 1		N
	- insulation subjected to conductive pollution; pollution degree 3		N

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Clause	Requirement – Test	Result – Remark	Verdict
	A force of 2 N is applied to bare conductors, other than heating elements		N
	A force of 30 N is applied to accessible surfaces		P
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		N
29.2.1	Creepage distances of basic insulation not less than specified in table 17	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 17		N
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14		N
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or		P
	Table 2 of IEC 60664-4, as applicable.....		N
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or		P
	Table 2 of IEC 60664-4 as applicable.....		N
29.2.4	Creepage distances of functional insulation not less than specified in table 18	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18		N
	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 have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked:		P
	- 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 (IEC 60335-2-45)		

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Clause	Requirement – Test	Result – Remark	Verdict
	- by an electric strength test in accordance with 29.3.2, or		N
	- by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		N
	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 exceeding 30 kHz		N
29.3.1	Supplementary insulation have a thickness of at least 1 mm		P
	Reinforced insulation have 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 consist of at least 2 layers		N
	Reinforced insulation consist of at least 3 layers		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
	If natural mica in thin sheet form is used (IEC 60335-2-45)		N
	- 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
	- 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
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19		N

30	RESISTANCE TO HEAT AND FIRE		--
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		P
	parts of thermoplastic material providing supplementary or reinforced insulation		P

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Clause	Requirement – Test	Result – Remark	Verdict
	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)	(see appended table)	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)	(see appended table)	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).....	(see appended table)	P
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		--
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		N
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		P
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies		P
	- for unattended appliances, 30.2.3 applies		N
	For appliances for remote operation, 30.2.3 applies		N
	For base material of printed circuit boards, 30.2.4 applies		P
	For contact firelighters , 30.2.3 is applicable (IEC 60335-2-45)		N
	For other appliances, 30.2.2 is applicable (IEC 60335-2-45)		P
	The tests are carried out on parts of non-metallic material that have been removed from the appliance		P
	When the glow-wire test is carried out, the parts are placed in the same orientation as they would be in normal use		P
	These tests are not carried out on the insulation of wires.		P

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EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 °C	See appended tabel	P
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		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 need to meet the requirements in ISO 9772 for material classified HBF		N
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and		P
	parts of non-metallic material within a distance of 3mm of such connections,		P
	subjected to the glow-wire test of IEC 60695-2-11		P
	The test severity is:		--
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation	(See appended tabel)	P
	- 650 °C, for other connections	(See appended tabel)	P
	Glow-wire applied to an interposed shielding material, if relevant		N
	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 0,5 A during normal operation		N
	- 650 °C, for other connections		N
	The glow-wire test is also not carried out on small parts. These parts are to:		--
	- comprise material having a glow-wire flammability index of at least 750 °C, or 650 °C as appropriate, or		N
	- comply with the needle-flame test of Annex E, or		N
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10.....:		N
	Glow-wire test not applicable to conditions as specified		N
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		N
	The tests are not applicable to conditions as specified		N
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and		N

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Clause	Requirement – Test	Result – Remark	Verdict
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		N
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C		N
	Glow-wire applied to an interposed shielding material, if relevant		N
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		N
30.2.3.2	Parts of non-metallic material supporting 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
	The test severity is:		N
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N
	- 650 °C, for other connections		N
	Glow-wire applied to an interposed shielding material, if relevant		N
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		N
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N
	<ul style="list-style-type: none"> • 775 °C, for connections carrying a current exceeding 0,2 A during normal operation 		N
	<ul style="list-style-type: none"> • 675 °C for other connections 		N
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N
	- 650 °C, for other connections		N
	The glow-wire test is also not carried out on small parts. These parts are to:		N
	- comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N
	- comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N
	- comply with the needle-flame test of Annex E, or		N
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N

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Clause	Requirement – Test	Result – Remark	Verdict
	The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those:		N
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		N
	- parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N
	- small parts, that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N
	- small parts for which the needle-flame test of Annex E was applied, or		N
	- small parts for which a material classification of V-0 or V-1 was applied		N
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		N
	- parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10 or		N
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E		P
	Test not applicable to conditions as specified	V-0	P

31	RESISTANCE TO RUSTING		--
	Relevant ferrous parts adequately protected against rusting		P
	Tests specified in part 2 when necessary		N

32	RADIATION, TOXICITY AND SIMILAR HAZARDS		--
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		P
	Compliance is checked by the limits or tests specified in part 2, if relevant		N

EN 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		P

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:		N
	- 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.B.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
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		N
7.6	Symbols 60417-5005 and IEC 60417-5006		N
7.12	The instructions give information regarding charging		N
	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N
	Details about how to remove batteries containing materials hazardous to the environment given		N

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Clause	Requirement – Test	Result – Remark	Verdict
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 stated in the instructions or 24 h.....:		N
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		N
19.10	Not applicable		
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		N
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being:		N
	- 100, if the mass of the part does not exceed 250 g (g).....:		N
	- 50, if the mass of the 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 in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		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
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		--

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	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 necessary for compliance with the standard		N
	Test conditions as specified		N

E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		--
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		P
7	Severities		--
	The duration of application of the test flame is 30 s ± 1 s		P
9	Test procedure		P
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of figure 1		P
9.2	The first paragraph does not apply		P
	If possible, the flame is applied at least 10 mm from a corner		N
9.3	The test is carried out on one specimen		P
	If the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N
11	Evaluation of test results		P
	The duration of burning not exceeding 30 s		N
	However, for printed circuit boards, the duration of burning not exceeding 15 s		P

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:	Certified components	N
1.5	Terminology		N
1.5.3	Class X capacitors tested according to subclass X2		N

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Clause	Requirement – Test	Result – Remark	Verdict
1.5.4	This subclause is applicable		N
1.6	Marking		N
	Items a) and b) are applicable		N
3.4	Approval testing		N
3.4.3.2	Table 3 is applicable as described		N
4.1	Visual examination and check of dimensions		N
	This subclause is applicable		N
4.2	Electrical tests		N
4.2.1	This subclause is applicable		N
4.2.5	This subclause is applicable		N
4.2.5.2	Only table 11 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		N
	This subclause is applicable		N
	Only insulation resistance and voltage proof are checked		N
4.13	Impulse voltage		N
	This subclause is applicable		N
4.14	Endurance		N
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		N
4.14.7	Only insulation resistance and voltage proof are checked		N
	Visual examination, no visible damage		N
4.17	Passive flammability test		N
	This subclause is applicable		N
4.18	Active flammability test		N
	This subclause is applicable		N

G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		--
	The following modifications to this standard are applicable for safety isolating transformers:		P
7	Marking and instructions		P
7.1	Transformers for specific use marked with:		--
	- name, trademark or identification mark of the manufacturer or responsible vendor		P

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Clause	Requirement – Test	Result – Remark	Verdict
	- model or type reference		P
17	Overload protection of transformers and associated circuits		P
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N
22	Construction		P
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		P
29	Clearances, creepage distances and solid insulation		—
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		P
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		P
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		P
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 50 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1		N

H	ANNEX H (NORMATIVE) SWITCHES		--
	Switches comply with the following clauses of IEC 61058-1, as modified:		N
	-The tests of IEC 61058-1 carried out under the conditions occurring in the appliance	certificated	N
	-Before being tested, switches are operated 20 times without load		N
8	Marking and documentation		N
	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		N
	The tests may be carried out on a separate sample		N
15	Insulation resistance and dielectric strength		N
15.1	Not applicable		N
15.2	Not applicable		N
15.3	Applicable for full disconnection and micro-disconnection		N
17	Endurance		N

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	Compliance is checked on three separate appliances or switches		N
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless		N
	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		N
	switches operated by hand that are interlocked so that they cannot be operated under load,		N
	are not subjected to the tests		N
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		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		N
	This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in table 24		N

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		N
8.1	Metal parts of the motor are considered to be bare live parts		N
11	Heating		N
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		N

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
16.3	Insulation between live parts of the motor and its other metal parts not subjected to the test		N
19	Abnormal operation		N
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:		N
	- 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		N
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
	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:	Certificated PCB board	N
5.7	Conditioning of the test specimens		N
	When production samples are used, three samples of the printed circuit board are tested		N
5.7.1	Cold		N
	The test is carried out at - 25°C		N
5.7.3	Rapid change of temperature		N
	Severity 1 is specified		N
5.9	Additional tests		N
	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

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	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
	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		P
	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		N
	Minimum clearances specified where pollution may be present in the microenvironment		N
	Degrees of pollution in the microenvironment		--
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		P
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		P

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Clause	Requirement – Test	Result – Remark	Verdict
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		N
	- 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		—
7.3	Test solutions		—
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		—
10.1	Procedure		--
	The proof voltage is 100 V, 175 V, 400 V or 600 V .. :	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		N
	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		N
	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		N

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
5	General conditions for the tests		N
5.7	The ambient temperature for the tests of Clauses 11 and 13 is 40^{+3}_0 °C.		N
7	Marking and instructions		N
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		N
11.8	The values of Table 3 are reduced by 15 K		N
13	Leakage current and electric strength at operating temperature		N
13.2	The leakage current for class I appliances not exceeding 0,5 mA		N
15	Moisture resistance		N
15.3	The value of t is 37 °C		N
16	Leakage current and electric strength		N
16.2	The leakage current for class I appliances not exceeding 0,5 mA		N
19	Abnormal operation		N
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	P

R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION -	--
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 validated in accordance with the requirements of this annex	N
R.1	Programmable electronic circuits using software	N

EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 constructed so that the software does not impair compliance with the requirements of this standard		N
R.2	Requirements for the architecture		N
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software		N
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.2 have one of the following structures:		N
	- single channel with periodic self-test and monitoring		N
	- dual channel (homogenous) with comparison		N
	- dual channel (diverse) with comparison		N
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in table R.1 have one of the following structures:		N
	- single channel with functional test		N
	- single channel with periodic self-test		N
	- dual channel without comparison		N
R.2.2	Measures to control faults/errors		N
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area is stored in a different format from that in the other area		N
R.2.2.2	Programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.2 and that use dual channel structures with comparison, have additional fault/error detection means for any fault/errors not detected by the comparison		N
R.2.2.3	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, means are provided for the recognition and control of errors in transmissions to external safety-related data paths		N

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Clause	Requirement – Test	Result – Remark	Verdict
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the programmable electronic circuits incorporate measures to address the fault/errors in safety-related segments and data indicated in table R.1 and R.2 as appropriate		N
R.2.2.5	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired		N
R.2.2.6	The software is referenced to relevant parts of the operating sequence and the associated hardware functions		N
R.2.2.7	Labels used for memory locations are unique		N
R.2.2.8	The software is protected from user alteration of safety-related segments and data		N
R.2.2.9	Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired		N
R.3	Measures to avoid errors		N
R.3.1	General		N
	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in table R.1 or R.2, the following measures to avoid systematic fault in the software are applied		N
	Software that incorporates measures used to control the fault/error conditions specified in table R.2 is inherently acceptable for software required to control the fault/error conditions specified in table R.1		N
R.3.2	Specification		N
R.3.2.1	Software safety requirements:	Software Id:	N
	The specification of the software safety requirements includes the descriptions listed		N
R.3.2.2	Software architecture		N

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EN 60335-2-45			
Clause	Requirement – Test	Result – Remark	Verdict
R.3.2.2.1	The specification of the software architecture includes the aspects listed - techniques and measures to control software faults/errors (refer to R.2.2); - interactions between hardware and software; - partitioning into modules and their allocation to the specified safety functions; - hierarchy and call structure of the modules (control flow); - interrupt handling; - data flow and restrictions on data access; - architecture and storage of data; - time-based dependencies of sequences and data	Document ref. No:	N
R.3.2.2.2	The architecture specification is validated against the specification of the software safety requirements by static analysis		N
R.3.2.3	Module design and coding		N
R.3.2.3.1	Based on the architecture design, software is suitably refined into modules		N
	Software module design and coding is implemented in a way that is traceable to the software architecture and requirements		N
R.3.2.3.2	Software code is structured		N
R.3.2.3.3	Coded software is validated against the module specification by static analysis		N
	The module specification is validated against the architecture specification by static analysis		N
R.3.3.3	Software validation		N
	The software is validated with reference to the requirements of the software safety requirements specification		N
	Compliance is checked by simulation of:		N
	- input signals present during normal operation		N
	- anticipated occurrences		N
	- undesired conditions requiring system action		N

TABLE R.1 ^e – GENERAL FAULT/ERROR CONDITIONS				
Component ^a	Fault/error	Acceptable measures ^{b,c}	Definitions See IEC 60730-1	Verdict

EN 60335-2-45				
Clause	Requirement – Test		Result – Remark	Verdict
1 Central processing unit (CPU)				N
1.1 Registers	Stuck at	Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2	N
1.2 VOID				N
1.3 Programme counter	Stuck at	Functional test, or Periodic self-test, or Independent time-slot monitoring, or Logical monitoring of the programme sequence	H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2	N
2 Interrupt handling and execution	No interrupt or too frequent interrupt	Functional test, or time-slot monitoring	H.2.16.5 H.2.18.10.4	N
3 Clock	Wrong frequency (for quartz synchronized clock: harmonics/sub-harmonics only)	Frequency monitoring, or time slot monitoring	H.2.18.10.1 H.2.18.10.4	N
4 Memory				N
4.1 Invariable memory	All single bit faults	Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy	H.2.19.3.1 H.2.19.3.2 H.2.19.8.2	N
4.2 Variable memory	DC fault	Periodic static memory test, or word protection with single bit redundancy	H.2.19.6 H.2.19.8.2	N
4.3 Addressing (relevant to variable and invariable memory)	Stuck at	Word protection with single bit redundancy including the address	H.2.19.8.2	N
5 Internal data path	Stuck at	Word protection with single bit redundancy	H.2.19.8.2	N
5.1 VOID				N
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19.8.2	N

EN 60335-2-45				
Clause	Requirement – Test		Result – Remark	Verdict
6 External communication	Hamming distance 3	Word protection with multi-bit redundancy, or CRC – single work, or Transfer redundancy, or Protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14	N
6.1	VOID			N
6.2	VOID			N
6.3 Timing	Wrong point in time	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or Comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3	N
	Wrong sequence	Logical monitoring, or time-slot monitoring, or Scheduled transmission	H.2.18.10.2 H.2.18.10.4 H.2.18.18	
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13	N
7.1	VOID			N
7.2 Analog I/O				N
7.2.1 A/D and D/A-converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13	N
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13	N
8	VOID			N
9 Custom chips ^d e.g. ASIC, GAL, gate array	Any output outside the static and dynamic functional specification	Periodic self test	H.2.16.6	N

NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines.

^a For fault/error assessment, some components are divided into their sub-functions.

^b For each sub-function in the table, the Table R.2 measure will cover the software fault/error.

^c Where more than one measure is given for a sub-function, these are alternatives.

^d To be divided as necessary by the manufacturer into sub-functions.

^e Table R.1 is applied according to the requirements of R.1 to R.2.2.9 inclusive.

EN 60335-2-45 EU GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement – Test	Result – Remark	Verdict

ZA	ANNEX ZA, SPECIAL NATIONAL CONDITIONS (EN 60335-1:2012)		--
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ATTACHMENT TO TEST REPORT IEC 60335-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Household and similar electrical appliances – Safety – Part 1: GENERAL REQUIREMENTS			
Differences according to.....: EN 60335-1:2012			
Attachment Form No.: EU_GD_IEC60335_1R			
Attachment Originator.....: Nemko AS			
Master Attachment.....: 2012-03			
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CENELEC COMMON MODIFICATIONS			
6.1	Delete “class 0” and “class 01”		N
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:		--
	• a tactile feedback, or		N
	• an audible and visual feedback		P
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
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

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EN 60335-2-45 EU GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement – Test	Result – Remark	Verdict
	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		N
11.8	Footnotes to “External enclosure of motor-operated appliances” to be taken into account		N
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		N
	Test probe 18 applied with a force of 2,5N on the appliance fully assembled		N
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:		P

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EN 60335-2-45 EU GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement – Test	Result – Remark	Verdict
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		P
	- 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		N
	components that are not marked or not used in accordance with their marking,		N
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard		N
	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
	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

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EN 60335-2-45 EU GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement – Test	Result – Remark	Verdict
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:		--
	- for Class I appliances: standard sheet C2b, C3b or 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"> halogen-free thermoplastic compound sheathed cords (H03Z1Z1H2-F or H03Z1Z1-F), for appliances having a mass not exceeding 3 kg 		N
	<ul style="list-style-type: none"> halogen-free thermoplastic compound sheathed cords (H05Z1Z1H2-F or H05Z1Z1-F), for other appliances 		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 50366 or 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
Annex ZA	Variations to IEC 60335-2-45 & EN 60335-2-45 for Special national conditions		--

EN 60335-2-45 EU GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement – Test	Result – Remark	Verdict
	No special national conditions causing a deviation from the European Standard		N

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Tables

10.1	TABLE: Power input deviation					P
Input deviation of/at:	P rated (W)	P measured (W)	Dp	Required Dp	Remark	
230V/50Hz	850	806.3	- 5.14%	+5 % or 20 W (whichever is the greater) -10 %	Max. setting	
230V/60Hz	850	810.5	- 4.65%	+5 % or 20 W (whichever is the greater) -10 %	Max. setting	
Supplementary information:						

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

11.8(1)	TABLE: Heating test, thermocouple measurements			P
Test voltage (V)	240VX1.06=254.4V~		--	
Ambient, t1 (°C)	24.5°C		--	
Ambient, t2 (°C)	24.8°C		--	
Thermocouple locations	Max. temperature rise measured, dT (K)	Max. temperature rise limit dT (K)		
1. Power Supply cord	17.4	50		
2. AC inlet	24.9	45		
3. AC connector	22.9	Ref.Cl.30		
4. Ambient of power switch	23.6	T105-25=80		
5. Transformer primary winding	43.5	85		
6. Transformer secondary winding	45.8	85		
7. Transformer core	37.1	--		
8. Input wire	23.8	T105-25=80		
9. PCB near U4	46.9	T130-25=105		
10. C5 E-cap body	47.2	T105-25=80		
11. PCB near U9	32.5	T130-25=105		
12. PCB for heat gun	6.0	T130-25=105		
13. Internal wire for heat gun	37.2	T80-25=60		
14. Fan winding for heat gun	37.7	85		
15. Plastic enclosure inside near heater for heat gun	68.8	Ref.Cl.30		

Tables

16. Plastic enclosure outside near heater for heat gun	23.8	60
17. Handle for heat gun	45.6	50
18. Plastic enclosure inside near heater for soldering iron	97.2	Ref.Cl.30
19. Handle for soldering iron	25.2	50
20. Soldering iron holder	139.9	Ref.Cl.30
21. LCD panel	12.2	60
22. Channel button knob	8.8	60
23. Channel power button knob	8.2	60
24. Adjust switch knob	6.3	60
25. Metal enclosure outside near transformer	19.8	35
26. Bottom cover	21.3	60
27. Power switch knob	8.6	60
28. Test corner floor	11.1	65
29. Ambient	24.8	--
<i>Supplementary information:</i>		

11.8 (2)	TABLE: Heating test, resistance method					P
	Test voltage (V).....	240VX1.06=254.4V~				—
	Ambient, t1 (°C)	24.5				—
	Ambient, t2 (°C)	24.8				—
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Transformer primary winding	40.7	49.5	55.7	95	B	
Transformer secondary winding	6.7	8.2	57.7	95	B	
<i>Supplementary information:</i>						

13.2	TABLE: Leakage current			P
	Heating appliances: 1.15 x rated input	--		—
	Motor-operated and combined appliances: 1,06 x rated voltage	254.4 V~		—
Leakage current between		I (mA)	Max. allowed I (mA)	
L/N to soldering iron hand plastic part		0.005	0.35 mApeak	
L/N to heat gun hand plastic part		0.005	0.35 mApeak	
L/N to power switch knob		0.005	0.35 mApeak	
L/N to metal part		0.015	0.75mA	
<i>Supplementary information:</i>				

Tables

13.3	TABLE: Electric strength			P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)	
L/N to soldering iron hand plastic part		3000V	No	
L/N to heat gun hand plastic part		3000V	No	
L/N to power switch knob		3000V	No	
L/N to metal part		1000V	No	
Supplementary information:				

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

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)	
L/N to soldering iron hand plastic part		0.008	0.25	
L/N to heat gun hand plastic part		0.008	0.25	
L/N to power switch knob		0.008	0.25	
L/N to metal part		0.020	0.75	
Supplementary information:				

16.3	TABLE: Electric strength			P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)	
L/N to soldering iron hand plastic part		3000V	No	
L/N to heat gun hand plastic part		3000V	No	
L/N to power switch knob		3000V	No	
L/N to metal part		1250V	No	
Supplementary information:				

17(a)	OVERLOAD PROTECTION OF TRANSFORMER (30V output)			P
Condition	:	1) Overload 2) Short-circuit		—
Ambient, t1 (°C)	:	24.3		—

Tables

	Ambient, t ₂ (°C)	24.6	-	
*	temperature rise dT of part/at:	dT (K)		Required dT (K)
		1) Overload	2) Short-circuit	
		254.4V	254.4V	
	Transformer primary winding	163.5	172.4	200=225-25
	Transformer secondary winding	169.3	180.5	200=225-25
Result: Transformer output (30V) short, after 1mins 40S, Transformer thermal link was opened, Passed Hi-pot test, no hazards.				

17(b)	OVERLOAD PROTECTION OF TRANSFORMER(26V output)			P
	Condition :	3) Overload 4) Short-circuit		-
	Ambient, t ₁ (°C)	24.4		-
	Ambient, t ₂ (°C)	24.9		-
*	temperature rise dT of part/at:	dT (K)		Required dT (K)
		1) Overload	2) Short-circuit	
		254.4V	254.4V	
	Transformer primary winding	141.2	159.3	200=225-25
	Transformer secondary winding	148.9	162.5	200=225-25
Result: Transformer output (26V) short, after 1mins 56S, Transformer thermal link was opened, Passed Hi-pot test, no hazards.				

17(c)	OVERLOAD PROTECTION OF TRANSFORMER(10V output)			P
	Condition :	5) Overload 6) Short-circuit		-
	Ambient, t ₁ (°C)	24.2		-
	Ambient, t ₂ (°C)	24.8		-
*	temperature rise dT of part/at:	dT (K)		Required dT (K)
		1) Overload	2) Short-circuit	
		254.4V	254.4V	
	Transformer primary winding	141.3	150.3	200=225-25
	Transformer secondary winding	145.2	151.8	200=225-25
Result: Transformer output (10V) short, after 3mins 25S, Transformer thermal link was opened, Passed Hi-pot test, no hazards.				

19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Test voltage (V)	240V		—
	Ambient, t ₁ (°C)	24.5		—

Tables

Ambient, t ₂ (°C).....:		24.8			—	
Temperature of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	T (°C)	Max. T (°C)	
Fan winding for heat gun	--	--	--	42.8	175	
<i>Supplementary information:</i> Lock motor fan, Heat gun continuously work, after 25s, Thermal cut-out operate, no damage, no hazard.						

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

19.11.2	TABLE: Abnormal operation, fault conditions				P / F
Component tested	Fault	Test voltage(V)	Test time	Result	
D1	S-C	240	10min	Input decreased from 760W/0.32A to 68.0W/0.28A to 274W/1.18A to 900W/3.2A to 0W/0A, after 3mins 25S, Transformer thermal link was opened.	
C9	S-C	240	10min	Input decreased from 760W/0.32A to 2.5W/0.03A. R6 damage immediately, Repeat three time, no hazards.	
U1 pin 1-2	S-C	240	10min	Input decreased from 760W/0.32A to 6.5W/0.07A. Unit shut down, recoverable, no damage, no hazards.	
U1 pin 1-3	S-C	240	30min	Input decreased from 760W/0.32A to 450W/0.19A to 230W/0.16A. Unit can not work as normal, continuously work until steady conditions are established, U1 damage, no hazards.	
U1 pin 2-3	S-C	240	10min	Input decreased from 760W/0.32A to 6.5W/0.07A. Unit shut down, recoverable, no damage, no hazards.	
U4 pin A-K	S-C	240	30min	Input decreased from 120W/0.45A to 85W/0.32A. Soldering iron continuously work until steady, conditions are established, no damage, no hazards.	
U4 pin A-G	S-C	240	30min	Input decreased from 120W/0.45A to 85W/0.32A. Soldering iron continuously work until steady, conditions are established, no damage, no hazards.	
U4 pin G-K	S-C	240	10min	Input decreased from 120W/0.45A to 7.0W/0.08A. Unit shut down, recoverable, no damage, no hazards.	

Tables

U11 pin A-K	S-C	240	3hours36min	Input decreased from 750W/0.32A to 450W/0.19A, Heat gun continuously work, after 1mins 5s, Thermal cut-out operate, no damage, no hazard.
U11 pin A-G	S-C	240	3hours30min	Input decreased from 750W/0.32A to 450W/0.19A. Heat gun continuously work, after 1mins 4s, Thermal cut-out operate, no damage, no hazard.
U11 pin G-K	S-C	240	10min	Input decreased from 750W/0.32A to 7.0W/0.08A. Unit shut down, recoverable, no damage, no hazards.

Supplementary information:

1, S-C=short-circuited, O-C=open-circuited, O-L=overload.

2, After the single fault test the unit passed 3000V hi-pot test between primary and accessible parts.

19.13	TABLE: Abnormal operation, temperature rises		P
Thermocouple locations	Max. temperature rise measured, dT (K)	Max. temperature rise limit, dT (K)	
Clause 19. 2(0.94 * 220V=206.8V)			
Power Supply cord	10.8	150	
AC inlet	14.5	Ref. Cl30	
AC connector	14.0	Ref. Cl30	
Transformer primary winding	24.6	200=225-25	
Transformer secondary winding	26.6	200=225-25	
LCD panel	11.4	Ref. Cl30	
Plastic enclosure	87.0	Ref. Cl30	
Soldering iron holder	133.4	Ref. Cl30	
Handle for heat gun	78.7	Ref. Cl30	
Test corner floor	10.6	150	
Ambient: 24.2°C			
Clause 19. 3(1.06 * 240V=254.4V)			
Power Supply cord	11.0	150	
AC inlet	16.4	Ref. Cl30	
AC connector	15.7	Ref. Cl30	
Transformer primary winding	27.1	200=225-25	
Transformer secondary winding	29.0	200=225-25	
LCD panel	12.3	Ref. Cl30	
Plastic enclosure	94.7	Ref. Cl30	
Soldering iron holder	136.7	Ref. Cl30	
Handle for heat gun	80.5	Ref. Cl30	

Tables

Thermocouple locations	Max. temperature rise measured, dT (K)	Max. temperature rise limit, dT (K)
Test corner floor	11.0	150
Ambient: 24.8°C		
Clause 19. 4(1.06 * 240V=254.4V) (Short circuit U4 pin A-K, Soldering iron continuously work until steady conditions are established, no damage, no hazards.)		
Power Supply cord	11.4	150
AC inlet	25.6	Ref. Cl30
AC connector	23.6	Ref. Cl30
Transformer primary winding	47.2	200=225-25
Transformer secondary winding	48.3	200=225-25
LCD panel	18.7	Ref. Cl30
Plastic enclosure	102.4	Ref. Cl30
Soldering iron holder	139.5	Ref. Cl30
Handle for heat gun	84.6	Ref. Cl30
Test corner floor	18.6	150
Ambient: 24.7°C		
Clause 19. 4(1.06 * 240V=254.4V) (Short circuit U11 pin A-K, heat gun continuously work, after 1mins 6s, Thermal cut-out operate, no damage, no hazard.)		
Power Supply cord	20.6	150
AC inlet	27.8	Ref. Cl30
AC connector	25.7	Ref. Cl30
Transformer primary winding	53.6	200=225-25
Transformer secondary winding	58.9	200=225-25
LCD panel	17.5	Ref. Cl30
Plastic enclosure	108.6	Ref. Cl30
Soldering iron holder	140.1	Ref. Cl30
Handle for heat gun	85.3	Ref. Cl30
Test corner floor	14.5	150
Ambient: 24.8°C		

23.5	TABLE: Electric strength measurements for basic insulation of internal wiring		P	
	Test voltage applied between:	Test voltage (V)		Breakdown
	Internal wire	2000		No
	Transformer lead wire	2000		No

Tables

24.1	TABLE: Components					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Power plug for EU	Shenzhen HongPu Electron Co., Ltd.	XTH-005	250VAC, 16A	DIN VDE 0620-1	VDE 40026370	
Power plug for BS	Unirise Electric Wire & Cable Co., Limited	UE-324	AC 250V; 13A (Built-in 5A/13A current fuse)	BS 1363	BSI* ASTA Licence No. 941	
Connector	Shenzhen HongPu Electron Co., Ltd.	XTH-021	250VAC, 10A	EN 60320-1	VDE 40025516	
(Alternative)	Hong Shan Chuan Industry (Shen Zhen) Co., Ltd.	HSC-406	250VAC, 10A	EN 60320-1	VDE 40025516	
Power cord	Gold Mark (China) Ltd.	H05VV-F	3×0.75 mm ²	EN 50525-2-11	VDE 117374	
(Alternative)	Hong Shan Chuan Industry (Shen Zhen) Co., Ltd.	H05VV-F	3×0.75 mm ²	EN 50525-2-11	VDE 40037206	
Appliance inlet	Zhe Jiang Bei Er Jia Electronic Co., Ltd.	ST-A01-004K	AC 250V, 10A	EN 60320-1	VDE 40023738	
Fuse	Conquer Electronics Co., Ltd.	UFE	6.3A, AC250V	EN 60127-1 EN 60127-3	VDE 40008020	
Fuse holder	Hongju (Dongguan) Electronic & Metal Products Co., Ltd.	FH1	6.3A, AC250V	EN 60127-1 EN 60127-3	VDE 40028467	
Power switch	Zhe Jiang Bei Er Jia Electronic Co., Ltd.	PS8A	AC250V, 6A, T105, 10E3	EN 61058-1	VDE 40027141	
Input wire	Leader Electric Wire & Cable Co Ltd	16#2	20AWG, 105°C, 300V	UL 758	UL E154283	
Heating shrinkable Tube	Guangzhou Kaiheng New Material Co., Ltd.	K-102	600 V; 125 °C	UL 224	UL E321827	
Transformer	Guangzhou Julong Electronic Co., Ltd.	E166X40#	I/P: 220V/50Hz O/P: 26VAC, 1A, (Blue-Blue) 10VAC, 200MA (green-Green), 30VAC, 150MA (Red-Red), Class B	EN 60335-1 EN 60335-2-45	Tested with appliance	
-Primary winding	Jiangmen City Jiang Ci Electrical Appliances Enterprise Co., Ltd	XUEW-UL@	130°C	UL 1446	UL E192838	
-Secondary winding	Jiangmen City Jiang Ci Electrical Appliances Enterprise Co., Ltd	XUEW-UL@	130°C	UL 1446	UL E192838	
-Bobbin	Shun De High & New Plastic Co., Ltd.	FR601/PPS	V-0, 1.7-1.9 130 °C	UL 94	UL E227341	

Tables

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
-Insulation tape	Jingjiang Heng He Rubber Industry Co., Ltd.	Polyester tape2	Layer 0.055mmX2 130 °C	UL 510	UL E219145
-Varnish	Tai Hu Co Ltd	ET-90(a)	Class F, 155 °C, 600V	UL 1446	UL E233623
-Thermal link	Dongguan Wancheng Fuse Co. Ltd.	L.3	250VAC, 2A, Tf130	EN 60691	VDE 40019590
-Primary lead wire	Leader Electric Wire & Cable Co Ltd	1672	20AWG, 105 °C, 300V	UL 758	UL E154283
-Secondary lead wire	Leader Electric Wire & Cable Co Ltd	1007	24AWG, 80 °C, 300V	UL 758	UL E154283
PCB	Shenzhen Bangde Circuit Co., Ltd.	BD-1	V-0, 130 °C	UL 94	UL E348757
Internal wire	Leader Electric Wire & Cable Co Ltd	1007	24AWG, 80 °C, 300V	UL 758	UL E154283
DC fan	Shenzhen cool Rui Electronics Co. Ltd.	HDS-5015H	DC24V, 0.2A	EN 60335-1 EN 60335-2-80	TUV/ CE
Control panel	Samsung Total Petrochemicals Co., Ltd.	HJ730+	PP HB 115 °C	UL 94	UL E140331
Temperature adjust switch knob	Samsung Total Petrochemicals Co., Ltd.	HJ730+	PP HB 115 °C	UL 94	UL E140331
Display Cover	Formosa Chemicals & Fibre Corp Plastics DIV	K1041	PP, 65 °C, HB	UL 94	UL E162823
Soldering iron holder	Tosoh Corp Polymers Div	GS-40	PPS, V-0, 220 °C	UL 94	UL E102861
Soldering iron handle	Tosoh Corp Polymers Div	GS-40	PPS, V-0, 220 °C	UL 94	UL E102861
Heat gun support	Tosoh Corp Polymers Div	GS-40	PPS, V-0, 220 °C	UL 94	UL E102861
Heat gun handle	Tosoh Corp Polymers Div	GS-40	PPS, V-0, 220 °C	UL 94	UL E102861
Thermal cut-out	Dongguan Kain Electronic Sci. & Tech. Co. Ltd.	KI66-*	250V~,130 °C	EN 60730-1 EN 60730-2-2	VDE 40031876

Supplementary information: ¹⁾ Indicates a mark which assures the agreed level of surveillance

25.15	TABLE: supply connection, strain relief test					N
Appliance mass (kg)	Pull force (N)	Duration for each time	Times	Result	Limited displacement	
--	--	--	--	--	≤2mm	
Remark: Appliance inlet was used						

Tables

28.1	TABLE: Threaded part torque test			P
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)	
Enclosure	3.15	II	0.6	
Transformer	3.00	II	0.5	
<i>Supplementary information:</i>				

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Tables

29.1	TABLE: Clearances					P
	Overvoltage category	II				—
		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic (mm)	Functional (mm)	Supplementary (mm)	Reinforced (mm)	Verdict / Remark
330	0,2* / 0,5 / 0,8**	---	---	---	---	N
500	0,2* / 0,5 / 0,8**	---	---	---	---	N
800	0,2* / 0,5 / 0,8**	---	---	---	---	N
1 500	0,5 / 0,8** / 1,0***	---	---	---	---	N
2 500	1,5 / <u>2,0</u> ***	Min 8.0mm	Min 3.1mm	Min 4.8mm	---	P
4 000	3,0 / <u>3,5</u> ***	---	---	---	Min 8.8mm	P
6 000	5,5 / 6,0***	---	---	---	---	N
8 000	8,0 / 8,5***	---	---	---	---	N
10 000	11,0 / 11,5***	---	---	---	---	N
Supplementary information:						
*) For tracks on printed circuit boards if pollution degree 1 and 2						
**) For pollution degree 3						
***) If the construction is affected by wear, distortion, movement of the parts or during assembly						

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Tables

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

Tables

Working voltage (V)	Creepage distance (mm) Pollution degree										Verdict
	1	2			3			Type of insulation			
	Material group				Material group						
	I	II	IIIa/IIIb	I	II	IIIa/IIIb ^{*)}	B ^{**)}	S ^{**)}	R ^{**)}		
>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
>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

Supplementary information:

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

^{**)} B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation

Tables

29.2	TABLE: Creepage distances, functional insulation							P
Working voltage (V)	Creepage distance(mm) Pollution degree							Verdict / Remark
	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	2,0	2,5	2,8	3,2	P(L to N: 3.1mm)
>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

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Tables

TABLE 30		RESISTANCE TO HEAT, FIRE AND TRACKING (appended table)											P	
Component	Manufacturer	Type	Ball pressure test				Tracking test [CTI/ PTI]	Glow wire test					Needle-flame test	Verdict
			75°C	cl. 11 +40°C	125° C	cl. 19 +25°C		GWT 550°C	GWT 650°C	GWT 750°C	GWFI 850°C	GWIT		
AC inlet	See table 24.1	See table 24.1	--	--	X 0.8 mm	--	--	--	--	X	X	--	--	P
AC connector	See table 24.1	See table 24.1	--	--	X 1.0 mm	--	--	--	--	X	X	--	--	P
PCB	See table 24.1	See table 24.1	--	--	X 1.1 mm	--	--	--	--	X	X	--	--	P
Plastic (soldering iron)	See table 24.1	See table 24.1	--	X 1.2 mm	--	--	--	X	--	--	--	--	--	P
Plastic (heat gun)	See table 24.1	See table 24.1	--	X 0.9 mm	--	--	--	X	--	--	--	--	--	P
LCD panel	See table 24.1	See table 24.1	X 0.8 mm	--	--	--	--	X	--	--	--	--	--	P
Transformer bobbin	See table 24.1	See table 24.1	--	--	X 1.0 mm	--	--	--	--	X	X	--	--	P
soldering iron holder	See table 24.1	See table 24.1	--	X 0.8 mm	--	--	--	X	--	--	--	--	--	P

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Tables

TABLE 30		RESISTANCE TO HEAT, FIRE AND TRACKING (appended table)											P	
Component	Manufacturer	Type	Ball pressure test				Tracking test [CTI/ PTI]	Glow wire test					Needle-flame test	Verdict
			75°C	cl. 11 +40°C	125°C	cl. 19 +25°C		GWT 550°C	GWT 650°C	GWT 750°C	GWFI 850°C	GWIT		
heat gun holder	See table 24.1	See table 24.1	--	X 0.8 mm	--	--	--	X	--	--	--	--	--	P
<p><i>Supplementary information:</i></p> <p>1) Parts of material classified at least HB40 or if relevant HBF</p> <p>2) Parts of material classified as V-0 or V-1</p> <p>3) Flame persisting longer than 2 s (= te – ti) need only be reported for unattended appliances</p> <p>4) Surrounding parts subjected to the needle-flame test of annex E</p> <p>5) Base material classified as V-0 or if relevant VTM-0</p> <p>6) The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not applicable for attended appliances</p>														

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Pictures



Fig. 1 -- Overview-1



Fig. 2 -- Electric soldering iron overview

Pictures



Fig. 3 -- Front overview

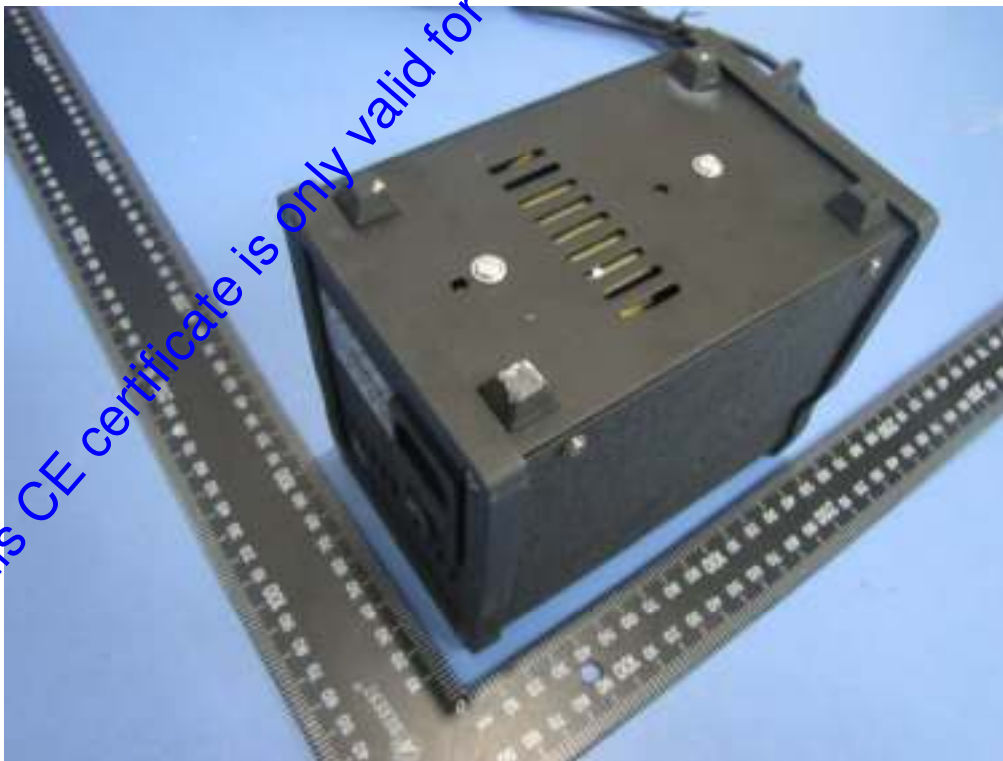


Fig. 4 -- Bottom overview

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Pictures



Fig. 5 -- Control panel overview



Fig. 6 -- Appliance inlet overview

Pictures



Fig. 7 -- Internal overview-1

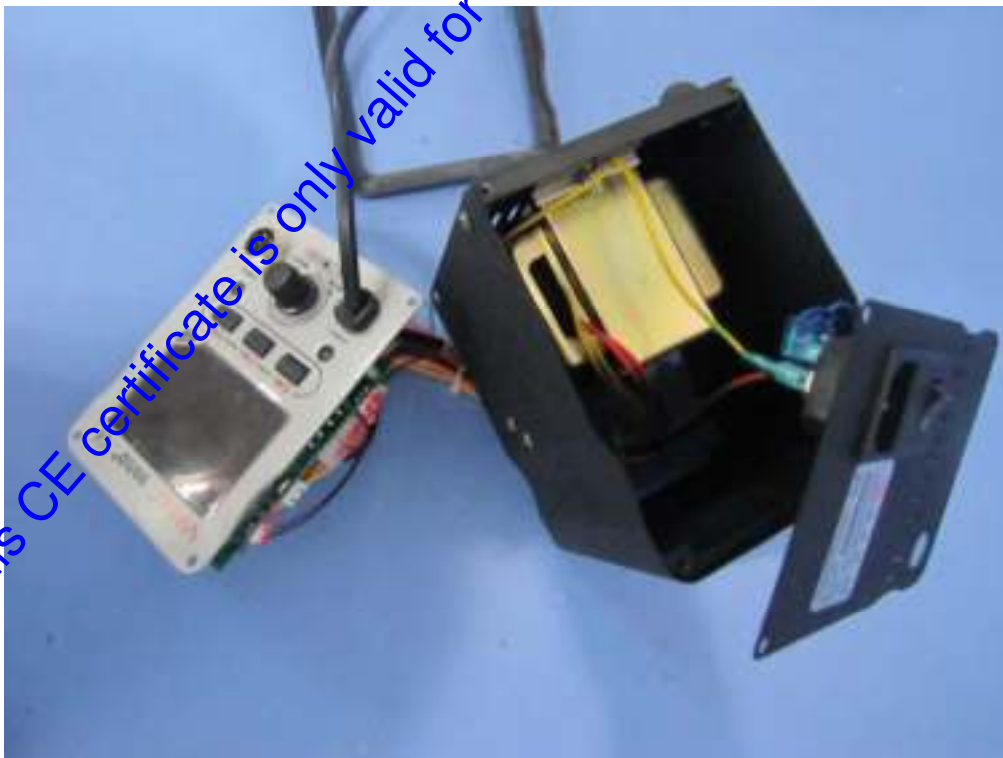


Fig. 8 -- Internal overview-2

Pictures



Fig. 9 -- Internal overview-3

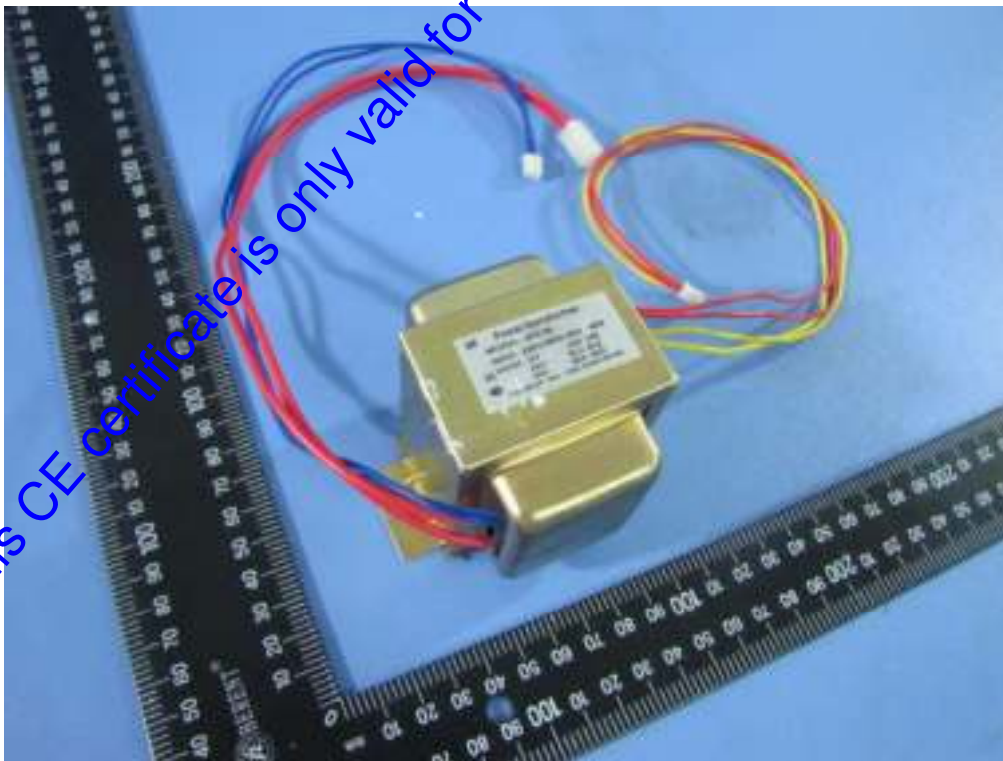


Fig. 10 -- Transformer overview-1

Pictures

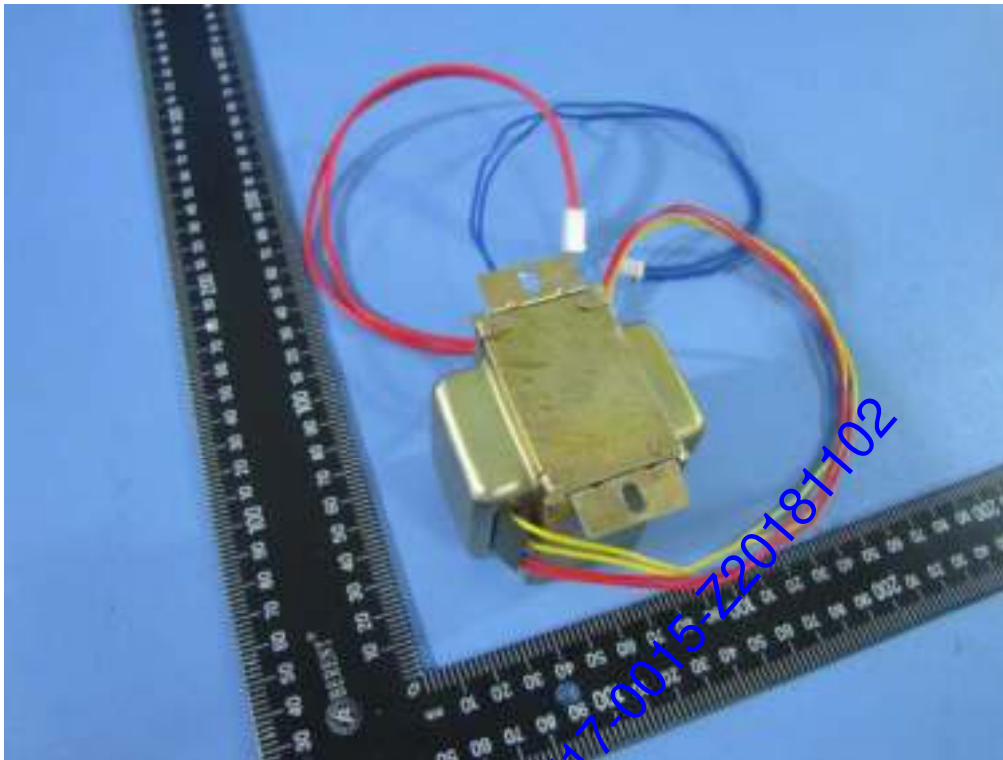


Fig. 11 -- Transformer overview-2



Fig. 12 -- Earthing connector overview

Pictures



Fig. 13 -- PCB component side overview



Fig. 14 -- PCB trace side overview

Pictures



Fig. 15 -- BS power plug and cord overview



Fig. 16 -- BS power plug overview