



LVD TEST REPORT

Report No. : NTEK-2015NT06162064S

Product : Residential Pipe heating cable

Model No. : PFPC1-1A080, PFPC1-1A003, PFPC1-1A006,
PFPC1-1A009, PFPC1-1A012, PFPC1-1A015,
PFPC1-1A018, PFPC1-1A024, PFPC1-1A030,
PFPC1-1A040, PFPC1-1A060

Applicant : Yangzhou E-poly Technology Co., Ltd.

Address : No.12, Lingbo Road, Economic Development Area,
Gaoyou City, Jiangsu Province, China

Issued by : Shenzhen NTEK Testing Technology Co., Ltd.

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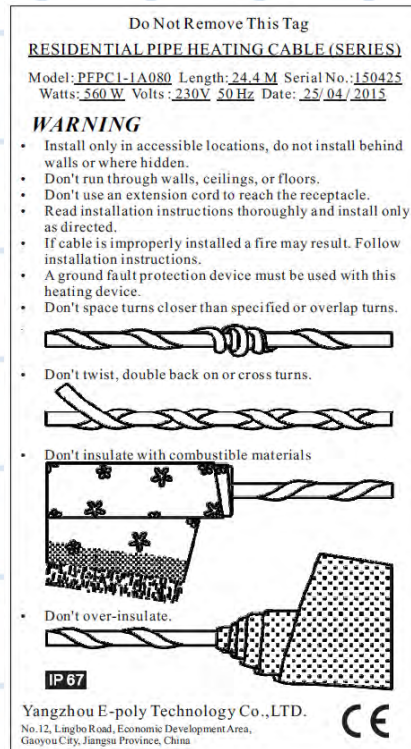
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TEST REPORT IEC/EN 60335-2-96 Household and similar electrical appliances – Safety - Part 2 : Particular requirements for flexible sheet heating elements for room heating	
Report Number	NTEK-2015NT06162064S
Tested by (+ signature)	Helen Lin
Approved by (+ signature)	Coco Li
Date of issue	July 13, 2015
Testing laboratory	Shenzhen NTEK Testing Technology Co., Ltd.
Address	1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China
Testing location	Same as above
Applicant's name	Yangzhou E-poly Technology Co., Ltd.
Address	No.12, Lingbo Road, Economic Development Area, Gaoyou City, Jiangsu Province, China
Test specification:	
Standard	<input type="checkbox"/> IEC 60335-2-96:2002 + A1:2003 + A2: 2008 in conjunction with IEC 60335-1:2010 <input checked="" type="checkbox"/> EN 60335-2-96:2002 + A1:2004 + A2:2009 in conjunction with EN 60335-1:2012 + A11:2014 <input checked="" type="checkbox"/> EN 62233:2008
Test procedure	LVD approval
Non-standard test method	N/A
Test Report Form No.	IEC60335_2_96F
Test Report Form(s) Originator	DEKRA Certification B.V.
Master TRF	Dated 2013-01
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Test item description	Residential Pipe heating cable
Trade Mark	E-POLY
Manufacturer	Yangzhou E-poly Technology Co., Ltd.
Address	No.12, Lingbo Road, Economic Development Area, Gaoyou City, Jiangsu Province, China
Model/Type reference	PFPC1-1A080, PFPC1-1A003, PFPC1-1A006, PFPC1-1A009, PFPC1-1A012, PFPC1-1A015, PFPC1-1A018, PFPC1-1A024, PFPC1-1A030, PFPC1-1A040, PFPC1-1A060
Ratings	AC 230V, 50Hz, 560W Max.

Test item particulars.....:								
Classification of installation and use.....: Fixed appliance								
Supply Connection.....: Supply cord with a plug								
Possible test case verdicts:								
- test case does not apply to the test object.....: N (/A)								
- test object does meet the requirement.....: P (Pass)								
- test object does not meet the requirement.....: F (Fail)								
Testing.....:								
Date of receipt of test item.....: June 10, 2015								
Date (s) of performance of tests.....: June 10 to July 11, 2015								
General remarks:								
The test results presented in this report relate only to the object tested.								
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"(see Enclosure #)" refers to additional information appended to the report.								
"(see appended table)" refers to a table appended to the report.								
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.								
General product information:								
-The heating cable will be applied straight along pipe, and will protect pipes up to 3.8 cm/1.5 inches in diameter.								
PFPC heat-tracing systems are approved and qualified for the applications of freeze protection of insulated metallic or plastic general water piping at the generally accepted maintenance temperature of 4°C/40°F with approved accessories.								
Type	Power (W)	Length		Voltage (V)	Current (A)	Resistance		
		(m)	(FT)			Min. (Ω)	Standard (Ω)	Max. (Ω)
PFPC1-1A003	21	0.9	3	230	0.09	2393.10	2519.05	2770.95
PFPC1-1A006	42	1.8	6	230	0.18	1196.55	1259.52	1385.48
PFPC1-1A009	63	2.7	9	230	0.27	797.70	839.68	923.65
PFPC1-1A012	84	3.7	12	230	0.37	598.27	629.76	692.74
PFPC1-1A015	105	4.6	15	230	0.46	478.62	503.81	554.19
PFPC1-1A018	126	5.5	18	230	0.55	398.85	419.84	461.83
PFPC1-1A024	168	7.3	24	230	0.73	299.14	314.88	346.37
PFPC1-1A030	210	9.1	30	230	0.91	239.31	251.90	277.10
PFPC1-1A040	280	12.2	40	230	1.22	179.48	188.93	207.82
PFPC1-1A060	420	18.3	60	230	1.83	119.65	125.95	138.55
PFPC1-1A080	560	24.4	80	230	2.43	89.74	94.46	103.91

Copy of marking plate

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



IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		P
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.		P
5.2	In general eight samples are required for the tests.		P
	The test of clause 22.105 is carried out on the same sample as that for the test of clause 13.2. (IEC 60335-2-96)		N
	Two samples of the additional layer of material, of sufficient size to cover the heating unit, are required if the test of 21.104 is carried out. (IEC 60335-2-96)		N
5.3	The test of clause 22.105 is carried out after the test of clause 13.2. (IEC 60335-2-96/A1)		N
5.6	Thermostats sensitive to room air temperature or outdoor air temperature are short-circuited. (IEC 60335-2-96)		P
5.10	For flexible sheet heating elements that are cut on site, the tests are carried out after connecting the supply leads and protecting the edges in accordance with the instructions. (IEC 60335-2-96)		N
5.101	Heating units to be installed in walls above 2,3 m are to be tested for installation in ceilings. (IEC 60335-2-96/A1)		N
6	CLASSIFICATION		P
6.1	Protection against electric shock: Class 0, 0I, I, II, III		P
	Heating unit is classified as:	Class I	P
6.2	Protection against harmful ingress of water		P
	- heating units for in a floor of concrete or similar are at least IP X7 (IEC 60335-2-96)	IP67	P
	- other heating units are at least IP X1 (IEC 60335-2-96)		N
7	MARKING AND INSTRUCTIONS		P
7.1	Rated voltage or voltage range (V)	230V	P
	Symbol for nature of supply, or		N
	Rated frequency (Hz)	50Hz	P
	Heating units marked with their rated power input... (IEC 60335-2-96)	(see marking plate)	P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	Flexible sheet heating elements without connection between adjacent elements shall be individually marked with their rated power input: (IEC 60335-2-96)		N
	Other flexible sheet heating elements marked with their rated power input per metre length.....: (IEC 60335-2-96)		N
	Manufacturer's or responsible vendor's name, trademark or identification mark.....: (see marking plate)		P
	Flexible sheet heating elements shall be marked with their maximum current if:		N
	– the current can vary depending on the length of the heating element; (IEC 60335-2-96)		N
	– other flexible sheet heating elements can be supplied through them. (IEC 60335-2-96)		N
	Model or type reference: (see marking plate)		P
	Symbol IEC 60417-5172, for class II appliances		P
	IP number, other than IPX0.....: (see marking plate)		P
	Symbol IEC 60417-5180, for class III appliances, unless		N
	the appliance is operated by batteries only		N
	Flexible sheet heating elements shall be marked with:		N
	-the indication of orientation, unless heating units are symmetrical; (IEC 60335-2-96)		N
	-the intended installation (ceilings, walls or floors); (IEC 60335-2-96)		P
	-the heating mode (direct heating or storage heating), unless intended for both modes. (IEC 60335-2-96)	Direct heating	P
	If the heating unit is only intended for application in floors of concrete or similar materials, it shall be marked accordingly. (IEC 60335-2-96)		N
	Flexible sheet heating elements are marked with and placed at least once every 0,5 m : (IEC 60335-2-96)		N
	Flexible sheet heating elements that can be cut on site and have to be cut at specified places shall be marked appropriately. (IEC 60335-2-96)		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, if the working voltage exceeds extra-low voltage		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
7.2	Warning for stationary appliances for multiple supply	One supply	N
	Warning placed in vicinity of terminal cover		N
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		N
	Different rated values marked with the values separated by an oblique stroke		N
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible		N
	Requirement met if frequent changes are not required and the rated voltage to which the appliance is to be adjusted is determined from a wiring diagram		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 arithmetic mean value of the rated voltage range		N
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N
7.6	Correct symbols used		P
	Symbol for nature of supply placed next to rated voltage		P
	Symbol for class II appliances placed unlikely to be confused with other marking		N
	Units of physical quantities and their symbols according to international standardized system		P
	Symbol "Direct ceiling heating" (IEC60335-2-96/A1)		N
	Symbol "Direct floor heating" (IEC60335-2-96/A1)		N
	Symbol "Floor storage heating" (IEC60335-2-96/A1)		N
	Symbol " Installation in concrete" (IEC60335-2-96/A1)		N
	Correct symbols used		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		N
	correct mode of connection is obvious		P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		N
	- marking of terminals exclusively for the neutral conductor (letter N)		N
	- marking of protective earthing terminals (symbol IEC 60417-5019)		N
	- marking not placed on removable parts		N
7.9	Marking or placing of switches which may cause a hazard		N
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means		N
	This applies also to switches which are part of a control		N
	If figures are used, the off position indicated by the figure 0		N
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		N
7.11	Indication for direction of adjustment of controls		N
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance		P
	The instructions state that:		P
	- the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction	Replace by EN 60335-1:2012	N
	- children being supervised not to play with the appliance		N
	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
7.12.1	Sufficient details for installation supplied		P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		N
	Instructions shall be provided. They shall include:		P
	a) explanation of the marking, if necessary; (IEC 60335-2-96)		P
	b) information for incorporating the heating units into the building, in particular content shall be included. (IEC 60335-2-96)		P
	c) a statement that the installation is to be in accordance with the national wiring rules. The content shall be included: (IEC 60335-2-96)		P
	d) the maximum current allowed to flow through one heating unit when other units are supplied through it or when the current can vary depending on its length; (IEC 60335-2-96)		N
	e) list of controls, unless they are incorporated into the heating unit; (IEC 60335-2-96)		P
	f) the maximum thermal resistance between the heating unit and the room; (IEC 60335-2-96)		N
	g) the thickness of covering materials, which for floors shall be at least 5 mm; (IEC 60335-2-96)		P
	h) characteristics of the thermal insulation that is to be inserted between separate heating units installed to heat a floor and the ceiling below it (IEC 60335-2-96)		N
	i) specification of any adhesive to be used (IEC 60335-2-96)		P
	j) a statement that a label is to be fixed adjacent to the distribution board and that it has to contain the locations of the heating units; (IEC 60335-2-96)		P
	k) if the heating units are installed in a suspended ceiling, or are accessible from the roof space, a statement that a label giving this information is to be fixed to the access point of the ceiling. (IEC 60335-2-96)		P
	l) in applications in timber floors, a statement indicating that heating units having basic insulation only shall be covered by additional electrical insulation or supplied through an isolating transformer. (IEC 60335-2-96)		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules		N
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected		N
7.12.4	Instructions for built-in appliances:		N
	- dimensions of space		N
	- dimensions and position of supporting and fixing		N
	- minimum distances between parts and surrounding structure		N
	- minimum dimensions of ventilating openings and arrangement		N
	- connection to supply mains and interconnection of separate components		N
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N
	a switch complying with 24.3		N
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N
	Replacement cord instructions, type Y attachment		N
	Replacement cord instructions, type Z attachment		P
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		P
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

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
7.12.101	Instructions for applications in floors of concrete or similar (IEC 60335-2-96)		N
7.12.102	The instructions for applications in metallic ceilings or metallic floors for heating units with basic insulation only, other than those supplied at safety extra-low voltage, (IEC 60335-2-96)		P
7.12.103	Instructions for applications on floors where heating units can be covered by tiles, unless the heating units are class I, class II or class III. (IEC 60335-2-96)		N
7.12.104	Instructions that work has to carried out by authorized persons (IEC 60335-2-96)		P
7.12.105	Instructions for heating units for storage heating applications (IEC 60335-2-96)		N
7.13	Instructions and other texts in an official language	English	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
	If symbols are used relating to the intended installation or heating mode, the superimposed rectangle shall have a height of at least 15 mm. (IEC 60335-2-96/A1)		P
7.15	Markings on a main part		P
	The test with petroleum spirit is not carried out. (IEC 60335-2-96)		P
	If used relating to the intended installation or heating mode, the superimposed rectangle shall have a height of at least 15 mm. (IEC 60335-2-96)		P
	For portable appliances, cover can be removed or opened without a tool		N
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		N
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		P
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		N
	Only the requirements for switches and controls are applicable. (IEC 60335-2-96)		N

IEC 60335-2-96			
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		N
7.101	Label with sufficient space provided (IEC 60335-2-96)		P
8	PROTECTION AGAINST ACCESS TO LIVE PARTS		P
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	Requirement applies for all positions, detachable parts removed		N
	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	No hazards	P
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts	No opening	N
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		N
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements		N
8.1.4	Accessible part not considered live if:		N
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N
	- safety extra-low d.c. voltage: not exceeding 42.4 V		N
	- or separated from live parts by protective impedance		N
	If protective impedance: d.c. current not exceeding 2 mA, and		N
	a.c. peak value not exceeding 0.7 mA		N
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μ F		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μ C		N
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		P
	- built-in appliances		N
	- fixed appliances		P
	- 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
	Clause not applicable. (IEC 60335-2-96)		P
10	POWER INPUT AND CURRENT		P
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1 ..	(see appended table)	P
	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		N
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2.....:	(see appended table)	N
	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		P
11.1	No excessive temperatures in normal use		P
	test ambient 20 $^{\circ}$ C \pm 2 $^{\circ}$ C(IEC 60335-2-96)		P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
11.2	The appliance is held, placed or fixed in position as described.....:		N
	Heating units intended to be installed in ceilings are positioned in accordance with 11.2.101. (IEC 60335-2-96)		N
	Modular heating units for suspended ceilings are positioned in accordance with 11.2.102. (IEC 60335-2-96)		N
	Heating units intended to be installed in floors are positioned in accordance with 11.2.103. (IEC 60335-2-96)		N
	Separate heating units intended to heat a timber floor and the ceiling below it are positioned in accordance with 11.2.104. (IEC 60335-2-96)		N
	Position of the sensor for a heating unit provided with a thermostat having a separate sensor. (IEC 60335-2-96)		N
11.2.101	Test framework for the heating units intended to be installed in a timber ceiling. (IEC 60335-2-96)		N
	Installation in accordance with the instructions. (IEC 60335-2-96)		N
11.2.102	Test framework for nine modular heating units. (IEC 60335-2-96)		N
	Installation in accordance with the instructions. (IEC 60335-2-96)		N
11.2.103	Test framework for the heating units intended to be installed in a timber ceiling. (IEC 60335-2-96 + A1)		N
	Test framework for the heating units intended to be installed in a timber floor. (IEC 60335-2-96 + A1)		N
	Installation in accordance with the instructions. (IEC 60335-2-96 + A1)		N
	Placement of heating units intended to be installed in a floor of concrete or similar material. (IEC 60335-2-96)		N
	Placement of heating units intended to be installed above a floor of concrete or similar material. (IEC 60335-2-96)		N
	Layer of concrete for the heating units which are covered with the additional layer, if specified in the instructions. (IEC 60335-2-96)		N
11.2.104	Test framework for separate heating element intended to heat a timber floor and specified ceiling(IEC 60335-2-96)		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
11.3	Temperature rises, other than of windings, determined by thermocouples		P
	Temperature rises of windings determined by resistance method, unless		N
	the windings are non-uniform or it is difficult to make the necessary connections		N
11.4	Heating appliances operated under normal operation at 1.15 times rated power input (W)	1.15x560=644W	P
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)		N
11.7	Heating units are operated until steady conditions are established. (IEC 60335-2-96)		P
	Heating units for storage heating applications are operated as specified for normal operation or (IEC 60335-2-96)		N
	until the charging control operates for the first time if this occurs first. (IEC 60335-2-96)		N
11.8	Temperature rises monitored continuously and not exceeding the values in table 3	(see appended table)	P
	If the temperature rise of a motor winding exceeds the value of table 3, or		N
	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 of surfaces not exceed the values shown in Table 101. (IEC 60335-2-96)		P
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		P
13.1	Leakage current not excessive and electric strength adequate		P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	Heating appliances operated at 1.15 times the rated power input (W).....:	1.15x560=644W	P
	Motor-operated appliances and combined appliances supplied at 1.06 times the rated voltage (V).....:		N
	Protective impedance and radio interference filters disconnected before carrying out the tests		N
	The heating units are installed as specified in 11.2 (IEC 60335-2-96)		P
	the most unfavourable covering material with respect to its electrical insulation characteristics being used. (IEC 60335-2-96)		P
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		P
	The value specified for class 0 appliances applies to heating units having basic insulation only. (IEC 60335-2-96)		N
	The value specified for class II appliances applies to heating units intended to be installed on a conductive surface and those covered by concrete or similar material. (IEC 60335-2-96)		N
	Grids and screens of insulated heating wires are disconnected from earth. (IEC 60335-2-96)		N
	Placement of metal foil. (IEC 60335-2-96)		P
	Leakage current measurements	(see appended table)	P
13.3	The appliance is disconnected from the supply		P
	The test is carried out directly on a heating unit and additional electrical insulation. (IEC 60335-2-96)		P
	The test voltage is applied after they have been conditioned for a period of 1 h at the temperature determined during the test of Clause 11. (IEC 60335-2-96)		P
	Electric strength tests according to table 4	(see appended table)	P
	No breakdown during the tests		P
14	TRANSIENT OVERVOLTAGES		N
	Appliances withstand the transient over-voltages to which they may be subjected		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	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		P
	The test is carried out directly on a heating unit. (IEC 60335-2-96)		P
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		P
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29		P
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529.....:	IP67	P
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		N
	IPX7 heating units are immersed for 72 h. (IEC 60335-2-96)		P
15.1.2	Heating units, other than IPX7 heating units, are placed horizontally on a perforated support in accordance with IEC 60529, taking into account the marking of orientation. (IEC 60335-2-96)		N
	Tested in both positions if the orientation is not marked. (IEC 60335-2-96)		N
15.2	Spillage of liquid does not affect the electrical insulation		N
	Appliances with type X attachment fitted with a flexible cord as described		N
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N
	Detachable parts are removed		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Overfilling test with additional amount of water, over a period of 1 min (I)		N
	The appliance withstands the electric strength test of 16.3		N
	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		N
15.3	Appliances proof against humid conditions		P
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		P
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part		N
	Humidity test for 48 h in a humidity cabinet		P
	The test is carried out directly on a heating unit and additional electrical insulation. (IEC 60335-2-96)		P
	Reassembly of those parts that may have been removed		P
	The appliance withstands the tests of clause 16		P
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		P
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		N
	Tests carried out at room temperature and not connected to the supply		P
	The tests are carried out directly on a heating unit and additional electrical insulation. (IEC 60335-2-96)		P
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V)	1.06x230=244V	P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by $\sqrt{3}$ (V)		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

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	- 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
	The value specified for class 0 appliances applies to heating units with basic insulation only. (IEC 60335-2-96)		N
	The value specified for class II appliances applies to heating units intended to be installed on a conductive surface or covered by concrete or similar material. (IEC 60335-2-96)		N
16.3	Electric strength tests according to table 7	(see appended table)	P
	The values specified for class 0 appliances apply to heating units with basic insulation only. (IEC 60335-2-96)		N
	The values specified for class II appliances apply to heating units intended to be installed on a conductive surface or covered by concrete or similar material. (IEC 60335-2-96)		N
	The additional insulation withstands the test voltage specified for reinforced insulation for specified heating units. (IEC 60335-2-96)		N
	The additional insulation withstands the test voltage specified for supplementary insulation for specified heating units. (IEC 60335-2-96)		N
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified	(see appended table)	P
	<i>For heating units with basic insulation only, other than those supplied through an isolating transformer, that are provided with additional electrical insulation for application in timber floors, this additional insulation shall withstand the test voltage specified for supplementary insulation. (IEC 60335-2-96/A1)</i>		N
	No breakdown during the tests		P
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		N

IEC 60335-2-96			
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)	N
	Appliance supplied with 1.06 or 0.94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V).....:		N
	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		N
	Temperature of the winding not exceeding the value specified in table 8		N
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N
18	ENDURANCE		P
18.101	Connections from the heating element to the supply leads and interconnection lead are reliable. Test is carried out 400 cycles. (IEC 60335-2-96)		P
18.102	Electrical connections between the resistance material and electrodes are reliable. No contact degradation or damage to the electrodes. (IEC 60335-2-96)		P
18.102.1	Test with heating unit wound on a cylindrical mandrel. (IEC 60335-2-96)		P
18.102.2	Test with heating element fully covered. (IEC 60335-2-96)		N
18.102.3	Test for 1 000 cycles with heating unit in humidity cabinet. (IEC 60335-2-96)		P
18.102.4	Test as 18.102.1 but for 2.000 cycles. (IEC 60335-2-96)		P
18.102.5	Test with needle inserted into the resistance material. (IEC 60335-2-96)		P
18.103	The resistance of the heating unit shall not decrease significantly during use. (IEC 60335-2-96)		P
19	ABNORMAL OPERATION		P
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe	(see appended table) No electronic circuits	N
	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		N
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		N
	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		P
	until steady conditions are established		N
	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		N
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0.85 times rated power input (W)	0.85x560=476W	P
	Placement for ceiling applications. (IEC 60335-2-96)		N
	Placement for floor applications. (IEC 60335-2-96)		N
	For storage heating applications, the heating units are charged for the rated charging period. (IEC 60335-2-96)		N
19.3	Test of 19.2 repeated; test voltage (V), power input of 1.24 times rated power input (W)	1.24x560=694.4W	P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited	s/c thermostat, temp. established steady condition, no hazard	P
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath		N
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures (V)		N
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or		N
	locking moving parts of other appliances		N
	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)	N
19.8	Multi-phase motors operated at rated voltage with one phase disconnected		

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Clause	Requirement - Test	Result - Remark	Verdict
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 30.2.3 is applicable and that use overload protective devices relying on electronic circuits to protect the motor windings, are also subjected to the test		N
	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		N
	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		N
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		N
	During and after each test the following is checked:		N
	- the temperature of the windings do not exceed the values specified in table 8		N
	- the appliance complies with the conditions specified in 19.13		N
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		N
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	- the base material of the printed circuit board withstands the test of Annex E		N
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29		N
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to circuits or parts of circuits meeting both of the following conditions:		N
	- 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 operating under conditions specified in clause 11, but supplied at rated voltage, duration of the tests as specified:		N
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29		N
	b) open circuit at the terminals of any component		N
	c) short circuit of capacitors, unless		N
	they comply with IEC 60384-14		N
	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		N
	f) failure of microprocessors and integrated circuits		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

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Clause	Requirement - Test	Result - Remark	Verdict
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		N
	a device that can be placed in the stand-by mode,		N
	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		N
	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		N
	They incorporate spark gaps		N
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		N
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3		N
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		N
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		N
	Earthed heating elements in class I appliances disconnected		N
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		N
19.11.4.6	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		N
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		N
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		N

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Clause	Requirement - Test	Result - Remark	Verdict
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate		N
	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)		N
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9.....	(see appended table)	P
	Compliance with clause 8 not impaired		N
	If the appliance can still be operated it complies with 20.2		N
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4:		P
	- basic insulation (V).....	1250V, no breakdown	P
	- supplementary insulation (V)		N
	- reinforced insulation (V)	3000V, no breakdown	P
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage		N
	The appliance does not undergo a dangerous malfunction, and		N
	no failure of protective electronic circuits, if the appliance is still operable		N
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		N
	- do not become operational, or		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		N
	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 floor and the wood of the test framework not exceed 150 K. (IEC 60335-2-96)		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
20	STABILITY AND MECHANICAL HAZARDS		N
20.1	This clause is not applicable		N
20.2	This clause is not applicable		N
21	MECHANICAL STRENGTH		P
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		N
	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		N
	The blows are only applied to rigid parts of the heating unit. (IEC 60335-2-96)	No rigid parts	N
	The appliance shows no damage impairing compliance with this standard, and		N

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Clause	Requirement - Test	Result - Remark	Verdict
	compliance with 8.1, 15.1 and clause 29 not impaired		N
	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
	Heating units are subjected to the tests of 21.101. (IEC 60335-2-96)		N
	Heating units intended to be installed in floors are also subjected to the test of 21.102. (IEC 60335-2-96)		N
	Heating units incorporating insulated wires intended to be installed in floors are also subjected to the test of 21.103. (IEC 60335-2-96)		N
	The additional layer of material covering heating units in floors of concrete or similar material, or under tiles, is subjected to the test of 21.104. (IEC 60335-2-96)		N
	These tests are not applicable to modular heating units. (IEC 60335-2-96)		N
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements	No solid insulation	N
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		N
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		P
21.101	Fully covering the width of the heating element. Bending test through angle of 180 ° in both directions for three times. The heating unit shall withstand clause 16.3 and no damaging. (IEC 60335-2-96)		P
	After the test, no breakdown in electric strength test and there is no damage to impair the compliance with the standard. (IEC 60335-2-96)		P
21.102	Two heating units are subjected to the scratch test with a hardened steel pin. (IEC 60335-2-96)		N
	After the test, no breakdown in electric strength test. (IEC 60335-2-96) (IEC 60335-2-96)		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
21.103	The part of the heating unit containing an insulated heating wire is tested with steel rod for 30 sec with a force of: (IEC 60335-2-96) <i>If screened insulated wires are covered by a sheath, the test is carried out with the sheath removed and with the sheet in place. (IEC 60335-2-96/A1)</i>		N
	- 600 N : for heating units for application in floor of concrete (IEC 60335-2-96)		N
	- 300 N : for heating units for other floor applications (IEC 60335-2-96)		N
	After the test, no breakdown in electric strength test. (IEC 60335-2-96)		N
	There is no penetration of the sheath. (IEC 60335-2-96/A1)		N
21.104	A sample of the additional layer of material is scratched with a hardened steel pin for three times. (IEC 60335-2-96/A1)		N
	There is no penetration of the material. (IEC 60335-2-96/A1)		N
22	CONSTRUCTION		P
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled		P
22.2	Stationary appliance: means to ensure all-pole disconnection from the supply being provided:		P
	- a supply cord fitted with a plug, or		P
	- a switch complying with 24.3, or		N
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		N
	- an appliance inlet		N
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 01 and class I appliances, connected to the phase conductor		N
22.3	Appliance provided with pins: no undue strain on socket-outlets		N
	Applied torque not exceeding 0.25 Nm		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating, unless		N
	rotating does not impair compliance with this standard		N
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		P
22.5	No risk of electric shock when touching the pins of the plug, for appliances having a capacitor with rated capacitance exceeding 0,1 μ F, the appliance being disconnected from the supply at the instant of voltage peak	No such capacitor	N
	Voltage not exceeding 34 V (V)		N
22.6	Electrical insulation not affected by condensing water or leaking liquid		P
	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
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		N
	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

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Clause	Requirement - Test	Result - Remark	Verdict
	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		P
22.12	Handles, knobs etc. fixed in a reliable manner		N
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		N
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N
22.13	Unlikely that handles, when gripped as in normal use, make the operator's hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded		N
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands and no undue wear of contacts		N
	Cord reel tested with 6000 operations, as specified		N

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Clause	Requirement - Test	Result - Remark	Verdict
	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		N
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		N
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
22.27	Parts connected by protective impedance separated by double or reinforced insulation		N

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Clause	Requirement - Test	Result - Remark	Verdict
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		N
	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

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	Electrodes not used for heating liquids		N
	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		N
	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
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N

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Clause	Requirement - Test	Result - Remark	Verdict
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless		N
	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
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 tests 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

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Clause	Requirement - Test	Result - Remark	Verdict
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		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
	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 is to be set before the appliance can be started, unless	No remote operation	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	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode		N
	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

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Clause	Requirement - Test	Result - Remark	Verdict
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	Secure fixing of the supply connection.		P
	A force of 60 N is applied to each supply lead for one min. (IEC 60335-2-96)		P
	Repeat the test after a rest period of 1 min. (IEC 60335-2-96)		P
	No breakdown in the electric strength test (IEC 60335-2-96)	No breakdown	P
	There is no damage to impair the compliance with the standard. (IEC 60335-2-96)		P
22.102	Not affect the material of the heating element. (IEC 60335-2-96)		P
	Thermal endurance of 336 h for heating unit at a temperature of 80 °C or 45 °C plus the temperature rise determined during the test of clause 11, whichever is higher: Temperature: (IEC 60335-2-96)		P
	No breakdown in the electric strength test (IEC 60335-2-96)		P
	There is no damage to impair the compliance with the standard. (IEC 60335-2-96)		P
22.103	Reliable bonding of sheets of electrical insulation of laminated flexible sheet heating elements. (IEC 60335-2-96)		N
	Thermal endurance of 336 h for heating unit at a temperature determined during the test of clause 11; Temperature: (IEC 60335-2-96)		N
	Separated the layers of insulation and attached to the clamps of tensile machine.		N
	The clamps are separated at a rate of 250 mm/min \pm 50 mm/min. (IEC 60335-2-96)		N
	The bond strength of each sample shall be at least 1,5 N. (IEC 60335-2-96)		N
	The average bond strength of the conditioned samples shall be not less than 80 % of the average bond strength of the unconditioned samples. (IEC 60335-2-96)		N
22.104	Connecting devices fitted to supply leads and interconnection leads are of class II construction and impossible to separate them without the aid of a tool. (IEC 60335-2-96)		P

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
22.105	Heating units of class II constructions to be installed under floors in damp locations not subject the user to excessive capacitive currents more than 0,25 mA. (IEC 60335-2-96/A1)		N
23	INTERNAL WIRING		P
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		P
	Wire holes in metal well-rounded or provided with bushings		N
	Wiring effectively prevented from coming into contact with moving parts		N
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges		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		N
	Flexible metallic tubes not causing damage to insulation of conductors		N
	Open-coil springs not used		N
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N
	No damage after 10 000 flexings for conductors flexed during normal use, or		N
	100 flexings for conductors flexed during user maintenance		N
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		N
	Not more than 10% of the strands of any conductor broken, and		N
	not more than 30% for wiring supplying circuits that consume no more than 15W		N
23.4	Bare internal wiring sufficiently rigid and fixed		N
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		P
	no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		N
	be such that it can only be removed by breaking or cutting		N
23.7	The colour combination green/yellow only used for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		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		P
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
	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

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Clause	Requirement - Test	Result - Remark	Verdict
	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		P
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14		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		N
24.1.3	Switches complying with IEC 61058-1, 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 a least 10 000 as specified, the complete switching system need not be tested		N
24.1.4	Automatic controls complying with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		N
	- thermostats: 10 000	approved	N
	- temperature limiters: 1 000		N
	- self-resetting thermal cut-outs: 300		N
	- voltage maintained non-self-resetting thermal cut-outs: 1 000		N
	- other non-self-resetting thermal cut-outs: 30		N
	- timers: 3 000		N
	- energy regulators: 10 000		N

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Clause	Requirement - Test	Result - Remark	Verdict
	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		N
	However, for 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	For remote operation of the appliance via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151		N
24.1.8	The relevant standard for thermal links is IEC 60691		N
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		N
24.1.9	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

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Clause	Requirement - Test	Result - Remark	Verdict
	- thermal cut-outs that can be reset by soldering, unless		N
	the solder has a melting point of at least 230 °C		N
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions		N
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

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Clause	Requirement - Test	Result - Remark	Verdict
	- 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
24.101	Thermal cut-outs that are necessary for compliance with Clause 19 are non-self-resetting with a trip-free mechanism. (IEC 60335-2-96)		N
24.102	Controls and other components necessary for the heating unit to comply with this standard are supplied with the flexible sheet heating element or (IEC 60335-2-96/A1)		P
	Sufficiently specified in the instructions for installation so they can be obtained separately. (IEC 60335-2-96/A1)		P
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		P
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		P
	- supply cord fitted with a plug,		P
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		N
	- pins for insertion into socket-outlets		N
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		N
25.3	Heating units, other than those that can be cut on site, shall incorporate one of the following means for permanent connection to fixed wiring: (IEC 60335-2-96)		N
	- a set of terminals; (IEC 60335-2-96)		N
	- a set of supply leads; (IEC 60335-2-96)		N
	- a supply cord. (IEC 60335-2-96)		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	A suitable means for connection to the supply mains provided by Heating units (IEC 60335-2-96)		N
	Supply leads is double insulated or (IEC 60335-2-96)		N
	fitted with insulating sleeves with at least 300 mm long and having a thickness corresponding to that of a sheath of a supply cord (code designation 60245 IEC 53). (IEC 60335-2-96)		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 assembling the supply cord to the appliance:		P
	- type X attachment		N
	- type Y attachment		N
	- type Z attachment, is allowed. (IEC 60335-2-96)		P
	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, other than for class III appliances, being one of the following types:		P
	- rubber sheathed (at least 60245 IEC 53)		N
	- polychloroprene sheathed (at least 60245 IEC 57)		N
	- cross-linked polyvinyl chloride sheathed (at least 60245 IEC 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 not exceeding 3 kg 		N
	<ul style="list-style-type: none"> ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances 		P

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Clause	Requirement - Test	Result - Remark	Verdict
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		N
	<ul style="list-style-type: none"> heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 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
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm ²)	0.75mm ²	P
25.9	Supply cords 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		P
25.13	Inlet openings so constructed as to prevent damage to the supply cord		N
	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		N
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is		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, as described:		N
	- applied force (N)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- number of flexings.....:		N
	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		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord, values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm)	>4kg, 100N, 0.35Nm	P
	Cord not damaged and max. 2 mm displacement of the cord	1mm < 2mm	P
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 supply 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

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Clause	Requirement - Test	Result - Remark	Verdict
	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
	- 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		P
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		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N
	Tying the cord into a knot or tying the cord with string not used		N
25.20	The insulated conductors of the supply cord for type Y and Z attachment additionally insulated from accessible metal parts		P
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

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Clause	Requirement - Test	Result - Remark	Verdict
	- 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 inlets:		N
	- live parts not accessible during insertion or removal		N
	Requirement not applicable to appliance inlets complying with IEC 60320-1		N
	- connector can be inserted without difficulty		N
	- the appliance is not supported by the connector		N
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless		N
	the supply cord is unlikely to touch such metal parts		N
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
	If necessary, electric strength test of 16.3		N
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this 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.		P
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		P
26	TERMINALS FOR EXTERNAL CONDUCTORS		P
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts		N

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Clause	Requirement - Test	Result - Remark	Verdict
	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
	Not incorporate screw-type terminals in heating units. (IEC 60335-2-96)		P
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
	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 of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		N
	Terminals fixed so that when the clamping means is tightened or loosened:		N
	- the terminal does not become loose		N
	- internal wiring is not subjected to stress		N
	- neither clearances nor creepage distances are reduced below the values in clause 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

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Clause	Requirement - Test	Result - Remark	Verdict
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	This requirement applies to all terminals to which connections are made during installation. (IEC 60335-2-96/A1)		N
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (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 of 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

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Clause	Requirement - Test	Result - Remark	Verdict
	This requirement also applies to heating units fitted with supply leads. (IEC 60335-2-96)		N
27	PROVISION FOR EARTHING		P
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	No accessible earthing metal parts, an earthing terminal used in plug.	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
	Components provided for the reduction of capacitive currents, and which are earthed, are not considered to provide provision for earthing. (IEC 60335-2-96/A1)		N
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		N
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm ² , and		N
	do not provide earthing continuity between different parts of the appliance, and		N
	conductors cannot be loosened without the aid of a tool		N
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part		N
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		N
27.4	No risk of corrosion resulting from contact between parts of the earthing terminal and the copper of the earthing conductor or other metal		N
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		N

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Clause	Requirement - Test	Result - Remark	Verdict
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 μm		N
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		N
27.5	Low resistance of connection between earthing terminal and earthed metal parts		N
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		N
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω)		N
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		P
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses	No screws used	P
	Screws not of soft metal liable to creep, such as zinc or aluminium		N
	Diameter of screws of insulating material min. 3 mm		N
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity		N
	Screws used for electrical connections or connections providing earthing continuity screwed into metal		N
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		N

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Clause	Requirement - Test	Result - Remark	Verdict
	For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation		N
	For screws and nuts; torque-test as specified in table 14.....:	(see appended table)	N
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless		P
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		N
	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
	- 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

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Clause	Requirement - Test	Result - Remark	Verdict
	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		N
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		N
	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		P
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies.....:		N
	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	(see appended table)	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		N
	Impulse voltage test is not applicable:		N
	- when the microenvironment is pollution degree 3, or		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- 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
	Modular heating units are in overvoltage category 2. (IEC 60335-2-96)		N
	Other heating units are in overvoltage category 3. (IEC 60335-2-96)		N
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		N
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16:	(see appended table)	N
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:		N
	- table 16 based on the rated impulse voltage	(see appended table)	N
	- 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 values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		N

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Clause	Requirement - Test	Result - Remark	Verdict
	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
	Lacquered conductors of windings considered to be bare conductors		N
	However, clearances at crossover points are not measured		N
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		N
	- table 16 based on the rated impulse voltage		N
	- table F.7a in IEC 60664-1, 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

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Clause	Requirement - Test	Result - Remark	Verdict
	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		N
	- precautions taken to protect the insulation; pollution degree 1		P
	- insulation subjected to conductive pollution; pollution degree 3		N
	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		N
	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	(see appended table)	N
	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	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable		N

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Clause	Requirement - Test	Result - Remark	Verdict
29.2.4	Creepage distances of functional insulation not less than specified in table 18	(see appended table)	N
	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		N
	Compliance checked:		N
	- by measurement, in accordance with 29.3.1, or		N
	- 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
	No dimensional requirements for the insulation of flexible sheet heating elements or additional electrical insulation. (IEC 60335-2-96/A2)		P
29.3.1	Supplementary insulation have a thickness of at least 1 mm		N
	Reinforced insulation have a thickness of at least 2 mm		N
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
	Two layers of insulation on the class II flexible sheet heating element. (IEC 60335-2-96)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Each layer withstands the electric strength test for reinforced insulation. However (IEC 60335-2-96/A2)		N
	If the layers are inseparable, the combination shall withstand the electric strength test for reinforced insulation. (IEC 60335-2-96/A2)		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
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		P
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		N
	parts of thermoplastic material providing supplementary or reinforced insulation		N
	sufficiently resistant to heat		N
	Ball-pressure test according to IEC 60695-10-2		N
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C)	(see appended table)	N
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C)	(see appended table)	N
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C)	(see appended table)	N
	The test is not applicable to flexible sheet heating elements. (IEC 60335-2-96)		P
	The tests of 25.1 and 25.4 of IEC 60884-1 are applicable to the flexible parts of connecting devices. (IEC 60335-2-96)		P

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Clause	Requirement - Test	Result - Remark	Verdict
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		N
	- 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		N
	- heating units intended for applications in floors of concrete or similar material. (IEC 60335-2-96)		N
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies		N
	- 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		N
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 °C		N
	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	Complied ISO 9772	P
30.2.2	Appliances operated while attended, parts of non-metallic material supporting current-carrying connections, and		N
	parts of non-metallic material within a distance of 3mm of such connections,		N
	subjected to the glow-wire test of IEC 60695-2-11		N
	The test severity is:		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- 750 °C, for connections carrying a current exceeding 0,5 A during normal operation		N
	- 650 °C, for other connections		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:		N
	- 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:		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
	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
	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
	This sub clause is not applicable to flexible sheet heating elements. (IEC 60335-2-96)		P

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Clause	Requirement - Test	Result - Remark	Verdict
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
	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

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Clause	Requirement - Test	Result - Remark	Verdict
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		N
	- 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		N
	Test not applicable to conditions as specified.....:		N
31	RESISTANCE TO RUSTING		N
	Relevant ferrous parts adequately protected against rusting		N
	Tests specified in part 2 when necessary		N
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		P
	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
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		--

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Clause	Requirement - Test	Result - Remark	Verdict
	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

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Clause	Requirement - Test	Result - Remark	Verdict
	Details about how to remove batteries containing materials hazardous to the environment given		N
7.15	Markings placed on the part of the appliance connected to the supply mains		N
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		N
	If the appliance can be operated without batteries, double or reinforced insulation required		N
11.7	The battery is charged for the period 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		N
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

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Clause	Requirement - Test	Result - Remark	Verdict
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		--
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N
	Test conditions as specified		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:		N
7	Severities		N
	The duration of application of the test flame is 30 s \pm 1 s		N
9	Test procedure		N
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1		N
9.2	The first paragraph does not apply		N
	If possible, the flame is applied at least 10 mm from a corner		N
9.3	The test is carried out on one specimen		N
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		N
11	Evaluation of test results		N
	The duration of burning not exceeding 30 s		N
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N

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Clause	Requirement - Test	Result - Remark	Verdict
F	ANNEX F (NORMATIVE) CAPACITORS		--
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		N
1.5	Terms and definitions		N
1.5.3	Class X capacitors tested according to subclass X2		N
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 are applicable		N
4.14.7	Only insulation resistance and voltage proof are checked		N
	No visible damage		N
4.17	Passive flammability test		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	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:		N
7	Marking and instructions		N
7.1	Transformers for specific use marked with:		N
	-name, trademark or identification mark of the manufacturer or responsible vendor		N
	-model or type reference		N
17	Overload protection of transformers and associated circuits		N
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N
22	Construction		N
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N
29	Clearances, creepage distances and solid insulation		N
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		N
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		N
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1		N
H	ANNEX H (NORMATIVE) SWITCHES		--
	Switches comply with the following clauses of IEC 61058-1, as modified below:		N
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	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, a switch 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
	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
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K)		N
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	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	The temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N
11.8	The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N
16	Leakage current and electric strength		N
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test		N
19	Abnormal operation		N
19.1	The tests of 19.7 to 19.9 are not carried out		N
19.1.101	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

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
22.1.101	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:		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
	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

IEC 60335-2-96			
Clause	Requirement - Test	Result - Remark	Verdict
	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		--
	Information 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 macroenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		P
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		P
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		P
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		N
	- 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		--

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Clause	Requirement - Test	Result - Remark	Verdict
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		N
7	Test apparatus		N
7.3	Test solutions		N
	Test solution A is used		N
10	Determination of proof tracking index (PTI)		N
10.1	Procedure		N
	The proof voltage is 100V, 175V, 400V or 600V....:		N
	The test is carried out on five specimens		N
	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 states 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
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C		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 residual current device (RCD) having a rated residual operating current not exceeding 30 mA		N

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Clause	Requirement - Test	Result - Remark	Verdict
	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
11.8	The values of Table 3 are reduced by 15 K		N
13.2	The leakage current for class I appliances not exceeding 0,5 mA		N
15.3	The value of t is 37 °C		N
16.2	The leakage current for class I appliances not exceeding 0,5 mA (mA):		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		N
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
	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

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Clause	Requirement - Test	Result - Remark	Verdict
	- 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
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

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Clause	Requirement - Test	Result - Remark	Verdict
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
R.3.2.2.1	<p>The specification of the software architecture includes the aspects listed</p> <ul style="list-style-type: none"> - 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

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Clause	Requirement - Test	Result - Remark	Verdict
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 – GENERAL FAULT/ERROR CONDITIONS

Component ¹⁾	Fault/error	Acceptable measures ^{2) 3)}	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
1 CPU 1.1 Registers	Stuck at	Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2			N
1.2 VOID						N

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Clause	Requirement - Test			Result - Remark		Verdict
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 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

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Clause	Requirement - Test		Result - Remark			Verdict
5 Internal data path	Stuck at DC fault	Word protection with single bit redundancy Comparison of redundant CPUs by either: <ul style="list-style-type: none">- reciprocal comparison- independent hardware comparator	H.2.19.8.2 H.2.18.15 H.2.18.3			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
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 Wrong sequence	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or Comparison of redundant communication channels by either: <ul style="list-style-type: none">- reciprocal comparison- independent hardware comparator Logical monitoring, or time-slot monitoring, or Scheduled transmission (same options as for wrong point in time)	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3 H.2.18.10.2 H.2.18.10.4 H.2.18.18			N

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Clause	Requirement - Test			Result - Remark		Verdict
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check Comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator	H.2.18.13 H.2.18.15 H.2.18.3			N
7.1 VOID						N
7.2 Analog I/O 7.2.1 A/D and D/A-converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13			N
8 VOID						N
9 Custom chips ⁴⁾ e.g. ASIC, GAL, Gate array	Any output outside the static and dynamic functional specification	Periodic self-test	H.2.16.6			N
NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines.						
¹⁾ For fault/error assessment, some components are divided into their sub-functions. ²⁾ For each sub-function in the table, the Table R.2 measure will cover the software fault/error. ³⁾ Where more than one measure is given for a sub-function, these are alternatives. ⁴⁾ To be divided as necessary by the manufacturer into sub-functions.						

Annex AA	Summary of installation instructions (IEC 60335-2-96)	--
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Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Clause	Requirement - Test	Result - Remark	Verdict
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ATTACHMENT TO TEST REPORT IEC 60335-1, 5th edition EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Household and similar electrical appliances – Safety – Part 1: GENERAL REQUIREMENTS

Differences according to:	EN 60335-1:2012 + A11:2014 EN 50366:2003 + A1:2006 or EN 62233:2008		
6.1	Delete “class 0” and “class 01”		P
7.1	Single-phase appliances to be connected to the supply mains: 230 V covered		P
	Multi-phase appliances to be connected to the supply mains: 400 V covered		N
7.10	Devices used to start/stop operational functions of the appliance distinguished from other manual devices by means of shape, size, surface texture, position, etc.		N
	An indication that the device has been operated is given by:		N
	• a tactile feedback, or		N
	• an audible and visual feedback		N
7.12	The instructions include the substance of the following:		—
	- 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

Attachment 1: EUROPEAN 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		N
	The appliance being in every possible position during the test		N
	The force on the probe in the straight position is increased to 10 N when probe 18 is used		N
	When using test probe 18 the appliance is fully assembled as in normal use without any parts removed, and		N
	parts intended to be removed for user maintenance are also not removed		N
8.2	Compliance is checked by applying the test probes of EN 61032		N
	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

Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Clause	Requirement - Test	Result - Remark	Verdict
	The requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components		P
	Components that have not been previously tested or do not comply with the standard for the relevant component are tested according to the requirements of 30.2		P
	Components that have been previously tested and shown to comply with the resistance to fire requirements in the standard for the relevant component need not be retested provided that:		N
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		N
	- the test report for the component states whether it complied with the standard for the relevant component with or without flame, flames not exceeding 2 s during the test are ignored		N
	Unless components have been previously tested and found to comply with the relevant standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		P
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant standard for the component are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components that have not been separately tested and found to comply with the relevant standard, and		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

Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Clause	Requirement - Test	Result - Remark	Verdict
	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
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

Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Clause	Requirement - Test	Result - Remark	Verdict
	-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:		—
	<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	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
ZA	ANNEX ZA (NORMATIVE) SPECIAL NATIONAL CONDITIONS		—
	All CENELEC countries		—

Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Clause	Requirement - Test	Result - Remark	Verdict
25.6 and 25.25	Information concerning National plug and socket-outlets is available from the CENELEC website. Normative national requirements concerning plug and socket-outlets are shown in the relevant National standard		P
	Ireland and United Kingdom		N
25.8	In the table, the lines for 10 A and 16 A are replaced by:		N
	> 10 and ≤ 13 1,25		N
	> 13 and ≤ 16 1,5		N
ZB	ANNEX ZB (INFORMATIVE) A-DEVIATIONS		—
	United Kingdom		—
25.6	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs to BS 1363 to be fitted to domestic appliances. It also allows plugs to BS 4573 and EN 50075 to be fitted to shavers and toothbrushes		N
ZC	ANNEX ZC (NORMATIVE) NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS		—
	A list of referenced documents in this standard		P
ZD	ANNEX ZD (INFORMATIVE) IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS		—
	A table with IEC and CENELEC code designations for flexible cords		P
ZE	ANNEX ZE (INFORMATIVE) SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE		P
ZF	ANNEX ZF (INFORMATIVE) CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD		—
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive) ... :	LVD	P

Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Clause	Requirement - Test	Result - Remark	Verdict
ZG	ANNEX ZG (NORMATIVE) UV APPLIANCES		N
	Requirements not applicable to the evaluated product		—
ZZ	ANNEX ZZ (INFORMATIVE) COVERAGE OF ESSENTIAL REQUIREMENTS OF EC DIRECTIVES		—
	Description of the relation between this European standard and the LVD (Low Voltage Directive, 2006/95/EC) and the MD (Machinery Directive, 2006/42/EC)	LVD	P

EN 60335-1(A11:2014)			—
7.14	In NOTE Z1, replace "IEC 82079-1" by "EN 82079-1".		N
Annex ZF	In Table ZF.1 – List of standards under CLC/TC 61, replace line of EN 60335-2-38 by the following:		N
	EN 60335-2-38, Commercial electric griddles and griddle grills	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> With moving parts

Annex EN 62233:2008

Clause	Requirement + Test	Result - Remark	Verdict
EMF- ELECTROMAGNETICS FIELDS			
	The tested product also complies with the requirements of EN 62233:2008		---
	Limit100%	Measured max.0.8%	P
<ul style="list-style-type: none"> • Tested at 240V 50Hz; • Measuring distance: 30cm; • Sensor location: Around; • Operating conditions: Continuously without load, highest speed setting; • Background noise level: less than 1% of limit. 			

10.1	TABLE: Power input deviation					P
Input deviation of/at:	P rated (W)	P measured (W)	dP (W, %)	Required dP (W, %)	Remark	
230V	560	523	-6.6%	±10%	-	
Supplementary information:						

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

11.8	TABLE: Heating test, thermocouple measurements			P
	Test voltage (V).....:	1.15x560=644W		—
	Ambient (°C).....:	20.0		—
Thermocouple locations		Max. temperature rise measured, dT (K)	Max.temperature rise limit, dT (K)	
Power cord		31.5	50	
Heating wire		32.1	-	
Thermostat		4.5	-	
Supplementary information:				

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

Supplementary information:					

13.2	TABLE: Leakage current		P
	Heating appliances: 1.15 x rated input (W):	1.15x560=644W	—
	Motor-operated and combined appliances: 1.06 x rated voltage (V).....:	-	—
Leakage current between		I (mA)	Max. allowed I (mA)
L to accessible parts		0.005	0.25
N to accessible parts		0.005	0.25
L to earthing		0.01	0.75
N to earthing		0.01	0.75
Supplementary information:			

13.3	TABLE: Electric strength			P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)	
L to accessible parts		3000	No	
N to accessible parts		3000	No	
L to earthing		1000	No	
N to earthing		1000	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 (V)	1.06 x 230= 244V	—
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$ (V)	-	—
Leakage current between		I (mA)	Max. allowed I (mA)
Live parts to accessible parts		0.005	0.25
Live parts to earthing		0.01	0.75
Supplementary information:			

16.3	TABLE: Electric strength		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
Live parts to accessible parts		3000	No
Live parts to earthing		1250	No
Supplementary information:			

17	TABLE: Overload protection, thermocouple measurements		N
Temperature rise of part/at:		dT (K)	Max. dT (K)
Supplementary information:			

17	TABLE: Overload protection, resistance method					N
	Test voltage (V)					—
	Ambient, t1 (°C)					—
	Ambient, t2 (°C)					—
Temperature of winding		R1 (Ω)	R2 (Ω)	dT (K)	T (°C)	Max. T (°C)

Supplementary information:					

19	Abnormal operation conditions						P
Operational characteristics		YES/NO	Operational conditions				
Are there electronic circuits to control the appliance operation?		No					
Are there "off" or "stand-by" position?		No					
The unintended operation of the appliance results in dangerous malfunction?		No					
Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	0.85 times power	No hazard.	-	N.A	-	-	P
19.3	1.24 times power	No hazard.	-	-	-	-	P
19.4	Thermostat short-circuited	No hazard.	-	-	-	-	P
19.5	-	-	-	-	-	-	-
19.6	-	-	-	N.A	-	-	-
19.7	-	-	-	-	-	-	-
19.8	-	-	-	-	-	-	-
19.9	-	-	-	-	-	-	-
19.10	-	-	-	-	-	-	-
19.11.2	-	-	-	-	-	-	-
19.11.4.8	-	-	-	-	-	-	-
19.10X	-	-	-	-	-	-	-
Supplementary information:							

19.7	TABLE: Abnormal operation, locked rotor/moving parts						N
	Test voltage (V):						—

	Ambient, t1 (°C).....:				—
	Ambient, t2 (°C).....:				—
Temperature of winding	R1 (Ω)	R2 (Ω)	dT (K)	T (°C)	Max. T (°C)
Supplementary information:					

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

19.13	TABLE: Abnormal operation, temperature rises				P
Thermocouple locations	Max. temperature rise measured, dT (K)			Max.temperature rise limit, dT (K)	
Clause	19.2	19.3	19.4	-	
Power cord	30.1	33.5	32.8	150	
Heating wire	30.9	34.9	33.6	150	
Supplementary information:					

24.1	TABLE: Components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Plug	Shangyu Jintao Electron Co., Ltd.	JT003	AC250V, 16A	DIN VDE 0620-1	VDE	
Flexible cord	Shangyu Jintao Electron Co., Ltd.	H05VV-F	3G0.75mm ²	DIN VDE 0281-5	VDE	

Heating cable	E-POLY TECHNOLOGY CORP	2775	105°C, 300V, VW-1,PVC	UL 758	UL E353368
Moding	TEKNOR APEX CO	84458	PVC, VW-1	UL 94	UL E73402
Thermostat	DONGGUAN KAIN ELECTRONIC SCI & TECH CO,LTD	KI31	5°C, 250V	UL 873	UL E343948
Heat-shrinkable tube	HONGSHANG HEAT SHRINKABLE MATERIALS CO LTD	H-5(3X)	125°C, 600V	UL 224	UL E204071

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

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

29.1	TABLE: Clearances					P
	Overvoltage category..... :		II			—
		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic (mm)	Supplementary (mm)	Reinforced (mm)	Functional (mm)	Verdict / Remark
330	0,2* / 0,5 / 0,8**	-	-	-	-	-
500	0,2* / 0,5 / 0,8**	-	-	-	-	-
800	0,2* / 0,5 / 0,8**	-	-	-	-	-
1 500	0,5 / 0,8** / 1,0***	-	-	-	-	-
2 500	<u>1,5</u> / 2,0***	>3	-	-	-	P
4 000	<u>3,0</u> / 3,5***	-	-	>5	-	P
6 000	5,5 / 6,0***	-	-	-	-	-

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

Supplementary information:

*) For tracks on printed circuit boards if pollution degree 1 and 2

**) For pollution degree 3

***) If the construction is affected by wear, distortion, movement of the parts or during assembly

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree										
	1	2			3			Type of insulation			
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb ^{*)}	B ^{**)}	S ^{**)}	R ^{**)}	Verdict
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9		—	—	
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9	—		—	
≤50	0,36	1,2	1,7	2,4	3,0	3,4	3,8	—	—		
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4		—	—	
125	0,28	0,75	1,05	1,5	1,9	2,1	2,4	—		—	
125	0,56	1,5	2,1	3,0	3,8	4,2	4,8	—	—		
250	0,56	1,25	1,8	<u>2,5</u>	3,2	3,6	4,0	>3	—	—	P
250	0,56	1,25	1,8	2,5	3,2	3,6	4,0	—		—	
250	1,12	2,5	3,6	<u>5,0</u>	6,4	7,2	8,0	—	—	>5	P
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	
400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	
400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	
500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	
500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		—	—	
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—		—	
>630 and ≤800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—		
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—	—	
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—		—	
>800 and ≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—		

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>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0		—	—	
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—		—	
>1000 and ≤1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0	—	—		
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0		—	—	
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—		—	
>1250 and ≤1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0	—	—		
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0		—	—	
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	—		—	
>1600 and ≤2000	11,2	16,0	22,0	32,0	40,0	44,0	50,0	—	—		
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0		—	—	
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—		—	
>2000 and ≤2500	15,0	20,0	28,0	40,0	50,0	56,0	64,0	—	—		
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0		—	—	
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—		—	
>2500 and ≤3200	20,0	25,0	36,0	50,0	64,0	72,0	80,0	—	—		
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0		—	—	
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—		—	
>3200 and ≤4000	25,0	32,0	44,0	64,0	80,0	90,0	100,0	—	—		
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0		—	—	
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—		—	
>4000 and ≤5000	32,0	40,0	56,0	80,0	100,0	112,0	126,0	—	—		
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0		—	—	
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—		—	
>5000 and ≤6300	40,0	50,0	72,0	100,0	126,0	142,0	160,0	—	—		
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0		—	—	
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—		—	
>6300 and ≤8000	50,0	64,0	90,0	126,0	160,0	180,0	200,0	—	—		
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0		—	—	
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—		—	
>8000 and ≤10000	64,0	80,0	112,0	160,0	200,0	220,0	250,0	—	—		
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0		—	—	
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—		—	
>10000 and ≤12500	80,0	100,0	142,0	200,0	250,0	280,0	320,0	—	—		

Supplementary information:

- *) Material group IIIb is allowed if the working voltage does not exceed 50 V
 **) B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation

29.2	TABLE: Creepage distances, functional insulation							N
Working voltage (V)	Creepage distance (mm) Pollution degree							
	1	2			3			
		Material group			Material group			
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*)	Verdict / Remark
≤10	0,08	0,4	0,4	0,4	1,0	1,0	1,0	
50	0,16	0,56	0,8	1,0	1,4	1,6	1,8	
125	0,25	0,71	1,0	1,4	1,8	2,0	2,2	
250	0,42	1,0	1,4	2,0	2,5	2,8	3,2	
400	0,75	1,6	2,2	3,2	4,0	4,5	5,0	
500	1,0	2,0	2,8	4,0	5,0	5,6	6,3	
>630 and ≤800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	
Supplementary information:								
*) Material group IIIb is allowed if the working voltage does not exceed 50 V								

30 TABLE: Resistance to heat and fire																			
Object/ part No.	Manufacturer / trademark	Type/ model	Ball pressure test °C				Glow wire test (GWT) °C					Glow-wire flammability index (GWFI) °C				Glow- wire ignition temp. (GWIT) °C		Needle - flame test (NFT)	Verdict
			75	125	cl. 11 +40	cl. 19 +25	550	650		750		850	550	650	750	850	675	775	
								te	ti	te	ti								
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Supplementary information:

1) Parts of material classified at least HB40 or if relevant HBF

2) Parts of material classified as V-0 or V-1

3) Flame persisting longer than 2 s (= te – ti) need only be reported for unattended appliances

4) Surrounding parts subjected to the needle-flame test of annex E

5) Base material classified as V-0 or if relevant VTM-0

6) The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not applicable for attended appliances

Attachment – photos

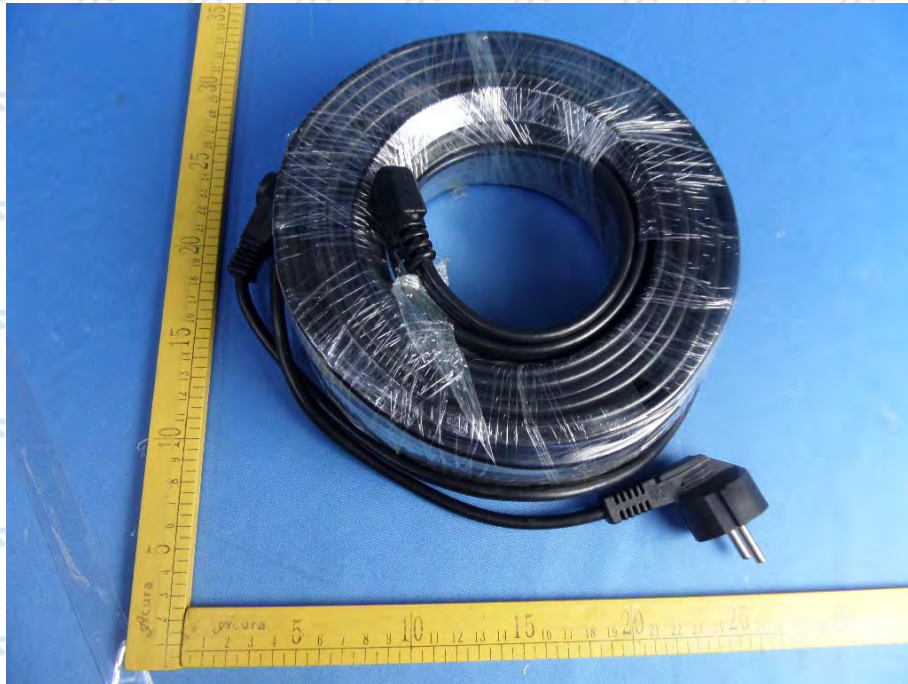


Fig.1



Fig.2

END OF REPORT