

TEST REPORT

no.: 240500150/1/E

Test name: Test of basic safety and essential performance

Test subject: Household appliances and similar purposes

Product name: Heating foil

Type – marking: TRO 100H

Manufacturer: Trivolt s.r.o.
Diaľničná cesta 22B
903 01 Senec
Slovak Republic

Applicant: COCV TSÚ Piešťany
Krajinská cesta 2929/9
921 01 Piešťany
Slovak Republic

Order no.: 240500150

Place of test: Test Laboratory TSÚ Piešťany, a. s.
Krajinská cesta 2929/9
921 01 Piešťany
Slovak Republic

Test – procedure method: See chap. 1

Date of test performance: 02.09.2024 – 13.09.2024

Distribution: 1x – Manufacturer
1x – TSU Piešťany, a. s.

Date of issue: 16.09.2024

 **TECHNICKÝ SKÚŠOBNÝ
ÚSTAV PIEŠŤANY, a. s.**
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-213-

Tested and
made by:



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1. Test methods

MPS 01/5.1-8 in scope of standards:

- **EN 60335-1:2012/AC:2014/A11:2014/A13:2017/A1:2019/A2:2019/A14:2019/A15:2021** Household and similar electrical appliances. Safety. Part 1: General requirements
- **EN IEC 60335-2-96:2021/A11:2021** Household and similar electrical appliances – Safety – Part 2-96: Particular requirements for flexible sheet heating elements for room heating.
- **EN 62233:2008** Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure

Test procedure deviation: none

The estimated uncertainty of measurement: not required

2. Measuring equipment and test facilities

- 130-316-096
- 130-316-85
- 130-316-075
- 130-317-021
- 130-317-088


3. Environmental conditions

Temperature: 25 °C

Humidity: 59 %

Atmospheric pressure: 999 hPa

4. Test sample(s)

Manufacturer:	Trivolt s.r.o. Diaľničná cesta 22B 903 01 Senec Slovak Republic
Place and date of taking sample(s):	The sample was submitted to the TSU Piešťany, a. s. on 04.06.2024 and recorded under the registration number 240500150/213/5536.
Product name:	Heating foil
Type mark:	TRO 100H
Derived variants:	TRO 100U, TRO 50U, TRO 100L, TRO 50L, TRO 50H, TRE 100U, TRE 50U, TRE 100L, TRE 50L, TRE 100H, TRE 50H
Serial number:	---
Description:	The devices are intended for the use of floor heating in residential areas. 230V 50Hz 140W/m
Copy of marking plate:	

5. Test results

EN 60335-1:2012/AC:2014/A11:2014/A13:2017/A1:2019/A2:2019/A14:2019/A15:2021			
Clause	Requirement + Test	Result - Remark	Verdict
4	General requirement		+
	Appliances shall be constructed so that in normal use, they function safely so as to cause no danger to persons or surroundings, even in the event of carelessness that may occur in normal use.		+
5	General conditions for the tests		+
	Unless otherwise specified, the tests are carried out in accordance with this clause.		+
6	Classification		+
6.1	Appliances shall be of one of the following classes with respect to protection against electric shock: class I, class II, class III	class II	+
	If an appliance consists of a part of class III construction and a detachable power supply part, the complete appliance is classified as a class I appliance or class II appliance in accordance with the classification applicable to its detachable power supply part.		X
6.2	Appliances shall have the appropriate degree of protection against harmful ingress of water.	IP 20, interior use, see manual	X
7	Marking and instructions		+
7.1	Appliances shall be marked with the		+
	- rated voltage or rated voltage range in volts;	230 V	+
	- symbol for nature of supply, unless the rated frequency is marked;	50 Hz	+
	- rated power input in watts or rated current in amperes;	140W/m See modification EN IEC 60335-2-96	+
	- name, trade mark or identification mark of the manufacturer or responsible vendor;	See Label photo	+
	- model or type reference;	See Label photo	+
	- symbol IEC 60417-5172 (2003-02) for class II appliances only;		+
	- IP number according to degree of protection against ingress of water, other than IPX0;	IP20	+
	- symbol IEC 60417-5180 (2003-02), for class III appliances. This marking is not necessary for appliances that are operated only by batteries (primary batteries or secondary batteries that are recharged outside of the appliance).		X
	The marking of rated voltage or rated voltage range, for appliances intended to be connected to the supply mains, shall cover: - 230 V for single-phase appliances; - 400 V for multi-phase appliances.	230V	+
Class II appliances and class III appliances incorporating a functional earth shall be marked with the symbol IEC 60417-5018 (2011-C7).		X	
The enclosure of electrically-operated water valves incorporated in external hose-sets for connection of an appliance to the water mains shall be marked with symbol IEC 60417-5036 (2002-10) if their working voltage exceeds extra-low voltage.		X	

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Clause	Requirement + Test	Result - Remark	Verdict
7.2	Stationary appliances for multiple supply shall be marked with the substance of the following: Warning: Before obtaining access to terminals, all supply circuits must be disconnected. This warning shall be placed in the vicinity of the terminal cover		X
7.3	Appliances having a range of rated values and which can be operated without adjustment throughout the range shall be marked with the lower and upper limits of the range separated by a hyphen		+
7.4	If the appliance can be adjusted for different rated voltages, the voltage to which the appliance is adjusted shall be clearly discernible. If frequent changes in voltage setting are not required, this requirement is considered to be met if the rated voltage to which the appliance is to be adjusted can be determined from a wiring diagram fixed to the appliance.		X
7.5	For appliances marked with more than one rated voltage or with one or more rated voltage ranges, the rated power input or rated current for each of these voltages or ranges shall be marked. However, if the difference between the limits of a rated voltage range does not exceed 10 % of the arithmetic mean value of the range, the marking for rated power input or rated current may be related to the arithmetic mean value of the range		X
	The upper and lower limits of the rated power input or rated current shall be marked on the appliance so that the relation between input and voltage is clear.		X
7.6	Used symbols		+
	The symbol for nature of supply shall be placed next to the marking for rated voltage.		+
	The symbol for class II appliances shall be placed so that it will be obvious that it is a part of the technical information and is unlikely to be confused with any other marking.		+
	Units of physical quantities and their symbols shall be those of the international standardized system.		+
7.7	Appliances to be connected to more than two supply conductors and appliances for multiple supply shall have a connection diagram fixed to them, unless the correct mode of connection is obvious.		X
7.8	Except for type Z attachment, terminals used for connection to the supply mains shall be indicated as follows:		X
	- terminals intended exclusively for the neutral conductor shall be indicated by the letter N;		X
	- protective earthing terminals shall be indicated by symbol IEC 60417- 5019 (2006-08)	inside	X
	These indications shall not be placed on screws, removable washers or other parts which can be removed when conductors are being connected.		X
7.9	Unless it is obviously unnecessary, switches which may give rise to a hazard when operated shall be marked or placed so as to indicate clearly which part of the appliance they control. Indications used for this purpose shall, wherever practicable, be comprehensible without a knowledge of languages or national standards.		X
7.10	The different positions of switches on stationary appliances and the different positions of controls on all appliances shall be indicated by figures, letters or other visual means. This requirement also applies to switches which are part of a control.		X

EN 60335-1:2012/AC:2014/A11:2014/A13:2017/A1:2019/A2:2019/A14:2019/A15:2021

Clause	Requirement + Test	Result - Remark	Verdict
	A push-push button switch used for start and stop the operation shall not be used for other functions such as changing the motor speed..		X
	For hand-held appliances with rated power input 50 W or lower it is acceptable to have a push-push button for different functions including on / off if there is an immediate feedback to the user e.g. by tactile feedback or audible and visible feedback.		X
	Where a push button can cycle through various modes during a prolonged push this is allowed as long as the appliance will switch off with a single short push action		X
	If figures are used for indicating the different positions, the off position shall be indicated by the figure 0 and the position for a higher value, such as output, input, speed or cooling effect, shall be indicated by a higher figure.		X
	The figure 0 shall not be used for any other indication unless it is positioned and associated with other numbers so that it does not give rise to confusion with the indication of the off position.		X
	Constructions with switches that have two different stable positions (meaning that it can be seen or felt when they have been pressed or rotated) are considered to have a tactile feedback.		X
	Devices used to start/stop operational functions of the appliance, if any, shall be distinguished from other manual devices by means of shape, or size, or surface texture, or position, etc.		X
	An indication that the device has been operated shall be given by:		X
	A tactile feedback or		X
	An audible and visual feedback.		X
7.11	Controls intended to be adjusted during installation or in normal use shall be provided with an indication for the direction of adjustment.		X
	Instructions for use shall be provided with the appliance so that the appliance can be used safely.		+
	If it is necessary to take precautions during user maintenance, appropriate details shall be given.		+
	The instructions shall include the substance of the following:		X
7.12	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. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.	Not intended for use by children	X
	The instructions for appliances having a part of class III construction supplied from a detachable power supply unit shall state that the appliance is only to be used with the power supply unit provided with the appliance.		X
	The instructions for class III appliances shall state that it must only be supplied at safety extra low voltage corresponding to the marking on the appliance. This instruction is not necessary for battery-operated appliances if the battery is a primary battery or secondary battery charged outside of the appliance.		X
7.12.Z1	The specific instructions related to the safe operation of this appliance (as given in 7.12 of this standard) shall be collated together in the front section of the user instructions. The height of the characters, measured on the capital letters, shall be at least 3 mm.		+
	These instructions shall also be available in an alternative format, e.g. on a website.	In manual	+

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Clause	Requirement + Test	Result - Remark	Verdict
	For appliances marked with different rated voltages or different rated frequencies (separated by a /), instructions shall be included to indicate to the user or installer what action must be taken to adjust the appliance for operation at the required rated voltage or rated frequency.		X
7.12.1	If it is necessary to take precautions during installation of the appliance, appropriate details shall be given.		+
	If an appliance is intended to be permanently connected to the water mains and not connected by a hose-set, this shall be stated.		X
7.12.2	If a stationary appliance is not fitted with a supply cord and a plug, or with other means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III conditions, the instructions shall state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.		X
7.12.3	If the insulation of the fixed wiring supplying an appliance for permanent connection to the supply mains can come into contact with parts having temperature rise exceeding 50 K during the test of Clause 11, the instructions shall state that the fixed wiring insulation must be protected, for example, by insulating sleeving having an appropriate temperature rating.		X
7.12.4	The instructions for built-in appliances shall include information with regard to the following:		X
	– dimensions of the space to be provided for the appliance;		X
	– dimensions and position of the means for supporting and fixing the appliance within this space;		X
	– minimum distances between the various parts of the appliance and the surrounding structure;		X
	– minimum dimensions of ventilating openings and their correct arrangement;		X
	– connection of the appliance to the supply mains and the interconnection of any separate components;		X
	– necessity to allow disconnection of the appliance from the supply after installation, unless the appliance incorporates a switch complying with 24.3. The disconnection may be achieved by having the plug accessible or by incorporating a switch in the fixed wiring in accordance with the wiring rules.		X
7.12.5	For appliances with type X attachment having a specially prepared cord, the instructions shall contain the substance of the following:		X
	- If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.		X
	For appliances with type Y attachment, the instructions shall contain the substance of the following.		+
	- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.		+
	For appliances with type Z attachment, the instructions shall contain the substance of the following.		X
	- The supply cord cannot be replaced. If the cord is damaged the appliance should be scrapped.		X
7.12.6	If a non-self-resetting thermal cut-out is required in order to comply with the standard then the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains shall contain the substance of the following:		X

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Clause	Requirement + Test	Result - Remark	Verdict
	CAUTION: In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility.		X
7.12.7	The instructions for fixed appliances shall state how the appliance is to be fixed to its support. The method of fixing stated is not to depend on the use of adhesives since they are not considered to be a reliable fixing means.		+
7.12.8	The instructions for appliances connected to the water mains shall state		X
	– the maximum inlet water pressure, in pascals;		X
	– the minimum inlet water pressure, in pascals, if this is necessary for the correct operation of the appliance.		X
	The instructions for appliances connected to the water mains by detachable hose-sets shall state that the new hose-sets supplied with the appliance are to be used and that old hose-sets should not be reused.		X
7.13	Instructions and other text required by this standard shall be written in an official language of the country in which the appliance is to be sold.		+
7.14	The markings required by the standard shall be clearly legible and durable.		+
7.15	The markings specified in 7.1 to 7.5 shall be on a main part of the appliance.		+
	Markings on the appliance shall be clearly discernible from the outside of the appliance but if necessary after removal of a cover. For portable appliances, it shall be possible to remove or open this cover without the aid of a tool.		+
	For stationary appliances, at least the name or trademark or identification mark of the manufacturer or responsible vendor and the model or type reference shall be visible when the appliance is installed as in normal use. These markings may be beneath a detachable cover. Other markings may be beneath a cover only if they are near to the terminals. For fixed appliances, this requirement applies after the appliance has been installed according to the instructions provided with the appliance.		+
	Indications for switches and controls shall be placed on or near these components. They shall not be placed on parts which can be positioned or repositioned in such a way that the marking is misleading.		X
7.16	If compliance with this standard depends upon the operation of a replaceable thermal link or fuse link, the reference number or other means for identifying the link shall be marked at such a place that it is clearly visible when the appliance has been dismantled to the extent necessary for replacing the link.		X
	This requirement does not apply to links which can only be replaced together with a part of the appliance.		X
8	Protection against access to live parts		+
8.1	Appliances shall be constructed and enclosed so that there is adequate protection against accidental contact with live parts.		+
8.1.4	An accessible part is not considered to be live if		X
	– the part is supplied at safety extra-low voltage, provided that		X
	• for a.c., the peak value of the voltage does not exceed 42,4 V;		X
	• for d.c., the voltage does not exceed 42,4 V; or		X
	– the part is separated from live parts by protective impedance.		X

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Clause	Requirement + Test	Result - Remark	Verdict
	If protective impedance is used, the current between the part and the supply source shall not exceed 2 mA for d.c., its peak value shall not exceed 0,7 mA for a.c. and		X
	– for voltages having a peak value over 42,4 V up to and including 450 V, the capacitance shall not exceed 0,1 µF;		X
	– for voltages having a peak value over 450 V up to and including 15 kV, the discharge shall not exceed 45 µC;		X
	– for voltages having a peak value over 15 kV, the energy in the discharge shall not exceed 350 mJ.		X
8.1.5	Live parts of built-in appliances, fixed appliances and appliances delivered in separate units, shall be protected at least by basic insulation before installation or assembly.		X
8.2	Class II appliances and class II constructions shall be constructed and enclosed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only.		X
	It shall only be possible to touch parts which are separated from live parts by double insulation or reinforced insulation.		X
9	Starting of motor-operated appliances		X
10	Power input and current		+
10.1	If an appliance is marked with rated power input, the power input at normal operating temperature shall not deviate from the rated power input by more than the deviation shown in Table 1.		X
	The deviation for motor-operated appliances applies for combined appliances if the power input of the motors is more than 50 % of the rated power input. The permissible deviations apply for both limits of the range for appliances marked with a rated voltage range having limits differing by more than 10 % of the arithmetic mean value of the range.		X
10.2	If an appliance is marked with rated current, the current at normal operating temperature shall not deviate from the rated current by more than the deviation shown in Table 2.		+
	The deviation for motor-operated appliances applies for combined appliances if the current of the motors is more than 50 % of the rated current. The permissible deviations apply for both limits of the range for appliances marked with a rated voltage range having limits differing by more than 10 % of the arithmetic mean value of the range.		X
11	Heating		+
11.1	Appliances and their surroundings shall not attain excessive temperatures in normal use.		+
12	Void		X
13	Leakage current and electric strength at operating temperature		+
13.1	At operating temperature, the leakage current of the appliance shall not be excessive and its electric strength shall be adequate.	see tables 13.2 and 13.3	+
14	Transient overvoltages		X

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Clause	Requirement + Test	Result - Remark	Verdict
	Appliances shall withstand the transient over-voltages to which they may be subjected.	Not such clearance	X
15	Moisture resistance		+
15.1	The enclosure of the appliance shall provide the degree of protection against moisture in accordance with the classification of the appliance.	IP20	+
15.2	Appliances subject to spillage of liquid in normal use shall be constructed so that such spillage does not affect their electrical insulation		X
15.3	Appliances are water resistant in normal operation.		+
16	Leakage current and electric strength		+
16.1	The leakage current of the appliance shall not be excessive and its electric strength shall be adequate.	see table 16.2 and 16.3	+
17	Overload protection of transformers and associated circuits		X
	Appliances incorporating circuits supplied from a transformer shall be constructed so that in the event of short circuits which are likely to occur in normal use, excessive temperatures do not occur in the transformer or in the circuits associated with the transformer.		X
18	Endurance		X
19	Abnormal operation		+
19.1	Appliances shall be constructed so that as a result of abnormal or careless operation, the risk of fire, mechanical damage impairing safety or protection against electric shock is obviated as far as is practicable.	See table 19	+
	Electronic circuits shall be designed and applied so that a fault condition will not render the appliance unsafe with regard to electric shock, fire hazard, mechanical hazard or dangerous malfunction.		+
20	Stability and mechanical hazards		+
20.1	Appliances, other than fixed appliances and hand-held appliances, intended to be used on a surface such as the floor or a table, shall have adequate stability.	fixed	X
20.2	Moving parts of appliances shall, as far as is compatible with the use and working of the appliance, be positioned or enclosed to provide adequate protection against personal injury in normal use. This requirement does not apply to parts of an appliance that necessarily have to be exposed to allow the appliance to perform its working function.		X
	For appliances having hazardous movable parts, due to their main function, e.g. the needle of a sewing machine, tools of kitchen machines or the blade of an electrical knife, full protection is not possible for performing their intended use.		X
	Protective enclosures, guards and similar parts shall be non-detachable parts and shall have adequate mechanical strength. However, enclosures that can be opened by overriding an interlock by applying the test probe are considered to be detachable parts.		+
	The unexpected closure of self-resetting thermal cut-outs and overcurrent protective devices shall not cause a hazard.		X

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Clause	Requirement + Test	Result - Remark	Verdict
21	Mechanical strength		+
21.1	Appliances shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use.		+
21.2	Accessible parts of solid insulation shall have sufficient strength to prevent penetration by sharp implements.		+
22	Construction		+
22.1	If the appliance is marked with the first numeral of the IP system, the relevant requirements of IEC 60529 shall be fulfilled.	IP20	+
22.2	For stationary appliances, means shall be provided to ensure all-pole disconnection from the supply mains. Such means shall be one of the following:		+
	– a supply cord fitted with a plug;		X
	– a switch complying with 24.3;		X
	– a statement in the instructions that a disconnection incorporated in the fixed wiring is to be provided;		+
	– an appliance inlet.		X
	Single-pole switches and single-pole protective devices that disconnect heating elements from the supply mains in single-phase, permanently connected class 0I appliances and class I appliances shall be connected to the phase conductor.		X
22.3	Appliances with pins for insertion into socket-outlets shall not impose undue strain on these socket-outlets. The means for retaining the pins shall withstand the forces to which the pins are likely to be subjected in normal use.		X
22.4	Appliances for heating liquids and appliances causing undue vibration shall not be provided with pins for insertion into socket-outlets.		X
22.5	Appliances intended to be connected to the supply mains by means of a plug shall be constructed so that in normal use there is no risk of electric shock from charged capacitors having a rated capacitance exceeding 0,1 µF, when the pins of the plug are touched.		X
22.6	Appliances shall be constructed so that their electrical insulation cannot be affected by water that could condense on cold surfaces or by liquid that could leak from containers, hoses, couplings and similar parts of the appliance. The electrical insulation of class II appliances and class II constructions shall not be affected if a hose ruptures or a seal leaks.		+
22.7	Appliances containing liquid or gases in normal use or having steam-producing devices shall incorporate adequate safeguards against the risk of excessive pressure.		X
22.8	For appliances having compartments to which access can be gained without the aid of a tool and that are likely to be cleaned in normal use, the electrical connections shall be arranged so that they are not subject to pulling during cleaning.		X
22.9	Appliances shall be constructed so that parts such as insulation, internal wiring, windings, commutators and slip rings are not exposed to oil, grease or similar substances, unless the substance has adequate insulating properties so that compliance with the standard is not impaired.		+

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Clause	Requirement + Test	Result - Remark	Verdict
22.10	It shall not be possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance. This requirement is only applicable if a non-self-resetting thermal cut-out is required by the standard and a voltage maintained non-self-resetting thermal cut-out is used to meet it.		X
	Non-self-resetting thermal motor protectors shall have a trip-free action unless they are voltage maintained.		X
	Reset buttons of non-self-resetting controls shall be located or protected so that their accidental resetting is unlikely to occur if this could result in a hazard.		X
22.11	Non-detachable parts that protect against access to live parts, moisture or contact with moving parts shall be fixed in a reliable manner and withstand the mechanical stress occurring during normal use. Snap-in devices used for fixing such parts shall have an obvious locked position. The fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing shall be reliable.		+
22.12	Handles, knobs, grips, levers and similar parts shall be fixed in a reliable manner so that they will not work loose in normal use if loosening could result in a hazard.		X
	If these parts are used to indicate the position of switches or similar components, it shall not be possible to fix them incorrectly if this could result in a hazard.		X
22.13	Appliances shall be constructed so that when handles are gripped in normal use, contact is unlikely between the operator's hand and parts having a temperature rise exceeding the value specified in Table 3 for handles which are held for short periods only in normal use.		X
22.14	Appliances shall have no ragged or sharp edges, other than those necessary for the functioning of the appliance, which could create a hazard for the user in normal use or during user maintenance.		+
	Pointed ends of self-tapping screws or other fasteners shall be located so that they are unlikely to be touched by the user in normal use or during user maintenance.		+
22.15	Storage hooks and similar devices for flexible cords shall be smooth and well-rounded.		X
22.16	Automatic cord reels shall be constructed so that they do not cause		X
	– undue abrasion or damage to the sheath of the flexible cord;		X
	– breakage of conductor strands;		X
	– undue wear of contacts.		X
22.17	Spacers intended to prevent the appliance from overheating walls shall be fixed so that it is not possible to remove them from the outside of the appliance by hand or by means of a screwdriver or a spanner.		X
22.18	Current-carrying parts and other metal parts, the corrosion of which could result in a hazard, shall be resistant to corrosion under normal conditions of use.		+
22.19	Driving belts shall not be relied upon to provide the required level of insulation unless they are constructed to prevent inappropriate replacement.		X
22.20	Direct contact between live parts and thermal insulation shall be effectively prevented unless such material is non-corrosive, non-hygroscopic and non-combustible.		X

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Clause	Requirement + Test	Result - Remark	Verdict
22.21	Wood, cotton, silk, ordinary paper and similar fibrous or hygroscopic material shall not be used as insulation, unless impregnated. This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements.	Not contained	+
22.22	Appliances shall not contain asbestos.	Not contained	+
22.23	Oils containing polychlorinated biphenyl (PCB) shall not be used in appliances.	Not contained	+
22.24	Bare heating elements, other than those in class III appliances or class III constructions that do not contain live parts, shall be supported so that the heating conductor is unlikely to come into contact with accessible metal parts if they rupture.		X
22.25	Appliances shall be constructed so that sagging heating conductors cannot come into contact with accessible metal parts. This requirement does not apply to class III appliances or class III constructions that do not contain live parts.		X
22.26	Appliances having parts of class III construction shall be constructed so that the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double insulation or reinforced insulation.		X
22.27	Parts connected by protective impedance shall be separated by double insulation or reinforced insulation.		X
22.28	For class II appliances connected in normal use to the gas mains or to the water mains, metal parts conductively connected to the gas pipes or in contact with the water shall be separated from live parts by double insulation or reinforced insulation.		X
22.29	Class II appliances intended to be permanently connected to fixed wiring shall be constructed so that the required degree of access to live parts is maintained after installation.		X
22.30	Parts of class II construction which serve as supplementary insulation or reinforced insulation, and which could be omitted during reassembly after servicing, shall be		X
	– fixed so that they cannot be removed without being seriously damaged, or		X
	– constructed so that they cannot be replaced in an incorrect position and if they are omitted, the appliance is rendered inoperable or manifestly incomplete.		X
22.31	Neither clearances nor creepage distances over supplementary insulation and reinforced insulation shall be reduced below the values specified in Clause 29 as a result of wear.		+
	If a part, such as a wire, screw, nut or spring, becomes loose or falls out of position, neither clearances nor creepage distances between live parts and accessible parts shall be reduced below the values specified for supplementary insulation. This requirement does not apply if:		+
	– parts are fixed by means of screws or nuts and locking washers provided that these screws or nuts are not required to be removed during the replacement of the supply cord or other servicing;		X
	– short rigid wires remain in position when the terminal screw is loosened;		X
	– parts are held in place with two independent fixings that are not expected to become loose at the same time;		+
	– wires connected by soldering are held in place near the terminals independently of the solder;		X

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	– wires connected to terminals have an additional fixing provided near the terminal, so that in the case of stranded conductors, the fixing clamps both the insulation and conductor.		X
22.32	Supplementary insulation and reinforced insulation shall be constructed or protected so that the deposition of pollution resulting from wear of parts within the appliance does not reduce clearances or creepage distances below the values specified in Clause 29.		X
	Parts of natural or synthetic rubber used as supplementary insulation shall be resistant to ageing or be located and dimensioned so that creepage distances are not reduced below the values specified in 29.2, even if cracks occur.		X
	Ceramic material which is not tightly sintered, similar materials or beads alone shall not be used as supplementary insulation or reinforced insulation.		X
	Insulating material in which heating conductors are embedded is considered to be basic insulation and not reinforced insulation. This requirement is not applicable to heating conductors in PTC heating elements.		X
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 shall not be in direct contact with live parts. Electrodes shall not be used for heating liquids.		X
	For class II construction, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts shall not be in direct contact with basic insulation or reinforced insulation unless the reinforced insulation consists of at least 3 layers.		X
	For class II construction, conductive liquids which are in contact with live parts shall not be in direct contact with reinforced insulation unless the reinforced insulation consists of at least 3 layers.		X
	An air layer shall not be used as basic insulation or supplementary insulation in a double insulation system if it is likely to be bridged by leaking liquid.		X
22.34	Shafts of operating knobs, handles, levers and similar parts shall not be live unless the shaft is inaccessible when the part is removed.		X
22.35	For constructions other than those of class III, handles, levers and knobs that are held or actuated in normal use shall not become live in the event of a failure of basic insulation. If these handles, levers and knobs are of metal and if their shafts or fixings are likely to become live in the event of a failure of basic insulation, they shall be adequately covered by insulating material or their accessible parts shall be separated from their shafts or fixings by supplementary insulation.		X
	For stationary appliances, this requirement does not apply to handles, levers and knobs, other than those of electrical components, provided that they are reliably connected to an earthing terminal or earthing contact or separated from live parts by earthed metal.		X
22.36	For appliances other than those of class III, handles which are continuously held in the hand in normal use shall be constructed so that when gripped in normal use, the operator's hand is not likely to touch metal parts unless they are separated from live parts by double insulation or reinforced insulation.		X
22.37	For class II appliances, capacitors shall not be connected to accessible metal parts and their casings, if of metal, shall be separated from accessible metal parts by supplementary insulation.		X

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	This requirement does not apply to capacitors complying with the requirements for protective impedance specified in 22.42.		X
22.38	Capacitors shall not be connected between the contacts of a thermal cut-out.		X
22.39	Lampholders shall be used only for the connection of lamps.		X
22.40	Motor-operated appliances and combined appliances which are intended to be moved while in operation, or which have accessible moving parts, shall be fitted with a switch to control the motor. The actuating member of this switch shall be easily visible and accessible.		X
	Unless the appliance can operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation shall be fitted with a switch for stopping the operation of the appliance. The actuating member of this switch shall be easily visible and accessible.		X
22.41	Appliances shall not incorporate components, other than lamps, containing mercury.		+
22.42	Protective impedance shall consist of at least two separate components. If any one of the components is short-circuited or open-circuited, the values specified in 8.1.4 shall not be exceeded.		X
	Component impedances shall be unlikely to change significantly during the lifetime of the appliance.		X
22.43	Appliances which can be adjusted for different voltages shall be constructed so that accidental changing of the setting is unlikely to occur.		X
22.44	An appliance is child-appealing if one of the following criteria is present: — appliance decorated using faces, cartoon like characters, or similar images; — appliance using shapes representing animals, characters, persons or scale models.		X
	An appliance is child-appealing if more than one of the following criteria are present: — using non-functional light (functional light is e.g. illumination of an object or area, signal indicating status of an appliance); — using non-functional sound (e.g. music); — using non-functional movement.		
22.45	When air is used as reinforced insulation, the appliance shall be constructed so that clearances cannot be reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure.		X
22.46	If programmable protective electronic circuits are used to ensure compliance with this standard, the software shall contain measures to control the fault/error conditions specified in Table R.1.		X
	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, if necessary.		X
	These requirements are not applicable to software used for functional purpose or for compliance with Clause 11.		X
22.47	Appliances intended to be connected to the water mains shall withstand the water pressure expected in normal use.		X
22.48	Appliances intended to be connected to the water mains shall be constructed to prevent backsiphonage of non-potable water into the water mains.		X

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22.49	For remote operation, the duration of operation shall be set before the appliance can be started unless the appliance switches off automatically at the end of a cycle or it can operate continuously without giving rise to a hazard.		X
22.50	Controls incorporated in the appliance, if any, shall take priority over controls actuated by remote operation.		+
22.51	A control on the appliance shall be manually adjusted to the setting for remote operation before the appliance can be operated in this mode. There shall be a visual indication on the appliance showing that the appliance is adjusted for remote operation. The manual setting and the visual indication of the remote mode are not necessary on appliances that can		X
	– operate continuously, or		X
	– operate automatically, or		X
	– be operated remotely, without giving rise to a hazard.		X
22.52	Socket-outlets on appliances accessible to the user shall be in accordance with the socket-outlet system used in the country in which the appliance is sold.		X
23	Internal wiring		+
23.1	Wireways shall be smooth and free from sharp edges.		+
	Wires shall be protected so that they do not come into contact with burrs, cooling fins or similar edges which may cause damage to their insulation.		+
	Holes in metal through which insulated wires pass shall have smooth well-rounded surfaces or be provided with bushings.		+
	Wiring shall be effectively prevented from coming into contact with moving parts.		+
23.2	Beads and similar ceramic insulators on live wires shall be fixed or located so that they cannot change their position or rest on sharp edges. If beads are inside flexible metal conduits, they shall be contained within an insulating sleeve, unless the conduit cannot move in normal use.		X
23.3	Different parts of an appliance that can move relative to each other in normal use or during user maintenance shall not cause undue stress to electrical connections and internal conductors, including those providing earthing continuity. Flexible metallic tubes shall not cause damage to the insulation of the conductors contained within them. Open-coil springs shall not be used to protect the wiring. If a coiled spring, the turns of which touch one another, is used for this purpose, there shall be an adequate insulating lining in addition to the insulation of the conductors.		X
23.4	Bare internal wiring shall be rigid and fixed so that, in normal use, clearances or creepage distances cannot be reduced below the values specified in Clause 29.		X
23.5	The insulation of internal wiring that is subjected to the supply mains voltage shall withstand the electrical stress likely to occur in normal use.		+
23.6	When sleeving is used as supplementary insulation on internal wiring, the sleeving shall be retained in position by clamping at both ends or be such that it can only be removed by breaking or cutting.		X
23.7	Conductors identified by the colour combination green/yellow shall only be used for earthing conductors.		+
23.8	Aluminium wires shall not be used for internal wiring.	Not used	+

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Clause	Requirement + Test	Result - Remark	Verdict
23.9	Stranded conductors shall not be consolidated by soldering where they are subjected to contact pressure, unless the contact pressure is provided by spring terminals.	Terminals used	+
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, shall be at least equivalent to that of light polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 52).		X
24	Components		+
24.1	Components shall comply with the safety requirements specified in the relevant standards as far as they reasonably apply.		+
	Unless otherwise specified, the requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance.		+
	Unless otherwise specified, 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.		+
	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 of this standard.		+
	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:		+
	– the severity specified in the component standard is not less than the severity specified in 30.2 of this standard, and		+
	– unless the preselection alternative is used, the test report for the component states whether it complied with the standard for the relevant component with or without flame. Flames existing for a cumulative time not exceeding 2 s during the test are ignored.		+
	If the above two conditions are not satisfied, the component is tested as part of the appliance.		X
	There are two levels of severity specified for appliances for which 30.2.3 is applicable.		+
24.2	Plugs and socket-outlets and other connecting devices of interconnection cords shall not be 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, if direct supply to these parts from the supply mains could give rise to a hazard.		X
	Appliances shall not be fitted with		+
	– switches or automatic controls in flexible cords;		+
	– devices that cause the protective device in the fixed wiring to operate in the event of a fault in the appliance;		+
	– thermal cut-outs that can be reset by a soldering operation, unless the solder has a melting point of at least 230 °C.		X
24.3	Switches intended to ensure all-pole disconnection of stationary appliances, as required in 22.2, shall be directly connected to the supply terminals and shall have a contact separation in all poles, providing full disconnection under overvoltage category III conditions.		X
24.4	Plugs and socket-outlets for extra-low voltage circuits, and those used as terminal devices for heating elements, shall not be 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.		X

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24.5	Capacitors in auxiliary windings of motors shall be marked with their rated voltage and their rated capacitance and shall be used in accordance with these markings.		X
24.6	The working voltage of motors directly connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, shall not exceed 42 V. In addition, they shall comply with the requirements of Annex I.		X
24.7	Detachable hose-sets for the connection of appliances to the water mains shall comply with IEC 61770. They shall be supplied with the appliance.		X
	Appliances intended to be permanently connected to the water mains shall not be connected by a detachable hose-set.		X
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding shall not cause a hazard in the event of a capacitor failure.		X
	The requirement is considered to be met by one or more of the following conditions:		X
	– the capacitors are of class of safety protection P2 according to IEC 60252-1;		X
	– the capacitors are housed within a metallic or ceramic enclosure that will prevent the emission of flame or molten material resulting from failure of the capacitor;		X
	– the distance of separation of the outer surface of the capacitor to adjacent non-metallic parts exceeds 50 mm;		X
	– adjacent non-metallic parts within 50 mm of the outer surface of the capacitor withstand the needle-flame test of Annex E;		X
24.8	– adjacent non-metallic parts within 50 mm of the outer surface of the capacitor are classified as at least V-1 according to IEC 60695-11-10, provided that the test sample used for the classification was no thicker than the relevant part of the appliance.		X
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.		X
25	Supply connection and external flexible cords		+
25.1	Appliances, other than those intended to be permanently connected to fixed wiring, shall be provided with one of the following means for connection to the supply mains:		+
	– supply cord fitted with a plug;		+
	– an appliance inlet having at least the same degree of protection against moisture as required for the appliance;		X
25.1	– pins for insertion into socket-outlets.		X
25.2	Appliances, other than stationary appliances for multiple supply, shall not be provided with more than one means of connection to the supply mains. Stationary appliances for multiple supply may be provided with more than one means of connection provided that the relevant circuits are adequately insulated from each other.		X
25.3	Appliances intended to be permanently connected to fixed wiring shall be provided with one of the following means for connection to the supply mains:		X
	– a set of terminals allowing the connection of a flexible cord;		X
	– a fitted supply cord;		X

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	– a set of supply leads accommodated in a suitable compartment;		X
	– a set of terminals allowing the connection of cables of fixed wiring having the nominal cross-sectional areas specified in 26.6;		X
	– a set of terminals and cable entries, conduit entries, knock-outs or glands, which allow the connection of the appropriate types of cable or conduit.		X
	Appliances intended to be permanently connected to fixed wiring that are provided with		X
	• a set of terminals allowing the connection of cables of fixed wiring having the nominal cross-sectional areas specified in 26.6, or		X
	• a set of terminals and cable entries, conduit entries, knock-outs or glands, which allow the connection of the appropriate types of cable or conduit, shall allow the connection of the supply conductors after the appliance has been fixed to its support.		X
	If a fixed appliance is constructed so that parts can be removed to facilitate easy installation, this requirement is considered to be met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support. In this case, removable parts are to be constructed for ease of reassembly without risk of incorrect assembly or damage to the wiring or terminals.		X
25.4	For appliances intended to be permanently connected to the fixed wiring and having a rated current not exceeding 16 A, cable and conduit entries shall be suitable for cables or conduits having a maximum overall dimension shown in Table 10.		X
	Conduit entries, cable entries and knock-outs shall be constructed or located so that the introduction of the conduit or cable does not reduce clearances or creepage distances below the values specified in Clause 29.		X
25.5	Supply cords shall be assembled to the appliance by one of the following methods:		X
	– type X attachment;		X
	– type Y attachment;		+
	– type Z attachment, if allowed in the relevant part 2.		X
	Type X attachments, other than those having a specially prepared cord, shall not be used for flat twin tinsel cords.		X
	For multi-phase appliances that are supplied with a supply cord and that are intended to be permanently connected to the fixed wiring, the supply cord shall be assembled to the appliance by a type Y attachment.		+
25.6	Plugs shall not be fitted with more than one flexible cord.		X
	Supply cords of single-phase portable appliances having a rated current not exceeding 16 A shall be fitted with a plug complying with the following standard sheets of IEC/TR 60083.		X
	– for class I appliances standard sheet C2b, C3b or C4;		X
	– for class II appliances standard sheet C5 or C6.		X
25.7	Supply cords for appliances other than class III appliances shall be one of the following types:		X
	– Rubber sheathed		X
	Their properties shall be at least those of ordinary tough rubber sheathed cords (code designation 60245 IEC 53).		X

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	Their properties shall be at least those of ordinary tough rubber sheathed cords (code designation 60245 IEC 53). These cords are not suitable for appliances intended to be used outdoors or when they are liable to be exposed to significant amounts of ultraviolet radiation.		X
	– Polychloroprene sheathed		X
	Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57).		X
	– Cross-linked polyvinyl chloride sheathed		X
	Their properties shall be at least those of cross-linked polyvinyl chloride sheathed cords (code designation 60245 IEC 88).		X
	– Polyvinyl chloride sheathed		X
	These cords shall not be used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of Clause 11. Their properties shall be at least those of		X
	• light polyvinyl chloride sheathed cord (code designation 60227 IEC 52), for appliances having a mass not exceeding 3 kg;		X
	• ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53), for other appliances.		X
	– Heat resistant polyvinyl chloride sheathed		X
	These cords shall not be used for type X attachment other than specially prepared cords. Their properties shall be at least those of		X
	• heat-resistant light polyvinyl chloride sheathed cord (code designation 60227 IEC 56), for appliances having a mass not exceeding 3 kg;		X
	• heat-resistant polyvinyl chloride sheathed cord (code designation 60227 IEC 57), for other appliances.		X
	– Halogen-free thermoplastic compound sheathed.		X
	Their properties shall be at least those of		X
	• halogen-free thermoplastic compound sheathed cords (code designation H03Z1Z1H2-F, H03Z1Z1-F), for appliances having a mass not exceeding 3 kg;		X
	• halogen-free thermoplastic compound sheathed cords (code designation H05Z1Z1H2-F or H05Z1Z1-F), for other appliances;		X
	– Cross-linked halogen-free compound sheathed.		X
	Their properties shall be at least those of cross-linked halogen-free compound sheathed cords (code designation H07ZZ-F).		X
	Supply cords for class III appliances shall be adequately insulated.		X
25.8	Conductors of supply cords shall have a nominal cross-sectional area not less than that shown in Table 11.		+
25.9	Supply cords shall not be in contact with sharp points or edges of the appliance.		+
25.10	The supply cord of class I appliances shall have a green/yellow core that is connected to the earthing terminal of the appliance and for appliances not intended for permanent connection to the fixed wiring, to the earthing contact of the plug.		X
25.11	Conductors of supply cords shall not be consolidated by soldering where they are subjected to contact pressure, unless the contact pressure is provided by spring terminals.		+
25.12	The insulation of the supply cords shall not be damaged when moulding the cord to part of the enclosure.		+

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Clause	Requirement + Test	Result - Remark	Verdict
25.13	Inlet openings for supply cords shall be constructed so that the sheath of the supply cord can be introduced without risk of damage. Unless the enclosure at the inlet opening is insulating material, a non-detachable lining or non-detachable bushing shall be provided that complies with 29.3 for supplementary insulation. If the supply cord is unsheathed, a similar additional bushing or lining is required, unless the appliance is a class 0 appliance or a class III appliance that does not contain live parts.		X
25.14	Appliances provided with a supply cord and that are moved while in operation shall be constructed so that the supply cord is adequately protected against excessive flexing where it enters the appliance.		X
25.15	Appliances provided with a supply cord, and appliances intended to be permanently connected to fixed wiring by a flexible cord, shall have a cord anchorage. The cord anchorage shall relieve conductors from strain, including twisting, at the terminals and protect the insulation of the conductors from abrasion.		X
	It shall not be possible to push the cord into the appliance to such an extent that the cord or internal parts of the appliance could be damaged.		+
25.16	Cord anchorages for type X attachments shall be constructed and located so that		X
	– replacement of the cord is easily possible;		X
	– it is clear how the relief from strain and the prevention of twisting are obtained;		X
	– they are suitable for the different types of supply cord that may be connected, unless the cord is specially prepared;		X
	– the cord cannot touch the clamping screws of the cord anchorage if these screws are accessible, unless they are separated from accessible metal parts by supplementary insulation;		X
	– the cord is not clamped by a metal screw which bears directly on the cord;		X
	– at least one part of the cord anchorage is securely fixed to the appliance, unless it is part of a specially prepared cord;		X
	– screws which have to be operated when replacing the cord do not fix any other component. However, this does not apply if		X
	• after removal of the screws, or if the component is incorrectly repositioned, the appliance becomes inoperative or is obviously incomplete;		X
	• the parts intended to be fastened by them cannot be removed without the aid of a tool during the replacement of the cord;		X
	– if labyrinths can be bypassed, the test of 25.15 is nevertheless withstood;		X
– for class 0 appliances, class 0I appliances and class I appliances, they are of insulating material or are provided with an insulating lining, unless failure of the insulation of the cord does not make accessible metal parts live;		X	
– for class II appliances, they are of insulating material or, if of metal, they are insulated from accessible metal parts by supplementary insulation.		X	
25.17	For type Y attachment and type Z attachment, cord anchorages shall be adequate.		+
25.18	Cord anchorages shall be arranged so that they are only accessible with the aid of a tool or shall be constructed so that the cord can only be fitted with the aid of a tool.		+

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Clause	Requirement + Test	Result - Remark	Verdict
25.19	For type X attachment, glands shall not be used as cord anchorages in portable appliances. Tying the cord into a knot or tying the cord with string is not allowed.		X
25.20	The insulated conductors of the supply cord for type Y attachment and type Z attachment shall be additionally insulated from accessible metal parts by basic insulation for class 0 appliances, class 0I appliances and class I appliances, and by supplementary insulation for class II appliances. This insulation may be provided by the sheath of the supply cord or by other means.		+
25.21	The space for the connection of supply cords having type X attachment, or for the connection of fixed wiring, shall be constructed		X
	– so that it is possible to check that the supply conductors are correctly positioned and connected before fitting any cover;		X
	– so that any cover can be fitted without risk of damage to the conductors or their insulation;		X
	– for portable appliances, so that the uninsulated end of a conductor, should it become free from the terminal, cannot come into contact with accessible metal parts.		X
25.22	Appliance inlets shall		X
	– be located or enclosed so that live parts are not accessible during insertion or removal of the connector. This requirement is not applicable to appliance inlets complying with IEC 60320-1;		X
	– be located so that the connector can be inserted without difficulty;		X
	– be located so that, after insertion of the connector, the appliance is not supported by the connector when it is placed in any position of normal use on a flat surface;		X
	– not be an appliance inlet for cold conditions if the temperature rise of external metal parts of the appliance exceeds 75 K during the test of Clause 11, unless the supply cord is unlikely to touch such metal parts in normal use.		X
25.23	Interconnection cords shall comply with the requirements for the supply cord, except that		X
	– the cross-sectional area of the conductors of the interconnection cord is determined on the basis of the maximum current carried by the conductor during the test of Clause 11 and not by the rated current of the appliance;		X
	– the thickness of the insulation of the conductor may be reduced if the voltage of the conductor is less than the rated voltage.		X
25.24	Interconnection cords shall not be detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected.		X
25.25	The dimensions of pins of appliances that are inserted into socket-outlets shall be compatible with the dimensions of the relevant socket-outlet. Dimensions of the pins and engagement face are to be in accordance with the dimensions of the relevant plug listed in IEC/TR 60083.		X
26	Terminals for external conductors		+
26.1	Appliances shall be provided with terminals or equally effective devices for the connection of external conductors. The terminals, other than terminals in class III appliances that do not contain live parts, shall only be accessible after the removal of a non-detachable cover. However, earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection.		+

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Clause	Requirement + Test	Result - Remark	Verdict
26.2	Appliances having type X attachment, except those having a specially prepared cord, and appliances for the connection of cables of fixed wiring shall be provided with terminals in which the connections are made by means of screws, nuts or similar devices, unless the connections are soldered.		X
	The screws and nuts shall not be used to fix any other component except that they may also clamp internal conductors if these are arranged so that they are unlikely to be displaced when fitting the supply conductors.		X
	If soldered connections are used, the conductor shall be positioned or fixed so that reliance is not placed upon the soldering alone to maintain it in position. However, soldering alone may be used if barriers are provided so that neither clearances nor creepage distances between live parts and other metal parts can be reduced below the values specified for supplementary insulation if the conductor becomes free at the soldered joint.		X
26.3	Terminals for type X attachment and those for the connection of cables of fixed wiring shall be constructed so that they clamp the conductor between metal surfaces with sufficient contact pressure but without causing damage to the conductor.		X
	The terminals shall be fixed so that when the clamping means is tightened or loosened		X
	– the terminal does not become loose. This does not apply if the terminals are fixed with two screws, or are fixed with one screw in a recess so that there is no appreciable movement or if they are not subject to torsion in normal use and they are locked by a self-hardening resin;		X
	– internal wiring is not subjected to stress;		X
	– neither clearances nor creepage distances are reduced below the values specified in Clause 29.		X
26.4	Terminals for type X attachment, except type X attachments having a specially prepared cord, and terminals for the connection of cables of fixed wiring, shall not require special preparation of the conductor such as by soldering of the strands of the conductor, the use of cable lugs, eyelets or similar devices. They shall be constructed or placed so that the conductor cannot slip out when clamping screws or nuts are tightened.		X
26.5	Terminals for type X attachment shall be located or shielded so that if a wire of a stranded conductor escapes when the conductors are fitted, there is no risk of accidental connection to other parts that could result in a hazard.		X
26.6	Terminals for type X attachment and for the connection of cables of fixed wiring shall allow the connection of conductors having the nominal cross-sectional areas shown in Table 13. However, if a specially prepared cord is used, the terminals need only be suitable for the connection of that cord.		X
26.7	Terminals for type X attachment, other than those in class III appliances that do not contain live parts, shall be accessible after removal of a cover or part of the enclosure.		X
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, shall be located close to each other.		X
26.9	Terminals of the pillar type shall be constructed and located so that the end of a conductor introduced into the hole is visible, or can pass beyond the threaded hole for a distance equal to half the nominal diameter of the screw but at least 2,5 mm.		X
26.10	Terminals with screw clamping and screwless terminals shall not be used for the connection of the conductors of flat twin tinsel cords unless the ends of the conductors are fitted with means suitable for use with screw terminals.		X

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Clause	Requirement + Test	Result - Remark	Verdict
26.11	For appliances having type Y attachment or type Z attachment, soldered, welded, crimped or similar connections may be used for the connection of external conductors. For class II appliances, the conductor shall be positioned or fixed so that reliance is not placed upon the soldering, crimping or welding alone to maintain the conductor in position. 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. However, these methods may be used alone if barriers are provided so that clearances and creepage distances between live parts and other metal parts cannot be reduced below the values specified for supplementary insulation, if the conductor becomes free at the soldered or welded joint or slips out of the crimped connection.	Y attachment, crimped conductors	+
27	Provision for earthing		X
27.1	Accessible metal parts of class 0I appliances and class I appliances that may become live in the event of an insulation fault, shall be permanently and reliably connected to an earthing terminal within the appliance or to the earthing contact of the appliance inlet.	Class I	X
	Earthing terminals and earthing contacts shall not be connected to the neutral terminal.		X
	Class 0 appliances, class II appliances and class III appliances shall have no provision for earthing.		X
	Safety extra-low voltage circuits shall not be earthed unless they are protective extra-low voltage circuits.		X
27.2	The clamping means of earthing terminals shall be adequately secured against accidental loosening.		X
	Terminals for the connection of external equipotential bonding conductors shall allow the connection of conductors having nominal cross-sectional areas of 2,5 mm ² to 6 mm ² and shall not be used to provide earthing continuity between different parts of the appliance. It shall not be possible to loosen the conductors without the aid of a tool.		X
27.3	If a detachable part having an earth connection is plugged into another part of the appliance, the earth connection shall be made before the current-carrying connections are established. The current-carrying connections shall be separated before the earth connection when removing the part.		X
	For appliances with supply cords, the arrangement of the terminals, or the length of the conductors between the cord anchorage and the terminals, shall be such that the current-carrying conductors become taut before the earthing conductor if the cord slips out of the cord anchorage.		X
27.4	All parts of the earthing terminal intended for the connection of external conductors shall be such that there is no risk of corrosion resulting from contact between these parts and the copper of the earthing conductor or any other metal in contact with these parts.		X
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, shall be of metal having adequate resistance to corrosion, unless they are parts of copper or copper alloys containing at least 58 % copper for parts that are worked cold, and at least 50 % copper for other parts, or unless they are parts of stainless steel containing at least 13 % chrome. If these parts are of steel, they shall be provided with an electroplated coating having a thickness of at least 5 µm at essential areas such as those liable to transmit a fault current.		X

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Clause	Requirement + Test	Result - Remark	Verdict
	Parts of coated or uncoated steel that are only intended to provide or to transmit contact pressure shall be adequately protected against rusting.		X
	If the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloy, precautions shall be taken to avoid the risk of corrosion resulting from contact between copper and aluminium or its alloys.		X
27.5	The connection between the earthing terminal or earthing contact and earthed metal parts shall have low resistance.	see table 27.5	X
	If the clearances of basic insulation in a protective extra-low voltage circuit are based on the rated voltage of the appliance, this requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit.		X
27.6	The printed conductors of printed circuit boards shall not be used to provide earthing continuity in hand-held appliances. 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.		X
28	Screws and connections		X
28.1	Fixings, the failure of which may impair compliance with this standard, electrical connections and connections providing earthing continuity shall withstand the mechanical stresses occurring in normal use.		X
	Screws used for these purposes shall not be of metal that is soft or liable to creep, such as zinc or aluminium. If they are of insulating material, they shall have a nominal diameter of at least 3 mm and they shall not be used for any electrical connections or connections providing earthing continuity.		X
	Screws used for electrical connections or for connections providing earthing continuity shall screw into metal.		X
	Screws shall not be of insulating material if their replacement by a metal screw could impair supplementary insulation or reinforced insulation. Screws that may be removed when replacing a supply cord having a type X attachment or when undertaking user maintenance shall not be of insulating material if their replacement by a metal screw could impair basic insulation.		X
28.2	Electrical connections and connections providing earthing continuity shall be constructed so that contact pressure is not transmitted through non-ceramic insulating material that is liable to shrink or to distort unless there is sufficient resiliency in the metallic parts to compensate for any possible shrinkage or distortion of the insulating material.		X
	This requirement does not apply to electrical connections in circuits of appliances for which		X
	• 30.2.2 is applicable and that carry a current not exceeding 0,5 A;		X
	• 30.2.3 is applicable and that carry a current not exceeding 0,2 A.		X
28.3	Space-threaded (sheet metal) screws shall only be used for electrical connections if they clamp the parts together.		X
	Thread-cutting (self-tapping) screws and thread rolling screws shall only be used for electrical connections if they generate a full form standard machine screw thread. However, thread-cutting (self-tapping) screws shall not be used if they are likely to be operated by the user or installer.		X
	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		X

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Clause	Requirement + Test	Result - Remark	Verdict
	– in normal use,		X
	– during user maintenance,		X
	– when replacing a supply cord having a type X attachment, or		X
	– during installation.		X
	At least two screws must be used for each connection providing earthing continuity, unless the screw forms a thread having a length of at least half the diameter of the screw.		X
28.4	Screws and nuts that make a mechanical connection between different parts of the appliance shall be secured against loosening if they also make electrical connections or connections providing earthing continuity. This requirement does not apply to screws in the earthing circuit if at least two screws are used for the connection or if an alternative earthing circuit is provided.		X
	Rivets used for electrical connections or for connections providing earthing continuity shall be secured against loosening if these connections are subject to torsion in normal use.		X
29	Clearances, creepage distances and solid insulation		+
	Appliances shall be constructed so that the clearances, creepage distances and solid insulation are adequate to withstand the electrical stresses to which the appliance is liable to be subjected.		+
29.1	Clearances shall not be less than the values specified in Table 16, taking into account the rated impulse voltage for the overvoltage categories of Table 15, unless, for basic insulation and functional insulation, they comply with the impulse voltage test of Clause 14. However, if the construction is such that the distances could be affected by wear, by distortion, by movement of the parts or during assembly, the clearances for rated impulse voltages of 1 500 V and above are increased by 0,5 mm and the impulse voltage test is not applicable.		+
	The impulse voltage test is not applicable when the microenvironment is pollution degree 3 or for basic insulation of class 0 appliances and class 0I appliances.		X
	Appliances are in overvoltage category II.		+
29.1.1	The clearances of basic insulation shall be sufficient to withstand the overvoltages likely to occur during use, taking into account the rated impulse voltage. The values of Table 16, or the impulse voltage test of Clause 14, are applicable.	see tables 29.1 and 29.2	+
	The clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1.		X
	Lacquered conductors of windings are considered to be bare conductors.		X
29.1.2	Clearances of supplementary insulation shall be not less than those specified for basic insulation in Table 16.		X
29.1.3	Clearances of reinforced insulation shall be not less than those specified for basic insulation in Table 16, using the next higher step for rated impulse voltage as a reference.		X
29.1.4	The clearances for functional insulation are the largest values determined from		+
	– Table 16 based on the rated impulse voltage;		+
	– Table F.7a in IEC 60664-1 based on the steady-state voltage or recurring peak voltage expected to occur across it, if the frequency of the steady-state voltage or recurring peak voltage does not		X

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Clause	Requirement + Test	Result - Remark	Verdict
	exceeds 30 kHz;		
	– Clause 4 of IEC 60664-4 based on the steady-state voltage or recurring peak voltage expected to occur across it, if the frequency of the steady-state voltage or recurring peak voltage exceeds 30 kHz.		X
	If the values of Table 16 are largest, the impulse voltage test of Clause 14 may be applied instead unless the microenvironment is pollution degree 3 or the construction is such that the distances could be affected by wear, by distortion, by movement of the parts or during assembly.		X
	However, clearances are not specified if the appliance complies with Clause 19 with the functional insulation short-circuited.		X
	Lacquered conductors of windings are considered to be bare conductors. However, clearances at crossover points are not measured.		X
	The clearance between surfaces of PTC heating elements may be reduced to 1 mm.		X
29.1.5	For appliances having higher working voltages than rated voltage, for example on the secondary side of a step-up transformer, or if there is a resonant voltage, the clearances for basic insulation are the largest values determined from		X
	– Table 16 based on the rated impulse voltage;		X
	– Table F.7a in IEC 60664-1 based on the steady-state voltage or recurring peak voltage expected to occur across it, if the frequency of the steady-state voltage or recurring peak voltage does not exceed 30 kHz;		X
	– Clause 4 of IEC 60664-4 based on the steady-state voltage or recurring peak voltage expected to occur across it, if the frequency of the steady-state voltage or recurring peak voltage exceeds 30 kHz.		X
	If the clearances applied for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, then the clearances of supplementary insulation shall be not less than those specified for basic insulation.		X
	If the clearances applied for basic insulation are selected from Table F.7a of IEC 60664-1, then the clearances of reinforced insulation shall be dimensioned as specified in Table F.7a to withstand 160 % of the withstand voltage required for basic insulation.		X
	If the clearances applied for basic insulation are selected from Clause 4 of IEC 60664-4, then the clearances of reinforced insulation shall be twice the value required for basic insulation.		X
	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 shall be not less than those specified in Table 16, using the next lower step for rated impulse voltage as a reference.		X
	For circuits supplied with a voltage lower than rated voltage, for example on the secondary side of a transformer, clearances of functional insulation are based on the working voltage, which is used as the rated voltage in Table 15.		X
29.2	Appliances shall be constructed so that creepage distances are not less than those appropriate for the working voltage, taking into account the material group and the pollution degree.		+
	Pollution degree 2 applies unless		+

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Clause	Requirement + Test	Result - Remark	Verdict
	– precautions have been taken to protect the insulation, in which case pollution degree 1 applies;		X
	– the insulation is subjected to conductive pollution, in which case pollution degree 3 applies.		X
29.2.1	Creepage distances of basic insulation shall not be less than those specified in Table 17. However, if the working voltage is periodic and has a frequency that exceeds 30 kHz, the creepage distances shall also be determined from Table 2 of IEC 60664-4. These values shall be used instead if they exceed the values in Table 17.		+
	Except for pollution degree 1, if the test of Clause 14 has been used to check a particular clearance, the corresponding creepage distance shall not be less than the minimum dimension specified for the clearance of Table 16.		X
29.2.2	Creepage distances of supplementary insulation shall be at least those specified for basic insulation in Table 17 or Table 2 of IEC 60664-4, as applicable.		X
29.2.3	Creepage distances of reinforced insulation shall be at least double those specified for basic insulation in Table 17 or Table 2 of IEC 60664-4, as applicable.		X
29.2.4	Creepage distances of functional insulation shall be not less than those specified in Table 18. However, if the working voltage is periodic and has a frequency that exceeds 30 kHz, the creepage distances shall also be determined from Table 2 of IEC 60664-4. These values shall be used instead if they exceed the values in Table 18.		+
	The creepage distances may be reduced if the appliance complies with Clause 19 with the functional insulation short-circuited.		X
29.3	Supplementary insulation and reinforced insulation shall have adequate thickness, or have a sufficient number of layers, to withstand the electrical stresses that can be expected during the use of the appliance.		X
30	Resistance to heat and fire		+
30.1	External parts of non-metallic material, parts of insulating material supporting live parts including connections, and parts of thermoplastic material providing supplementary insulation or reinforced insulation, shall be sufficiently resistant to heat if their deterioration could cause the appliance to fail to comply with this standard.		+
	This requirement does not apply to the insulation or sheath of flexible cords or internal wiring.		X
30.2	Parts of non-metallic material shall be resistant to ignition and spread of fire.		+
	The requirement does not apply to parts having a mass not exceeding 0,5 g which are considered insignificant parts, provided the cumulative effect of insignificant parts located within 3 mm of each other is unlikely to propagate flames that originate inside the appliance by propagating flames from one insignificant part to another.		X
	The requirement also does not apply to decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance.		X
31	Resistance to rusting		+
	Ferrous parts, the rusting of which might cause the appliance to fail to comply with this standard, shall be adequately protected against rusting.		+

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Clause	Requirement + Test	Result - Remark	Verdict
32	Radiation, toxicity and similar hazards		+
	Appliances shall not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use.	See chapter 5.1	+
Annex B	Appliances powered by rechargeable batteries		X
7	Marking and instructions		X
7.1	The battery compartment of appliances incorporating batteries that are intended to be replaced by the user shall be marked with the battery voltage and the polarity of the terminals.		X
	The positive terminal shall be indicated by symbol IEC 60417-5005 (2002-10) and the negative terminal by symbol IEC 60417-5006 (2002-10).		X
7.6	+ Symbol IEC 60417-5005 (2002-10) Plus; positive polarity		X
	- Symbol IEC 60417-5006 (2002-10) Minus; negative polarity		X
7.12	The instructions shall give information regarding charging.		X
	The instructions for appliances incorporating batteries that are intended to be replaced by the user shall include the following:		X
	– the type reference of the battery;		X
	– the orientation of the battery with regard to polarity;		X
	– the method of replacing batteries;		X
	– details regarding safe disposal of used batteries;		X
	– warning against using non-rechargeable batteries;		X
	– how to deal with leaking batteries.		X
	The instructions for appliances incorporating a battery that contains materials that are hazardous to the environment shall give details on how to remove the battery and shall state that		X
	– the battery must be removed from the appliance before it is scrapped;		X
– the appliance must be disconnected from the supply mains when removing the battery;		X	
– the battery is to be disposed of safely.		X	
7.15	Markings, other than those associated with the battery, shall be placed on the part of the appliance that is connected to the supply mains.		X
8	Protection against access to live parts		X
8.2	Appliances having batteries that according to the instructions may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment. If the appliance can be operated without the batteries, double insulation or reinforced insulation is required.		X
19	Abnormal operation		X
19.10	Not applicable.		X
21	Mechanical strength		X
21.B.101	Appliances having pins for insertion into socket-outlets shall have adequate mechanical strength.		X
25	Supply connection and external flexible cords		X
25.13	An additional lining or bushing is not necessary for interconnection cords in class III appliances or class III constructions that do not contain live parts.		X

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Clause	Requirement + Test	Result - Remark	Verdict
Annex C	Ageing test on motors		X
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		X
Annex D	Thermal motor protectors		X
	Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard		X
Annex E	Needle-flame test		X
Annex F	Capacitors		X
4.1	Visual examination and check of dimensions		X
	This subclause is applicable.		X
4.2	Electrical tests		X
4.2.1	This subclause is applicable.		X
4.2.5	This subclause is applicable.		X
4.2.5.2	Only Table 11 is applicable. The values for test A apply; however, for capacitors in heating appliances, the values for test B or test C apply.		X
4.12	Damp heat, steady state		X
	This subclause is applicable.		X
4.13	Impulse voltage		X
	This subclause is applicable.		X
4.14	Endurance		X
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable.		X
4.17	Passive flammability test		X
	This subclause is applicable.		X
4.18	Active flammability test		X
	This subclause is applicable.		X
Annex G	Safety isolating transformers		X
7	Marking and instructions		X
7.1	Transformers for specific use shall be marked with		X
	– name, trademark or identification mark of the manufacturer or responsible vendor;		X
	– model or type reference.		X
22	Construction		X
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable.		X
29	Clearances, creepage distances and solid insulation		X
29.1, 29.2 and 29.3	The distances specified in items 2a, 2c and 3 in Table 13 of IEC 61558-1 apply.		X
	For insulated winding wires complying with Subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances. In addition, for windings providing reinforced insulation, the distance specified in item 2c of Table 13 of IEC 61558-1 is not		X

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Clause	Requirement + Test	Result - Remark	Verdict
	assessed.		
	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 these values are greater than the values specified in items 2a, 2c and 3 in Table 13 of IEC 61558-1.		X
Annex H Switches			
8	Marking and documentation		X
	Switches are not required to be marked. However, a switch that can be tested separately from the appliance shall be marked with the manufacturer's name or trademark and the type reference.		X
15	Insulation resistance and dielectric strength		X
	Subclause 15.1 is not applicable.		X
	Subclause 15.2 is not applicable.		X
	Subclause 15.3 is applicable for full disconnection and micro-disconnection.		X
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		X
	This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24.		X
Annex I Motors having basic insulation that is inadequate for the rated voltage of the appliance			
22	Construction		X
22.1.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit shall be insulated from accessible parts of the appliance by double insulation or reinforced insulation.		X
Annex J Coated printed circuit boards			
5.7	Conditioning of the test specimens		X
	When production samples are used, three samples of the printed circuit board are tested.		X
5.7.1	Cold		X
	The test is carried out at -25 °C.		X
5.7.3	Rapid change of temperature		X
	Severity 1 is specified.		X
5.9	Additional tests		X
	This subclause is not applicable.		X
Annex K Overvoltage categories			
	The following information on overvoltage categories is extracted from IEC 60664-1		+
	Overvoltage category is a numeral defining a transient overvoltage condition.		+

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Clause	Requirement + Test	Result - Remark	Verdict
	Equipment of overvoltage category IV is for use at the origin of the installation.		X
	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		X
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation.		+
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies.		X
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriately low level.		X
Annex M	Pollution degree		+
	The following information on pollution degrees is extracted from IEC 60664-1.		+
	The microenvironment determines the effect of pollution on the insulation. The macroenvironment, however, has to be taken into account when considering the microenvironment.		+
	Means may be provided to reduce pollution at the insulation under consideration by effective use of enclosures, encapsulation or hermetic sealing. Such means to reduce pollution may not be effective when the equipment is subjected to condensation or if in normal use, it generates pollutants itself.		+
	Small clearances can be bridged completely by solid particles, dust and water and therefore minimum clearances are specified where pollution may be present in the microenvironment.		+
	Degrees of pollution in the microenvironment		+
	For the purpose of evaluating creepage distances, the following four degrees of pollution in the microenvironment are established:		+
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence;		X
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected;		+
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected;		X
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		X
Annex N	Proof tracking test		X
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		X
7	Test apparatus		X
7.3	Test solutions		X
	Test solution A is used		X
10	Determination of proof tracking index (PTI)		X
10.1	Procedure		X
	The proof voltage is 100 V, 175 V, 400 V or 600 V, as appropriate		X
	The test is carried out on five specimens		X

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Clause	Requirement + Test	Result - Remark	Verdict
	In case of doubt, a material is considered to have a PTI of the specified value if it withstands the test at a voltage equal to the proof voltage reduced by 25 V, the number of drops being increased to 100		X
10.2	Report		X
	The report shall state if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		X
Annex R	SOFTWARE EVALUATION		X
	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		X
R.1	Programmable electronic circuits using software		X
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or Table R.2 shall be constructed so that the software does not impair compliance with the requirements of this standard.		X
R.2	Requirements for the architecture		X
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or Table R.2 shall use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software.		X
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.2 shall have one of the following structures:		X
	- single channel with periodic self-test and monitoring		X
	- dual channel (homogenous) with comparison		X
	- dual channel (diverse) with comparison		X
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.1 shall have one of the following structures:		X
	- single channel with functional test		X
	- single channel with periodic self-test		X
	- dual channel without comparison		X
R.2.2	Measures to control faults/errors		X
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area shall be stored in a different format from that in the other area (see software diversity, IEC 60730-1 H.2.18.19).		X
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 shall have additional fault/error detection means (such as periodic functional tests, periodic self tests, or independent monitoring) for any fault/errors not detected by the comparison.		X
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 Table R.2, means shall be provided for the recognition and control of errors in transmissions to external safety-related data paths. Such means shall take into account errors in data, addressing, transmission timing and sequence of protocol.		X

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Clause	Requirement + Test	Result - Remark	Verdict
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or Table R.2, the programmable electronic circuits shall incorporate measures to address the fault/errors in safety-related segments and data indicated in Table R.1 or Table R.2 as appropriate.		X
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 Table R.2, detection of a fault/error shall occur before compliance with Clause 19 is impaired.		X
R.2.2.6	The software shall be referenced to relevant parts of the operating sequence and the associated hardware functions.		X
R.2.2.7	Where labels are used for memory locations, these labels shall be unique		X
R.2.2.8	The software shall be protected from user alteration of safety-related segments and data.		X
R.2.2.9	The software and safety-related hardware under its control shall be initialized and shall terminate before compliance with Clause 19 is impaired		X
R.3	Measures to avoid errors		X
	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or Table R.2, the following measures to avoid systematic faults in the software shall be applied.		X
	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 .		X
R.3.2	Specification		X
R.3.2.2	Software architecture		X
R.3.2.3	Module design and coding		X
R.3.3.3	Software validation		X
Annex ZA	Special national conditions		X
Annex ZC	Normative references to international publications with their corresponding European publications		X
Annex ZG	UV appliances		X
7	Marking and instructions		X
7.12.ZG	The instructions for appliances incorporating UVC emitters shall include the substance of the following:		X
	WARNING — This appliance contains a UV emitter. Do not stare at the light source.		X
32	Radiation, toxicity and similar hazards		+
	For appliances incorporating UV emitters the manufacturer's shall deliver a declaration providing evidence that the plastic material exposed to the radiation is UV resistant.		X

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Clause	Requirement – Test	Result – Remark	Verdict
7	MARKING AND INSTRUCTIONS		
7.1	Instead of the marking of rated power input or rated current the following applies:		
	- heating units shall be marked with their rated power input;		X
	- flexible sheet heating elements without connection between adjacent elements shall be individually marked with their rated power input;		X
	- other flexible sheet heating elements shall be marked with their rated power input per metre length.	16 W/m	+
	Flexible sheet heating elements shall be marked with their maximum current if		
	- the current can vary depending on the length of the heating element;		+
	- other flexible sheet heating elements can be supplied through them.		X
	Flexible sheet heating elements shall be marked with		
	- the indication of orientation, unless heating units are symmetrical;		X
	- the intended installation (ceilings, walls or floors);	Floors	+
	- the heating mode (direct heating or storage heating), unless intended for both modes.	Direct heating	+
	If the heating unit is only intended for application in floors of concrete or similar materials, it shall be marked accordingly.		X
	The marking shall be repeated at least once every 0,5 m of the heating element or on every section that can be cut to form a heating unit.		X
	Flexible sheet heating elements that can be cut on site and have to be cut at specified places shall be marked appropriately.		X
7.12.1	Instructions shall be provided. They shall include Informácie sa musia poskytnúť. Musia obsahovať		
	a) an explanation of the marking and symbols, if necessary;		X
	b) information for incorporating the heating units into the building, in particular the following:		
	- precautions to be taken to avoid damage during installation, such as dropping sharp objects or stepping on the heating unit, or careless pouring of concrete;		+
	- dimensions and distances to be taken into account;		+
	- rozmery a vzdialenosti, ktoré treba brať do úvahy;		+
	- a statement that the heating units have to be separated from other heat sources such as luminaires and chimneys;		+
	- description of the fixing areas of the heating unit;		+
	- opis upevňovacích oblastí ohrievacej jednotky;		+
	- guidance on how to avoid air gaps between the heating element and the screed of concrete floors;		+
	- guidance on how to avoid damage to a heating element and its terminations in timber constructions due to relative movement after installation;		+
	- a warning against incorporating heating units below a height of 2,3 m into walls or into ceilings inclined at less than 45° to the vertical;		X
	- the lowest ambient temperature at which heating units may be installed;	10<	+
	- the minimum radius for bending the heating element, if applicable.		X
	- minimálny polomer ohybu ohrievacieho prvku, ak je to vhodné.		X
	Except for modular heating units, the instructions shall include the following:		
	- precautions to be taken to avoid creasing the heating element;		+
	- a statement that the heating unit is not to be installed on irregular surfaces;		X

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Clause	Requirement – Test	Result – Remark	Verdict
	- description of the intended orientation and a statement that the heating unit is to be installed in this way (for heating units having non-symmetric construction).		X
	c) a statement that the installation is to be in accordance with the national wiring rules. The substance of the following shall be included: c) Vyjadrenie, že inštalácia sa musí vykonať v súlade národnými prepismi pre elektrický rozvod. Musí obsahovať v podstate text tohto znenia:		
	- the heating units are to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA. Alternatively, except for installations in floors surrounding swimming pools, they may be supplied through an isolating transformer. This statement is not required for class III heating units and for applications in:		X
	• timber floors provided that the instructions for installation state that there is to be an air gap between the heating unit and the floor;		X
	• timber ceilings;		X
	• floors of concrete or similar material in dry locations (dry locations are areas outside zone 3 as defined in IEC 60364-7-701) as long as the basic insulation and additional electrical insulation each withstand the electric strength test of 16.3 for reinforced insulation;		X
	- how to connect heating units to the supply, giving the cross-sectional area of the leads, if applicable;		+
	- how to interconnect the heating units, giving the cross-sectional area of the leads, if applicable;		+
	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;		+
	e) list of controls, unless they are incorporated into the heating unit;		X
	f) the maximum thermal resistance between the heating unit and the room;		X
	g) the type of covering materials that are allowed to be used in conjunction with the heating units with a statement that the advice of the manufacturer is to be requested before materials other than those recommended are used; the thickness of covering materials, which for floors shall be at least 5 mm;		X
	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;		X
	i) specification of any adhesive to be used; i) špecifikáciu akéhokoľvek lepidla, ktoré sa musí použiť;		X
	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;		X
	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.		X
	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. .		X
7.12.101	The instructions for applications in floors of concrete or similar material or under tiles shall state that		
	a) a grid is to be installed above the heating unit. The grid is to		X
	- be protected against corrosion but not electrically insulated;		X
	- be electrically and mechanically equivalent to a steel grid having a mesh not more than 50 mm x 50 mm and a wire diameter of 1 mm, unless the grid covers		X
	• class II heating units;		X

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Clause	Requirement – Test	Result – Remark	Verdict
	<ul style="list-style-type: none"> • heating units installed with additional electrical insulation; 		X
	<ul style="list-style-type: none"> - fully cover the heating unit including the fixing areas. It may cover several heating units; 		+
	<ul style="list-style-type: none"> - be connected to earth; 		+
	<ul style="list-style-type: none"> - be fitted with terminals suitable for the connection of two conductors each having a nominal cross-sectional area of 2,5 mm²; 		+
	<ul style="list-style-type: none"> - be checked for electrical continuity during installation. 		+
	The grid is not required for		
	<ul style="list-style-type: none"> - class III heating units; 		X
	<ul style="list-style-type: none"> - class II heating units supplied through an isolating transformer; 		X
	<ul style="list-style-type: none"> - class II heating units that are installed in dry locations (dry locations are areas outside zone 3 as defined in IEC 60364-7-701) and are supplied through a residual current device (RCD); 		+
	<ul style="list-style-type: none"> - heating units installed in dry locations (dry locations are areas outside zone 3 as defined in IEC 60364-7-701) if the basic insulation and additional electrical insulation each withstand the electric strength test of 16.3 of reinforced insulation; 		X
	<ul style="list-style-type: none"> - heating units incorporating a metallic shield or braid having a resistance per unit length equivalent to that of 0,5 mm² copper wire. 		X
	b) when the heating units have been positioned, they must be covered with an additional layer of material for mechanical protection. If the heating units are placed on concrete, a similar layer is to be inserted between the heating unit and the concrete. Adjacent layers are to overlap and be fixed to each other. The layer is to extend up each wall to the surface level of the screed. These statements are not required if		+
	<ul style="list-style-type: none"> - screened insulated heating wires are covered with a sheath complying with 21.103; 		X
	<ul style="list-style-type: none"> - the additional electrical insulation complies with the test of 21.102. 		+
	c) when heating units having basic insulation only, other than those supplied at safety extra-low voltage, are provided with additional electrical insulation, this additional insulation is to be placed directly on the heating unit;		X
	d) class II heating units are to be installed at a distance of at least 30 mm from conductive parts of the building, such as water pipes.		X
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, shall state that		X
	a) the flexible sheet heating element is to be fully covered by the ceiling or floor;		X
	b) the metallic parts of the ceiling or floor are to be earthed. The instructions shall state that they have to be fitted with terminals suitable for the connection of two conductors each having a nominal cross-sectional area of 2,5 mm ² and explain how the connection to the earthing terminal is to be made to ensure a low resistance. The statements regarding the need for earthing are not required if it is stated that a layer of additional electrical insulation is to be installed between the heating unit and the ceiling. If this insulation is not provided, the name of the manufacturer and reference of the insulation shall be given.		X
7.12.103	The instructions for applications on floors where the heating units are to be covered by tiles shall state that the heating units are to be covered by additional electrical insulation, unless the heating units are class I, class II, class III.		+

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Clause	Requirement – Test	Result – Remark	Verdict
7.12.104	The instructions for flexible sheet heating elements that can be cut on site shall state that this work is only to be carried out by persons authorized by the manufacturer and shall give information on how to		
	- cut the element;		+
	- protect the edges of the elements;		+
	- connect the supply leads and the interconnection leads, and insulate the connections		+
7.12.105	The instructions for heating units for storage heating applications shall specify the rated charging period.		X
7.14	The test with petroleum spirit is not carried out.		+
	If symbols are used relating to the intended installation or heating mode, the superimposed rectangle shall have a height of at least 15 mm.		X
7.15	Only the requirements for switches and controls are applicable.		X
7.101	A label that contains sufficient space for the locations of the heating units to be listed shall be provided for each installation giving:		
	- the name, trade mark or identification mark of the manufacturer or responsible vendor;		+
	- the model or type reference.		+
	It shall state the substance of the following: Musí ustanovovať v podstate toto:		
	- flexible sheet heating units are installed in the ceiling/floor; - ohybné plošné ohrievacie prvky sa inštalujú v strope/podlahe;		+
	- do not restrict the thermal emission of the heated ceiling/floor; - neobmedzujte tepelné vyžarovanie ohrievaného stropu/podlahy;		+
	The specific application is to be stated on the label. Na štítku sa musí uviesť špecifická aplikácia.		+
	- do not affix materials other than those recommended; - nepripevňujte iné než odporúčané materiály;		+
	- do not insert nails or screws. - neprichytávajújte klincami alebo skrutkami.		+
10	POWER INPUT AND CURRENT		
10.1	The requirement also applies to the rated power input per metre length of flexible sheet heating elements. Požiadavka sa uplatňuje aj na menovitý príkon na meter dĺžky ohybných plochých ohrievacích prvkov.		+
11	HEATING		
11.1	<i>The tests are carried out in a room that is maintained at an ambient temperature of 20 °C ± 2 °C</i>		+
11.2	Heating units intended to be installed in ceilings are positioned in accordance with 11.2.101.		X
	Modular heating units for suspended ceilings are positioned in accordance with 11.2.102.		X
	Heating units intended to be installed in floors are positioned in accordance with 11.2.103.		+
	Separate heating units intended to heat a timber floor and the ceiling below it are positioned in accordance with 11.2.104.		X
	If a heating unit is provided with a thermostat having a separate sensor, the sensor is located on the centreline of one of the adjacent heating units but outside the area of the thermal insulation placed on the floor.		X
11.7	Heating units are operated until steady conditions are established. Ohrievacie jednotky sa prevádzkujú až do ustáleného stavu.		+
	Heating units for storage heating applications are operated as specified for normal operation or until the charging control operates for the first time if this occurs first.		X

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Clause	Requirement – Test	Result – Remark	Verdict
11.8	The temperature rise of surfaces shall not exceed the values shown in Table 101.		+
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		
13.1	The heating units are installed as specified in 11.2, the most unfavourable covering material with respect to its electrical insulation characteristics being used.		+
13.2	The value specified for class 0 appliances applies to heating units having basic insulation only.		X
	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.		X
	If the heating unit is intended to be installed on a conductive surface or covered by concrete or similar material, any additional electrical insulation specified in the instructions is placed in position.		+
	Grids and screens of insulated heating wires are disconnected from earth.		+
	The metal foil is placed on accessible surfaces. It is connected to the metal support of the test arrangement when testing modular heating units. The metal foil is not brought into contact with the terminations of grids or screens of insulated heating wires.		X
13.3	The test is carried out directly on a heating unit and additional electrical insulation. 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.		+
15	MOISTURE RESISTANCE		
15.1	The test is carried out directly on a heating unit.		X
15.1.1	IPX7 heating units are immersed for 72 h.		X
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. If the orientation is not marked, they are tested in both positions.		X
15.3	The test is carried out directly on a heating unit and additional electrical insulation		X
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		
16.1	The tests are carried out directly on a heating unit and additional electrical insulation.		+
16.2	The value specified for class 0 appliances applies to heating units with basic insulation only.		X
	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.		+
	If the heating unit is intended to be installed on a conductive surface or covered by concrete or similar material, any electrical insulation specified in the instructions is placed in position.		+
16.3	The value specified for class 0 appliances applies to heating units with basic insulation only.		X
	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.		X
	For heating units with basic insulation only, other than those supplied at safety extra-low voltage, that are provided with additional electrical insulation for application in floors of concrete or similar material, each insulation shall withstand the test voltage specified for reinforced insulation.		+
	For heating units with basic insulation only, other than those supplied at safety extra-low voltage, that are provided with additional electrical insulation for application in metallic ceilings, this additional insulation shall withstand the test voltage specified for supplementary insulation.		X

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Clause	Requirement – Test	Result – Remark	Verdict
	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.		X
19	ABNORMAL OPERATION		
19.2	For ceiling applications, a piece of thermal insulation having a thermal resistance of approximately 0,9 m ² K/W is held against the ceiling covering material and located centrally across the heating units. It has a length of 0,8 m and a width equal to that of the heating unit.		X
	For floor applications, the thermal resistance of the piece of thermal insulation placed on the floor is increased to approximately 1,45 m ² K/W and is placed in the most unfavourable position.		+
	For storage heating applications, the heating units are charged for the rated charging period.		X
19.13	The temperature rise of the floor and the wood of the test framework shall not exceed 150 K.		+
21	MECHANICAL STRENGTH		
21.1	The blows are only applied to rigid parts of the heating unit.		+
	Heating units are subjected to the tests of 21.101.		X
	Heating units intended to be installed in floors are also subjected to the test of 21.102.		+
	Heating units incorporating insulated wires intended to be installed in floors are also subjected to the test of 21.103.		X
	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.		+
	These tests are not applicable to modular heating units.		X
22	Construction		
22.101	The means of connection to the supply shall be securely fixed to the heating element.		+
22.102	The insulation covering the connections and the edges of the heating element shall not affect the material of the heating element.		+
22.103	The sheets of electrical insulation of laminated flexible sheet heating elements shall be reliably bonded together. However, if the heating units are for application in a floor of concrete or similar material, only the edges of the heating element have to be bonded.		+
22.104	Connecting devices fitted to supply leads and interconnection leads shall be of class II construction. It shall not be possible to separate them without the aid of a tool.		+
22.105	Heating units of class II construction intended to be installed under floors in damp locations shall not subject the user to excessive capacitive currents.		X
	Heating units having basic insulation only, but covered with additional electrical insulation, are considered to be class II construction.		X
24	COMPONENTS		
24.101	Thermal cut-outs that are necessary for compliance with Clause 19 shall be non-self resetting with a trip-free mechanism.		X
24.102	Controls and other components necessary for the heating unit to comply with this standard shall be supplied with the flexible sheet heating element or sufficiently specified in the instructions for installation so they can be obtained separately.		+
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
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:	can be cut on site	
	- a set of terminals		X
	- a set of supply leads		X
	- a supply cord.		X

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Clause	Requirement – Test	Result – Remark	Verdict
	Heating units that can be cut on site shall be supplied with a suitable means for connection to the supply mains. Supply leads shall be double insulated or fitted with insulating sleeves. The sleeves shall be at least 300 mm long and have a thickness corresponding to that of a sheath of a supply cord (code designation 60245 IEC 53).		+
25.5	Type Z attachment is allowed.		X
26	TERMINALS FOR EXTERNAL CONDUCTORS		
26.1	Heating units shall not incorporate screw-type terminals.		+
26.5	This requirement applies to all terminals to which connections are made during installation.		+
26.11	This requirement also applies to heating units fitted with supply leads.		+
27	PROVISION FOR EARTHING		
27.1	Components provided for the reduction of capacitive currents, and which are earthed, are not considered to provide provision for earthing.		+
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		
29.1	Modular heating units are in overvoltage category 2. Other heating units are in overvoltage category 3.	category 3	+
29.3	There are no dimensional requirements for the insulation of flexible sheet heating elements or additional electrical insulation.		+
30	RESISTANCE TO HEAT AND FIRE		
30.1	The test is not applicable to flexible sheet heating elements. The tests of 25.1 and 25.4 of IEC 60884-1 are applicable to the flexible parts of connecting devices.		+
30.2	The requirement is not applicable to heating units intended for applications in floors of concrete or similar material.		+
30.2.3.1	This subclause is not applicable to flexible sheet heating elements.		+

10.1	TABLE: Power input deviation					X
Input deviation of/at:	P rated (W)	P measured (W)	ΔP	Required ΔP	Remark	
Supplementary information:						

10.2	TABLE: Current deviation					+
Input deviation of/at:	I rated (A) max.	I measured (A) one phase	ΔI (A, %)	Required ΔI (A, %)	Remark	
230 V,50Hz	1,82	1,90	+4,39 %	+15 %	PASS	
Supplementary information: the sample operated as delivered						

11.8	TABLE: Heating test, thermocouple measurements				X
	Test voltage (V)				-----
	Ambient (°C)				-----
Thermocouple locations		Max. temperature rise measured, dT (K)	Max. temperature rise limit, dT (K)		
Supplementary information:documentation					

13.2	TABLE: Leakage current				+
	Heating appliances: 1.15 x rated input (W)		N/A		-----
	Motor-operated and combined appliances: 1.06 x rated voltage (V)		243,8		-----
Leakage current between:			I (mA)	Max. allowed I (mA)	
Live part - earthed part			< 0,4*	0,107	
Supplementary information: * without EMI filters					

13.3	TABLE: Dielectric strength			+
Test voltage applied between:		Test potential applied (V)	Breakdown / flashover (Yes/No)	
Live part - earthed part		1000	No	
Supplementary information:				

14	TABLE: Transient overvoltages					X
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		+
	Single phase appliances: 1.06 x rated voltage (V) :	254,4	-----
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$ (V) :	N/A	-----
Leakage current between:		I (mA)	Max. allowed I (mA)
Live part - earthed part		0,014	0,75
Supplementary information: * without EMI filters			

16.3	TABLE: Dielectric strength		+
Test voltage applied between:		Test potential applied (V)	Breakdown / flashover (Yes/No)
Live part - earthed part		1250	No
Supplementary information:			

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

19	Abnormal operation conditions						+
Operational characteristics			YES/NO	Operational conditions			
Are there electronic circuits to control the appliance operation?			Yes				
Are there "off" or "stand-by" position?			Yes				
The unintended operation of the appliance results in dangerous malfunction?			No				
Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	x	x	x	x	x	x	x
19.3	x	x	x	x	x	x	x
19.4	x	x	x	x	x	x	x
19.5	x	x	x	x	x	x	x
19.6	x	x	x	x	x	x	x
19.8	x	x	x	x	x	x	x
19.10	x	x	x	x	x	x	x
19.11.2	SC, NC	No hazard	x	x	x	x	PASS
19.11.4	refuse to clause 9.11.4	No hazard	x	PASS	x	x	PASS*
19.12	x	x	x	x	x	x	x
19.14	x	x	x	x	x	x	x
19.15	x	x	x	x	x	x	x
Supplementary information: *see EMC test report							

19.7	TABLE: Abnormal operation, locked rotor/moving parts					X
	Test voltage (V)					----
	Ambient, t1 (°C)					----
	Ambient, t2 (°C)					----
Temperature of winding:		R1 (Ω)	R2 (Ω)	Δ T (K)	T (°C)	Max. T (°C)
Supplementary information:						

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

19.13	TABLE: Abnormal operation, temperature rises			X
Thermocouple locations:		Max. temperature rise measured, Δ T (K)	Max. temperature rise limit, Δ T (K)	
Supplementary information:				

21.1	TABLE: Impact resistance			+
Impacts per surface	Surface tested	Impact energy (Nm)	Comments	
3	Enclosure sides	0,5	No hazard	
Supplementary information:				

24.1	TABLE: Components information					X
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Supplementary information:						

27.5	TABLE: Provision for earthing			X
Accessible part under test	Test current (1,5x rated I or 25 A) [A]	Resistance (<0,1 Ω required)	Verdict	
Earthing terminal to accessible metal parts of device	25	0,05 Ω	PASS	
Supplementary Information:				

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

29.1	TABLE: Clearances					+
Overvoltage category : II					-----	
Type of insulation:						
Rated impulse voltage (V):	Min. cl (mm)	Basic (mm)	Supplementary (mm)	Reinforced (mm)	Functional (mm)	Verdict / Remark
2500	1,5	>1.5	-	-		+
Supplementary information:						

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										+
Working voltage (V):	Creepage distance (mm) Pollution degree							Type of insulation			
	1	2			3						
	Material group			Material group							
	I	II	IIIa/IIIb	I	II	IIIa/IIIb*	B**	S**	R**	Verdict	
230	0,56	1,25	1,8	<u>2,5</u>	3,2	3,6	4,0	> 2,5	x	x	+
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											

30.1	TABLE: Ball pressure			X
Part	Test temperature (°C)		Impression diameter (mm)	Allowed impression diameter (mm)

30.2	TABLE: glow-wire tests			X
Part	Test temperature (°C)		Ignition	Remarks

5.1 Household and Similar Electrical Appliance Electromagnetic Fields Test

The tests according to:

EN 62233:2008 Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure.

Test conditions:

Environmental conditions	Required value	Actual value
Temperature:	15°C ÷ 35 °C	25,6 °C
Humidity:	30 % ÷ 75 %	52,7 %
Pressure:	860 hPa ÷ 1060 hPa	999 hPa

Result of test:

Specifications:			
Frequency range	:	10Hz ÷ 400 kHz	
Field probe	:	100 cm ²	
Sensor locations	:	<input type="checkbox"/> All surfaces <input checked="" type="checkbox"/> Around <input type="checkbox"/> Top <input type="checkbox"/> Front <input type="checkbox"/> Bottom, front <input type="checkbox"/> Other: Sensor location specified in A1.3 of standard	
Measuring Distance(cm)	:	<input type="checkbox"/> 0 <input checked="" type="checkbox"/> 30 <input type="checkbox"/> 200	
Coupling factor $a_c(r)$:	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Value:0,17	
Reference level of the magnetic flux density at f_{CO} B_{RL}	:	5/f (μT)	
r.m.s. value of the magnetic flux density $B_{r.m.s.}$:	1,264 μT	
Weighted result for one measurement W_n	:	$W_n = \frac{B_{r.m.s.}}{B_{RL}}$	0,01264 -
Weighted result for one measurement taking the coupling of the inhomogeneous field into account by applying $a_c(r_1)$ W_{nc}	:	$W_{nc} = a_c(r_1) \cdot W_n$	0,0021488 PASS $W_{nc} < 1$

Result of test: PASS

6. Conclusion

Results of inspection, measure, test & finding:

EN IEC 60335-1:2012/AC:2014/A11:2014/A13:2017/A1:2019/A2:2019/A14:2019/A15:2021														
Section	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Test sample No.:1	+	+	+	+	+	X	+	+	X	+	X	+	+	X

EN IEC 60335-1:2012/AC:2014/A11:2014/A13:2017/A1:2019/A2:2019/A14:2019/A15:2021															
Section	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Test sample No.:1	X	+	+	+	+	+	+	+	+	+	+	+	+	+	+

EN IEC 60335-1:2012/AC:2014/A11:2014/A13:2017/A1:2019/A2:2019/A14:2019/A15:2021																
Section Annex	B	C	D	E	F	G	H	I	J	K	M	N	R	ZA	ZC	ZG
Test sample No.:1	X	X	X	X	X	X	X	X	X	+	+	X	X	X	X	X

EN IEC 60335-2-96:2021/A11:2021														
Section	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Test sample No.:1	+	+	+	+	+	X	+	+	X	+	X	+	+	X

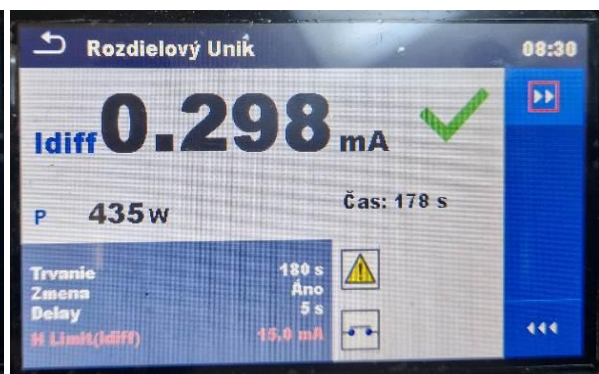
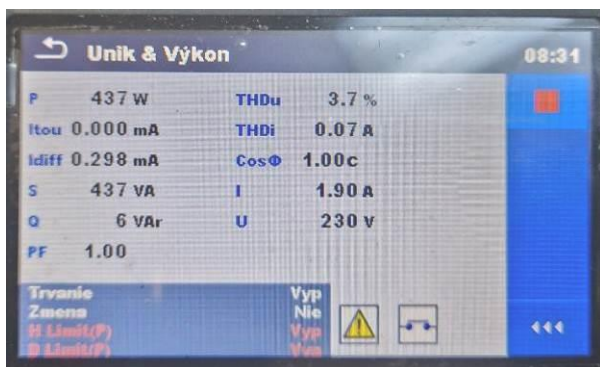
EN IEC 60335-2-96:2021/A11:2021															
Section	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Test sample No.:1	X	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Legend:

- + ⇔ Test object does meet the requirement
- ⇔ Test object does not meet the requirement
- ⇔ Test not performed
- X ⇔ Test case does not apply to the test object

REQUIREMENTS ARE MEET IN ACCORDANCE WITH STANDARDS

7. Photodocumentation



END OF TEST REPORT