

<p align="center">TEST REPORT EN 60335-1:2012/AC:2014 Household and similar electrical appliances –Safety – Part 1:General requirements</p>	
Report Reference No.	SCC(15)-40712A-3-10- LVD
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Address	No.45 Wenming Dong Road Longquangyi Chengdu 610100 P. R. China
Testing location/procedure	CHINA CEPREI (SICHUAN) LABORATORY.
Address	No.45 Wenming Dong Road Longquangyi Chengdu 610100 P. R. China
Applicant's name	JINHUA SORIN ELECTRIC VEHICLE CO., LTD
Address	NO.518 Meihe Road,Wucheng District,Jinhua City,Zhejiang Province
Test specification:	
Standard	EN 60335-1:2012/AC:2014
Test procedure	LVD
Non-standard test method	N/A
Test Report Form No.	EN 60335-1
TRF Originator	CHINA CEPREI (SICHUAN) LABORATORY.
Master TRF	Dated 2012
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Test item description	Electric Scooter
Trade Mark	E-TWOW
Test model/Type reference	S2 S3 : ECO MASTER BOOSTER
Ratings	24VDC,250W; adapter input 100-240VAC,50/60Hz
Manufacturer	JINHUA SORIN ELECTRIC VEHICLE CO., LTD
Factory location	1NO.518 Meihe Road,Wucheng District,Jinhua City,Zhejiang Province

Test item particulars	
Classification of installation and use	Move
Nature of supply	A.C
Class of protection against electrical shock	Class II
Degree of protection against moisture	IP20
Type of cord attachment	Y
Type of mounting	---
- building-in	No
- independent	Yes
- integrated	No
Switch	Yes
Thermostat	Yes
Thermal cut-out	Yes
Electronic circuit	Yes
Program controller	No
Timer	No
More than one function	No
Appliance inlet provided	No
Appliance for unattended use	No
Bare heating elements	No
Appliance to be immersed for cleaning	No
Appliance for outdoor use	No
Connector incorporating a thermostat.....	No
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement	P(Pass)
- test object does not meet the requirement.....	F(Fail)
Testing	
Date of receipt of test item	December 27,2015
Date (s) of performance of tests	December 27,2015 to January 15, 2016

General remarks:

This report is not valid as a CE Test Report unless signed by an approved CE Testing Laboratory and appended to a CE Test Certificate issued.

The test results presented in this report relate only to the object tested.

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"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (point) is used as the decimal separator.

Summary of testing:

Ambient temperature :22°C, humidity:55%

Complete test was conducted on S2.

S2 S3 : ECO MASTER BOOSTER are the same serial products and same in the circuit and the structure .

A representative sample of the product covered by this report has been tested and complies with the applicable requirements of this standard.

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Clause	Requirement - Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		P
	Tests performed according to cl. 5, e.g. nature of supply, sequence of testing, etc.		P
6	CLASSIFICATION		P
6.1	Protection against electric shock: Class 0, 0I, I, II, III	Class II	P
6.2	Protection against harmful ingress of water		P
7	MARKING AND INSTRUCTIONS		P
7.1	Rated voltage or voltage range (V).....	adapter input 100-240VAC	P
	Nature of supply	~	P
	Rated frequency (Hz)	50/60Hz	P
	Rated power input (W):	250W	P
	Rated current (A)		N
	Manufacturer's or responsible vendor's name, trademark or identification mark	JINHUA SORIN ELECTRIC VEHICLE CO., LTD	P
	Model or type reference	S2	P
	Symbol 5172 of IEC 60417, for Class II appliances	Class II	N
	IP number, other than IPX0		N
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hosesetsfor connection of an appliance to the water mains. (IEC/EN 60335-1/A1)	No appropriate components	N
7.2	Warning for stationary appliances for multiple supply	Not this appliances	N
	Warning placed in vicinity of terminal cover		N
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		N
	Different rated values marked with the values separated by an oblique stroke		N
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible	Not this appliances	N
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless	Not this appliances	N
	the power input is related to the mean value of the rated voltage range		P
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N
7.6	Correct symbols used	Correct	P

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Clause	Requirement - Test	Result - Remark	Verdict
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply		N
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		P
	- marking of terminals exclusively for the neutral conductor (N)		N
	- marking of protective earthing terminals (symbol 5019 of IEC 60417)		N
	- marking not placed on removable parts		N
7.9	Marking or placing of switches which may cause a hazard		P
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means	Marking or placing of switches which may cause a hazard	P
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		P
7.11	Indication for direction of adjustment of controls		N
7.12	Instructions for safe use provided	English instruction	P
7.12.1	Sufficient details for installation supplied		P
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules	Plug assembled	N
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions stating that the fixed wiring must be protected		N
7.12.4	Instructions for built-in appliances: (Not built-in appliance)		N
	- dimensions of space	No built-in appliances	N
	- dimensions and position of supporting means		N
	- distances between parts and surrounding structure		N
	- dimensions of ventilation openings and arrangement		N
	- connection to supply mains and interconnection of separate components		N
	- plug accessible after installation, unless		N
	a switch complying with 24.3		N
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Replacement cord instructions, type Y attachment	Y attachment	P
	Replacement cord instructions, type Z attachment		N
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 cutout that is reset by disconnection of the supply mains shall contain the substance of the following: 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.		N
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.		P
7.12.8	The instructions for appliances connected to the water mains shall state – the maximum inlet water pressure, in pascals; – the minimum inlet water pressure, in pascals, if this is necessary for the correct operation of the appliance. 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.	Refer to manual	P
7.13	Instructions and other texts in an official language	English	P
7.14	Marking clearly legible and durable	Legible and durable	P
7.15	Marking on a main part		P
	Marking clearly discernible from the outside, if necessary after removal of a cover		N
	For portable appliances, cover can be removed or opened without a tool		N
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation	Pass muster	P
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading	Pass muster	P
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		P

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Clause	Requirement - Test	Result - Remark	Verdict
8	PROTECTION AGAINST ACCESS TO LIVE PARTS		P
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N
	Use of test probe B of IEC 61032: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		P
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032: no contact with live parts of visible glowing heating elements		P
8.1.4	Accessible part not considered live if:		P
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N
	- safety extra-low d.c. voltage: not exceeding 42.4 V		N
	- or separated from live parts by protective impedance		N
	If protective impedance: d.c. current not exceeding 2 mA, and		N
	a.c. peak value not exceeding 0.7 mA	< 0,7 mA	P
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μ F		N
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μ C		N
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		N
	- built-in appliances		N
	- fixed appliances		N
	- appliances delivered in separate units		N
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only	No danger	P
	Only possible to touch parts separated from live parts by double or reinforced insulation		N
10	POWER INPUT AND CURRENT		P

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Clause	Requirement - Test	Result - Remark	Verdict
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1	(see appended table)	P
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2	(see appended table)	N
11	HEATING		P
11.1	No excessive temperatures in normal use	(See appended table) In normal position of use	P
11.2	Hand-held appliances are held in their normal position of use.		P
	Built-in appliances are installed in accordance with the instructions.		N
	Other heating appliances and other combined appliances are placed in a test corner		P
	Other motor-operated appliances are positioned		N
	For appliances provided with an automatic cord reel.		N
11.3	Temperature rises, other than of windings, determined by thermocouples	(See appended table)	P
	Temperature rises of windings determined by resistance method, unless		N
	the windings makes it difficult to make the necessary connections		N
11.4	Heating appliances operated under normal operation at 1.15 times rated power input		P
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage		N
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage		P
11.7	Operation duration corresponding to the most unfavourable conditions of normal use		P
11.8	Temperature rises not exceeding values in table 3	(see appended tables)	P
	Protective devices do not operate		N
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4 (IEC/EN 60335-1/A1)		N
	Sealing compound does not flow out		N
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		P
13.1	Leakage current not excessive and electric strength adequate		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Heating appliances operated at 1.15 times rated power input		N
	Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage		P
	Protective impedance and radio interference filters disconnected before carrying out the tests		N
13.2	Leakage current measured by means of the circuit described in figure 4 of IEC 60990		P
	Leakage current measurements	(see appended table)	P
13.3	Electric strength tests according to table 4	(see appended table)	P
	No breakdown during the tests	No breakdown	P
14	TRANSIENT OVERVOLTAGES		N
	Appliances withstand the transient overvoltages to which they may be subjected		N
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6	(see appended table)	N
	No flashover during the test, unless of functional insulation		N
	In case of flashover of functional insulation, the appliance complies with clause 19 with the clearance short circuited		N
15	MOISTURE RESISTANCE		P
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance		N
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		N
	No trace of water on insulation which can result in a reduction of clearances and creepage distances below values specified in clause 29	IP20	N
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529		P
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		P
	Built-in appliances installed according to the instructions		N
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		N
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N

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Clause	Requirement - Test	Result - Remark	Verdict
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube		N
	However, for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		N
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N
	Appliances with type X attachment fitted with a flexible cord as described		N
	Detachable parts tested as specified		N
15.2	Spillage of liquid does not affect the electrical insulation		N
	Appliances with type X attachment fitted with a flexible cord as described		N
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N
	Detachable parts removed		N
	Overfilling test with additional amount of water, over a period of 1 min (I)		N
	The appliance withstands the electric strength test of 16.3		N
	No trace of water on insulation that can result in a reduction of clearances and creepage distances below values specified in clause 29		N
15.3	Appliances proof against humid conditions		P
	Humidity test for 48 h in a humidity cabinet	93±2 % relative humidity, 28 ±2 °C, 48 h	P
	The appliance withstands the tests of clause 16		P
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		P
16.1	Leakage current not excessive and electric strength adequate	(see appended table)	P
	Protective impedance disconnected from live parts before carrying out the tests	Not applicable	P
16.2	Single-phase appliances: test voltage 1.06 times rated voltage	1.06 times rated voltage	P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by $\sqrt{3}$		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Leakage current measurements	(see appended table)	P
16.3	Electric strength tests according to table 7	(see appended table)	P
	No breakdown during the tests	No breakdown	P
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		N
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use	(see appended table)	N
	Appliance supplied with 1.06 or 0.94 times rated voltage and the most unfavourable short-circuit or overload likely to occur in normal use applied.....:		N
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		N
	Temperature of the winding not exceeding the value specified in table 8,		N
	however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N
18	ENDURANCE		N
	Requirements and tests are specified in part 2 when necessary	Not applicable	N
19	ABNORMAL OPERATION		P
19.1	The risk of fire or mechanical damage under abnormal or careless operation obviated	Can avoid these risks	P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe		N
	Pumps are also subjected to the tests of 19.101 and 19.102.		N
19.2	Test of appliance with heating elements with restricted heat dissipation; test voltage (V): power input of 0.85 times rated power input	No heating elements	N
19.3	Test of 19.2 repeated; test voltage (V): power input of 1.24 times rated power input		N
19.4	Test conditions as in cl. 11, any control limiting the temperature during tests of cl. 11 short-circuited		N
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the elements sheath		N
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N

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Clause	Requirement - Test	Result - Remark	Verdict
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions	No PTC heating elements	N
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures		N
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts of other appliances		N
	Locked rotor, motor capacitors open-circuited or short-circuited, if required		N
	Locked rotor, capacitors open-circuited one at a time		N
	Test repeated with capacitors short-circuited one at a time, if required		N
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		N
	Other appliances supplied with rated voltage for a period as specified		N
	Winding temperatures not exceeding values specified in table 8	(see appended table)	N
19.8	Three-phase motors operated at rated voltage with one phase disconnected		P
19.9	A running overload test is carried out on appliances incorporating motors that are intended to be remotely or automatically controlled or liable to be operated continuously.		N
19.10	Series motor operated at 1.3 times rated voltage for 1 min		N
	During the test, parts not being ejected from the appliance		N
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless they comply with the conditions specified in 19.11.1		P
19.11.1	Before applying the fault conditions a) to f) in 19.11.2, it is checked if circuits or parts of circuit meet both of the following conditions:		N
	- the electronic circuit is a low-power circuit, that is, the maximum power at low-power points does not exceed 15 W according to the tests specified		N

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

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Clause	Requirement - Test	Result - Remark	Verdict
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A).....:		P
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9		P
	Enclosures not deformed to such an extent that compliance with cl. 8 is impaired		P
	If the appliance can still be operated it complies with 20.2		P
	Insulation, other than of class III appliance, withstand the electric strength test of 16.3, the test voltage specified in table 4:		P
	- 1000 V basic insulation.....:	No breakdown	P
	- 1750 V supplementary insulation.....:	No breakdown	P
	- 3000 V reinforced insulation.....:	No breakdown	P
19.14	Appliances operated under the conditions of Clause 11. Contactors or relays contacts operating under the conditions of clause 11 short-circuited (IEC/EN 60335-1/A2)		N

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Clause	Requirement - Test	Result - Remark	Verdict
20	STABILITY AND MECHANICAL HAZARDS		P
20.1	Adequate stability		N
	Tilting test through an angle of 10° (appliance placed on an inclined plane/horizontal plane); appliance does not overturn		N
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		N
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		P
	Protective enclosures, guards and similar parts are non-detachable		P
	Adequate mechanical strength and fixing of protective enclosures		P
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure		P
	Not possible to touch dangerous moving parts with test probe		P
21	MECHANICAL STRENGTH		P
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling	Have an adequate mechanical strength	P

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Clause	Requirement - Test	Result - Remark	Verdict
	The appliance is rigidly supported and three blows are applied to every point of the enclosure		P
	No damage after three blows applied to various parts of the enclosure, impact energy $0,5 \pm 0,04$ J	No damage.	P
	If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3		P
	If necessary, repetition of groups of three blows on a new sample		N
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements (IEC/EN 60335-1/A1)		N
	The insulation is tested as specified, unless (IEC/EN 60335-1/A1)		N
	the thickness of supplementary insulation is at least 1 mm and reinforced insulation is at least 2 mm (IEC/EN 60335-1/A1)		N
22	CONSTRUCTION		P
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	IP20	P
22.2	Stationary appliance: means to provide all-pole disconnection from the supply provided, the following means being available:		P
	- a supply cord fitted with a plug		P
	- a switch complying with 24.3		N
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided		N
	- an appliance inlet		P
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase permanently connected class I appliances, connected in the phase conductor		N
22.3	Appliance provided with pins: no undue strain on socket-outlets	Not socket-outlets appliance	N
	Applied torque not exceeding 0.25 Nm		N
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating unless rotating does not impair compliance with the standard		N
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		N

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Clause	Requirement - Test	Result - Remark	Verdict
22.5	Appliances intended to connect the supply mains by means of a plug shall be no risk of electric shock when the pins of the plug are touched.	No danger.	P
	One second after disconnection, the voltage between the pins of the plug shall not exceed 34 V.	<34V , after 1S	P
22.6	Electrical insulation not affected by condensing water or leaking liquid		P
	Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak		N
22.7	Adequate safeguards against the risk of excessive pressure in appliances provided with steam-producing devices	Not this appliance	N
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		P
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances		P
	Adequate insulating properties of oil or grease to which insulation is exposed		N
22.10	Location or protection of reset buttons of non-self-resetting controls is so that accidental resetting is unlikely		N
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts	Pass muster	P
	Obvious locked position of snap-in devices used for fixing such parts		N
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		P
	Tests as described		P
	Push force applied for 10 s:50N		N
	Pull force applied for 10 s:50N	10N , 10s Pass muster	P
22.12	Handles, knobs etc. fixed in a reliable manner		P
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		P
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		P
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N

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Clause	Requirement - Test	Result - Remark	Verdict
22.13	Unlikely that handles, when gripped as in normal use, make the operators hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance	No sharp edges or ragged	P
	No exposed pointed ends of self tapping screws etc., liable to be touched by the user in normal use or during user maintenance	No exposed pointed ends	P
22.15	Storage hooks and the like for flexible cords smooth and well rounded	No storage hooks	N
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands, no undue wear of contacts	No automatic cord reels	N
	Cord reel tested with 6000 operations, as specified		N
	Electric strength test of 16.3, voltage of 1000 V applied		N
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner	No such components	N
22.18	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use		P
22.19	Driving belts not used as electrical insulation	No such components	N
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless material used is non-corrosive, non-hygroscopic and non-combustible		P
	Compliance is checked by inspection and, if necessary, by appropriate test		P
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless impregnated		P
22.22	Appliances not containing asbestos	No asbestos	P
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements adequately supported		N
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N
22.25	Sagging heating conductors cannot come into contact with accessible metal parts		N
22.26	The insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		N

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Clause	Requirement - Test	Result - Remark	Verdict
22.27	Parts connected by protective impedance separated by double or reinforced insulation		N
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water: separated from live parts by double or reinforced insulation		N
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		N
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Clearances and creepage distances over supplementary and reinforced insulation not reduced below values specified for supplementary insulation		P
	Creepage distances and clearances over supplementary or reinforced insulation not reduced to less than 50% of values specified in 29 if wires, screws etc. becomes loose		P
22.32	Supplementary and reinforced insulation designed or protected against deposition of dirt or dust		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		N
	Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation		P
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N
22.33	Conductive liquids that are or may become accessible in normal use are not in direct contact with live parts		N
	Electrodes not used for heating liquids		N
	For class II constructions, conductive liquids that are or may become accessible in normal use, not in direct contact with basic or reinforced insulation		N
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation		N

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Clause	Requirement - Test	Result - Remark	Verdict
22.34	Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed		P
22.35	Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault		P
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of an insulation fault, they are either adequately covered by insulation material, or their accessible parts are separated from their shafts or fixings by supplementary insulation		P
	This requirement does not apply to handles, levers and knobs on stationary appliances other than those of electrical components, provided they are either reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N
22.36	Handles continuously held in the hand in normal use are so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless they are separated from live parts by double or reinforced insulation		N
22.37	Capacitors in Class II appliances not connected to accessible metal parts, unless complying with 22.42		N
	Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42		N
22.38	Capacitors not connected between the contacts of a thermal cut-out		N
22.39	Lamp holders used only for the connection of lamps		N
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		N
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur	Not this appliance	N

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Clause	Requirement - Test	Result - Remark	Verdict
22.44	Appliances are not allowed to have an enclosure that is shaped and decorated so that the appliance is likely to be treated as a toy by children	Can't be treated as a toy by children	P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.4 due to deformation as a result of an external force applied to the enclosure		N
22.46	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.		N
22.47	Appliances intended to be connected to the water mains shall withstand the water pressure expected in normal use.		N
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.		N
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.		N
22.50	Controls incorporated in the appliance, if any, shall take priority over controls actuated by remote operation.		N
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.		N
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.		P
23	INTERNAL WIRING		P
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		P
	Wire holes in metal well rounded or provided with bushings		N
	Wiring effectively prevented from coming into contact with moving parts		N
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges or corners	No beads.	N
	Beads inside flexible metal conduits contained within an insulating sleeve		N

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Clause	Requirement - Test	Result - Remark	Verdict
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N
	Flexible metallic tubes not causing damage to insulation of conductors		N
	Open-coil springs not used		N
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N
	Electric strength test, 1000 V between live parts and accessible metal parts		N
23.4	Bare internal wiring sufficiently rigid and fixed	No bare internal wiring	N
23.5	The insulation of internal wiring withstanding the electrical stress likely to occur in normal use		P
	No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by positive means		P
23.7	The colour combination green/yellow used only for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	No lead-tin soldering of stranded conductors where they are subject to contact pressure, unless		P
	clamping means so constructed that there is no risk of bad contact due to cold flow of the solder		N
24	COMPONENTS		P
24.1	Components comply with safety requirements in relevant IEC standards	Pass muster	P
	List of components	(see appended table)	P
	Components not tested and found to comply with relevant IEC standard for the number of cycles specified are tested in accordance with 24.1.1 to 24.1.6		N
	Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		N
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14, or		N
	tested according to annex F		N

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Clause	Requirement - Test		Result - Remark	Verdict
24.1.2	Safety isolating transformers complying with IEC 61558-2-6, or			N
	tested according to annex G			N
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000, or			P
	Current and power factor measured during switching-on and normal operation			N
	Switch tested separately according to IEC 328 for 10000 cycles			P
	Switches operated under no load and only with the aid of a tool and interlocked switches operated by hand not subjected to tests of 15 and 16 of IEC 328			N
24.1.4	Automatic controls complying with IEC 60730-1 with relevant part 2. The number of cycles of operation being:			P
	- thermostats:	10 000		P
	- temperature limiters:	1 000		N
	- self-resetting thermal cut-outs:	300		P
	- non-self-resetting thermal cut-outs:	30		N
	- timers:	3 000		N
	- energy regulators:	10 000		N
24.1.5	Appliance couplers complying with IEC 60320-1			N
	However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3			N
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable			N
24.2	Appliances shall not be fitted with			P
	switches or automatic controls in flexible cords;			P
	devices that cause the protective device in the fixed wiring to operate in the event of a fault in the appliance;			P
	thermal cut-outs that can be reset by a soldering operation, unless the solder has a melting point of at least 230 °C.			N
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and having a contact separation in all poles, providing full disconnection under overvoltage category III conditions			P
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1			N

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Clause	Requirement - Test	Result - Remark	Verdict
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance and used accordingly		N
	Capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, are of class P1 or P2 of IEC 60252		N
	Voltage across capacitors in series with a motor winding does not exceed 1,1 times rated voltage, when the appliance is supplied at 1,1 times rated voltage under minimum load		N
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42V.		N
	In addition, the motors are complying with the requirements of Annex I		N
24.7	Detachable hose-sets for the connection of appliances to the water mains shall comply with IEC 61770. They shall be supplied with the appliance.		N
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		P
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		P
	- supply cord fitted with a plug		P
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance		P
	- pins for insertion into socket-outlets		N
25.2	Appliance not provided with more than one means of connection to the supply mains		N
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		N
25.3	Connection of supply conductors for appliance intended to be permanently connected to fixed wiring possible after the appliance has been fixed to its support		N
	Appliance provided with a set of terminals for the connection of cables or fixed wiring, cross-sectional areas specified in 26.6		N
	Appliance provided with a set of terminals allowing the connection of a flexible cord		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Appliance provided with a set of supply leads accommodated in a suitable compartment		N
	Appliance provided with a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate type of cable or conduit		N
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 10		P
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in 29		P
25.5	Method for assemble supply cord with the appliance:		P
	- type X attachment	Y	N
	- type Y attachment		P
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords	Y	N
25.6	Plugs fitted with only one flexible cord	Yes	P
25.7	Supply cord not lighter than:		P
	- braided cord (60245 IEC 51)		N
	- ordinary tough rubber sheathed cord (60245 IEC 53)		P
	- flat twin tinsel cord (60227 IEC 41)		N
	- light polyvinyl chloride sheathed cord (60227 IEC 52), appliance not exceeding 3 kg		N
	- ordinary polyvinyl chloride sheathed cord (60227 IEC 53), appliance exceeding 3 kg		N
	Temperature rise of external metal parts exceeding 75 K, PVC cord not used, unless		N
	appliance so constructed that the supply cord is not likely to touch external metal parts in normal use, or		N
	the supply cord is appropriate for higher temperatures, type Y or type Z attachment used		N
25.8	Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area (mm²)		P
25.9	Supply cord not in contact with sharp points or edges	Pass muster	P
25.10	Green/yellow core for earthing purposes in Class I appliance	Class II appliance	N
25.11	Conductors of supply cords not consolidated by lead-tin soldering where they are subject to contact pressure, unless		P

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Clause	Requirement - Test	Result - Remark	Verdict
	clamping means so constructed that there is no risk of bad contacts due to cold flow of the solder		N
25.12	Moulding the cord to part of the enclosure does not damage the insulation of the supply cord		P
25.13	Inlet opening so shaped as to prevent damage to the supply cord		P
	Unless the enclosure at the inlet opening is of insulation material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		P
	If unsheathed supply cord, a similar additional bushing or lining is required, unless		N
	the appliance is class 0		N
25.14	Supply cords adequately protected against excessive flexing		N
	Flexing test:		N
	- applied force (N).....:		N
	- number of flexings.....:		N
	The test does not result in:		N
	- short circuit between the conductors		N
	- breakage of more than 10% of the strands of any conductor		N
	- separation of the conductor from its terminal		N
	- loosening of any cord guard		N
	- damage, within the meaning of the standard, to the cord or the cord guard		N
	- broken strands piercing the insulation and becoming accessible		N
25.15	Conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	Cord or internal parts of appliance not damaged when cord pushed into the appliance	No damage.	P
	Pull force applied 25 times to supply cord		P
	Torque applied to supply cord (Nm).....:		P
	Torque test not performed (automatic cord reel)		P
	No damage of the cord		N
	Max. 2 mm displacement of cord; conductors not moved more than 1 mm in the terminals	0.15mm	N
	Creepage distances and clearances not reduced below specified values of 29.1		N
25.16	Cord anchorages for type X attachments constructed and located so that:		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- replacement of the cord is easily possible		N
	- it is clear how the relief from strain and the prevention of twisting are obtained		N
	- they are suitable for different types of cord		N
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless separated from accessible metal parts by supplementary insulation		N
	- the cord is not clamped by a metal screw which bears directly on the cord		N
	- at least one part of the cord anchorage securely fixed to the appliance, unless part of a specially prepared cord		N
	- screws which have to be operated when replacing the cord do not fix any other component, if applicable		N
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N
	- for Class 0, 0I and I appliances: they are of insulating material or are provided with an insulating lining, unless a failure of the insulation of the cord does not make accessible metal parts live		N
	- for Class II appliances: they are of insulating material, or if of metal, they are insulated from accessible metal parts by supplementary insulation		N
25.17	Adequate cord anchorages for type Y and Z attachment	Y attachment	P
25.18	Cord anchorages only accessible with the aid of a tool, or		P
	so constructed that the cord can only be fitted with the aid of a tool		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N
	Tying the cord into a knot or tying the cord with string not used		N
25.20	Conductors of the supply cord for type Y and Z attachment adequately additionally insulated	Adequately insulated	P
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed to permit checking of conductors with respect to correct positioning and connection before fitting any cover, no risk of damage to the conductors when fitting the cover, no contact with accessible metal parts if a conductor becomes loose, etc.		P

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Clause	Requirement - Test	Result - Remark	Verdict
	For portable appliances, the uninsulated end of a conductor prevented from any contact with accessible metal parts, unless the end of the cord is such that the conductors are unlikely to slip free	Pass muster	P
25.22	Appliance inlet:		P
	- live parts not accessible during insertion or removal		P
	- connector can be inserted without difficulty		P
	- the appliance is not supported by the connector		P
	- is not for cold conditions if temp. rise of external metal parts exceeds 75 K, unless the supply cord is not likely to touch such metal parts		N
25.23	Interconnection cords comply with the requirements for the supply cord, except as specified		N
	If necessary, electric strength test of 16.3		N
25.24	Interconnection cords not detachable without the aid of a tool if compliance with the standard is impaired when they are disconnected		N
25.25	Dimensions of pins compatible with the dimensions of the relevant socket-outlet. Dimensions of pins and engagement face in accordance with the relevant plug in IEC 60083		N
26	TERMINALS FOR EXTERNAL CONDUCTORS		N
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		N
	Terminals only accessible after removal of a non-detachable cover		N
26.2	Appliances with type X attachment and appliances for connection to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless the connections are soldered		N
	Screws and nuts serve only to clamp supply conductors, except		N
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone		N
	Soldering alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free at the soldered joint		N

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Clause	Requirement - Test	Result - Remark	Verdict
26.3	Terminals for type X attachment and for connection to fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure and without damaging the conductor		N
	Terminals for type X attachment and those for connection to fixed wiring so fixed that when tightening or loosening the clamping means:		N
	- the terminal does not loosen		N
	- internal wiring is not subjected to stress		N
	- clearances and creepage distances are not reduced below the values in 29		N
	Compliance checked by inspection and by the test of subclause 8.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified. Nominal diameter of thread (mm); screw category; torque (Nm)		N
26.4	Terminals for type X attachment, except those with a specially prepared cord, and those for connection to fixed wiring, no special preparation of conductors required, and so constructed or placed that conductors prevented from slipping out		N
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N
	Stranded conductor test, 8 mm insulation removed		N
	No contact between live parts and accessible metal parts and, for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N
26.6	Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm ²)		N
	Terminals only suitable for a specially prepared cord		N
26.7	Terminals for type X attachment accessible after removal of a cover or part of the enclosure		N
26.8	Terminals for the connection to fixed wiring, including the earthing terminal, located close to each other		N
26.9	Terminals of the pillar type constructed and located as specified		N
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless conductors ends fitted with a device suitable for screw terminals		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Pull test of 5 N to the connection		N
26.11	For type Y and Z attachment: soldered, welded, crimped and similar connections may be used		N
	For Class II appliances: the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N
	For Class II appliances: soldering, welding or crimping alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free		N
27	PROVISION FOR EARTHING		N
27.1	Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal or contact of the appliance inlet		N
	Earthing terminals not connected to neutral terminal		N
	Class 0, II and III appliance have no provision for earthing		N
	Safety extra-low voltage circuits not earthed, unless protective extra-low voltage circuits		N
27.2	Clamping means adequately secured against accidental loosening		N
	Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm ² , and		N
	do not provide earthing continuity between different parts of the appliance		N
	Conductors cannot be loosened without the aid of a tool		N
27.3	For appliances with supply cord, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		N
27.4	No risk of corrosion resulting from contact between metal of earthing terminal and other metal		N
	Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure		N
	Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5 µm		N
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N
	In case of aluminium alloys precautions taken to avoid risk of corrosion		N

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Clause	Requirement - Test	Result - Remark	Verdict
27.5	Low resistance of connection between earthing terminal and earthed metal parts		N
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided that clearances of basic insulation are based on the rated voltage of the appliance		N
	Resistance not exceeding 0,1 Ω at the specified low-resistance test		N
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand held appliances		N
	They may be used in other appliances if:		N
	- at least two tracks are used with independent soldering points and the appliance complies with requirements of 27.5 for each circuit		N
	- the material of the printed circuit board complies with IEC 60249-2-4 or IEC 60249-2-5		N
28	SCREWS AND CONNECTIONS		P
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm	Not screws of insulating material	N
	Screws of insulating material not used for any electrical connection or connections providing earthing continuity	Not screws of insulating material	N
	Screws used for electrical connections or connections providing earthing continuity screw into metal		N
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		N
	Type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw can impair basic insulation		N
	For screws and nuts; test as specified		P
	number of times..... :		P
	torque (table 12) (Nm)..... :		P

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Clause	Requirement - Test	Result - Remark	Verdict
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure not transmitted through insulating material liable to shrink or distort, unless shrinkage or distortion compensated		P
	This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0.5A		P
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N
	Thread-cutting (self-tapping) screws only used for electrical connections if they generate a full form standard machine screw thread		N
	Such screws not used if they are likely to be operated by the user or installer unless the thread is formed by a swaging action		N
	Thread-cutting and space-threaded screws may be used in connections providing earthing continuity, provided unnecessary to disturb the connection and at least two screws are used for each connection		N
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		N
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion		N
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		P
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment or to provide basic insulation, annex J applies		N
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15	(see appended table)	P
	The values specified may be smaller for basic insulation and functional insulation if the clearance meets the impulse voltage test of clause 14		N
	Appliances are in overvoltage category II		P
	Clearances less than specified in table 16 not allowed for basic insulation of class 0 and class 0I appliances,		N
	or if pollution degree 3 is applicable		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Compliance is checked by inspection and measurements as specified		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage	(see appended table)	P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1mm if the microenvironment is pollution degree 1		N
	Lacquered conductors of windings assumed to be bare conductors, but the clearances specified in table 16 are reduced by 0.5mm for rated impulse voltages of at least 1500V		N
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16	(see appended table)	P
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, but using the next higher step for rated impulse voltage	(see appended table)	P
29.1.4	For functional insulation, the values of table 16 are applicable, unless		N
	the appliance complies with clause 19 with the functional insulation short-circuited		N
	Clearances at crossover points of lacquered conductors not measured		N
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N
	Lacquered conductors of windings assumed to be bare conductors, but the clearances specified in table 16 are reduced by 0.5mm for rated impulse voltages of at least 1500V		N
29.1.5	Appliances having higher working voltage than rated voltage, the voltage used for determining clearances from table 16 is the sum of the rated impulse voltage and the difference between the peak value of the working voltage and the peak value of the rated voltage		N
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation based on the working voltage used as the rated voltage in table 15		N

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Clause	Requirement - Test	Result - Remark	Verdict
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree	(see appended table)	P
	Pollution degree 2 applies, unless		P
	precautions taken to protect the insulation; pollution degree 1		P
	insulation subjected to conductive pollution; pollution degree 3		N
	Compliance is checked by inspection and measurements as specified		N
29.2.1	Creepage distances of basic insulation not less than specified in table 17	(see appended table)	P
	For pollution degree 1, creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14		N
29.2.2	Creepage distances of supplementary insulation at least as specified for basic insulation in table 17		N
29.2.3	Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17		P
29.2.4	Creepage distances of functional insulation not less than specified in table 18		N
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		P
29.3	Solid insulation having a minimum thickness of 1mm for supplementary insulation,		N
	and 2mm for reinforced insulation		N
	This requirement does not apply if the supplementary insulation, other than mica or similar scaly material, consists of at least two layers, each of the layers withstands the electric strength test of 16.3		N
	This requirement does not apply if the reinforced insulation, other than mica or similar scaly material, consists of at least three layers, any two layers together withstand the electric strength test of 16.3		N
	This requirement also does not apply to inaccessible insulation and does not exceed the maximum permissible temperature values, or		N
	if the insulation, after conditioning as specified, withstands the electric strength test of 16.3		N
30	RESISTANCE TO HEAT AND FIRE		P
30.1	External parts of non-metallic material,		P

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Clause	Requirement - Test	Result - Remark	Verdict
	parts supporting live parts, and		P
	thermoplastic material providing supplementary or reinforced insulation,		P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts: at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C).....:		P
	Parts supporting live parts: at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125°C, whichever is the higher; temperature (°C)		P
	Parts of thermoplastic material providing supplementary or reinforced insulation, 25°C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C).....:		N
30.2	Relevant parts of non-metallic material adequately resistant to ignition and spread of fire		P
30.2.1	Glow-wire test of IEC 60695-2-11 at 550 °C, unless	glow-wire test at 550 °C	P
	the material is classified at least HB40 according to IEC 60695-11-10		N
	Parts for which the glow-wire test cannot be carried out meet the requirements in ISO9772 for category FH3 material		N
30.2.2	Not applicable		N
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		N
	Test not applicable to conditions as specified		N
30.2.3.1	Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and		N
	parts of insulating material within a distance of 3mm,		N
	having a glow-wire flammability index of at least 850°C according to IEC 60695-2-12		N
30.2.3.2	Parts of insulating material supporting current-carrying connections, and		N
	parts of insulating material within a distance of 3mm,		N
	subjected to glow-wire test of IEC 60695-2-11		N
	Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 as specified		N
	Glow-wire test of IEC 60695-2-11, the temperature being:		N

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Clause	Requirement - Test	Result - Remark	Verdict
	-750°C, for connections carrying a current exceeding 0,2A during normal operation		N
	-650°C, for other connections		N
	Parts that during the test produce a flame persisting longer than 2 s, tested as specified		N
	If a flame persists longer than 2 s during the test, parts above the connection, as specified, subjected to the needle-flame test of annex E, unless		N
	the material is classified as V-0 or V-1 according to IEC 60695-11-10		N
30.2.4	Base material of printed circuit boards subjected to needle-flame test of annex E		N
	Test not applicable to conditions as specified		P
31	RESISTANCE TO RUSTING		N
	Relevant ferrous parts adequately protected against rusting		N
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		N
	Appliance does not emit harmful radiation		N
	Appliance does not present a toxic or similar hazard		N

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Clause	Requirement - Test	Result - Remark	Verdict
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		N
	Description of routine tests to be carried out by the manufacturer		N
B	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES		N
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N
	This annex does not apply to battery chargers		N
3.1.9	Appliance operated under the following conditions:		N
	-the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		N
	-the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		N
	If the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		N
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N
5.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N
7.12	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N
	Details about how to remove batteries containing materials hazardous to the environment given		N
7.15	Markings placed on the part of the appliance connected to the supply mains		N
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		N
	If the appliance can be operated without batteries, double or reinforced insulation required		N

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Clause	Requirement - Test	Result - Remark	Verdict
11.7	The battery is charged for the period described		N
19.1	Appliances subjected to tests of 19.101, 19.102 and 19.103		N
19.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N
19.102	Short-circuiting of the terminals of the battery, being fully charged, for appliances having batteries that can be removed without the aid of a tool		N
19.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N
21.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength, checked according to procedure 2 of IEC 68-2-32		N
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-32, the number of falls being:		N
	- 100, the mass of part does not exceed 250 g		N
	- 50, the mass of part exceeds 250 g		N
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N
25.13	An additional lining or bushing not required for interconnection cords operating at safety extra-low voltage		N
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N
	For other parts, 30.2.2 applies		N
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		N
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N
D	ANNEX D (NORMATIVE) ALTERNATIVE REQUIREMENTS FOR PROTECTED MOTORS		N
	Applicable to protected motors for unattended use, test of 19.7 carried out on a separate sample according to the specification		N
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		N
	Needle-flame test carried out in accordance with IEC 60695-2-2, with the following modifications:		N

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Clause	Requirement - Test	Result - Remark	Verdict
5	Severities		N
	The duration of application of the test flame is 30 s \pm 1 s		N
8	Test procedure		N
8.2	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of figure 1		N
8.4	The first paragraph does not apply		N
	If possible, the flame is applied at least 10 mm from a corner		N
8.5	The test is carried out on one specimen		N
	If the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N
10	Evaluation of test results		N
	The duration of burning not exceeding 30 s		N
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N
F	ANNEX F (NORMATIVE) CAPACITORS		N
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		N
1.5	Terminology		N
1.5.3	Class X capacitors tested according to subclass X2		N
1.5.4	This subclause is applicable		N
1.6	Marking		N
	Items a) and b) are applicable		N
3.4	Approval testing		N
3.4.3.2	Table II is applicable as described		N
4.1	Visual examination and check of dimensions		N
	This subclause is applicable		N
4.2	Electrical tests		N
4.2.1	This subclause is applicable		N
4.2.5	This subclause is applicable		N
4.2.5.2	Only table IX is applicable		N
	Values for test A apply		N

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Clause	Requirement - Test	Result - Remark	Verdict
	However, for capacitors in heating appliances the values for test B or C apply		N
4.12	Damp heat, steady state		N
	This subclause is applicable		N
	Only insulation resistance and voltage proof are checked		N
4.13	Impulse voltage		N
	This subclause is applicable		N
4.14	Endurance		N
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		N
4.14.7	Only insulation resistance and voltage proof are checked		N
	Visual examination, no visible damage		N
4.17	Passive flammability test		N
	This subclause is applicable		N
4.18	Active flammability test		N
	This subclause is applicable		N
G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		N
	The following modifications to this standard are applicable for safety isolating transformers:		N
7	Marking and instructions		N
7.1	Transformers for specific use marked with:		N
	-name, trademark or identification mark of the manufacturer or responsible vendor		N
	-model or type reference		N
17	Overload protection of transformers and associated circuits		N
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N
22	Construction		N
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N
29	Clearances, creepage distances and solid insulation		N
29.1 and 29.2	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N
H	ANNEX H (NORMATIVE) SWITCHES		N
	Switches comply with the following clauses of IEC 61058-1, as modified:		N

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Clause	Requirement - Test	Result - Remark	Verdict
	-The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N
	-Before being tested, switches are operated 20 times without load		N
8	Marking and documentation		N
	Switches are not required to be marked		N
	However, switches that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N
13	Mechanism		N
	The tests may be carried out on a separate sample		N
15	Insulation resistance and dielectric strength		N
15.1	Not applicable		N
15.2	Not applicable		N
15.3	Applicable for full disconnection and micro-disconnection		N
17	Endurance		N
	Compliance is checked on three separate appliances or switches		N
	For 17.2.4.4, the number of cycles is 10 000, unless otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335		N
	Switches for operation under no load and which can be operated only by a tool and switches operated by hand that are interlocked so that they cannot be operated under load, are not subjected to the tests		N
	Subclause 17.2.5.2 is not applicable		N
	Temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1		N
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N
	This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in table 24		N
I	ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE		N
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		N
8	Protection against access to live parts		N

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Clause	Requirement - Test	Result - Remark	Verdict
8.1	Metal parts of the motor are considered to be bare live parts		N
11	Heating		N
11.3	Temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N
11.8	Temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N
16	Leakage current and electric strength		N
16.3	Insulation between live parts of the motor and its other metal parts not subjected to the test		N
19	Abnormal operation		N
19.1	The tests of 19.7 to 19.9 not carried out		N
19.101	Appliance operated at rated voltage with each of the following fault conditions:		N
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N
	- short circuit of each diode of the rectifier		N
	- open circuit of the supply to the motor		N
	- open circuit of any parallel resistor, the motor being in operation		N
	Only one fault simulated at a time, the tests carried out consecutively		N
22	Construction		N
22.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		N
	Compliance checked by the tests specified for double and reinforced insulation		N
J	ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS		N
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		N
6.6	Climatic sequence		N
	When production samples are used, three samples of the printed circuit board are tested		N
6.6.1	Cold		N
	The test is carried out at -25°C		N
6.6.3	Rapid change of temperature		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Severity 1 is specified		N
6.8.6	Partial discharge extinction voltage		N
	Type A coatings not subjected to a partial discharge test		N
6.9	Additional tests		N
	This subclause is not applicable		N
K	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		P
	The information on overvoltage categories is extracted from IEC 60664-1		P
	Overvoltage category is a numeral defining a transient overvoltage condition		P
	Equipment of overvoltage category IV is for use at the origin of the installation		N
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		N
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		N
	Sequences for the determination of clearances and creepage distances		N
M	ANNEX M (NORMATIVE) POLLUTION DEGREE		N
	The information on pollution degrees is extracted from IEC 60664-1		N
	Pollution		N
	The microenvironment determines the effect of pollution on the insulation, taking into account the microenvironment		N
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Minimum clearances specified where pollution may be present in the microenvironment		N
	Degrees of pollution in the microenvironment		N
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		N
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		N
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		N
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		N
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		N
5	Test apparatus		N
5.1	Electrodes		N
	The note does not apply		N
5.4	Test solutions		N
	Test solution A is used		N
6	Procedure		N
6.3	Proof tracking test		N
	Voltage is 100V, 175V, 400V or 600V		N
	Note 3 of clause 3 applies		N
	The test is carried out on five specimens		N
	In case of doubt, additional test with voltage reduced by 25V, the number of drops increased to 100		N
7	Report		N
	The report stating if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N
O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Description of tests for determination of resistance to heat and fire		N

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Clause	Requirement - Test	Result - Remark	Verdict

10.1	TABLE: Power input deviation					P
Input deviation of/at:		P rated (W)	P measured (W)	dP	Required dP	Remark
230V /50Hz		250	242	-3.2%	+5%/-10%	P

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

11.8	TABLE: Heating test, thermocouples			P
	Test voltage (V) :	243.8		—
	Ambient (°C).....:	22		—
Thermocouple locations		dT (K)	Max. dT (K)	
Test corner		42.6	65	
Supply cord		34.1	50	
Enclosure of the appliance		29.7	60	
Surface of capacitor		15.1	20	
Internal wiring		23.5	50	
PCB		22.0	See clause 30	
Switch		8.9	35	

11.8	TABLE: Heating test, resistance method			N
	Test voltage (V)	:		—
	Ambient, t ₁ (°C).....	:		—
	Ambient, t ₂ (°C).....	:		—
Temperature rise of winding	dT (K)		Max. dT (K)	Insulation class

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Clause	Requirement - Test	Result - Remark	Verdict

13.2	TABLE: Leakage current		P
	Heating appliances: 1.15 x rated input.....:		—
	Motor-operated and combined appliances: 1.06 x rated voltage		—
Leakage current between		I (mA)	Max. allowed I (mA)
L/N to accessible part		0,012	0,25

13.3	TABLE: Electric strength		P
L/N		1000	No
L/N to accessible part		3000	No

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

16.2	TABLE: Leakage current		P
	Single phase appliances: 1.06 x rated voltage	243.8V	—
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$:		—
Leakage current between		I (mA)	Max. allowed I (mA)
L/N to accessible part		0,013	0,25

16.3	TABLE: Electric strength		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
Reinforced insulation		3000	No
Live parts and surface of Multi prove		3000	No

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Clause	Requirement - Test	Result - Remark	Verdict

Live parts and surface of earthed metal parts	1500	No
Live parts and surface of non-metal parts	3000	No

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

19.7	TABLE: Abnormal operation, locked rotor/moving parts			N
	Test voltage (V)	:		—
	Ambient, t_1 (°C)	:		—
	Ambient, t_2 (°C)	:		—
Temperature of winding		dT (K)	T (°C)	Max. T (°C)

19.13	TABLE: Abnormal operation, temperature rises			N
Thermocouple locations		dT (K)	Max. dT (K)	

28.1	TABLE: Threaded part torque test			P
Threaded part identification		Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Screw for fixing enclosure		3,5	II	0,8

29.1	TABLE: Clearances			P
	Overvoltage category.....:	II		—
		Type of insulation:		

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Clause	Requirement - Test	Result - Remark	Verdict

Rated impulse voltage (V):	Min. cl (mm)	Basic	Functional	Supplementary	Reinforced	Verdict / Remark
330	0,5	---	---	---	---	N
500	0,5	---	---	---	---	N
800	0,5	---	---	---	---	N
1 500	1,0	---	---	---	---	N
2 500	2,0	>2	>2	>2	---	P
4 000	3,5	---	---	---	>3.5	P
6 000	6,0	---	---	---	---	N
8 000	8,5	---	---	---	---	N
10 000	11,5	---	---	---	---	N

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree										
	1	2			3			Type of insulation			
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb	B ^{*)}	S ^{*)}	R ^{*)}	Verdict
>50	0,2	0,6	0,9	1,2	1,5	1,7	1,9		—	—	N/A
>50	0,2	0,6	0,9	1,2	1,5	1,7	1,9	—		—	N/A
>50	0,4	1,2	1,8	2,4	3,0	3,4	3,8	—	—		N/A
>50 and ≤125	0,3	0,8	1,1	1,5	1,9	2,1	2,4		—	—	N/A
>50 and ≤125	0,3	0,8	1,1	1,5	1,9	2,1	2,4	—		—	N/A
>50 and ≤125	0,6	1,6	2,2	3,0	3,8	4,2	4,8	—	—		N/A
>125 and ≤250	0,6	1,3	1,8	<u>2,5</u>	3,2	3,6	<u>4,0</u>	6.24	—	—	P
>125 and ≤250	0,6	1,3	1,8	<u>2,5</u>	3,2	3,6	<u>4,0</u>	—	8.10	—	P
>125 and ≤250	1,2	2,6	3,6	<u>5,0</u>	6,4	7,2	<u>8,0</u>	—	—	9.40	P
>250 and ≤400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	N/A
>250 and ≤400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	N/A
>250 and ≤400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		N/A
>400 and ≤500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	N/A
>400 and ≤500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	N/A
>400 and ≤500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		N/A

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

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Clause	Requirement - Test							Result - Remark			Verdict
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—		—	N/A
>8000 and ≤10000	64,0	80,0	112,0	160,0	200,0	220,0	250,0	—	—		N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0		—	—	N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—		—	N/A
>10000 and ≤12500	80,0	100,0	142,0	200,0	250,0	280,0	320,0	—	—		N/A
*), B=Basic, S=Supplementary and R=Reinforced											

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

30.1	TABLE: Ball pressure	N
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Clause	Requirement - Test	Result - Remark	Verdict

Part	Test temperature (°C)	Impression diameter (mm)	Allowed impression (mm)
enclosure	75	0.62	2
Plastic for supporting motor brush	125	0.5	2

Photos of the sample



Notice

1. This test report shall be invalid without the cachet of the testing laboratory.
2. This copied report shall be invalid without the sealed cachet of the testing laboratory.
3. This report shall be invalid without tester signature, reviewer signature and approver signature.
4. This report is invalid if altered.
5. Client shall put forward demurrer within 15days after receipt of report.
The testing laboratory shall refuse disposal if exceeded the time limit.
6. The test results presented in this report relate only to the object tested.

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