Prüfbericht-Nr.: *Test Report No.*:	**50349141 001**	**Auftrags-Nr.:** *Order No.*:	244181029	Seite 1 von 121 *Page 1 of 121*
Kunden-Referenz-Nr.: *Client Reference No.*:	**2061587**	**Auftragsdatum:** *Order date*:	22-11-2019	
Auftraggeber: *Client*:	**Bestway (HongKong) International Ltd.** *Suite 713, 7/Floor, East Wing, Tsim Sha Tsui Centre, 66 Mody Road, Kowloon, Hong Kong*			
Prüfgegenstand: *Test item*:	SPA			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	S200102			
Auftrags-Inhalt: *Order content*:	CoC LVD			
Prüfgrundlage: *Test specification*:	EN 60335-1: 2012+A11+A13+A14+A1+A2 EN 60335-2-60: 2003+A1+A2+A11+A12 EN 62233: 2008			

Wareneingangsdatum: *Date of receipt*:	18-03-2020
Prüfmuster-Nr.: *Test sample No.*:	A001034361-001 A001077551-001
Prüfzeitraum: *Testing period*:	20-03-2020 to 26-03-2020
Ort der Prüfung: *Place of testing*:	TÜV Rheinland (Shanghai) Co., Ltd.
Prüflaboratorium: *Testing laboratory*:	TÜV Rheinland (Shanghai) Co., Ltd.
Prüfergebnis*: *Test result**:	Pass

geprüft von / *tested by*:

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
25-05-2020	Du Juan/PE	

kontrolliert von / *reviewed by*:

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
25-05-2020	Yi Zhuangcheng/TC	

Sonstiges / *Other*:

The report contains IEC report page 2 to 92, EN deviation report page 93 to 121.

Attachment 1: Test equipments list (2 pages)

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 60335-2-60
Safety of household and similar electrical appliances
Part 2: Particular requirements for whirlpool baths and whirlpool spas

Report Number. .....:	50349141 001
Date of issue.....:	See cover page
Total number of pages.....	See cover page
Name of Testing Laboratory preparing the Report.....:	TUV Rheinland (Shanghai) Co., Ltd.
Applicant's name .....:	**Bestway (HongKong) International Ltd.**
Address.....:	*Suite 713, 7/Floor, East Wing, Tsim Sha Tsui Centre, 66 Mody Road, Kowloon, Hong Kong*
Test specification:	
Standard.....:	IEC 60335-2-60:2017 for use in conjunction with IEC 60335-1:2010, COR1:2010, COR2:2011, AMD1:2013, COR1:2014, AMD2:2016, COR1:2016
Test procedure .....:	CoC LVD
Non-standard test method…….:	N/A
Test Report Form No. .....:	IEC60335_2_60K
Test Report Form(s) Originator ....:	IMQ S.p.A.
Master TRF.....:	Dated 2018-04-05

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description..... :	SPA
Trade Mark..... :	Bestway
Manufacturer ..... :	Same as applicant
Model/Type reference..... :	S200102
Ratings..... :	220-240V~; 50Hz; IPX5; Class I; Heating: 2050W; Heating + Bubble: 1850W

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**Testing Laboratory:**	**TUV Rheinland (Shanghai) Co., Ltd.**	
Testing location/ address ..... :		**No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai CHINA**	
Tested by (name, function, signature)..... :		**See cover page**	
Approved by (name, function, signature) .. :		**See cover page**	
☐	**Testing procedure: CTF Stage 1:**	**N/A**	
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**	**N/A**	
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**	**N/A**	
☐	**Testing procedure: CTF Stage 4:**	**N/A**	
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment): See cover page	
Summary of testing:	
Tests performed (name of test and test clause): All tests have been carried out on S200102. Test of IEC 61558-2-16 Annex BB was additionally performed for the switching mode power supply transformer on PCB.	**Testing location:** TÜV Rheinland (Shanghai) Co., Ltd. No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai CHINA

Summary of compliance with National Differences

List of countries addressed:

EU Group Differences

☒ **The product fulfils the requirements of:**
EN 60335-1: 2012+A11+A13+A14+A1+A2
EN 60335-2-60: 2003+A1+A2+A11+A12
EN 62233: 2008

Copy of marking plate

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

Test item particulars:	
Classification of installation and use..... :	Transportable(tested as portable appliance)
Supply Connection ..... :	Fixed power cord with plug
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2020-03-05
Date (s) of performance of tests .....:	2020-03-09 to 2020-03-30

General remarks:

"(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.

EN 60335-1: 2012/A13+A14+A1+A2 and the differences between IEC 60335-2-60:2017 and EN 60335-2-60: 2003+A1+A2+A11+A12 have been considered.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....:	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) .....:	Bestway (Nantong) Recreation Corp. No. 8 Hui Min West Road, Economic Development Zone, Rugao, Jiangsu 226500, P.R. China.

General product information:

The SPA is intended for household use only, rigid water tube fixed in SPA heater to connect with inflatable pools, ready for use when SPA heater is well connected.

The SPA has function of water filtrations, heating water from 20°C to 40°C, water jet &air blowing as a kind of massage. Heating function always combined with filter pump, water jet and air blowing automatically stop operation after 1 hour and 30 mins respectively. The air blowing function can be operated together with the heating function, but power input of the heating will automatically turn to be the half when two functions are operated simultaneously.

The power supply PCB controls heater, water pump and air pump. The switching mode safety insolating transformer provides SELV to control circuit.

1. Water pump works under 12V SELV which is supplied by safety isolating transformer.

2. The PTC heating elements' live parts are wrapped by 6 layers of film for electric insulation, mechanically fixed by metal frame and sealed at the end. The sealed heater is fixed inside another earthed metal plate and sealed at both ends by seal mat. So the PTC elements are separated from water by reinforced insulation and two separate seals.

3. Water jet pump motor's metal shaft is reliably earthed and enclosed by plastic material. The shaft is isolated

from water by seal rings and the impeller. There are two separate casing for motor and pump unit. The two casing are separated by a compartment open to atmosphere (between two sealing means), so the water has no possible to access metal shaft and live parts. Additionally, when first seal of the motor shaft is broke, leakage water will be detected by a water resistance detecting device and jet motor will be automatically all pole disconnected from the supply mains.

4. Air blower has two anti- flow back valves to prevent the water flow back to the motor.

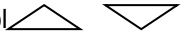
4. The PTC heating elements' external metal enclosure is intended to be connected with external equipotential bonding terminals.

5. An earth fault detection circuit is incorporated (optional) in the power supply PCB. The appliance cannot be put into operation in case of failure connection of the protective earth system in the supply mains.

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict

5	**GENERAL CONDITIONS FOR THE TESTS**		**P**
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.	Transportable whirlpool SPA, tested as portable appliance.	P
5.7	If the tests are influenced by the temperature of the water, it is manteined at 40 °C (IEC 60335-2-60)		P
	Or at the maximum value allowed by the control, whichever is greater (IEC 60335-2-60)	Controlled by SPA heater, max 40°C water temperature	P
5.10	A class III construction part of the appliance is tested connected to its detachable power supply part taking into account the instructions provided with the appliance		N/A
5.101	Transportable whirlpool spas are tested as portable appliances (IEC 60335-2-60)		P
6	**CLASSIFICATION**		**P**
6.1	Protection against electric shock: Class 0, 0I, I, II, III..... .....:		N/A
	Portable appliances shall be class II or class III... : (IEC 60335-2-60)		N/A
	Stationary appliances shall be class I, class II or class III..... .... : (IEC 60335-2-60)		N/A
	Transportable whirlpool spas having metal parts in contact with water shall be class I or class III.....: (IEC 60335-2-60)	Class I	P
	For a class III construction with a detachable power supply part the appliance is classified according to the detachable power supply part		N/A
6.2	Protection against harmful ingress of water		P
	Whirlpool baths and whirlpool spas shall be at least IPX5 (IEC 60335-2-60)	IPX5	P
	Other appliances shall be at least IPX4 (IEC 60335-2-60)		N/A
	Parts of appliances intended for mounting within the dwelling but outside the zones specified in IEC 60364-7-701 shall be at least IPX0 (IEC 60335-2-60)		N/A
7	**MARKING AND INSTRUCTIONS**		**P**
7.1	Rated voltage or voltage range (V)..... .....:	220-240V	P
	Symbol for nature of supply, or..... .....:	~	P
	Rated frequency (Hz)..... .....:	50Hz	P

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
	Rated power input (W), or .... :	2050W for heating; 1850W for heating and bubble	P
	Rated current (A) .... :		N/A
	Manufacturer's or responsible vendor's name, trademark or identification mark .... :	See marking label	P
	Model or type reference..... ..... :	See marking label	P
	Symbol IEC 60417-5172, for class II appliances		N/A
	IP number, other than IPX0 .... :	IPX5	P
	Symbol IEC 60417-5180(2003-02), for class III appliances, unless		N/A
	the appliance is operated by batteries only, or		N/A
	for appliances powered by rechargeable batteries recharged in the appliance		N/A
	Symbol IEC 60417-5018, for class II and class III appliances incorporating a functional earth		N/A
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hose-sets for connection of an appliance to the water mains, if the working voltage exceeds extra-low voltage		N/A
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hose-sets for connection of an appliance to the water mains, if the working voltage exceeds extra-low voltage		N/A
7.2	Warning for stationary appliances for multiple supply		N/A
	Warning placed in vicinity of terminal cover		N/A
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen	AC220-240V	P
	Different rated values marked with the values separated by an oblique stroke		N/A
7.4	Appliance adjustable for different rated voltages or rated frequencies, the voltage or the frequency is clearly discernible.		N/A
	Requirement met if frequent changes are not required and the rated voltage or rated frequency to which the appliance is to be adjusted is determined from a wiring diagram		N/A
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N/A

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
	the power input or current are related to the arithmetic 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/A
7.6	Correct symbols used		P
	Symbol for nature of supply placed next to rated voltage		P
	Symbol for class II appliances placed unlikely to be confused with other marking		N/A
	Units of physical quantities and their symbols according to international standardized system		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		N/A
	correct mode of connection is obvious		N/A
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		N/A
	- marking of terminals exclusively for the neutral conductor (letter N)		N/A
	- marking of protective earthing terminals (symbol IEC 60417-5019)		N/A
	- markings of functional earthing terminals (symbol IEC 60417-5018)	No functional earthing	N/A
	- marking not placed on removable parts		N/A
7.9	Marking or placing of switches which may cause a hazard	Electronic operation button, marked with relevant symbol	P
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means .... :	Marked symbol easily understand	P
	This applies also to switches which are part of a control		P
	If figures are used, the off position indicated by the figure 0		N/A
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		N/A
7.11	Indication for direction of adjustment of controls	By symbol 	P
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance		P
	The instructions state that:		N/A

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
	- the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction	Refer to EN deviations	N/A
	- children being supervised not to play with the appliance	Refer to EN deviations	N/A
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided		N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless		N/A
	it is a battery-operated appliance, the battery being charged outside the appliance		N/A
	For appliances for altitudes exceeding 2000 m, the maximum altitude is stated.		N/A
	The instructions for appliances incorporating a functional earth states that the appliance incorporates an earth connection for functional purposes only		N/A
	The instructions shall provide details concerning cleaning and other maintenance (IEC 60335-2-60)		P
	The innstructions for portable appliances shall state that no part of the appliance is to be located above the bath during use (IEC 60335-2-60)		P
	The instructions for whirlpool spas shall provide information concerning: (IEC 60335-2-60)		P
	- Maintenance of water puruty, especially pH values and chlorine concentrations.		P
	- Cleaning and disinfection.		P
	- Use and installation of a cover.		P
	- Disposal of water.		P
	- Precaution to avoid damage due to water freezing.		P
	- Precaution to avoid damage when the appliance is left empty for an extended period.		P
7.12.1	Sufficient details for installation supplied		P
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated	Not connected to the water mains	N/A
	If different rated voltages or different rated frequencies are marked, the instructions state what action to be taken to adjust the appliance		N/A

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
	The installation instructions shall state the substance of the following: (IEC 60335-2-60)		P
	– parts containing live parts, except parts supplied with safety extra-low voltage not exceeding 12 V, must be inaccessible to a person in the bath;		P
	– earthed appliances must be permanently connected to fixed wiring except for transportable whirlpool spas with earthing, which must only be plugged directly into an earthed socket-outlet of the fixed wiring;		P
	– parts incorporating electrical components, except remote control devices, must be located or fixed so that they cannot fall into the bath;		P
	– the appliance must be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA		P
	The installation instructions shall give details on how to follow the wiring rules, for example specifying that parts are installed in the correct zone and that equipotential bonding is carried out (IEC 60335-2-60)		P
	If the appliance is intended to be fixed by screws or other permanent fixing devices, the installation instructions shall give details on how to fix the appliance (IEC 60335-2-60)		P
	NOTE 101 This instruction is not necessary if the method of fixing is obvious (IEC 60335-2-60)		P
	The installation instructions for whirlpool spas shall state that: (IEC 60335-2-60)		P
	– the floor has to be capable of supporting the expected load;		P
	– an adequate drainage system has to be provided to deal with overflow water		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		N/A
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected		N/A
7.12.4	Instructions for built-in appliances:		N/A
	- dimensions of space		N/A
	- dimensions and position of supporting and fixing		N/A
	- minimum distances between parts and surrounding structure		N/A

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
	- minimum dimensions of ventilating openings and arrangement		N/A
	- connection to supply mains and interconnection of separate components		N/A
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N/A
	a switch complying with 24.3		N/A
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N/A
	Replacement cord instructions, type Y attachment		P
	Replacement cord instructions, type Z attachment		N/A
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		P
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		N/A
7.12.8	Instructions for appliances connected to the water mains:		N/A
	- max. inlet water pressure (Pa) ....:		N/A
	- min. inlet water pressure, if necessary (Pa) .....:		N/A
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		N/A
7.12.9	Instructions specified in 7.12 and from 7.12.1 to 7.12.8 appear together before any other instructions supplied with the appliance		P
	These instructions may be supplied with the appliance separately from any functional use booklet		N/A
	They may follow the description of the appliance that identifies parts, or follow the drawings/sketches common to the languages of the instructions		P
	In addition, instructions are also available in an alternative format such as on a website or in a format such as a DVD:		P
7.13	Instructions and other texts in an official language	English	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
	Signal words WARNING, CAUTION, DANGER in uppercase having a height as specified:		N/A

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
	Uppercase letter of the text explaining the signal word not smaller than 1,6 mm		P
	Moulded in, engraved, or stamped markings either raised above or have a depth below the surface of at least 0,25 mm, unless		N/A
	contrasting colours are used		P
	Markings checked by inspection, measurement and rubbing test as specified		P
7.15	Markings on a main part		P
	Marking clearly discernible from the outside, if necessary after removal of a cover		P
	For portable appliances, cover can be removed or opened without a tool		N/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		P
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N/A
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		P
	The symbol IEC 60417-5018 placed next to the symbol IEC 60417-5172 or IEC 60417-5180		N/A
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link	Fuse on power supply PCB is not replaceable.	N/A
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
	Lamps behind a detachable cover not removed, if conditions met		N/A
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N/A
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts	Test finger can not contact any live parts	P
	Use of test probe B of IEC 61032 through openings, with a force of 20 N: no contact with live parts		N/A

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts	Test pin can not contact with live part for class II construction	P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		N/A
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements		N/A
	For a single switching action obtained by a switching device, requirements as specified		N/A
	For appliances with a supply cord and without a switching device, the single switching action may be obtained by the withdrawal of the plug from a socket-outlet		N/A
8.1.4	Any energized part is considered to be a live part (IEC 60335-2-60)		P
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		N/A
	- built-in appliances		N/A
	- fixed appliances		N/A
	- appliances delivered in separate units		N/A
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only	.	P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P
9	STARTING OF MOTOR-OPERATED APPLIANCES		N/A
	This clause of Part 1 is not applicable (IEC 60335-2-60)		N/A
10	**POWER INPUT AND CURRENT**		**P**
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1. :	(see appended table)	P
	If the power input varies throughout the operating cycle and the maximum value of the power input exceeds, by a factor greater than two, the arithmetic mean value of the power input occurring during a representative period, the power input is the maximum value that is exceeded for more than 10 % of the representative period.		N/A

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
	Otherwise the power input is taken as the arithmetic mean value.		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A
	the rated power input is related to the arithmetic mean value		P
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2 ..... :	(see appended table)	N/A
	If the current varies throughout the operating cycle and the maximum value of the current exceeds, by a factor greater than two, the arithmetic mean value of the current occurring during a representative period, the current is the maximum value that is exceeded for more than 10 % of the representative period.		N/A
	Otherwise the current is taken as the arithmetic mean value.		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A
	the rated current is related to the arithmetic mean value of the range		N/A
11	**HEATING**		**P**
11.1	No excessive temperatures in normal use		P
11.2	The appliance is held, placed or fixed in position as described ..... :		P
11.3	Temperature rises, other than of windings, determined by thermocouples		P
	Temperature rises of windings determined by resistance method, unless		P
	the windings are non-uniform or it is difficult to make the necessary connections		P
11.4	Heating appliances operated under normal operation at 1.15 times rated power input (W) .... :	PTC heater	N/A
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V) ..... :		N/A
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage (V) ..... :	Tested at 0,94Un and 1,06Un, 1,06Un is most unfavourable condition	P

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict
11.7	Operation duration corresponding to the most unfavourable conditions of normal use	Filter pump and heater are in operation, heated water from ambient (about 25°C) to water temp. sensor control operated (40°C), then air pump and water jet pump operated.	P
11.8	Temperature rises monitored continuously and not exceeding the values in table 3 ..... :	(see appended table)	P
	If the temperature rise of a motor winding exceeds the value of table 3, or		N/A
	if there is doubt with regard to classification of insulation,		N/A
	tests of Annex C are carried out		N/A
	Sealing compound does not flow out		P
	Protective devices do not operate, except		P
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4		N/A
	In appliaces incorates a heating element the water temperature at the inlet of the whirlpool bath or whirlpool spa shall not exceed 50 °C (IEC 60335-2-60)	Max. water temp. 40,6°C	P
13	**LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE**		**P**
13.1	Leakage current not excessive and electric strength adequate		P
	Heating appliances operated at 1.15 times the rated power input (W) ..... :		N/A
	Motor-operated appliances and combined appliances supplied at 1.06 times the rated voltage (V) ..... :	254,4V	P
	Protective impedance and radio interference filters disconnected before carrying out the tests		P
13.2	The leakage current is measured by means of the circuit described in Figure 4 of IEC 60990:1999		P
	For class 0I appliances and class I appliances, except parts of class II construction, C may be replaced by a low impedance ammeter		P
	Leakage current measurements ..... :	(see appended table)	P
13.3	The appliance is disconnected from the supply		P
	Electric strength tests according to table 4 ..... :	(see appended table)	P
	No breakdown during the tests		P
14	**TRANSIENT OVERVOLTAGES**		**N/A**

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Clause	Requirement - Test	Result - Remark	Verdict
	Appliances withstand the transient over-voltages to which they may be subjected		N/A
	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/A
	No flashover during the test, unless		N/A
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N/A
15	**MOISTURE RESISTANCE**		**P**
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance		P
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		P
	No trace of water on insulation which can result in a reduction of clearances or creepage distances below values specified in clause 29		P
	Traces of water on the insulation of parts supplied at safety extra-low voltage not exceeding 12 V are ignored (IEC 60335-2-60)		P
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529..... :	IPX5	P
	Water valves containing live parts in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances		N/A
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N/A
	Built-in appliances installed according to the instructions		N/A
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		P
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N/A
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N/A
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube, and		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	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/A
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N/A
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support, and		N/A
	for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Detachable parts subjected to the relevant treatment with the main part		P
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		P
	Whirlpool baths and whirlpool spas are tested without side panels fitted unless they are an integral part of the appliance (IEC 60335-2-60)	Integral part of the appliance	N/A
15.2	Spillage of liquid does not affect the electrical insulation		N/A
	Spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N/A
	Detachable parts are removed		N/A
	Overfilling test with additional amount of the solution, over a period of 1 min (l) ..... :		N/A
	The appliance withstands the electric strength test of 16.3		N/A
	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
15.3	Appliances proof against humid conditions	25°C; 93%	P
	Checked by test Cab: Damp heat steady state in IEC 60068-2-78		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Detachable parts removed and subjected, if necessary, to the humidity test with the main part		P
	Humidity test for 48 h in a humidity cabinet		P
	Reassembly of those parts that may have been removed		P
	The appliance withstands the tests of clause 16		P
16	**LEAKAGE CURRENT AND ELECTRIC STRENGTH**		**P**
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		P
	Tests carried out at room temperature and not connected to the supply		P
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V) ..... :	254,4V	P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3 (V) ..... :		N/A
	Leakage current measurements ..... :	(see appended table)	P
	Limit values doubled if:		N/A
	- all controls have an off position in all poles, or		N/A
	- the appliance has no control other than a thermal cut-out, or		N/A
	- all thermostats, temperature limiters and energy regulators do not have an off position, or		N/A
	- the appliance has radio interference filters		N/A
	With the radio interference filters disconnected, the leakage current do not exceed limits specified ..... :	(see appended table)	P
16.3	Electric strength tests according to table 7 ..... :	(see appended table)	P
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified ..... :	(see appended table)	P
	No breakdown during the tests		P
17	**OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS**		**P**
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use ..... :	(see appended table)	P
	Appliance supplied with 1.06 or 0.94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V) ..... :		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Basic insulation is not short-circuited		P
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		P
	Temperature of the winding not exceeding the value specified in table 8		P
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1	Transformer for water pump	P
	The test is repeated with chlorinator cells loaded so that the current is 95 % of the lowest current that causes a protective device to operate. The test is continued until steady conditions are established (IEC 60335-2-60)		N/A
18	**ENDURANCE**		**N/A**
	This clause of Part 1 is not applicable (IEC 60335-2-60)		N/A
19	**ABNORMAL OPERATION**		**P**
19.1	The risk of fire, mechanical damage or electric shock under abnormal or careless operation obviated		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe ..... :		P
	Appliances incorporating heating elements subjected to the tests of 19.2 and 19.3, and		P
	if the appliance also has a control that limit the temperature during clause 11 it is subjected to the test of 19.4, and		P
	if applicable, to the test of 19.5		N/A
	Appliances incorporating PTC heating elements are also subjected to the test of 19.6		P
	Appliances incorporating motors subjected to the tests of 19.7 to 19.10, as applicable		P
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		P
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11	Same result as tests of 19.3 and 19.4	P
	Appliances incorporating voltage selector switches subjected to the test of 19.15		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Unless otherwise specified, the tests are continued until a non-self-resetting thermal cut-out operates, or		P
	until steady conditions are established		N/A
	If a heating element or intentionally weak part becomes open-circuited, the relevant test is repeated on a second sample		N/A
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0.85 times rated power input (W)..... :	Tested under 202,8V	P
	Appliances in which water is circulated, the whirlpool bath or whirlpool spa is filled and the appliance operated, after which it is switched off and the whirlpool bath or whirlpool spa emptied (IEC 60335-2-60)		P
	Heating elements are then switched on (IEC 60335-2-60)	Tested with water filled, filter pump “on”. Then empty bath, failure of water flow sensor and temperature sensor, non-self-resetting thermal cut-out operated, no hazard.	P
	The pump being operated or at rest whichever more unfavourable (IEC 60335-2-60)		P
	Appliances in which air is circulated, air inlets and outlets are blocked (IEC 60335-2-60)		P
	Heating elements are then switched on (IEC 60335-2-60)		P
	If possible, the blower being in operation (IEC 60335-2-60)		P
19.3	Test of 19.2 repeated; test voltage (V), power input of 1.24 times rated power input (W) ..... :	Tested under 267,3V	P
19.4	Test conditions as in clause 11, any control limiting the temperature during tests of clause 11 short-circuited	Temperature sensor 40°C was shorted, non-self-resetting thermal cut-out operated, no hazard.	P
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the sheath		N/A
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N/A

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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/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		P
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures (V) ..... :		P
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque, or	Test for air pump motor, water jet pump motor, water pump is approved type	P
	locking moving parts of other appliances		P
	Locked rotor, capacitors open-circuited one at a time		P
	Test repeated with capacitors short-circuited one at a time, unless		N/A
	the capacitor is of class S2 or S3 of IEC 60252-1		P
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed ..... :		N/A
	An electronic timer or programmer that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, is a protective electronic circuit		N/A
	Other appliances supplied with rated voltage for a period as specified ..... :	Combined tested with annex D until steady conditions	P
	Winding temperatures not exceeding values specified in table 8 ..... :	(see appended table)	P
	Test carried out with the whirlpool bath or whirlpool spa filled as specified for normal operation (IEC 60335-2-60)		P
19.8	Multi-phase motors operated at rated voltage with one phase disconnected		N/A
19.9	Running overload test on appliances incorporating motors intended to be remotely or automatically controlled or liable to be operated continuously		N/A
	Motor-operated and combined appliances for which 30.2.3 is applicable and that use overload protective devices relying on electronic circuits to protect the motor windings, are also subjected to the test		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Winding temperatures not exceeding values as specified..... :	(see appended table)	N/A
19.10	Series motor operated at 1.3 times rated voltage for 1 min (V) ..... :	For air pump motor 312V	P
	During the test, parts not being ejected from the appliance		P
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless		P
	they comply with the conditions specified in 19.11.1		P
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless		N/A
	restarting does not result in a hazard		P
	Appliances having a device with an off position obtained by electronic disconnection, or a device placing the appliance in a stand-by mode, subjected to the tests of 19.11.4	Not possible unsafe operation according to the OSM decision	N/A
	If the safety of the appliance under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127, the test of 19.12 is carried out		P
	During and after each test the following is checked:		P
	- the temperature of the windings do not exceed the values specified in table 8		P
	- the appliance complies with the conditions specified in 19.13		P
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		P
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided both of the following conditions are met:		N/A
	- the base material of the printed circuit board withstands the test of Annex E		N/A
	- any loosened conductor does not reduce clearance or creepage distances between live parts and accessible metal parts below the values specified in clause 29		N/A
19.11.1	Fault conditions a) to g) in 19.11.2 are not applied to circuits or parts of circuits meeting both of the following conditions:		P
	- 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		P

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Clause	Requirement - Test	Result - Remark	Verdict
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the appliance does not rely on the correct functioning of the electronic circuit		P
19.11.2	Fault conditions applied one at a time, the appliance operating under conditions specified in clause 11, but supplied at rated voltage, duration of the tests as specified:		P
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in clause 29		N/A
	b) open circuit at the terminals of any component		P
	c) short circuit of capacitors, unless		P
	they comply with IEC 60384-14		P
	d) short circuit of any two terminals of an electronic component, other than integrated circuits		P
	This fault condition is not applied between the two circuits of an optocoupler		P
	e) failure of triacs in the diode mode		P
	f) failure of microprocessors and integrated circuits		P
	g) failure of an electronic power switching device		N/A
	Each low power circuit is short-circuited by connecting the low-power point to the pole of the supply source from which the measurements were made		P
19.11.3	If the appliance incorporates a protective electronic circuit that operates to ensure compliance with Clause 19, the appliance is tested as specified		N/A
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or		N/A
	a device that can be placed in the stand-by mode,		N/A
	subjected to the tests of 19.11.4.1 to 19.11.4.7, the device being set in the off position or in the stand-by mode	Not possible unsafe operation according to the OSM decision	N/A
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, the tests being carried out after the protective electronic circuit has operated, except that		N/A
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena.		N/A
	Surge protective devices disconnected, unless		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	They incorporate spark gaps		N/A
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, at frequency ranges specified		N/A
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		N/A
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		N/A
	An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode		N/A
	An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling		N/A
	Earthed heating elements in class I appliances disconnected		N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		N/A
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		N/A
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		N/A
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		N/A
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate		N/A
	The appliance continues to operate normally, or		N/A
	requires a manual operation to restart		N/A
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) ..... :	Short ZNR1 Measured current > 2,75*I_{fuse} =8,7A	P

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Clause	Requirement - Test	Result - Remark	Verdict
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9 ..... :	(see appended table)	P
	Compliance with clause 8 not impaired		P
	If the appliance can still be operated it complies with 20.2		P
	Insulation, other than of class III appliances or class III constructions that do not contain live parts, withstands the electric strength test of 16.3, the test voltage as specified in table 4:		P
	- basic insulation (V) ..... :	1000	P
	- supplementary insulation (V)..... :	1750	P
	- reinforced insulation (V) ..... :	3000	P
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstand the electric strength test of 16.3, the test voltage being twice the working voltage		P
	The appliance does not undergo a dangerous malfunction, and		P
	no failure of protective electronic circuits, if the appliance is still operable		P
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		N/A
	- do not become operational, or		N/A
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		P
	If the appliance contains lids or doors that are controlled by one or more interlocks, one of the interlocks may be released provided that:		N/A
	- the lid or door does not move automatically to an open position when the interlock is released, and		N/A
	- the appliance does not start after the cycle in which the interlock was released		N/A
	The temperature at the inlet of whirlpool baths that have provisiosn for water heating and whirlpool spas shall not exceed 55 °C when measured in accordance with clause 11. (IEC 60335-2-60)		P
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited	RY3	P

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Clause	Requirement - Test	Result - Remark	Verdict
	For a relay or contactor with more than one contact, all contacts are short-circuited at the same time		N/A
	A relay or contactor operating only to ensure the appliance is energized for normal use is not short-circuited		P
	If more than one relay or contactor operates in clause 11, they are short-circuited in turn		N/A
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied		N/A
20	**STABILITY AND MECHANICAL HAZARDS**		**P**
20.1	Appliances having adequate stability		P
	Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn		P
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		P
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury	Covered by external enclosure	P
	Protective enclosures, guards and similar parts are non-detachable, and	All fixed by screws	P
	have adequate mechanical strength		P
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		N/A
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected closure		P
	Not possible to touch dangerous moving parts with the test probe described		P
21	**MECHANICAL STRENGTH**		**P**
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 0,5 J	(see appended table)	P
	The appliance shows no damage impairing compliance with this standard, and		P

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Clause	Requirement - Test	Result - Remark	Verdict
	compliance with 8.1, 15.1 and clause 29 not impaired		P
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N/A
	If necessary, repetition of groups of three blows on a new sample		N/A
	Whirlpool spas are also subjected to the impact test after the appliance has been maintained at a temperature of −10 °C for 24 h, unless (IEC 60335-2-60)		P
	they are intended for indoor use only (IEC 60335-2-60)		N/A
	If the appliance is too large for the conditioning room, parts of the appliance may be tested separately. In this case, the impact test is carried out immediately after the conditioning without reassembly (IEC 60335-2-60)		N/A
	For water containers that provide protection against access to live parts, the value of the impact energy is 1 J. (IEC 60335-2-60)		P
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3	The control circuit is supplied by SELV and control panel is insulated by plastic cover	N/A
22	**CONSTRUCTION**		**P**
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled		N/A
22.2	Stationary appliance: means to ensure all-pole disconnection from the supply being provided:		P
	- a supply cord fitted with a plug, or		P
	- a switch complying with 24.3, or		N/A
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		N/A
	- an appliance inlet		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 0I and class I appliances, connected to the phase conductor		N/A
22.3	Appliance provided with pins: no undue strain on socket-outlets		N/A
	Applied torque not exceeding 0.25 Nm		N/A
	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/A
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating, unless		N/A
	rotating does not impair compliance with this standard		N/A
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		P
22.5	No risk of electric shock when touching pins, for appliances having a capacitor with rated capacitance equal to or greater than 0,1 μF, the appliance being disconnected from the supply at the instant of voltage peak		P
	Voltage not exceeding 34 V (V)..... :	0V	P
	If compliance relies on the operation of an electronic circuit, the electromagnetic phenomena tests of 19.11.4.3 and 19.11.4.4 are applied		N/A
	The discharge test is then repeated three times, voltage not exceeding 34 V (V):		N/A
22.6	Electrical insulation not affected by condensing water or leaking liquid	Power supply PCB, control PCB, air pump motor and jet pump motor all covered by plastic housing	P
	Electrical insulation of Class II appliances not affected if a hose ruptures or seal leaks	Adequate drain hole and waterproof construction incorporated	P
	In case of doubt, test as described		N/A
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices		N/A
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless		P
	the substance has adequate insulating properties		N/A
22.10	Not possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance, if:		P
	- a non-self-resetting thermal cut-out is required by the standard, and		N/A
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		P
	Non-self-resetting thermal motor protectors have a trip-free action, unless		N/A
	they are voltage maintained		P
	Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely		N/A
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		P
	Obvious locked position of snap-in devices used for fixing such parts	Snap-in not used, all fixing by screws	N/A
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N/A
	Tests as described		P
22.12	Handles, knobs etc. fixed in a reliable manner, if loosening result in a hazard	No such parts	N/A
	Removing or fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible, if resulting in a hazard		N/A
	A choking hazard does not apply to appliances for commercial use		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N/A
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N/A
	If the part is removed and can be contained within the small parts cylinder, it is considered to be a choking hazard		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
22.13	Unlikely that handles, when gripped as in normal use, make the operator's hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N/A
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	No exposed pointed ends of self-tapping screws or other fasteners, likely to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded		P
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands and no undue wear of contacts		N/A
	Cord reel tested with 6000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1000 V applied		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless		N/A
	constructed to prevent inappropriate replacement		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		N/A
	material used is non-corrosive, non-hygroscopic and non-combustible		N/A
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless		P
	impregnated		N/A
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		N/A
22.22	Appliances not containing asbestos		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements, except in class III appliances or class III constructions that do not contain live parts, adequately supported	No such bare heating elements	N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N/A
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		N/A
22.26	For class III constructions the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation	SELV provided by safety isolated transformer, reinforced insulation relay provided.	P
22.27	Parts connected by protective impedance separated by double or reinforced insulation		P
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/A
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/A
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		P
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2	Not used as insulation	N/A
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Ceramic and similar porous material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		N/A
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N/A
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts, or		P
	unearthed metal parts separated from live parts by basic insulation only		N/A
	Electrodes not used for heating liquids		N/A
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless	Conductive liquids in contact with earthed metal part are isolated from live parts by reinforced insulation.	P
	the reinforced insulation consists of at least 3 layers	The reinforced insulation of PTC heater consists of 6 layers	P
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		P
	Conductive liquids may be in direct contact with live parts supplied at safety extra low voltage not exceeding 12 V. (IEC 60335-2-60)		N/A
	NOTE 101 This does not allow direct access to live parts, which is prohibited by application of Clause 8 (IEC 60335-2-60)	No conductive liquid in direct contact with SELV parts	P
	Parts such as switches and controls accessible to the user in the whirlpool bath or whirlpool spa shall only be supplied at safety extra-low voltage not exceeding 12 V (IEC 60335-2-60)		P
22.34	Shafts of operating knobs, handles, levers etc. not live, unless		N/A
	the shaft is not accessible when the part is removed		N/A
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation	Such parts have class III constructions.	N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		N/A
	This requirement does not apply to handles, levers and knobs on stationary appliances and cordless appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N/A
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N/A
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless	No such handles	N/A
	they are separated from live parts by double or reinforced insulation		N/A
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N/A
	the capacitors comply with 22.42		N/A
22.38	Capacitors not connected between the contacts of a thermal cut-out		P
22.39	Lamp holders used only for the connection of lamps		N/A
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/A
	If the appliance cannot operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation being fitted with a switch for stopping the operation. The actuating member of the switch being easily visible and accessible		N/A
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		P
	Resistors checked by the test of 14.1 a) in IEC 60065		N/A
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14		P
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N/A
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		P
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1		N/A
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N/A
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N/A
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		N/A
	No leakage from any part, including any inlet water hose		N/A
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water		N/A
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless		N/A
	the appliance switches off automatically or can operate continuously without hazard		N/A
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		N/A
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	There is a visual indication showing that the appliance is adjusted for remote operation		N/A
	These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard:		N/A
	- continuously, or		N/A
	- automatically, or		N/A
	- remotely		N/A
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold		N/A
22.53	Class II appliances and class III appliances that incorporate functionally earthed parts shall have at least double insulation or reinforced insulation between live parts and the functionally earthed parts.		N/A
22.54	Button cells and batteries designated R1 shall not be accessible without the aid of a tool unless		N/A
	the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously.		N/A
22.55	Devices operated to stop the intended function of the appliance, if any, are be distinguished from other manual devices by means of shape, size, surface texture or position :		P
	The requirement concerning position does not preclude use of a push on push off switch		P
	An indication when the device has been operated is given by:		P
	– tactile feedback from the actuator or from the appliance, or		N/A
	– reduction in heat output; or		N/A
	– audible and visible feedback		P
22.56	Detachable power supply part provided with the part of class III construction		N/A
22.57	The properties of non-metallic materials do not degrade from exposure to UV-C radiation, as specified in Annex T		N/A
	This requirement does not apply to glass, ceramics or similar materials		N/A
22.101	Appliances in which air is circulated shall be constructed so that water cannot penetrate into the motor and come into contact with live parts or basic insulation (IEC 60335-2-60)	Two single way valves in series built in the way air blower to pool and another valve in pool provide enough protection. Tested and passed	P
	The overflow outlet of whirlpool baths and whirlpool spas is blocked and the bath or spa is filled until water overflows.		P
	Non-return valves are rendered inoperative one at a time.		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Separate appliances intended to be used with a conventional bath are placed on the floor.		P
	except that portable mats are placed in a bath filled with water.		N/A
	The mat is then raised to the most unfavourable position allowed by the construction of the appliance but to a height not exceeding 2 m.		P
	Non-return valves are rendered inoperative one at a time.		P
	The test is carried out with all possible methods of connecting the hose		P
	After the test there shall be no trace of water on insulation that could result in a reduction of clearances and creepage distances below the values specified in Clause 29.		P
22.102	Whirlpool baths shall be constructed so that the quantity of water that remains in the appliance after emptying the bath, and is recirculated the next time the bath is used, shall not exceed 0,5 l or 0,2 % of the capacity of the bath, whichever is less (IEC 60335-2-60)		N/A
	The capacity of the whirlpool bath is considered to be the volume of water required to fill the bath until water starts to flow through the overflow outlet		N/A
	Compliance is checked by any suitable method, such as measurements using chemical dilution, weighing or determination of volume		N/A
22.103	Whirlpool baths and whirlpool spas constructed that hair cannot be drawn into apertures due to water suction if this could result in a hazard (IEC 60335-2-60)		P
	The appliance is filled as specified for normal operation.		P
	A mass of 50 g of medium or fine natural human hair attached to a wooden rod having a diameter of 25 mm, the free length of hair being 400 mm.		P
	The rod with sufficient length for the hair to reach the suction opening.		P
	The hair is saturated for at least 2 min in the water.		P
	The free end of the hair placed over the suction opening and the appliance operated while supplied at rated voltage		P
	The hair is moved from side to side for up to 2,5 min in an attempt to get it sucked completely into the opening.		P
	The rod is pulled in order to withdraw the hair from the water and the pull force is measured with:		P
	– the rod pulled vertically.		P
	– the rod pulled at an angle of approximately 40° to the vertical.		P

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Clause	Requirement - Test	Result - Remark	Verdict
	The force shall not exceed 20 N.	<20N	P
	If the whirlpool bath or whirlpool spa is provided with a detachable cover for the suction opening, the test is also carried out with the cover in place		P
	During the test, the hair is used to sweep the cover in an attempt to displace it		P
	The test is carried out five times		P
	If the whirlpool bath or whirlpool spa has more than one suction opening, they are tested in turn		P
	The hair is brushed periodically to keep it tangle free		P
22.104	Portable appliances shall not have openings on the underside that would allow small items to penetrate and touch live parts (IEC 60335-2-60)	Tested as portable appliance, no such openings.	P
	Compliance is checked by inspection and by measuring the distance between the supporting surface and live parts through openings		P
	This distance shall be at least 20 mm		P
22.105	Whirlpool spas incorporating a water filtration system in order that the required level of water purity can be achieved. (IEC 60335-2-60)		P
	The filtration system does not have to automatically control the pH value of the water		P
	Compliance is checked by inspection		P
22.106	For class I transportable whirlpool spas, all metal parts that are in contact with water shall be connected to protective earth (IEC 60335-2-60)		P
	The metal parts in contact with the water shall be resistant to corrosion		P
	Metal parts of heating elements that are in contact with water shall be separated from live parts by double insulation or reinforced insulation consisting of at least 3 layers		P
	Other metal parts that are in contact with the water shall be separated from live parts by double insulation or reinforced insulation		N/A
	Compliance is checked by inspection and the relevant tests		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		P
	Wiring effectively prevented from coming into contact with moving parts		P
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Beads inside flexible metal conduits contained within an insulating sleeve		N/A
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		P
	Flexible metallic tubes not causing damage to insulation of conductors		N/A
	Open-coil springs not used		N/A
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N/A
	No damage after 10 000 flexings for conductors flexed during normal use, or		N/A
	100 flexings for conductors flexed during user maintenance		N/A
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		N/A
	Not more than 10% of the strands of any conductor broken, and		N/A
	not more than 30% for wiring supplying circuits that consume no more than 15W		N/A
23.4	Bare internal wiring sufficiently rigid and fixed	No such internal wiring	N/A
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		P
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		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
	For class II construction, the requirements for supplementary insulation and reinforced insulation apply,		P
	except that the sheath of a cord complying with IEC 60227 or IEC 60245 may provide supplementary insulation		P
	A single layer of internal wiring insulation does not provide reinforced insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		P
	be such that it can only be removed by breaking or cutting		N/A

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Clause	Requirement - Test	Result - Remark	Verdict

23.7	The colour combination green/yellow only used for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N/A
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		N/A
24	**COMPONENTS**		**P**
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components..... :	(see appended table)	P
	Motors not required to comply with IEC 60034-1, they are tested as part of the appliance		P
	Relays tested as part of the appliance, or		P
	alternatively according to IEC 60730-1, and meeting the additional requirements in IEC 60335-1		N/A
	The requirements of Clause 29 apply between live parts of components and accessible parts of the appliance		P
	Components can comply with the requirements for clearances and creepage distances for functional insulation in the relevant component standard		P
	30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections		P
	Components that have not been previously tested to comply with the IEC standard for the relevant component are tested according to the requirements of 30.2		P
	Components that have been previously tested to comply with the resistance to fire requirements in the IEC standard for the relevant component need not be retested provided the specified conditions are met		P
	If these conditions are not satisfied, the component is tested as part of the appliance		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Power electronic converter circuits not required to comply with IEC 62477-1, they are tested as part of the appliance		N/A
	If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		P
	For components mentioned in 24.1.1 to 24.1.9 no additional tests specified in the relevant component standard are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components not tested and found to comply with relevant IEC standard and components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard		N/A
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		N/A
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, comply with IEC 60384-14		P
	If the capacitors have to be tested, they are tested according to Annex F		N/A
24.1.2	Transformers in associated switch mode power supplies comply with Annex BB of IEC 61558-2-16	Transformer on power supply PCB	P
	Safety isolating transformers comply with IEC 61558-2-6		N/A
	If they have to be tested, they are tested according to Annex G	Transformer for water pump	P
24.1.3	Switches comply with IEC 61058-1, the number of cycles of operation being at least 10 000	No such switch	N/A
	If they have to be tested, they are tested according to Annex H		N/A
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N/A

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Clause	Requirement - Test	Result - Remark	Verdict

	If the switch only operates a motor starting relay complying with IEC 60730-2-10 with the number of cycles of a least 10 000 as specified, the complete switching system need not be tested		N/A
24.1.4	Automatic controls comply with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		P
	- thermostats: 10 000		N/A
	- temperature limiters: 1 000		N/A
	- self-resetting thermal cut-outs: 300		N/A
	- voltage maintained non-self-resetting thermal cut-outs: 1 000		N/A
	- other non-self-resetting thermal cut-outs: 30		P
	- timers: 3 000		N/A
	- energy regulators: 10 000		N/A
	The number of cycles for controls operating during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited		N/A
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D	See Annex D	P
	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IEC 60730-2-8 is IPX7		N/A
	Thermal cut-outs of the capillary type shall comply with the requirements for type 2.K controls in IEC 60730-2-9.		N/A
24.1.5	Appliance couplers comply with IEC 60320-1		N/A
	However, for class II appliances classified higher than IPX0, the appliance couplers comply with IEC 60320-2-3		N/A
	Interconnection couplers comply with IEC 60320-2-2		N/A
24.1.6	Small lamp holders similar to E10 lamp holders comply with IEC 60238, the requirements for E10 lamp holders being applicable		N/A
24.1.7	For remote operation of the appliance via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
24.1.8	The relevant standard for thermal links is IEC 60691		P
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		N/A
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance		P
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance ..... :		P
24.2	Appliances not fitted with:		P
	- switches, automatic controls or power supplies in flexible cords	PRCD is not a switch or automatic control	P
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		P
	- thermal cut-outs that can be reset by soldering, unless		P
	the solder has a melding point of at least 230 ˚C		N/A
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions		N/A
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N/A
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly	358V<450V	P
	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	403V<490V	P
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42 V		N/A
	In addition, the motors comply with the requirements of Annex I		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770		N/A
	They are supplied with the appliance		N/A
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N/A
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure		P
	One or more of the following conditions are to be met:		P
	- the capacitors are of class S2 or S3 according to IEC 60252-1		P
	- the capacitors are housed within a metallic or ceramic enclosure		N/A
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N/A
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		N/A
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N/A
24.101	Thermal cut-outs incorporated in appliances for compliance with 19.4 not self resetting (IEC 60335-2-60)		P
	Compliance is checked by inspection		P
24.102	Class III appliances shall be provided with a safety isolating transformer classified at least IPX4 (IEC 60335-2-60)		N/A
	Compliance is checked by inspection		N/A
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, the current rating and voltage rating of the plug being not less than the corresponding ratings of its associated appliance		P
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		N/A
	- pins for insertion into socket-outlets		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Class I appliances, other than transportable whirlpool spas, shall only be provided with means for permanent connection to fixed wiring (IEC 60335-2-60)		N/A
	Transportable whirlpool spas shall only be provided with a supply cord fitted with a plug (IEC 60335-2-60)		P
	The supply cord shall have a length of at least 5 m (IEC 60335-2-60)	≥ 5m	P
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		N/A
25.3	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains:		N/A
	- a set of terminals allowing the connection of a flexible cord		N/A
	- a fitted supply cord		N/A
	- a set of supply leads accommodated in a suitable compartment		N/A
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N/A
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm)..... :		N/A
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
25.5	Method for assembling the supply cord to the appliance:		P
	- type X attachment		N/A
	- type Y attachment		P
	- type Z attachment, if allowed in relevant part 2		N/A
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N/A
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		N/A
	Type X attachments are not allowed for transportable whirlpool spas (IEC 60335-2-60)		N/A
25.6	Plugs fitted with only one flexible cord		P
25.7	Supply cords, other than for class III appliances, being one of the following types:		P
	- rubber sheathed (at least 60245 IEC 53)		N/A
	- polychloroprene sheathed (at least 60245 IEC 57)		N/A
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		N/A
	• light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg		N/A
	• ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances		N/A
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		N/A
	• heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg		N/A
	• heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		N/A
	halogen-free, low smoke, thermoplastic insulated and sheathed		N/A
	• Light duty halogen-free low smoke flexible cable (62821 IEC 101) for circular cable and (62821 IEC 101f) for flat cable		N/A
	• Ordinary duty halogen-free low smoke flexible cable (62821 IEC 102) for circular cable and (62821 IEC 102) for flat cable		N/A
	Supply cords for class III appliances adequately insulated		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N/A
	Supply cords for transportable whirlpool spas shall not be lighter than rubber sheathed cords. Their properties shall be at least those of ordinary polychloroprene sheathed cords (code designation 60245 IEC 57) (IEC 60335-2-60)	H07RN-F	P
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm^2) ..... :	Current<10A; 1,5mm^2 or 1,0mm^2. The length of power cord>5m	P
25.9	Supply cords not in contact with sharp points or edges		P
25.10	Supply cord of class I appliances have a green/yellow core for earthing		P
	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue		N/A
	Where additional neutral conductors are provided in the supply cord:		N/A
	– other colours may be used for these additional neutral conductors;		N/A
	– all of the neutral conductors and line conductors are identified by marking using the alpha numeric notation specified in IEC 60445		N/A
	– the supply cord is fitted to the appliance		N/A
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N/A
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		P
25.13	Inlet openings so constructed as to prevent damage to the supply cord		P
	If it is not evident that the supply cord can be introduced without risk of damage, 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 the appliance is		N/A
	class 0, or		N/A
	a class III appliance not containing live parts		N/A
25.14	Supply cords moved while in operation adequately protected against excessive flexing		N/A
	Flexing test, as described:		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	- applied force (N) ..... :		N/A
	- number of flexings ..... :		N/A
	The test does not result in:		N/A
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		N/A
	- breakage of more than 10% of the strands of any conductor		N/A
	- separation of the conductor from its terminal		N/A
	- loosening of any cord guard		N/A
	- damage to the cord or the cord guard		N/A
	- broken strands piercing the insulation and becoming accessible		N/A
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord:		P
	- fixed appliances: pull 100 N; torque (not on automatic cord reel) (Nm) ..... :		N/A
	- other appliances: values shown in Table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm) ..... :	100N, 25 times; 0,35Nm, for 1min	P
	Cord not damaged and max. 2 mm displacement of the cord	1mm on cord	P
25.16	Cord anchorages for type X attachments constructed and located so that:		N/A
	- replacement of the cord is easily possible		N/A
	- it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	- they are suitable for different types of supply cord		N/A
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless		N/A
	they are separated from accessible metal parts by supplementary insulation		N/A
	- the cord is not clamped by a metal screw which bears directly on the cord		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	- at least one part of the cord anchorage securely fixed to the appliance, unless		N/A
	it is part of a specially prepared cord		N/A
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N/A
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		N/A
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N/A
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		N/A
	failure of the insulation of the cord does not make accessible metal parts live		N/A
	- for class II appliances they are of insulating material, or		N/A
	if of metal, they are insulated from accessible metal parts by supplementary insulation		N/A
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		N/A
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance		P
25.18	Cord anchorages only accessible with the aid of a tool, or		P
	Constructed so that the cord can only be fitted with the aid of a tool		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N/A
	Tying the cord into a knot or tying the cord with string not used		N/A
25.20	The conductors of the supply cord for type Y and Z attachment insulated from accessible metal parts		P
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		N/A
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		N/A
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		N/A
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		N/A
25.22	Appliance inlets:		N/A
	- live parts not accessible during insertion or removal		N/A
	Requirement not applicable to appliance inlets complying with IEC 60320-1		N/A
	- connector can be inserted without difficulty		N/A
	- the appliance is not supported by the connector		N/A
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless		N/A
	the supply cord is unlikely to touch such metal parts		N/A
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		N/A
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		N/A
	- the thickness of the insulation may be reduced		N/A
	- for class I or class II appliance with class III construction, the cross sectional areas of the conductors need not comply with 25.8 if specified conditions are met		N/A
	If necessary, electric strength test of 16.3		N/A
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		N/A
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		N/A
	- the thickness of the insulation may be reduced		N/A
	If necessary, electric strength test of 16.3		N/A
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected		N/A
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		N/A
26	**TERMINALS FOR EXTERNAL CONDUCTORS**		**P**
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts		N/A
	Earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection		N/A
26.2	Appliances with type X attachment and appliances for the connection of cables to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless		N/A
	the connections are soldered		N/A
	Screws and nuts not used to fix any other component, except		N/A
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N/A
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N/A
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N/A
26.3	Terminals for type X attachment and for connection of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		N/A
	Terminals fixed so that when the clamping means is tightened or loosened:		N/A
	- the terminal does not become loose		N/A
	- internal wiring is not subjected to stress		N/A
	- neither clearances nor creepage distances are reduced below the values in clause 29		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified (Nm) ..... :		N/A
	No deep or sharp indentations of the conductors		N/A
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		N/A
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		N/A
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/A
	Stranded conductor test, 8 mm insulation removed		N/A
	No contact between live parts and accessible metal parts and,		N/A
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N/A
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm^2) ..... :		N/A
	If a specially prepared cord is used, terminals need only be suitable for that cord		N/A
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other		N/A
26.9	Terminals of the pillar type constructed and located as specified		P
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless		P
	conductors ends fitted with means suitable for screw terminals		N/A
	Pull test of 5 N to the connection		P

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Clause	Requirement - Test	Result - Remark	Verdict
26.11	For type Y and Z attachment, soldered, welded, crimped or similar connections may be used		P
	For Class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		P
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		N/A
27	**PROVISION FOR EARTHING**		**P**
27.1	Accessible metal parts of Class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet	PTC heating elements' metal enclosure and jet pump motor metal enclosure and shaft are reliably earthed.	P
	Earthing terminals and earthing contacts not connected to the neutral terminal		P
	Class 0, II and III appliances have no provision for protective earthing		N/A
	Class II appliances and class III appliances may incorporate an earth for functional purposes.		N/A
	Safety extra-low voltage circuits not earthed, unless		N/A
	protective extra-low voltage circuits		N/A
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		P
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm², and		P
	do not provide earthing continuity between different parts of the appliance, and		P
	conductors cannot be loosened without the aid of a tool		P
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
	Class I appliances shall be provided with a terminal for the connection of external equipotential bonding conductors (IEC 60335-2-60)		P
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	For appliances with supply cords, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		P
	These requirements are not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes.		N/A
27.4	No risk of corrosion resulting from contact between parts of the earthing terminal and the copper of the earthing conductor or other metal		P
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		P
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm		P
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		P
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		P
	These requirements are not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes.		N/A
27.5	Low resistance of connection between earthing terminal and earthed metal parts		P
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		P
	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
	Resistance not exceeding 0,1 Ω at the specified low-resistance test (Ω)..... :	Max. 0,043Ω	P
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.		N/A
	They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit		N/A
	These requirements are not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes.		N/A

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Clause	Requirement - Test	Result - Remark	Verdict

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	No such screw	N/A
	Screws of insulating material not used for any electrical connections or connections providing earthing continuity		N/A
	Screws used for electrical connections or connections providing earthing continuity screwed into metal		P
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		N/A
	For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation		N/A
	For screws and nuts; torque-test as specified in table 14 ..... :	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless		P
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		N/A
	This requirement does not apply to electrical connections in circuits of appliances for which:		N/A
	• 30.2.2 is applicable and that carry a current not exceeding 0,5 A		N/A
	• 30.2.3 is applicable and that carry a current not exceeding 0,2 A		N/A
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together	Not for electrical connections	N/A
	Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		N/A
	Thread-cutting, thread rolling and space threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection:		N/A
	- in normal use,		N/A
	- during user maintenance,		N/A
	- when replacing a supply cord having a type X attachment, or		N/A
	- during installation		N/A
	At least two screws being used for each connection providing earthing continuity, unless		N/A
	the screw forms a thread having a length of at least half the diameter of the screw		N/A
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		N/A
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		N/A
	if an alternative earthing circuit is provided		N/A
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion		N/A
29	**CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION**		**P**
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies ..... :		N/A
	The microenvironment is pollution degree 1 under type 1 protection		N/A
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		N/A
	These values apply to functional, basic, supplementary and reinforced insulation..... :		P

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Clause	Requirement - Test	Result - Remark	Verdict
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless ..... :	(see appended table)	P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		N/A
	However, if the distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable		N/A
	For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 shall be increased according to the relevant multiplier values in Table A.2 of IEC 60664-1.		N/A
	Impulse voltage test is not applicable:		N/A
	- when the microenvironment is pollution degree 3, or		P
	- for basic insulation of class 0 and class 0I appliances		N/A
	- or to appliances intended for use at altitudes exceeding 2 000 m.		N/A
	Appliances are in overvoltage category II		P
	A force of 2 N is applied to bare conductors, other than heating elements		N/A
	A force of 30 N is applied to accessible surfaces		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	The values of table 16 or the impulse voltage test of clause 14 are applicable ..... :	(see appended table)	N/A
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		N/A
	Lacquered conductors of windings considered to be bare conductors		P
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16:	(see appended table)	P
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage ..... :	(see appended table)	P

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Clause	Requirement - Test	Result - Remark	Verdict
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		P
29.1.4	Clearances for functional insulation are the largest values determined from:		P
	- table 16 based on the rated impulse voltage ..... :	(see appended table)	P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz	For switching mode power supply part on PCB	P
	If values of table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless		N/A
	the microenvironment is pollution degree 3, or		N/A
	the distances can be affected by wear, distortion, movement of the parts or during assembly		N/A
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
	Lacquered conductors of windings considered to be bare conductors		P
	However, clearances at crossover points are not measured		N/A
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		P
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		P
	- table 16 based on the rated impulse voltage ..... :		P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N/A
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or Clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation		N/A
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160% of the withstand voltage required for basic insulation		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	If clearances for basic insulation are selected from Clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation		N/A
	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/A
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15		P
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	For PTC heating elements, transformer, relay inside.	P
	- precautions taken to protect the insulation; pollution degree 1	For sealed power supply PCB	P
	- insulation subjected to conductive pollution; pollution degree 3		P
	The microenvironment is pollution degree 3 unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance (IEC 60335-2-60)		P
	A force of 2 N is applied to bare conductors, other than heating elements		N/A
	A force of 30 N is applied to accessible surfaces		P
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		P
29.2.1	Creepage distances of basic insulation not less than specified in table 17 ..... :	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 17 ..... :		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14 ..... :		P
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or..... :	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable ..... :		N/A
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or..... :	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable ..... :		N/A
29.2.4	Creepage distances of functional insulation not less than specified in table 18..... :	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18..... :		N/A
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked:		P
	- by measurement, in accordance with 29.3.1, or	Adequate thickness provided	P
	- by an electric strength test in accordance with 29.3.2, or	Insulation film around PTC heating element	P
	- for insulation, other than single layer internal wiring insulation, by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		N/A
	for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N/A
	-by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other		P
	- as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		N/A

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Clause	Requirement - Test	Result - Remark	Verdict

29.3.1	Supplementary insulation have a thickness of at least 1 mm	Thickness of external enclosure is 3,0mm	P
	Reinforced insulation have a thickness of at least 2 mm		P
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		P
	Supplementary insulation consist of at least 2 layers		N/A
	Reinforced insulation consist of at least 3 layers	6 layers of insulation film wrapped around the live parts of heating element	P
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N/A
	the electric strength test of 16.3		N/A
	If the temperature rise during the tests of clause 19 does not exceed the value specified in table 3, the test of IEC 60068-2-2 is not carried out		P
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in table 19 ..... :		N/A
30	**RESISTANCE TO HEAT AND FIRE**		**P**
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		P
	parts of thermoplastic material providing supplementary or reinforced insulation		P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C) ..... :	(see appended Table 30.1)	P
	Parts supporting live parts tested at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C) ..... :	(see appended Table 30.1)	P
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C) ..... :	(see appended Table 30.1)	P
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		N/A
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		N/A
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies		N/A
	- for unattended appliances, 30.2.3 applies		P
	For appliances for remote operation, 30.2.3 applies		N/A
	For base material of printed circuit boards, 30.2.4 applies		P
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 °C	(see appended Table 30.2)	P
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		N/A
	the material is classified at least HB40 according to IEC 60695-11-10		N/A
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		N/A
30.2.2	Not applicable.(IEC 60335-2-60)		N/A
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	The tests are not applicable to conditions as specified..... :		N/A
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and		P
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		P
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C		P
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
30.2.3.2	Parts of non-metallic material supporting connections, and		P
	parts of non-metallic material within a distance of 3mm,		P
	subjected to the glow-wire test of IEC 60695-2-11 with appropriate severity level:	(see appended Table 30.2)	P
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		P
	- 650 °C, for other connections		P
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		N/A
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N/A
	• 775 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	• 675 °C, for other connections		N/A
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts are to:		P
	- comprise material having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- comprise material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or	Terminal sheath	P
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those:		N/A
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750 °C or 650 °C as appropriate, but produce a flame that persist longer than 2 s, or		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	- parts that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts, that comprised material having a glow-wire flammability index of at least 750 °C or 650 °C as appropriate, or		N/A
	- small parts for which the needle-flame test of Annex E was applied, or		N/A
	- small parts for which a material classification of V-0 or V-1 was applied		N/A
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		N/A
	- parts having a glow-wire ignition temperature of at least 775 °C or 675 °C as appropriate, or		N/A
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or		N/A
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
30.2.4	Base material of printed circuit boards subjected to the needle-flame test of Annex E	(see appended Table 30.2/30.4)	N/A
	Test not applicable to conditions as specified ..... :	V-0 approved	P
31	**RESISTANCE TO RUSTING**		**P**
	Relevant ferrous parts adequately protected against rusting		P
	Tests specified in part 2 when necessary		N/A
32	**RADIATION, TOXICITY AND SIMILAR HAZARDS**		**P**
	Appliance does not emit harmful radiation or present a toxic or similar hazard due to their operation in normal use		P
	Compliance is checked by the limits or tests specified in part 2, if relevant		N/A
A	**ANNEX A (INFORMATIVE)** **ROUTINE TESTS**		**N/A**
	Description of routine tests to be carried out by the manufacturer		N/A
B	**ANNEX B (NORMATIVE)** **APPLIANCES POWERED BY RECHARGEABLE BATTERIES THAT ARE RECHARGED IN THE APPLIANCE**		**N/A**

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Clause	Requirement - Test	Result - Remark	Verdict
C	**ANNEX C (NORMATIVE) AGEING TEST ON MOTORS**		**N/A**
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N/A
	Test conditions as specified		N/A
D	**ANNEX D (NORMATIVE) THERMAL MOTOR PROTECTORS**		**P**
	Applicable to appliances having motors that incorporate thermal motor protectors necessary for compliance with the standard	For air pump motor and jet pump motor	P
	Test conditions as specified		P
E	**ANNEX E (NORMATIVE) NEEDLE-FLAME TEST**		**P**
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		P
7	Severities		P
	The duration of application of the test flame is 30 s ± 1 s		P
9	Test procedure		P
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of Figure 1		P
9.2	The first paragraph does not apply		P
	If possible, the flame is applied at least 10 mm from a corner		P
9.3	The test is carried out on one specimen		P
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		P
11	Evaluation of test results		P
	The duration of burning not exceeding 30 s		P
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N/A
F	**ANNEX F (NORMATIVE) CAPACITORS**		**N/A**
	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/A
1.5	Terms and definitions		N/A
1.5.3	Class X capacitors tested according to subclass X2		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
1.5.4	This subclause is applicable		N/A
1.6	Marking		N/A
	Items a) and b) are applicable		N/A
3.4	Approval testing		N/A
3.4.3.2	Table 3 is applicable as described		N/A
4.1	Visual examination and check of dimensions		N/A
	This subclause is applicable		N/A
4.2	Electrical tests		N/A
4.2.1	This subclause is applicable		N/A
4.2.5	This subclause is applicable		N/A
4.2.5.2	Only table 11 is applicable		N/A
	Values for test A apply		N/A
	However, for capacitors in heating appliances the values for test B or C apply		N/A
4.12	Damp heat, steady state		N/A
	This subclause is applicable		N/A
	Only insulation resistance and voltage proof are checked		N/A
4.13	Impulse voltage		N/A
	This subclause is applicable		N/A
4.14	Endurance		N/A
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 are applicable		N/A
4.14.7	Only insulation resistance and voltage proof are checked		N/A
	No visible damage		N/A
4.17	Passive flammability test		N/A
	This subclause is applicable		N/A
4.18	Active flammability test		N/A
	This subclause is applicable		N/A
G	**ANNEX G (NORMATIVE)** **SAFETY ISOLATING TRANSFORMERS**		**P**
	The following modifications to this standard are applicable for safety isolating transformers:		P
7	Marking and instructions		P
7.1	Transformers for specific use marked with:		P

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Clause	Requirement - Test	Result - Remark	Verdict
	-name, trademark or identification mark of the manufacturer or responsible vendor .....:		P
	-model or type reference .....:		P
17	Overload protection of transformers and associated circuits		P
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		P
22	Construction		P
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		P
29	Clearances, creepage distances and solid insulation		P
29.1, 29.2, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply	For transformer on power supply PCB: pri. winding to core: Cl=Cr=4,0mm; sec. winding to core: Cl=Cr=4,0mm; pri. winding to sec. winding: Cl=Cr=10,0mm; L to N of pri. winding: Cl=Cr=5,0mm; tripple insulated wire used for sec. winding; For transformer of water pump: winding to core: Cl=Cr=5,0mm; Input winding to output winding: Cl=Cr>15,0mm; L to N of input winding: Cl=Cr=10,0mm	P
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances	For transformer on power supply PCB	P
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed	For transformer on power supply PCB	P
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1	For transformer on power supply PCB: Values specified in IEC 60664-4 not greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1	N/A
H	**ANNEX H (NORMATIVE) SWITCHES**		**N/A**
	Switches comply with the following clauses of IEC 61058-1, as modified below:		N/A
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Before being tested, switches are operated 20 times without load		N/A
8	Marking and documentation		N/A
	Switches are not required to be marked		N/A
	However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N/A
13	Mechanism		N/A
	The tests may be carried out on a separate sample		N/A
15	Insulation resistance and dielectric strength		N/A
15.1	Not applicable		N/A
15.2	Not applicable		N/A
15.3	Applicable for full disconnection and micro-disconnection		N/A
17	Endurance		N/A
	Compliance is checked on three separate appliances or switches		N/A
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless		N/A
	otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335 .....:		N/A
	Switches for operation under no load and which can be operated only by a tool, and		N/A
	switches operated by hand that are interlocked so that they cannot be operated under load,		N/A
	are not subjected to the tests		N/A
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		N/A
	Subclauses 17.2.2 and 17.2.5.2 not applicable		N/A
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1		N/A
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K).....:		N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N/A
	Clause 20 is applicable to clearances across full disconnection and micro-disconnection		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	It is also applicable to creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24		N/A
I	**ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE**		**N/A**
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		N/A
8	Protection against access to live parts		N/A
8.1	Metal parts of the motor are considered to be bare live parts		N/A
11	Heating		N/A
11.3	The temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N/A
11.8	The temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N/A
16	Leakage current and electric strength		N/A
16.3	Insulation between live parts of the motor and its other metal parts is not subjected to the test		N/A
19	Abnormal operation		N/A
19.1	The tests of 19.7 to 19.9 are not carried out		N/A
19.I.101	Appliance operated at rated voltage with each of the following fault conditions:		N/A
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N/A
	- short circuit of each diode of the rectifier		N/A
	- open circuit of the supply to the motor		N/A
	- open circuit of any parallel resistor, the motor being in operation		N/A
	Only one fault simulated at a time, the tests carried out consecutively		N/A
22	Construction		N/A
22.I.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/A
	Compliance checked by the tests specified for double and reinforced insulation		N/A

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Clause	Requirement - Test	Result - Remark	Verdict

J	**ANNEX J (NORMATIVE)** **COATED PRINTED CIRCUIT BOARDS**		**N/A**
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		N/A
5.7	Conditioning of the test specimens		N/A
	When production samples are used, three samples of the printed circuit board are tested		N/A
5.7.1	Cold		N/A
	The test is carried out at -25 °C		N/A
5.7.3	Rapid change of temperature		N/A
	Severity 1 is specified		N/A
5.9	Additional tests		N/A
	This subclause is not applicable		N/A
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		P
	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/A
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		P
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N/A
	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/A
L	**ANNEX L (INFORMATIVE)** **GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES**		**P**
	Information for the determination of clearances and creepage distances		P
M	**ANNEX M (NORMATIVE)** **POLLUTION DEGREE**		**P**

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Clause	Requirement - Test	Result - Remark	Verdict
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		P
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		P
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		P
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence	For sealed power supply PCB	P
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected	For PTC heating element and inside of relay, transformer	P
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		P
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N/A
N	**ANNEX N (NORMATIVE)** **PROOF TRACKING TEST**		**P**
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		P
7	Test apparatus		P
7.3	Test solutions		P
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		P
10.1	Procedure		P
	The proof voltage is 100V, 175V, 400V or 600V...:	175V	P
	The test is carried out on five specimens		P
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
10.2	Report		P
	The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N/A
O	**ANNEX O (INFORMATIVE)** **SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30**		**P**
	Description of tests for determination of resistance to heat and fire		P
P	**ANNEX P (INFORMATIVE)** **GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES**		**N/A**
Q	**ANNEX Q (INFORMATIVE)** **SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS**		**P**
	Description of tests for appliances incorporating electronic circuits		P
R	**ANNEX R (NORMATIVE)** **SOFTWARE EVALUATION**		**N/A**
S	**ANNEX S (NORMATIVE)** **BATTERY OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGEABLE OR NOT RECHARGED IN THE APPLIANCE**		**N/A**
T	**ANNEX T (NORMATIVE)** **UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS**		**N/A**

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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)	ΔP (W, %)	Required ΔP (W, %)	Remark
230V/50Hz (heating)	2050	1922	-6,24%	-10%, +5%	Pass
230V/50Hz (heating + bubble)	1850	1705	-7,8%	-10%, +5%	Pass
Supplementary information:					

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

11.8	TABLE: Heating test, thermocouple measurements (Heating and then bubble)		P
	Test voltage (V) ..... :	257,4	—
	Ambient (°C) ..... :	24,8	—

Thermocouple locations	Max. temperature rise measured, ΔT (K)	Max.temperature rise limit, ΔT (K)
Power cord	16,7	50
RY1 relay in PCB	20,9	T-25=60
RY2 relay in PCB	30,2	T-25=60
RY3 relay in PCB	23,2	T-25=60
RY4 relay in PCB	30,2	T-25=60
RY7 relay in PCB	24,9	T-25=60
Transformer EE16 winding in PCB	17,9	80
Transformer T4 surface	40,0	For ref.
X2capacitor in PCB	14,0	T-25=75
PCB terminal (black)	15,9	See 30.1
PCB material	28,5	120
Metal enclosure of air pump	44,7	For ref.
X2 capacitor for air pump	40,9	T-25=60
Stator winding of air pump	54,1	115
Internal wire of air pump	47,0	T-25=100
Plastic enclosure of air pump	36,7	See 30.1
Running capacitor for jet pump	21,2	T-25=60

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Clause	Requirement - Test	Result - Remark	Verdict

winding of jet pump	79,7	115
Lead wire of jet pump	54,0	T-25=100
Terminal box of jet pump	47,4	See 30.1
Surface of water pump	36,5	For ref.
Surface of transformer of water pump	39,3	For ref.
Surface of heating elements	27,0	For ref.
Non-self-resetting thermal cutout	22,2	For ref.
Lead wire of heating elements	41,3	T-25=175
Surface of control panel	2,9	75
Appliance enclosure (inside)	6,5	See 30.1
Water temperature at inlet	---	50℃
Water temperature at outlet	---	50℃
Supplementary information: Tested firstly under heating function and then blowing function with air pump, Max. value listed.		

11.8	TABLE: Heating test, resistance method					P
	Test voltage (V) ..... :		254,4			—
	Ambient, t1 (°C) ..... :		22,4			—
	Ambient, t2 (°C) ..... :		24,8			—
Temperature rise of winding		R1 (Ω)	R2 (Ω)	ΔT (K)	Max. ΔT (K)	Insulation class
Stator winding of air pump		2,306	2,874	60,9	115	Class155
Main winding of jet pump		4,58	6,12	84,0	115	Class155
Sub winding of jet pump		8,03	10,82	86,9	115	Class155
Winding of water pump		0,484	0,570	43,3	95	Class130
Pri winding of transformer for water pump		32,1	38,0	44,8	95	Class130
Sec winding of transformer for water pump		120,1 m	141,6 m	43,6	95	Class130
Supplementary information:						

13.2	TABLE: Leakage current			P
	Heating appliances: 1.15 x rated input (W).....:			—
	Motor-operated and combined appliances: 1.06 x rated voltage (V).....:	254,4V		—
Leakage current between		I (mA)	Max. allowed I (mA)	
L/N to heating element metal surface (earth disconnected)		0,155/0,147	0,35 peak	
L/N to enclosure, control panel		0,010/0,004	0,35 peak	

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Clause	Requirement - Test	Result - Remark	Verdict

L/N to heating element metal surface	0,110/0,103	0,75
Supplementary information: Max. value listed		

13.3	**TABLE: Electric strength**		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
L/N to SELV		3000	No
L/N to heating element surface(earth disconnected)		3000	No
SELV to electronic touch screen		500	No
L/N to control panel		3000	No
L/N to jet pump shaft (1,2U+700)		1130	No
Supplementary information:			

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

16.2	**TABLE: Leakage current**		P
	Single phase appliances: 1.06 x rated voltage (V) .....:	254,4V	—
	Three phase appliances 1.06 x rated voltage divided by √3 (V) .....:		—
Leakage current between		I (mA)	Max. allowed I (mA)
L/N to heating element metal surface(earth disconnected)		0,065	0,25
L/N to electronic touch screen		0,014	0,25
L/N to heating element metal surface		0,092	0,75
Supplementary information: only the max. value listed			

16.3	**TABLE: Electric strength**		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
L/N to SELV		3000	No
L/N to heating element surface(earth disconnected)		3000	No
L/N to electronic touch screen		3000	No
SELV to electronic touch screen		500	No

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Clause	Requirement - Test	Result - Remark	Verdict

L/N to jet pump shaft (1,2U+950)	1380	No
Each layer of insulation film around PTC heating elements	1750	No
Supplementary information:		

17	**TABLE: Overload protection, thermocouple measurements (Transformer HS28514/ EE-16 on PCB)**		P
Temperature rise of part/at:		T (°C)	Max. T (°C)
Winding surface		71,2	175
Supplementary information: only the max. value was listed			

17	**TABLE: Overload protection, thermocouple measurements (Transformer HS33530/EE-16 on PCB)**		P
Temperature rise of part/at:		T (°C)	Max. T (°C)
Winding surface		98,7	175
Supplementary information: only the max. value was listed			

17	**TABLE: Overload protection, thermocouple measurements (Transformer for water pump)**		P
Temperature rise of part/at:		T (°C)	Max. T (°C)
Plastic enclosure		86,8	175
Test corner		84,1	125
Supplementary information: only the max. value was listed			

17	**TABLE: Overload protection, thermocouple measurements (Transformer T4 on PCB)**		P
Temperature rise of part/at:		T (°C)	Max. T (°C)
Winding surface		30,2	175
Supplementary information: only the max. value was listed			

19	**Abnormal operation conditions**	P
Operational characteristics	YES/NO	Operational conditions
Are there electronic circuits to control the appliance operation?	Yes	
Are there “off” or “stand-by” position?	Yes	If become operational, not result in dangerous malfunction
The unintended operation of the appliance results in dangerous malfunction?	No	

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Clause	Requirement - Test	Result - Remark	Verdict

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	Tested under 0,85* P_n, failure of one water flow sensors and temp. sensors	Non self-resetting thermal cut-out operated, no hazard.	N.A	N.A	N.A	N.A	P
	Tested under 0,85* P_n, air inlets and outlets blocked	Motor protector operated, no hazard					
19.3	Tested under 1,24* P_n, other conditions same as above	Same as above	N.A	N.A	N.A	N.A	P
	Tested under 1,24* P_n, air inlets and outlets blocked	Same as above					
19.4	Failure of temp. sensor	Non-self - resetting thermal cut-out operated	N.A	N.A	N.A	N.A	P
19.5	---	N/A	N.A	N.A	N.A	N.A	N/A
19.6	Increase working voltage of PTC until 1,5 times working voltage	Voltage until 360V, no rupture of PTC	N.A	N.A	N.A	N.A	P
19.7	Lock the air pump motor and jet pump motor	Protected by motor protector	N.A	N.A	N.A	N.A	P
19.8	---	N/A	N.A	N.A	N.A	N.A	N/A
19.9	---	N/A	N.A	N.A	N.A	N.A	N/A
19.10	312V	No danger	N.A	N.A	N.A	N.A	P
19.11.2	240V	No danger	N.A	N.A	N.A	N.A	P

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Clause	Requirement - Test	Result - Remark	Verdict

19.11.4.8	---	N/A	N.A	N.A	N.A	N.A	N/A
19.14	Same as Cl.11	No danger	N.A	N.A	N.A	N.A	N/A
Supplementary information:							

19.7	TABLE: Abnormal operation, locked rotor/moving parts (for air pump mtor)					P
	Test voltage (V) ..... :		240			—
	Ambient, t1 (°C) ..... :		23,4			—
	Ambient, t2 (°C) ..... :		---			—
Temperature of winding	R1 (Ω)	R2 (Ω)	ΔT (K)	T (°C)	Max. T (°C)	
Stator winding	2,311	2,670	---	63,5	215	
Supplementary information:						

19.7	TABLE: Abnormal operation, locked rotor/moving parts (jet pump motor)					P
	Test voltage (V) ..... :		240			—
	Ambient, t1 (°C) ..... :		22,5			—
	Ambient, t2 (°C) ..... :		---			—
Temperature of winding	R1 (Ω)	R2 (Ω)	ΔT (K)	T (°C)	Max. T (°C)	
Total winding(lock rotor)	12,56	16,49	---	102,9	215	
Total winding(capacitor OC)	12,56	15,07	---	73,9	215	
Supplementary information:						

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

19.13	TABLE: Abnormal operation, temperature rises	P
Thermocouple locations	Max. temperature rise measured, dT (K)	Max.temperature rise limit, ΔT (K)
Power cord	22,5	150
Plastic enclosure	9,2	See 30.1
Winding of air pump	119,7	215

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Water temp.	49,1(°C)	55(°C)
Supplementary information: only the max. value was listed		

24.1	TABLE: Components information				P
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1])**
Power Plug (for British market)	Friendship Enterprises Int Ltd	FE-130P	AC250V; 13A	BS 1363	KM 99612ASTA 1307
	Wuxi Zhonghui Wire & Cable Co., Ltd	ZH-61A	AC250V; 13A	BS 1363	ASTA970 & 17896
	Zhenjiang Huayin Instrument and Electrical Equipment Co. Ltd	3B03	AC250V; 13A	BS 1363	KM 70530
Power plug	Wuxi Zhonghui Wire & Cable Co., Ltd.	ZH-3B	AC250V;16A; IP44	DIN VDE 0620-1	TUVR 50322212
Fuse in British Plug	DEL International Industrial (U.K.)	DISSMANN, JADE	AC250V; 50Hz; 10A/13A	BS 1362	ASTA 997
	Dongguan Cooper Electronics Co., Ltd.	TDC 180 (BUSSMANN)	AC240V; 50Hz; 10A/13A	BS 1362	ASTA 658
	Group Talents Limited	SEM 11-10A/13A	AC240V; 50Hz; 10A/13A	BS 1362	KM 21062&500
	Pantene Industrial Co., Ltd	7000 SERIES	AC240V; 50Hz; 10A/13A	BS 1362	ASTA 15
Power cord(>5m)	Ningbo Light-Heavy Electronics Technology Co., Ltd.	H07RN-F	3G1,0mm^{2}or 3G1,5mm^2	EN 50525-2-21	VDE 40024301
	Wuxi Zhonghui Wire & Cable Co., Ltd	H07RN-F	3G1,0mm^{2}or 3G1,5mm^2	EN 50525-2-21	VDE 40020334
	Zhenjiang Zhongjia Electrical Co., Ltd	H07RN-F	3G1,0mm^2 or 3G1,5mm^2	EN 50525-2-21	VDE 40030173
PRCD	Kedu Electric Co., Ltd.	PD20B	AC220-250V, In=16A, I△n=10mA, IP55	HD 639 S1	Intertek 13SHN1451-02
	Kedu Electric Co., Ltd.	PD22B	AC220-250V, In=16A, I△n=10mA, IP66	HD 639 S1	TUV R 50341109
Connection cord for heating element	YUYAO KAIAN CABLE TECHNOLOGY CO., LTD.	8094	300/500V; 180ºC; 16/17/18AWG	DIN 57250 Teil 106	VDE 40044349

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	GUANGDONG HAERKN NEW ENERGY CO., LTD.	8094	300/500V; 180ºC; 16/17/18AWG	DIN 57250 Teil 106	VDE 40019516
	HANSTAR FLUORO-PLASTIC INSULATED WIRES CO.,LTD.	HX...D	300/500V; 180ºC; 16/17/18AWG	DIN 57250 Teil 106	VDE 40007210
	Guangdong Haerkn New Energy Co., Ltd.	H05SS-K	300/500V, 180ºC; 1X0,75mm^2	EN 50525-2-41	VDE 40026436
PTC Heating Element	Bestway Inflatables & Material Corp	---	AC 220-240V; 2000W; (500W*4)	EN 60335-2-60	Test with appliance
Film Around heating element	SuzhouKying Industrial Materials Co Ltd.	KYPI	0,04mm; V-0	---	UL E248478
	TIANJIN JIAYI INSULATION MATERIALCO LTD	6051	0,04mm; V-0	---	UL E301086
	JIANGSU YABANG NEW MATERIAL CO LTD	6051	0,04mm; V-0	---	UL E302236
Thermal Cut out on heater	Baoying Electrical Appliances Factory	JW6-III	AC250V; Max. 15A; 50ºC	EN 60730-1 EN 60730-2-9	VDE 40008368
	ShaoxingZhongxin Electric Appliance Co.,Ltd	KSD301RxC KSD301RxP	AC250V; 16A; 50ºC	EN 60730-1 EN 60730-2-9	TÜV R50229791
Air blowing motor	Goleader Industries (Shanghai) Co., Ltd	XZ8218S23-RW24	AC220-240V; 50Hz; Class F; stator winding: 2,306ΩX2; Rotor winding: 4,20Ω(180º) at 22,4ºC	EN 60335-2-60	Tested with appliance
Motor protector for air blowing motor	Jiangsu Meikai Electric Co.,ltd.	17AM-M140G+ PTC	AC250V; 140°C	EN 60730-1 EN 60730-2-2	VDE 40030600
X2 Capacitor on air blowing motor	WINDAY ELECTRONIC (DONG GUAN) CO., LTD	MPX	AC275V; 0,47µF; T100	EN 60384-14	VDE 40018071/ 40030283
	FoshanShundeBeijiao Hua Da Electric Industrial Co., Ltd.	HD-MKP-Series /HD-Series	AC275V; 0,47µF; T85/T105	EN 60384-14	VDE 40027182
	Dain Electronics Co., Ltd.	MPX	AC275V; 0,47µF; T110/T100	EN 60384-14	VDE 40018798

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Clause	Requirement - Test	Result - Remark	Verdict

	Tenta Electric Industrial Co. Ltd.	MEX	AC275V; 0,47µF; T100	EN 60384-14	VDE 119119
	Dongguan QinHong (QNR) Electronic Technology Co.,LTD	MPX	AC275/300/310V; 0,47µF;T110	EN 60384-14	VDE 40047280
Lead wire for air blowing motor	YUYAO KAIAN CABLE TECHNOLOGY CO., LTD.	8094	300/500V; 180ºC; 18AWG	DIN 57250 Teil 106	VDE 40044349
	Guangdong Haerkn New Energy Co., Ltd.	8094	300/500V; 180ºC; 18AWG	DIN 57250 Teil 106	VDE 40019516
	HANSTAR FLUORO-PLASTIC INSULATED WIRES CO.,LTD.	HX...D	300/500V; 180ºC; 18AWG	DIN 57250 Teil 106	VDE 40007210
	Guangdong Haerkn New Energy Co., Ltd.	H05SS-K	300/500V, 180ºC; 1X0,75mm^2	EN 50525-2-41	VDE 40026436
Jet pump motor	CHANGZHOU HONEST ELECTRIC CO.,LTD	RW11A100EC	220~240V/50Hz; Class F Main winding: 4,58Ω; Sub winding: 8,03Ω (22,4ºC)	EN 60335-2-60	Tested with appliance
Jet pump motor protector	JIANGSU MEIKAI Electric CO., LTD.	17AMD 135Z+PTC	135 ºC	EN 60730-1 EN 60730-2-2	VDE 40030600
Jet pump motor capacitor	YanCheng City KangWei Electron Co.,Ltd	CBB60SHS3	AC450V;25uF; S3;40/85/21	EN 60252-1	TÜV R50278187
	Xunde Electrical and Electronic Co., Ltd.	CBB60S3	AC450V; 25uF; S3;40/85/21	EN 60252-1	TÜV R50286357
Wire connector for jet pump motor	HEAVY POWER CO LTD	CE2	300V; 150˚C	EN 60335-1	UL E113650
	HEAVY POWER CO LTD	CE5	300V; 150˚C	EN 60335-1	UL E113650
	JIANGXI GAOCHAO INDUSTRIAL CO LTD	CE2; CE2X; CE2 750°C; CE2X750°C ; CE5; CE5X; CE5X 750°C; CE5 750°C	300V 150°C	EN 60335-1	UL E494015
Water pump	Bestway Inflatables & Material Corp.	#58113	AC 12V; 50Hz;50W; IPX7; Class III	EN 60335-2-41 EN 60335-1	TÜV R50298383

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Clause	Requirement - Test	Result - Remark	Verdict

Transformer for water pump	TDC Power Products Co., Ltd.	DE-60-12W	Pri. winding: 32,1Ω Sec. winding: 120mΩ (22,4ºC); Input:AC220-240V; 50Hz; 70VA output: AC12V; Max.60VA	EN 61558-1 EN 60335-1	Test with appliance
Input cord & output cord of water pump transformer	Zheng Yu Electric Appliance Fittings (Kunshan) Co.,Ltd.	H05RN-F	2X0,75mm^2	EN 50525-2-21	VDE 40016693
	NingBo Light-Heavy Electronics Technology Co.,Ltd.	H05RN-F	2X0,75mm^2	EN 50525-2-21	VDE 40024301
	KunshanSumtung Cable Technology Co., Ltd.	H05RN-F	2X0,75mm^2	EN 50525-2-21	VDE 40046079
	Jintan Wanda Cord & Cable Co., Ltd.	H05RN-F	2X0,75mm^2	EN 50525-2-21	VDE 40017713
Thermal link in water pump transformer	ZHANGZHOU AUPO ELECTRONICS CO.,LTD.	P4, P4-F	250VAC,2A, 130℃	EN 60691	VDE 40000032
	Xiamen Set Electronics Co., Ltd.	K4	250VAC,2A, 130℃	EN 60691	VDE 40017055
Power Supply PCB material	Kingboard Laminates Holdings Ltd.	FR-4.0	V-0; 130º C	EN 60335-1 EN 60335-2-60	UL E123995 & Test with appliance
	Shengyi TECHNOLOGY Co., Ltd	FR-4.0	V-0; 130º C	EN 60335-1 EN 60335-2-60	UL E109769 & Test with appliance
X2 Capacitor in PCB (C4)	Jimson Electronics (Xiamen) Co., Ltd	MKP	AC275V; 0,1uF; T100	EN 60384-14	VDE 40000463
	FoshanShundeChuang Ge Electronic Industrial Co., Ltd.	MKP-X2	AC275V; 0,1uF; T105	EN 60384-14	VDE 40008922
	Shenzhen Jing Yu Electronics Co., Ltd.	CBBX2	AC275V; 0,1uF; T100	EN 60384-14	VDE 40025597
	Dain Electronics Co., Ltd.	MPX	AC275V; 0,1uF; T110	EN 60384-14	VDE 40018798
	Shenzhen JinghaoCapacitor Co., Ltd	CBB62B	AC280V; 0,1uF; T100	EN 60384-14	VDE 40018690
	WINDAY ELECTRONIC (DONG GUAN) CO.,	MPX Serie(s)	AC310V; 0,1uF; T100	EN 60384-14	VDE 40030283

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	LTD				
X2 Capacitor in PCB (CX1/CX2/ CX3)	Jimson Electronics (Xiamen) Co., Ltd.	MKP	AC275V; 0,22uF; 40/100/21	EN 60384-14	VDE 40000463
	FoshanShunde Chuang Ge Electronic Industrial Co., Ltd.	MKP-X2	AC275V; 0,22uF; 40/105/21	EN 60384-14	VDE 40008922
	Dain Electronics Co., Ltd.	MPX	AC275V; 0,22uF; T110	EN 60384-14	VDE 40018798
	Shenzhen Jinghao Capacitor Co., Ltd	CBB62B	AC305V; 0,22uF; 40/110/56	EN 60384-14	VDE 40018690
	WINDAY ELECTRONIC (DONG GUAN) CO., LTD	MPX Serie(s)	AC310V; 0,22uF; 40/100/21C	EN 60384-14	VDE 40030283
Y2 Capacitor in PCB (C1/C2)	Guangdong South Hongming Electronic Science and Technology Co., Ltd.	F	AC250V; 4700pF; T125	EN 60384-14	VDE 40036246
	TDK Corporation.	CS	AC250V; 4700pF; T125	EN 60384-14	VDE 40029781
Fuse1 in power supply PCB	XC Electronics (Shen Zhen) Corp. Ltd.	5TE	AC250V; 3,15A	EN 60127	VDE 40029550
	Conquer Electronics Co.,Ltd.,	MST series	AC250V; 3,15A	EN 60127	VDE 40017118
	Dongguan Better Electronics Technology Co., Ltd.	932	AC250V; 3,15A	EN 60127	VDE 40033369
Relay for heater& air blowing motor &water pump (RY1/RY3/ RY4/RY5)	Xiamen Hongfa Electroacoustic Co., Ltd.	HF62F 012-1HT	AC250V; 16A; T85	EN 61810-1 Clause 17 of EN 60730-1	TÜV R50147086
	Sanyou Corporation Limited	SMIH-SH-112LM	AC250V; 16A; T85	EN 61810-1 Clause 17 of EN 60730-1	TÜV R50227999
	SONG CHUAN PRECISION CO., LTD.	302P-1AH-C & 302P-1AH-C M02	AC250V; 17A; T85	EN 61810-1 Clause 17 of EN 60730-1	TÜV R50025929
	DONGGUAN CHUROD ELECTRONICS CO., LTD.	CHZ02-S-112LA2	AC 250V; 16A; T85	EN 61810-1 Clause 17 of EN 60730-1	TUV R50212872

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	SHENZHEN GOLDEN ELECTRICAL APPLIANCES CO., LTD.	GU-1A-12DP	AC 250V; 16A; T85	EN 61810-1 Clause 17 of EN 60730-1	TÜV R50217082
Relay for jet motor RY7	Sanyou Corporation Limited	SFK-112DMP	AC250V; making 80A for 300ms; breaking 20A;T85	EN 61810-1 Clause 17 of EN 60730-1	TUV R50138321
Optocoupler (U1)	Sharp Corporation	PC817	Insulation voltage: 890Vpk; Transient overvoltage: 9000Vpk	EN 60747-5-5	VDE 40008087
	Lite-On Technology Corporation	LTV-817	Insulation voltage: 890Vpk; Transient overvoltage: 8000Vpk	EN 60747-5-5	VDE 40015248
	Everlight Electronics Co., Ltd.	EL817	Insulation voltage: 850Vpk; Transient overvoltage: 6000Vpk	EN 60747-5-5	VDE 132249
Relay for water pump (RY2) in power supply PCB	Xiamen HongfaElectroacoustics Co., Ltd	JZC-32FA-T 012-HSL2	AC250V; 5A;T105	EN 61810-1 Clause 17 of EN 60730-1	VDE 40006182
	Sanyou Corporation Limited	SJ-S-112DM	AC250V; 5A; T85	EN 61810-1 Clause 17 of EN 60730-1	VDE 40002146 & TUV R 50142420
	Tyco Electronics (Shenzhen) Co., Ltd.	OJ-SH-112LMH	AC250V; 8A; T70	EN 61810-1 Clause 17 of EN 60730-1	TÜV R50139166
	NINGBO TIANBO GANGLIAN ELECTRONICS CO., LTD.	TRG1D-12VDC-S-H	AC250V; 5A; T85	EN 61810-1 Clause 17 of EN 60730-1	TUV R 50108695
Transformer TR1 in power supply PCB	HANG SING INDUSTRIAL CO.,LTD.	HS28514/EE-16	Input: 220-240V; Output: 12V/5V; Class B	EN 60335-1	Test with appliance
	HANG SING INDUSTRIAL CO.,LTD.	HS33530/EE-16	Input: 220-240V; Output: 12V/5V; Class B	EN 60335-1	Test with appliance
Triple insulated wire of transformer in PCB	Shenzhen KaizhongHedong New Materials Co., Ltd.	TIW-B	Φ0,25mm/ Φ0,35mm; Triple insulated wires	EN 61558-2-16	VDE 40038861
	Suzhou Yusheng Electronic Co.,Ltd.	TIW-B	Φ0,25mm/ Φ0,35mm;Triple insulated wires	EN 61558-2-16	VDE 40033527

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	Dah Jin Technology Co.,Ltd.,	TLW-B	Φ0,25mm/ Φ0,35mm;Triple insulated wires	EN 61558-2-16	VDE 40008834
	Furukawa Electric Co.,Ltd.	TEX-E	Φ0,25mm/ Φ0,35mm;Triple insulated wires	EN 61558-2-16	VDE 006735
Varistor	Centra Science Corp.	CNR-10D561K	Max. peak current:2500A; Max. continuous voltage: AC350V; T85	EN 61051-1	VDE 40008220
	Guangdong South Hongming Electronic Science and Technology Co., Ltd.,	ZVR-10D561	Max. peak current: 3500A; Max. continuous voltage: AC360V; T85	EN 61051-1	VDE 40027789
	Thinking Electronic Industrial Co.,Ltd.	TVR10561	Max. peak current:2500A; Max. continuous voltage: AC350V; T85	EN 61051-1	VDE 005944
Relay(RY6) in power supply PCB(optional)	Xiamen Hongfa Electroacoustic Co., Ltd.	JZC-32FA-T 012-HSL2	AC250V; 5A; T105	EN 61810-1	VDE 40006182
	Sanyou Corporation Limited	SJ-S-112DM	AC250V; 5A; T85	EN 61810-1	VDE 40002146 & TUV R 50142420
	Tyco Electronics (Shenzhen) Co., Ltd.	OJ-SH-112LMH	AC250V; 8A; T85	EN 61810-1	TÜV R50139166
	NINGBO TIANBO GANGLIAN ELECTRONICS CO., LTD.	TRG1D-12VDC-S-H	AC250V; 5A; T85	EN 61810-1	TUV R 50108695
Fuse2 in power supply PCB(optional)	XC Electronics (Shen Zhen) Corp. Ltd.	5TE	AC300V; 1A	EN 60127	VDE 40036821
	Dongguan Better Electronics Technology Co., Ltd.	932	AC250V;1A	EN 60127	VDE 40033369
Transformer T4 in power supply PCB(optional)	XiamenZettler Magnetics Co.Ltd.,	BV302S09006	Pri. 230VAC, 50/60Hz, Sec.9VAC, 0,6VA	EN 61558-1 EN 61558-2-6 EN 60335-1	VDE 40022230& test with applliance
Optocoupler (U6)(optional)	Sharp Corporation	PC817	Insulation voltage: 890Vpk; Transient overvoltage: 9000Vpk	EN 60747-5-5	VDE 40008087

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Clause	Requirement - Test	Result - Remark	Verdict

	Lite-On Technology Corporation	LTV-817	Insulation voltage: 890Vpk; Transient overvoltage: 8000Vpk	EN 60747-5-5	VDE 40015248
	Everlight Electronics Co., Ltd	EL817	Insulation voltage: 850Vpk; Transient overvoltage: 6000Vpk	EN 60747-5-5	VDE 132249
Resistors R14/R15/R35/ R36(optional)	Shijiazhuang HaiTe Electronic Co., Ltd.	MG (RI) *	1 MOhm,1W	EN 62368-1	VDE 40007756
	KOA CORPORATION	RCR60	1 MOhm,1W	EN 60065	VDE 124069
	KOA CORPORATION	RCR50EN - Series	1 MOhm,0,5W	EN 60065	VDE 40024807
	KOA CORPORATION	RCR60 RCR50EN	1 MOhm,1W 1 MOhm,0,5W	EN 62368-1	VDE 40048563
	Uniroyal ElectronicsIndustry Co., Ltd.	MGR Series	1 MOhm,1W 1 MOhm,0,5W	EN 60065	VDE 40011056
	Uniroyal Electronics Industry Co., Ltd.	MGR	1 MOhm,1W 1 MOhm,0.5W	EN 60065	VDE 40033048
	Yageo Components (Suzhou)Co. Ltd.	HHV series	1 MOhm,1W 1 MOhm,0,5W	EN 62368-1	VDE 40031974
	Yageo Components (Suzhou)Co. Ltd	HHV1SS	1 MOhm,1W	EN 60065	VDE 40030554
	Yageo Components (Suzhou)Co. Ltd	HHV50; HHV50S	1 MOhm,0,5W	EN 60065	VDE 40030554
Lead wire for jet pump motor	SHANGHAI PANDA WIRE & CABLE CO LTD	3271	18AWG,125℃	EN 60335-1 EN 60335-2-60	E109819& Test with appliance
	ZHEJIANG LONDA ELECTRONIC WIRE & CABLE CO LTD	3271	18AWG,125℃	EN 60335-1 EN 60335-2-60	E205056& Test with appliance
	Chang Zhou Hong Chang Electronics Co Ltd	3271	18AWG,125℃	EN 60335-1 EN 60335-2-60	E212395& Test with appliance
	Qifurui Electronics Co	3271	18AWG,125℃	EN 60335-1 EN 60335-2-60	E211048& Test with appliance
	XINYA ELECTRONIC CO LTD	3271	18AWG, 125℃	EN 60335-1 EN 60335-2-60	E170689& Test with appliance

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	GUANGZHOU FENGTAI MEIHUA CABLE CO LTD	3321	18AWG, 150℃	EN 60335-1 EN 60335-2-60	E204798& Test with appliance
	DANYANG WINPOWER WIRE & CABLE MFG CO LTD	3321	18AWG, 150℃	EN 60335-1 EN 60335-2-60	E330446& Test with appliance
	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	3321	18AWG, 150℃	EN 60335-1 EN 60335-2-60	E227566& Test with appliance
Terminal block J1on power supply PCB	NINGBO DEGSON ELECTRONICS CO LTD	DG65	AC300V;20A/ 30A	EN 60335-1 EN 60335-2-60	UL E228872& Test with appliance
	JITE INDUSTRIAL (SHENZHEN) CO LTD	BTB-550(a)	AC300V;20A	EN 60335-1 EN 60335-2-60	ULE183240 & Test with appliance
Enclosure	CHI MEI CORPORATION	ABS	---	EN 60335-1 EN 60335-2-60	Tested with appliance
Jet pump Motor enclosure	Shanghai Se-charm Complex Materical Co. Ltd.	PP+GF	Min. thickness 1,2 mm	EN 60335-1 EN 60335-2-60	Tested with appliance
Pool	Bestway (Hong Kong) International Ltd.	#260001000160	Square, 201cm (Outer)/151cm (Inner), Height 80 cm, PVC	EN 60335-1 EN 60335-2-60	Tested with appliance
	Bestway (Hong Kong) International Ltd.	#260001000151	Square, 180cm (outer)/130cm (Inner), Height 71 cm, PVC	EN 60335-1 EN 60335-2-60	Tested with appliance

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 of terminal on PCB	3,92	II	1,2	
Screw for earthing	3,92	II	1,2	
Supplementary information:				

29.1 - 29.2	**TABLE: Clearance and creepage distance measurements**					**P**
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required cr (mm)**	**cr (mm)**
Live parts to SELV on power PCB(P1)	---	240	1,5	5,5	1,5	8,5
L to N on power PCB(P1)	---	240	1,5	3,8	1,5	3,8

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Clause	Requirement - Test	Result - Remark	Verdict

Live parts to Y capacitors connection point(P1)	---	240	1,5	4,5	1,5	4,5
Y capacitors connection point to SELV (P1)	---	240	1,5	2,8	1,5	8,0
Terminals of 104ºC thermal fuse on power PCB(P1)	---	5	0,2	0,8	0,2	0,8
SELV parts to accessible surface on control PCB(P3)	---	12	0,5	6,5	1,9	6,5
Live parts of the heating element to metal casing of the heater(P2)	---	240	3,0	7,0	5,0	7,0
L to N of the heating element(P2)	---	240	1,5	3,0	2,0	3,0
Rotor winding to core of air pump motor(P2)	---	240	1,5	2,8	2,5	3,2
Stator winding to core of air pump motor(P3)	---	240	1,5	4,0	4,0	4,2
Commutator to shaft/motor frame of air pump motor(P3)	---	240	1,5	8,0	4,0	8,0
Stator winding to core of jet pump motor(P3)	---	240	1,5	4,0	4,0	4,2
Supplementary information:						

29.3	**TABLE: Distance Through Insulation Measurements**			**P**
Distance through insulation di at/of:	**U r.m.s. (V)**	**Test voltage (V)**	**Required di (mm)**	**di (mm)**
External enclosure	240	--	2,0	3,0
Power supply PCB housing	240	--	1,0	2,2
Cover for display circuit	12	--	--	1,5
Plastic enclosed the jet motor shaft	240	--	1,0	1,0
Supplementary information:				

30.1	**TABLE: Ball Pressure Test of Thermoplastics**		**P**
Allowed impression diameter (mm) .....:	2,0		—
Object/ Part No./ Material	**Manufacturer/ trademark**	**Test temperature (°C)**	**Impression diameter (mm)**
Plastic enclosure	See table 24.1	75	0,8
Power supply PCB transformer bobbin	See table 24.1	125	0,6

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Clause	Requirement - Test	Result - Remark	Verdict

Water pump transformer bobbin	See table 24.1	125	0,4
Terminal on power supply PCB	See table 24.1	125	1,2
PCB	See table 24.1	125	0,3
Brush holder of air pump	See table 24.1	125	0,6
Supplementary information:			

IEC 60335-2-60			
Clause	Requirement - Test	Result - Remark	Verdict

30.2	TABLE: Resistance to heat and fire - Glow wire tests							P
Object/ Part No./ Material	**Manufacturer / trademark**	**Glow wire test (GWT); (°C)**						**Verdict**
		550	**650**		**750**		**850**	
			te	**ti**	**te**	**ti**		
Plastic enclosure	See table 24.1	X						P
Pool material	See table 24.1	X						P
Power supply PCB transformer bobbin	See table 24.1		0s	---				P
Water pump transformer resin	See table 24.1				0s	---	X	P
Water pump transformer bobbin	See table 24.1				0s	---	X	P
Film around heater	See table 24.1				0s	---	X	P
Relay(all suppliers listed in table 24.1)	See table 24.1				0s	---		P
Brush holder of air pump	--				0s	---	X	P
Motor protector sheath	--				0s	---	X	P
Terminal on power supply PCB	See table 24.1				0s	---	X	P
Jet pump motor capacitor					0s	---	X	P
Wire connector	See table 24.1				0s	---	X	P

Object/ Part No./ Material	**Manufacturer / trademark**	**Glow-wire flammability index (GWFI), °C**				**GW ignition temp. (GWIT), °C**		**Verdict**
		550	**650**	**750**	**850**	**675**	**775**	

The test specimen passed the glow wire test (GWT) with no ignition [($t_e - t_i$) ≤ 2s] (Yes/No):	No
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No) .....:	Yes
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)?.....:	Yes

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Clause	Requirement - Test	Result - Remark	Verdict

Ignition of the specified layer placed underneath the test specimen (Yes/No) .....:	No

Supplementary information:

- 550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF
- The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances

30.2/30.4	**TABLE: Needle- flame test (NFT)**				**P**
Object/ Part No./ Material	**Manufacturer/ trademark**	**Duration of application of test flame (ta); (s)**	**Ignition of specified layer Yes/No**	**Duration of burning (tb) (s)**	**Verdict**
Terminal sheath	--	30	No	0	P

Supplementary information:

- NFT not relevant (or applicable) for Parts of material classified as V-0 or V-1
- NFT not relevant (or applicable) for Base material of PCBs classified as V-0 or if relevant VTM-0

List of test equipment used: see attachment 1

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to CTF Stage 1 or CTF Stage 2 procedure has been used.
Note: This page may be removed when CTF Stage 1 CTF Stage 2 are not used. See also Clause 4.8 in OD 2020 for more details.

Clause	Measurement/ testing	Testing/measuring equipment/material used, (Equipment ID)	Range used	Last calibration date	Calibration due date
Supplementary information:					

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT

IEC 60335-2-60

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Household and similar electrical appliances – Safety –

Part 2-60: Particular requirements for whirlpool baths and whirlpool spas

Differences according to:	EN 60335-2-60 :2003 + A1:2005 + A2:2008 + A11:2010 + A12:2010 used in conjunction with: EN 60335-1:2012+A11 EN 62233:2008
Attachment Form No.:	EU_GD_IEC60335_2_60M
Attachment Originator:	IMQ S.p.A.
Master Attachment:	Date 2020-04-24

	CENELEC COMMON MODIFICATIONS (EN)		
6	**CLASSIFICATION**		P
6.1	Delete “class 0” and “class 01”		P
	Protection against electric shock: Class I, II, III	Class I	P
7	**MARKING AND INSTRUCTIONS**		P
7.1	Single-phase appliances to be connected to the supply mains: 230 V covered		P
	Multi-phase appliances to be connected to the supply mains: 400 V covered		N/A
7.10	Devices used to start/stop operational functions of the appliance distinguished from other manual devices by means of shape, size, surface texture, position, etc.		P
	An indication that the device has been operated is given by:		P
	• a tactile feedback, or		N/A
	• an audible and visual feedback		P
7.12	The instructions include the substance of the following:		P
	- this appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved		P
	- children shall not play with the appliance		P

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	- cleaning and user maintenance shall not be made by children without supervision	Not applicable for this appliance	N/A
7.12.Z1	The specific instructions related to the safe operation of this appliance is collated together in the front section of the user instructions		P
	The height of the characters, measured on the capital letters, is at least 3 mm		P
	These instructions are also available in an alternative format, e.g. on a website		P
8	**PROTECTION AGAINST ACCESS TO LIVE PARTS**		P
8.1.1	Also test probe 18 of EN 61032 is applied		P
	The appliance being in every possible position during the test		P
	The force on the probe in the straight position is increased to 10 N when probe 18 is used		P
	When using test probe 18 the appliance is fully assembled as in normal use without any parts removed, and		P
	parts intended to be removed for user maintenance are also not removed		P
8.2	Compliance is checked by applying the test probes of EN 61032		P
	For built-in appliances and fixed appliances, the test probe B and probe 18 of EN 61032 are applied only after installation		N/A
11	**HEATING**		P
11.8	Footnotes to “External enclosure of motor-operated appliances” to be taken into account		P
15	**MOISTURE RESISTANCE**		P
15.1.2	Appliances with an automatic cord reel tested with the cord in the most unfavourable position so that the reeling of the wet cord may affect electrical insulation during operation, the cord not being dried before reeling		N/A
20	**STABILITY AND MECHANICAL HAZARDS**		P
20.2	When using the test probe similar to test probe B with a circular stop face, the accessories and detachable covers are removed		P
	Test probe 18 applied with a force of 2,5N on the appliance fully assembled		P

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
22	**CONSTRUCTION**		P
22.33	For whirlpool spas, conductive liquids may be in direct contact with live parts supplied at safety extralow voltage not exceeding 12 V during maintenance (e.g. water quality checking) or cleaning operations. (EN 60335-2-60:2003/A11:2010)	Not direct contact with live parts supplied at SELV	P
24	**COMPONENTS**		P
24.1	Components comply with the safety requirements specified in the relevant standards as far as they reasonably apply		P
	The requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance.		P
	The requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components		P
	Components that have not been previously tested or do not comply with the standard for the relevant component are tested according to the requirements of 30.2		P
	Components that have been previously tested and shown to comply with the resistance to fire requirements in the standard for the relevant component need not be retested provided that:		P
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		P
	- the test report for the component states whether it complied with the standard for the relevant component with or without flame, flames not exceeding 2 s during the test are ignored		N/A
	Unless components have been previously tested and found to comply with the relevant standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		P
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant standard for the component are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components that have not been separately tested and found to comply with the relevant standard, and		P
	components that are not marked or not used in accordance with their marking,		P

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard		P
	Lamp holders and starter holders that have not been previously tested and found to comply with the relevant standard are tested as a part of the appliance and additionally comply with the gauging and interchangeability requirements of the relevant standard under the conditions occurring in the appliance		N/A
	Where the relevant standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used		N/A
	Plugs and socket-outlets and other connecting devices of interconnection cords are not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1, or		N/A
	with connectors and appliance inlets complying with the standard sheets of IEC 60320-1,		N/A
	if direct supply to these parts from the supply mains gives rise to a hazard		N/A
24.1.7	If the remote operation of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is EN 41003		N/A
	Compliance with Clause 8 of this standard is not impaired by connecting the appliance to a device covered by EN 41003		N/A
24.7	Hose-sets do not need to be supplied with the appliance. (EN 60335-2-60:2003/A12:2010)		N/A
24.Z1	For motor running capacitors (IEC 60252-1 type P2) with a metallic enclosure having an overpressure fuse the flame testing of internal plastic parts supporting current carrying connections as required in 30.2.2 and 30.2.3.1 is not necessary		N/A
25	**SUPPLY CONNECTION AND EXTENAL FLEXIBLE CORDS**		P
25.6	Supply cords of single-phase portable appliances having a rated current not exceeding 16 A, fitted with a plug complying with the following standard sheets of IEC/TR 60083:		P
	- for Class I appliances: standard sheet C2b, C3b or C4 .....:		P
	- for Class II appliances: standard sheet C5 or C6 .....:		N/A

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
25.7	Rubber sheathed cords (60245 IEC 53) are not suitable for appliances intended to be used outdoors or when they are liable to be exposed to significant amount of ultraviolet radiation		P
	Halogen-free thermoplastic compound sheathed supply cords have properties at least those of:		N/A
	• halogen-free thermoplastic compound sheathed cords (H03Z1Z1H2-F or H03Z1Z1-F), for appliances having a mass not exceeding 3 kg		N/A
	• halogen-free thermoplastic compound sheathed cords (H05Z1Z1H2-F or H05Z1Z1-F), for other appliances		N/A
	Cross-linked halogen-free compound sheathed supply cords have properties at least those of cross-linked halogen-free compound sheathed cords (H07ZZ-F)		N/A
26	**TERMINALS FOR EXTERNAL CONDUCTORS**		P
26.11	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain them in position unless they are held in place near the terminals independently of the solder		N/A
29	**CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION**		P
29.3.Z1	Appliance constructed so that if there is a possibility of damaging the insulation during installation, the insulation withstands the scratch and penetration test of 21.2		N/A
32	**RADIATION, TOXICITY AND SIMILAR HAZARDS**		P
32	Compliance regarding electromagnetic fields is checked according to EN 50366 or EN 62233		P
ANNEX I	**MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE**		N/A
Annex I, 19.I.101	The appliance is supplied at rated voltage and operated under normal operation with each of the fault conditions specified		N/A
	The duration of the test is as specified in 19.7		N/A

ZA	**ANNEX ZA (NORMATIVE), SPECIAL NATIONAL CONDITIONS (EN)**		P
25.6 and 25.25	Information concerning National plug and socket- outlets is available from the CENELEC website, under the following hyperlink: ftp://cencenelec.eu/CENELEC/TCs/61/PlugsSockets.pdf		P

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	Denmark		N/A
7.12	Requirements regarding marking tag of power supply cord and connection of earthing wire for class I appliances delivered without a plug		N/A
	Norway		N/A
19.5	The test is also applicable to appliances intended to be permanently connected to fixed wiring		N/A
	France and Norway		N/A
22.2	The second paragraph of this subclause, dealing with single-phase, permanently connected class I appliances having heating elements, is not applicable due to the supply system		N/A
	Belgium, France, Spain and United Kingdom		P
25.6	Plugs according to standard sheet C2b not allowed		P
	Austria, Finland, Germany, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom		P
25.6	Plugs according to standard sheet C3b not allowed		P
	Denmark		N/A
25.6	Supply cords of single-phase portable appliances having a rated current not exceeding 13 A provided with a plug according to the following:		N/A
	Class I appliances: Section 107-2-D1, ed.3 1998, Standard Sheet DK 2-1a		N/A
	For appliances covered by a Part 2 of EN 60335, also plugs in accordance with Section 107-2-D1, ed. 3, 1998, Standard Sheet C2b, C3b or C4 are allowed		N/A
	Class II appliances: Section 107-2-D1, ed.3 1998, Standard Sheet C1b, C5, C6, DKA 2-1a and DKA 2-1b		N/A
	Stationary single-phase appliances, having a rated current not exceeding 13 A, and provided with a supply cord and a plug, the plug is in accordance with the requirements above		N/A

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	Multi-phase appliances and single-phase appliances having a rated current exceeding 13 A, and provided with a supply cord and a plug, the plug is in accordance with the requirements below:		N/A
	Class I appliances: Section 107-2-D1, Standard Sheet DK 6-1a / EN 60309-2, Standard Sheet 2-II, 2-IV		N/A
	Class II appliances: Section 107-2-D1, Standard Sheet DK 6-1a / EN 60309-2, Standard Sheet 2-II, 2-IV, the earthing contact not being connected		N/A
	The current for the plug not exceeding the values specified; standard sheet (no.); current (A) :		N/A
	Ireland		N/A
25.6	Only plugs according to Standard Sheets B2 and C5 allowed		N/A
	Italy		N/A
25.6	Only plugs listed in CENELEC Report R0BT-005:2001 allowed		N/A
	Spain		N/A
25.6	For appliances for household use, only the following plugs are allowed:		N/A
	according to UNE 20315: ESC 10-1b, C2b, C4, C6 or ESB 25-5b		N/A
	according to UNE-EN 50075		N/A
	Switzerland		N/A
25.6	Supply cords of portable household and similar electrical appliances having a rated current not exceeding 10 A, provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets:		N/A
	SEV 6532-2.1991, plug type 15, 3P+N+PE, 250/400 V, 10 A		N/A
	SEV 6533-2.1991, plug type 11, L+N, 250 V, 10 A		N/A
	SEV 6534-2.1991 plug type 12, L+N+PE, 250 V, 10 A		N/A
	United Kingdom		P

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
25.6	Only plugs according to Standard Sheets B2 and C5 allowed		P
	Ireland and <u>United Kingdom</u>		P
25.8	Replacement of figures (rated current/cross-sectional area) in the table		P
ZB	**ANNEX ZB (INFORMATIVE), NATIONAL DEVIATIONS (EN)**		N/A
	Switzerland		N/A
4	Information about batteries with carbon-zinc and alkali-manganese		N/A
	Italy		N/A
7.1	The voltage is 220 V/380 V		N/A
	Ireland		N/A
25.6	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and allow only plugs complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances.		N/A
	United Kingdom		P
25.6	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and allow only plugs to BS 1363 to be fitted to domestic appliances. It also allows plugs to BS 4573 and standard sheet C5 to be fitted to shavers and toothbrushes.		P
	Germany		P
29.3	Third dashed item not applicable for appliances where the insulation is accessible. Additional measures, such as a multi-layered insulation or adequate thickness, taken.		N/A
ZC	**ANNEX ZC (NORMATIVE)** NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS		P
	A list of referenced documents in this standard		P

IEC60335_2_60M - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
ZD	**ANNEX ZD (INFORMATIVE)** IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS		P
	A list of code designations for different types of flexible cords		P
ZE	**ANNEX ZE (INFORMATIVE)** SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE	Not for commercial use	N/A
ZF	**ANNEX ZF (INFORMATIVE)** CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD		P
	A list of standards under CENELEC/TC61 with the consequent allocation of standards under LVD or MD	Under LVD	P
ZZ	**ANNEX ZZ (INFORMATIVE)** COVERAGE OF ESSENTIAL REQUIREMENTS OF EC DIRECTIVES		P
	Description of the background for the European standard		P

Annex EN 62233:2008			
Clause	Requirement + Test	Result - Remark	Verdict
EMF- ELECTROMAGNETICS FIELDS			
	The tested product also complies with the requirements of EN 62233:2008		P
	Limit ……100%	Measured max.: 7,927%	P

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	CENELEC COMMON MODIFICATIONS (EN)		
6.1	For a class III construction with a detachable power supply part the appliance is classified according to the detachable power supply part		N/A
7.1	Symbol IEC 60417-5018, for class II and class III appliances incorporating a functional earth		N/A
	Symbol IEC 60417-5180, for class III appliances, unless		N/A
	the appliance is operated by batteries only, or		N/A
	for appliances powered by rechargeable batteries recharged in the appliance		N/A
7.4	Appliances adjustable for different rated voltages or rated frequencies, the voltage or the frequency setting is clearly discernible		N/A
	Requirement met if frequent changes are not required and the rated voltage or rated frequency to which the appliance is to be adjusted is determined from a wiring diagram		N/A
7.6	Correct symbols used		P
7.8	Marking of functional earthing terminals (symbol IEC 60417-5018)		N/A
7.10	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.		N/A
	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.		N/A
	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.		N/A
	Audible feedback is any audible response got immediately after the operation of the switch.		N/A
	The click of a switch can be accepted as an audible feedback provided that it is originated inside the switch that is operated and can be heard at a distance of 77 cm from the switch.		N/A
	The sound of the motor is regarded as an audible feedback.		N/A
	Add the following text after the third paragraph of the addition: 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		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
7.12	For appliances for altitudes exceeding 2000 m, the maximum altitude is stated ....:		N/A
	The instructions for appliances incorporating a functional earth states that the appliance incorporates an earth connection for functional purposes only		N/A
7.12.1	If different rated voltages or different rated frequencies are marked, the instructions state what action to be taken to adjust the appliance		N/A
7.12.9	Instructions specified in 7.12 and from 7.12.1 to 7.12.8 appear together before any other instructions supplied with the appliance		P
	These instructions may be supplied with the appliance separately from any functional use booklet		N/A
	They may follow the description of the appliance that identifies parts, or follow the drawings/sketches		P
	In addition, instructions are also available in an alternative format such as on a website or on request from the user in a format such as a DVD	On the website	P
7.14	Markings clearly legible and durable:		P
	Signal words WARNING, CAUTION, DANGER in uppercase having a height as specified ....:		P
	Uppercase letter of the text explaining the signal word not smaller than 1,6 mm ....:		P
	Moulded in, engraved, or stamped markings either raised above or have a depth below the surface of at least 0,25 mm, unless		N/A
	contrasting colours are used		N/A
	Markings checked by inspection, measurement and rubbing test as specified		P
7.15	The symbol IEC 60417-5018 placed next to the symbol IEC 60417-5172 or IEC 60417-5180		N/A
8.1.1	Also test probe 18 of EN 61032 is applied		P
	The appliance being in every possible position during the test, except that		P
8.1.3	Instead of test probe B, test probe 18 and test probe 13, for appliances other than those of class II, test probe 41 of IEC 61032 is applied with a force not exceeding 1 N to live parts of visibly glowing heating elements, all poles of which can be disconnected by a single switching action		N/A
	For a single switching action obtained by a switching device, requirements as specified		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
	For appliances with a supply cord and without a switching device, the single switching action may be obtained by the withdrawal of the plug		N/A
10.1	If the power input varies throughout the operating cycle and the maximum value of the power input exceeds, by a factor greater than two, the arithmetic mean value of the power input occurring during a representative period, the power input is the maximum value that is exceeded for more than 10 % of the representative period		N/A
	Otherwise the power input is the arithmetic mean value		P
10.2	If the current varies throughout the operating cycle and the maximum value of the current exceeds, by a factor greater than two, the arithmetic mean value of the current occurring during a representative period, the current is the maximum value that is exceeded for more than 10 % of the representative period		N/A
	Otherwise the current is the arithmetic mean value		N/A
11.8	Temperature rises monitored continuously and not exceeding the values in table 3:		P
13.2	The leakage current including Class II construction is measured by means of the circuit described in Figure 4 of IEC 60990:1999		P
	For class 0I appliances and class I appliances, except parts of class II construction, C may be replaced by a low impedance ammeter		P
	Leakage current measurements.....:		P
15.2	Spillage of liquid does not affect the electrical insulation		N/A
	Spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N/A
	Detachable parts are removed		N/A
	Overfilling test with additional amount of the solution, over a period of 1 min (l).....:		N/A
	The appliance withstands the electric strength test of 16.3		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	No trace of water on insulation that can result in a reduction of clearances or creepage distances below values specified in clause 29		N/A
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V) .....:		P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3 (V).....:		N/A
	Leakage current measurements including Class II Construction		P
19.1	If the control performs more than one function, only that aspect of the control under consideration is rendered inoperative.		N/A
	Other functions of the control may continue to operate normally.		N/A
19.7	Test repeated with capacitors short-circuited one at a time, unless		N/A
	the capacitor is of class S2 or S3 of IEC 60252-1		P
	An electronic timer or programmer that operates to ensure compliance with the test before the maximum period under the conditions of Clause 11 is reached, is a protective electronic circuit		N/A
19.11.3	If the appliance incorporates a protective electronic circuit that operates to ensure compliance with clause 19, the appliance is tested as specified		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, at frequency ranges specified		N/A
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		N/A
	An open circuit test voltage of 2 kV is applicable for the line-to-line coupling mode		N/A
	An open circuit test voltage of 4 kV is applicable for the line-to-earth coupling		N/A
	Earthed heating elements in class I appliances disconnected		N/A
20.2	For appliances having dangerous moving parts, due to their working 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		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
22.5	No risk of electric shock when touching pins, for appliances having a capacitor with rated capacitance equal to or greater than 0,1μF, the appliance being disconnected from the supply at the instant of voltage peak		P
	Voltage not exceeding 34 V (V) ..... :	<34V	P
	If compliance relies on the operation of an electronic circuit, the electromagnetic phenomena tests of 19.11.4.3 and 19.11.4.4 are applied		N/A
	The discharge test is then repeated three times, voltage not exceeding 34 V (V)..... :		N/A
22.12	Handles, knobs etc. fixed in a reliable manner, if loosening result in a hazard		N/A
	Removing or fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible, if resulting in a hazard		N/A
	A choking hazard does not apply to appliances for commercial use		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N/A
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N/A
	If the part is removed and can be contained within the small parts cylinder, it is considered to be a choking hazard		N/A
	Other parts intended to be detached during use, maintenance or cleaning (e.g. batteries, battery covers, lids, attachments, steam nozzles) are not considered as parts providing a similar function as handles, knobs, grips, levers		N/A
22.17	The requirement is not applicable to built-in appliances		N/A
22.32	Ceramic and similar porous material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		P
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts, or		P
	unearthed metal parts separated from live parts by basic insulation only		P

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

22.35	This requirement does not apply to handles, levers and knobs on stationary appliances and cordless appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N/A
22.53	Class II appliances and class III appliances that incorporate functionally earthed parts have at least double insulation or reinforced insulation between live parts and the functionally earthed parts		N/A
22.54	Button cells and batteries designated R1 not accessible without the aid of a tool, unless		N/A
	the cover of their compartment can only be opened after at least two independent movements have been applied simultaneously		N/A
22.55	Devices operated to stop the intended function of the appliance, if any, are be distinguished from other manual devices by means of shape, size, surface texture or position .....:		P
	The requirement concerning position does not preclude use of a push on push off switch		N/A
	An indication when the device has been operated is given by:		P
	– tactile feedback from the actuator or from the appliance, or		N/A
	– reduction in heat output; or		N/A
	– audible and visible feedback		P
22.56	Detachable power supply part provided with the part of class III construction		N/A
22.57	The properties of non-metallic materials do not degrade from exposure to UV-C radiation, as specified in Annex T		N/A
	This requirement does not apply to glass, ceramics or similar materials		N/A
23.5	A single layer of internal wiring insulation does not provide reinforced insulation		P
24.1	Components comply with the safety requirements specified in the relevant EN standards as far as they reasonably apply		P
	Motors are not required to comply with EN 60034-1, but tested as part of the appliance according to this standard		P
	Relays are tested as part of the appliance according to this standard		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	Relays may be alternatively tested to EN 60730-1 and the additional requirements in EN 60335-1		N/A
	The requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance		P
	Components may comply with the requirements for clearances and creepage distances for functional insulation as specified in the relevant component standard		P
	The requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components		P
	Components that have not been tested and shown to comply with the EN standard for the relevant component are tested according to the requirements of 30.2 of this standard		P
	Components that have been tested and shown to comply with the resistance to fire requirements in the EN standard for the relevant component need not be retested provided that:		P
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		P
	- the test report for the component states the values of t_e and t_i acc. to EN 60695-2-11		P
	If the above two conditions are not satisfied, the component is tested as part of the appliance		P
	Power electronic converter circuits are not required to comply with EN 62477-1, but tested as part of the appliance according to this standard		N/A
	Unless components have been tested and found to comply with the relevant EN standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		P
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant EN standard for the component are necessary other than those specified in 24.1.1 to 24.1.9		P
	Components that have not been tested and found to comply with the relevant EN standard, and		P
	components that are not marked or not used in accordance with their marking,		P
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard		P

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
	Lamp-holders and starter-holders that have not been tested and found to comply with the relevant EN standard are tested as a part of the appliance and additionally comply with the gauging and interchangeability requirements of the relevant EN standard under the conditions occurring in the appliance		N/A
	Where the relevant EN standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used		N/A
	There are no additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of EN 60320-1 and EN 60309, unless they are specifically mentioned in the text of this standard		P
	Plugs and socket-outlets and other connecting devices of interconnection cords are not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1, or		N/A
	with connectors and appliance inlets complying with the standard sheets of EN 60320-1, if		N/A
	direct supply to these parts from the supply mains gives rise to a hazard		N/A
	For plugs used in CENELEC countries Annex ZH applies		P
24.1.2	Transformers in associated switch mode power supplies comply with Annex BB of IEC 61558-2-16. Clause 26 of IEC 61558-1 and Annex H of IEC 61558-1 are not applicable.		P
24.1.4	Thermal cut-outs of the capillary type comply with the requirements for type 2.K controls in IEC 60730-2-9		N/A
24.1.5	However, for class II appliances classified higher than IPX0, the appliance couplers comply with IEC 60320-2-3		N/A
24.8	The requirement is considered to be met - the capacitors are of class S2 or S3 according to IEC 60252-1.		P
24.Z1	Type S2 and S3 capacitors according to EN 60252-1 are not required to undergo the testing as required by 30.2.2 and 30.2.3.1		P
25.1	Supply cord fitted with a plug, the current rating and voltage rating of the plug being not less than the corresponding ratings of its associated appliance		P
	Plugs and pins for insertion into socket outlets follow the relevant standards sheets in Annex ZH		P

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

25.7	Supply cords, other than for class III appliances, being one of the following types:		P
	- rubber sheathed (at least 60245 IEC 53)		N/A
	Rubber sheathed cords (60245 IEC 53) are not suitable for appliances intended to be used outdoors, or		N/A
	when they are liable to be exposed to significant amount of ultraviolet radiation		N/A
	- polychloroprene sheathed (at least 60245 IEC 57)		N/A
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		N/A
	• light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg		N/A
	• ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances		N/A
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		N/A
	• heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg		N/A
	• heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		N/A
	- halogen-free, low smoke, thermoplastic insulated and sheathed		N/A
	• light duty halogen-free low smoke flexible cable (62821 IEC 101) for circular cable and (62821 IEC 101f) for flat cable		N/A
	• Ordinary duty halogen-free low smoke flexible cable (62821 IEC 102) for circular cable and (62821 IEC 102f(for flat cable		N/A
	Supply cords for class III appliances adequately insulated		N/A
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N/A
25.10	In multi-phase appliances, the colour of the neutral conductor of the supply cord is blue		N/A
	Where additional neutral conductors are provided in the supply cord:		N/A
	– other colours may be used for these additional neutral conductors;		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	– all of the neutral conductors and line conductors are identified by marking using the alpha numeric notation specified in IEC 60445		N/A
	– the supply cord is fitted to the appliance		N/A
25.13	If it is not evident that the supply cord can be introduced without risk of damage, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		N/A
25.15	Pull and torque test of supply cord:		P
	- fixed appliances: pull 100 N; torque (not on automatic cord reel) (Nm) ..... :		N/A
	- other appliances: values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm) ..... :		P
	Cord not damaged and max. 2 mm displacement of the cord		P
25.20	The conductors of the supply cord for type Y and Z attachment insulated from accessible metal parts		P
25.23	for class I or class II appliance with class III construction, the cross sectional areas of the conductors need not comply with 25.8 if specified conditions are met		N/A
25.25	Instead of IEC/TR 60083, dimensions of the pins and engagement face of plugs of appliances that are inserted into socket-outlets are in accordance with the dimensions of the relevant plug standard		N/A
	Common plugs and socket-outlets types in CENELEC countries as shown in Annex ZH		N/A
27.1	Class 0, II and III appliances have no provision for protective earthing		N/A
	Class II appliances and class III appliances can incorporate an earth for functional purposes		N/A
27.2	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.3	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.4	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
27.5	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
27.6	Requirements not applicable to class II appliances and class III appliances that incorporate an earth for functional purposes		N/A
29.1	For appliances intended for use at altitudes exceeding 2 000 m, the clearances in Table 16 is increased according to the relevant multiplier values in Table A.2 of IEC 60664-1		N/A
	Impulse voltage test is not applicable: to appliances intended for use at altitudes exceeding 2 000 m		N/A
29.3	Compliance checked:		N/A
	- for insulation, other than single layer internal wiring insulation, by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and		N/A
	- by an assessment of the thermal quality of the material according to 29.3.3 combined with an electric strength test in accordance with 23.5, for each single layer internal wiring insulation touching each other, or		N/A
32	Compliance regarding electromagnetic fields is checked according to EN 62233		P
B	**ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES THAT ARE RECHARGED IN THE APPLIANCE**		**N/A**
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N/A
	Three forms of construction covered:		N/A
	a) Appliance supplied directly from the supply mains or a renewable energy source, the battery charging circuitry and other supply unit circuitry incorporated within the appliance		N/A
	b) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the part of the appliance containing the battery		N/A
	c) The part of the appliance incorporating the battery is supplied from the supply mains or a renewable energy source, via a detachable supply unit. The battery charging circuitry is incorporated within the detachable supply unit		N/A
3.1.9	Appliance operated under the following conditions:		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	- the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		N/A
	- the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N/A
	-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/A
	- 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/A
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N/A
5.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N/A
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage (V) and polarity of the terminals..... .....:		N/A
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		N/A
	Appliances intending to be supplied from a detachable supply unit marked with symbol IEC 60417-6181 and its type reference along with symbol ISO 7000-0790 (2004-01), or		N/A
	use only with <model designation> supply unit ...:		N/A
7.6	Additional symbols		N/A
7.12	The instructions give information regarding charging		N/A
	Instructions for appliances incorporating batteries intended to be replaced by the user include required information		N/A
	Instructions for appliances containing non user-replaceable batteries state the substance of the following:		N/A
	This appliance contains batteries that are only replaceable by skilled persons		N/A
	Instructions for appliances containing non-replaceable batteries shall state the substance of the following:		N/A
	This appliance contains batteries that are non-replaceable		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	For appliances intending to be supplied from a detachable supply unit for the purposes of recharging the battery, the type reference of the detachable supply unit is stated along with the following:		N/A
	WARNING: For the purposes of recharging the battery, only use the detachable supply unit provided with this appliance		N/A
	If the symbol for detachable supply unit is used, its meaning is explained		N/A
7.15	Markings placed on the part of the appliance connected to the supply mains		N/A
	The type reference of the detachable supply unit is placed in close proximity to the symbol		N/A
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/A
	If the appliance can be operated without batteries, double or reinforced insulation required		N/A
11.7	The battery is charged for the period stated in the instructions or 24 h .....:		N/A
11.8	Temperature rise of the battery surface does not exceed the limit in the battery manufacturer's specification; measured (K); limit (K).....:		N/A
	If no limit specified, the temperature rise does not exceed 20 K; measured (K) .....:		N/A
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		N/A
19.10	Not applicable		N/A
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N/A
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N/A
19.13	The battery does not rupture or ignite		N/A
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		N/A
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being:		N/A
	- 100, if the mass of the part does not exceed 250 g (g).....:		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	- 50, if the mass of the part exceeds 250 g .....:		N/A
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N/A
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N/A
25.13	An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		N/A
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N/A
	For other parts, 30.2.2 applies		N/A
H	**ANNEX H (NORMATIVE)** **SWITCHES**		N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N/A
	Clause 20 is applicable to clearances across full disconnection and micro-disconnection		N/A
	It is also applicable to creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in Table 24		N/A
P	**ANNEX P (INFORMATIVE)** **GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN TROPICAL CLIMATES**		N/A
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332		N/A
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a tropical climate and that are marked with symbol IEC 60417-6332, if liable to be connected to a supply mains that excludes the protective earthing conductor		N/A
5.7	The ambient temperature for the tests of clauses 11 and 13 is 40 +3/0 °C		N/A
7.1	The appliance marked with symbol IEC 60417-6332		N/A
7.12	The instructions state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	The instructions state that the appliance is considered to be suitable for use in countries having a tropical climate, but may also be used in other countries		N/A
	If symbol IEC 60417-6332 is used, its meaning is explained		N/A
S	**ANNEX S (NORMATIVE)** **BATTERY OPERATED APPLIANCES POWERED BY BATTERIES THAT ARE NON-RECHARGEABLE OR NOT RECHARGED IN THE APPLIANCE**		**N/A**
	The following modifications to this standard are applicable for battery-operated appliances where the batteries are either non-rechargeable (primary batteries), or		N/A
	rechargeable batteries (secondary batteries) that are not recharged in the appliance		N/A
5.8.1	If the supply terminals for the connection of the battery have no indication of polarity, the more unfavourable polarity is applied		N/A
5.S.101	Appliances intended for use with a battery box are tested with the battery box supplied with the appliance or with the battery box recommended in the instructions		N/A
5.S.102	Appliances are tested as motor-operated appliances.		N/A
7.1	Appliances marked with the battery voltage (V) and the polarity of the terminals, unless ....:		N/A
	the polarity is irrelevant		N/A
	Appliances also marked with:		N/A
	– name, trade mark or identification mark of the manufacturer or responsible vendor ....:		N/A
	– model or type reference..... .....:		N/A
	– IP number according to degree of protection against ingress of water, other than IPX0... .....:		N/A
	– type reference of battery or batteries..... .....:		N/A
	If relevant, the positive terminal is indicated by the symbol IEC 60417-5005 and the negative terminal by the symbol IEC 60417-5006		N/A
	If appliances use more than one battery, they are marked to indicate correct polarity connection of the batteries		N/A
7.6	Additional symbols		N/A
7.12	The instructions contain the following, as applicable:		N/A
	– the types of batteries that may be used... .....:		N/A
	– how to remove and insert the batteries		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

	– non-rechargeable batteries are not to be recharged		N/A
	– rechargeable batteries are to be removed from the appliance before being charged		N/A
	– different types of batteries or new and used batteries are not to be mixed		N/A
	– batteries are to be inserted with the correct polarity		N/A
	– exhausted batteries are to be removed from the appliance and safely disposed of		N/A
	– if the appliance is to be stored unused for a long period, the batteries are removed		N/A
	– the supply terminals are not to be short-circuited		N/A
11.5	Appliances are supplied with the most unfavourable supply voltage between		N/A
	– 0,55 and 1,0 times the battery voltage, if the appliance can be used with non-rechargeable batteries		N/A
	– 0,75 and 1,0 times battery voltage, if the appliance is designed for use with rechargeable batteries only		N/A
	The values specified in Table S.101 for the internal resistance per cell of the battery is taken into account		N/A
19.1	The tests are carried out with the battery fully charged unless otherwise specified		N/A
19.13	The battery does not rupture or ignite		N/A
19.S.101	Appliances are supplied with the voltage specified in 11.5. The supply terminals having an indication of polarity are connected to the opposite polarity, unless		N/A
	such a connection is unlikely to occur due to the construction of the appliance		N/A
19.S.102	For appliances with provision for multiple batteries, one or more of the batteries are reversed and the appliance is operated, if reversal of batteries is allowed by the construction		N/A
25.5	The flexible leads or flexible cord used to connect an external battery or battery box in is connected to the appliance by a type X attachment		N/A
25.13	This requirement is not applicable to the flexible leads or flexible cord connecting external batteries or a battery box with an appliance		N/A
25.S.101	Appliances have suitable means for connection of the battery. If the type of battery is marked on the appliance, the means of connection is suitable for this type of battery		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict

26.5	Terminal devices in an appliance for the connection of the flexible leads or flexible cord connecting an external battery or battery box are so located or shielded that there is no risk of accidental connection between supply terminals		N/A
30.2.3.2	There is no battery in the area of the vertical cylinder used for the consequential needle flame test, unless		N/A
	the battery is shielded by a barrier that meets the needle flame test of Annex E, or		N/A
	that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
T	**ANNEX T (NORMATIVE)** **UV-C RADIATION EFFECT ON NON-METALLIC MATERIALS**		**N/A**
	Requirements for non-metallic materials subject to direct or reflected UV-C radiation exposure and whose mechanical and electrical properties are relied upon for compliance with the		N/A
	Does not apply to glass, ceramic and similar materials		N/A
	Tested as specified in ISO 4892-1 and ISO 4892-2, with the following modifications:		N/A
	Modifications to ISO 4892-1:		N/A
5.1.6	The UV-C emitter is a low pressure mercury lamp with a quartz envelope having a continuous spectral irradiance of 10 W/m2 at 254 nm		N/A
	Subclause 5.1.6.1 and Table 1 are not applicable		N/A
5.2.4	The black-panel temperature shall be 63 °C +/- 3 °C		N/A
5.3.1	Humidification of the chamber air is specified in part 2 when necessary		N/A
9	This clause is not applicable		N/A
	Modifications to ISO 4892-2:		N/A
7.1	At least three test specimens are tested		N/A
	Ten samples of internal wiring is tested		N/A
7.2	The specimens are attached to the specimen holders such that they are not subject to any stress		N/A
7.3	Apparatus prepared as specified		N/A
	The test specimens and, if used, the irradiance-measuring instrument are exposed for 1 000 h		N/A
7.4	If used, a radiometer is mounted and calibrated such that it measures the irradiance at the exposed surface of the test specimen		N/A

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
7.5	Material properties and test methods for parts providing mechanical support or impact resistance as specified in Table T.1		N/A
	Material properties and test method for electrical insulation of internal wiring as specified in Table T.2		N/A
8	This clause is not applicable		N/A
A	**ANNEX ZA (**NORMATIVE) **SPECIAL NATIONAL CONDITIONS (EN)**		N/A
	Denmark, Sweden, Norway and Finland		N/A
7.12.8	The maximum inlet water pressure is at least 1,0 MPa ....:		N/A
	Denmark		N/A
22.47	The maximum inlet water pressure is at least 1,0 MPa ....:		N/A
	Ireland and <u>United Kingdom</u>		P
25.8	In the table, the line >10 A and ≤16 A is replaced with:		N/A
	> 10 and ≤ 13 1,25 (1,0)[b]		N/A
	> 13 and ≤ 16 1,5 (1,0)[b]		N/A
ZB	**ANNEX ZB** (INFORMATIVE) **A-DEVIATIONS**		N/A
	Ireland		N/A
25.1 and 25.25	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances		N/A
	United Kingdom		P
25.1 and 25.25	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs to BS 1363 to be fitted to domestic appliances.		P
	It also allows plugs to BS 4573 and EN 50075 to be fitted to shavers and toothbrushes		P

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
ZC	**ANNEX ZC (NORMATIVE)** **NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**		**P**
	A list of documents referred to in the text of this standard in such a way that some or all of their content constitutes requirements of this document		P
ZD	**ANNEX ZD** (INFORMATIVE) **IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS**		P
	List of IEC and CENELEC code designations for flexible cords		P
ZF	**ANNEX ZF** (INFORMATIVE) **CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD**		P
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive) ..... :	LVD	P
ZH	**ANNEX ZH** (INFORMATIVE) **Common plug and socket-outlet types in CENELEC countries**		P
	In general, supply cords of single-phase appliances having a rated current not exceeding 16 A are fitted with a plug complying with the following standard sheets:		P
	- for class I appliances or class II appliances with functional earth, standard sheet EU2, EU3 or EU4:		P
	- for class II appliances, standard sheet EU5, EU6 or EU7 ..... :		N/A
	There are exemptions or differences in certain CENELEC countries		N/A
ZI	**ANNEX ZI** (INFORMATIVE) **Information on the application of A11:2014 to EN 60335-1:2012** **CENELEC CLC/TC 61(SEC)2096A**		P
	Clarification of the application of parts 2 in conjunction with the 2002 or 2012 version of EN 60335-1		P
ZZA	**ANNEX ZZA** (INFORMATIVE) **RELATIONSHIP BETWEEN THIS EUROPEAN STANDARD AND THE SAFETY OBJECTIVES OF DIRECTIVE 2014/35/EU [2014 OJ L96} AIMED TO BE COVERED**		P

Differences from EN 60335-1:2012 + AC:2014 + A11:2014 to EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A1:2019 + A14:2019 + A2:2019			
Clause	Requirement - Test	Result - Remark	Verdict
	This standard provides one means of conforming to safety objectives of Directive 2014/35/EU		P
	When cited in the Official Journal under that Directive, compliance with the normative clauses of this standard given in Table ZZA.1 confers a presumption of conformity with the safety objectives of that Directive and associated EFTA regulations		P
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the safety objectives		P
ZZB	**ANNEX ZZB** (INFORMATIVE) **RELATIONSHIP BETWEEN THIS EUROPEAN STANDARD AND THE ESSENTIAL REQUIREMENTS OF DIRECTIVE 2006/42/EC AIMED TO BE COVERED**		N/A
	This standard provides one means of conforming to essential requirements of EU Directive 2006/42/EC		N/A
	When cited in the Official Journal under that Directive, compliance with the normative clauses of this standard given in Table ZZB.1 confers a presumption of conformity with the essential requirements of that Directive and associated EFTA regulations		N/A
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the essential health and safety requirements		N/A

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Measurement Equipment List

Testing Start Date 20.03.2020
Testing end date 26.03.2020

Project Manager Juan Du
Cost Center 150
Test Report Number 50349141 001
Order Item Number 0244181029A00050

Customer Bestway (Hong Kong) International
Product Name SPA
Comment ATTACHMENT 1

Equip.	Description	Model	Manufacturer	Last Date DD.MM.YYYY	Due Date DD.MM.YYYY
G1812171	AC/DC Digital Power Meter	WT110	YOKOGAWA Electric Corporation	06.09.2019	06.09.2020
G1812173	Milliohm Meter	3540	HIOKI E.E. CORPORATION	11.11.2019	11.11.2020
G1812174	Tracking Tester	TI-VI	Shanghai Han Qiu	08.04.2020	08.04.2021
G1812177	Glow Wire Tester	GW-V	Shanghai Han Qiu	08.04.2020	08.04.2021
G1812179	Needle Flame Tester	NF-II	Shanghai Han Qiu	08.04.2020	08.04.2021
G1812180	Digital Clamp Meter	337	FLUKE Corporation	03.02.2020	03.02.2021
G1812758	Digital Multimeter	189	FLUKE Corporation	03.02.2020	03.02.2021
G1812209	Earth Continuity Tester	TOS6210	KIKUSUI Electronic Corporation	04.09.2019	04.09.2020
G1812223	Exposure level tester	ELT-400 2304/03	Narda Safety Test Solutions	14.01.2020	14.01.2021
G1812238	Digital Phosphor Oscilloscope	DPO3014	Tektronix	04.06.2019	04.06.2020
G1812249	Leak Current HiTESTER	ST5541	HIOKI E.E. CORPORATION	24.02.2020	24.02.2021
G1812254	AC/DC Withstanding Voltage Tester	TOS5301	KIKUSUI Electronic Corporation	06.09.2019	06.09.2020
G1812265	AC/DC Power Meter	WT310EH	YOKOGAWA	06.09.2019	06.09.2020
G1812274	Stopwatch	HS-30	CASIO	13.04.2020	13.04.2021
G1812276	Spring-operated Impact Hammer	F22.50	PTL Dr. Grabenhorst GmbH	10.06.2019	10.06.2021
G1812755	Jointed Test Finger	P10.14	PTL Dr. Grabenhorst GmbH	06.01.2018	06.01.2023
G1812341	Test Finger Nail	P10.41	PTL Dr. Grabenhorst GmbH	18.07.2017	18.07.2022
G1812354	Test Probe for IEC 61032 Figure 9	IEC60950-1:2001Fig2B	Shanghai Qiang Kun Machine	08.03.2018	08.03.2023
G1812389	Digital Caliper	0~ 150mm	Shang Liang	03.02.2020	03.02.2021
G1812390	Test probe 18 for EN 61032	None	Shanghai Wei Si Hong	03.12.2018	03.12.2023
G1812426	Digital Protractor	(0~ 90)°	Guilin GemRed Sensor	10.04.2020	10.04.2021
G1812499	Handy Push-Pull Gauge	NK-200	ALGOL INSTRUMENT CO., LTD.	05.09.2019	05.09.2020
G1812503	Rigid Test Finger for IEC 61032 figure7	P10.38	PTL Dr. Grabenhorst GmbH	08.04.2020	08.04.2021
G1812507	Digital Pressure Gauge	MG-5000-A-MD	A & P Instrument Co., Ltd.	25.02.2020	25.02.2021
G1812518	Ball Pressure Test Apparatus	None	Shanghai Xiangkui instruments	18.04.2020	18.04.2021
G1812523	Digital Force Gauge	HP-20	Yueqing Hanpi Instruments	05.09.2019	05.09.2020
G1811894	Torque Driver Tester	TDT600CN	TOHNICHI MFG. CO., LTD.	16.01.2020	16.01.2021
G1812547	Cold-Heat Climate Test Chamber	WKII-600/40	Germany WEISS Umwelttechnik	08.04.2020	08.04.2021
G1812550	Data Acquisition/Switch Unit	34970A	Agilent Technologies	06.09.2019	06.09.2020
G1812599	High Temperature Chamber	SEG-041	Shanghai Espec Environmental	03.02.2020	03.02.2021

* No entry for devices that are not subject to regular calibration or require initial verification/calibration only.

where required, Signature: 

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Measurement Equipment List

Testing Start Date	20.03.2020
Testing end date	26.03.2020
Project Manager	Juan Du
Cost Center	150
Test Report Number	50349141 001
Order Item Number	0244181029A00050
Customer	Bestway (Hong Kong) International
Product Name	SPA
Comment	ATTACHMENT 1

Equip.	Description	Model	Manufacturer	Last Date DD.MM.YYYY	Due Date DD.MM.YYYY
G1811606	IPX3~ IPX6 Tester	DEYI-01	Wuxi Deyi High-tech Co., Ltd.	16.01.2020	16.01.2021

* No entry for devices that are not subject to regular calibration or require initial verification/calibration only.

where required, Signature: _____