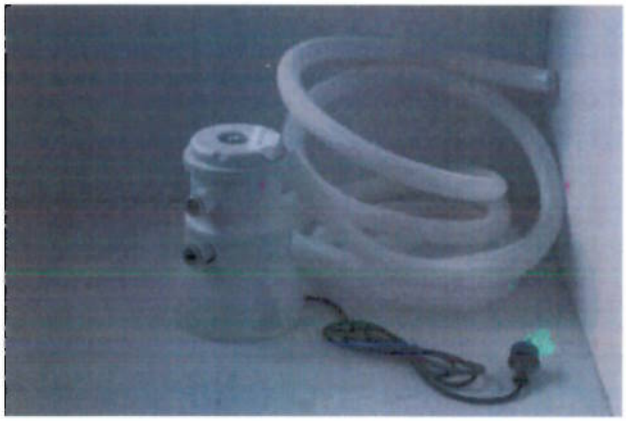
TESTING
CNAS L4615

TEST REPORT N°: LIA-12AU0631HTSP-R1
This report replaces and cancels the previous test report No: LIA-12AU0631HTSP dated on 2012-09-27

TEST REPORT

To:	KUNSHAN LIANHUA PRINTING LTD		To:	-
Attn:	Qian xingchun		Attn:	-
Address:	NO,6 Yangqin Road, Kunshan Development Zone		Address:	-
Fax:	0512-57633969		Fax:	-
E-mail:	chien@ks-lianhua.com		E-mail:	-

This document includes: 103 pages

Factory name:	KUNSHAN LIANHUA PRINTING LTD		
Location:	NO,6 Yangqin Road, Kunshan Development Zone	Sample No:	SH120814/044
		Start date:	Aug,20.2012
		Finish date:	Sep,29.2012
		Standards used:	EN 60335-1 :2002+A1 :2004+A11 :2006 +A2 :2006+A13 :2008+A14 :2010+A15 : 2011 EN 60335-2-41 :2003+A1 :2004+A2 : 2010 EN 62233 :2008
		Clauses examined:	See page 2
		Re-testing:	NONE
Easy clean filter pump / SA-3755, SA-3766, SA-3766E, SA-3767F, LH-3787F, SA-3767		Remark / Note:	NONE

CONCLUSION: **The sample satisfies to the clauses examined.**

Test done by:	Approved by:
Jerry WANG	Ken TAO

LCIE CHINA COMPANY LIMITED

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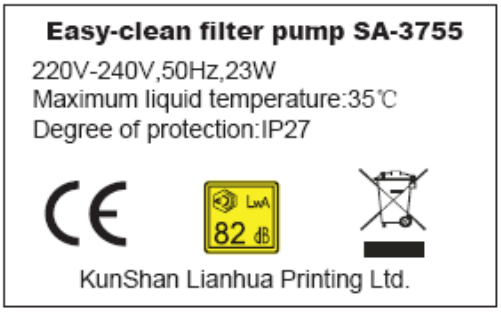
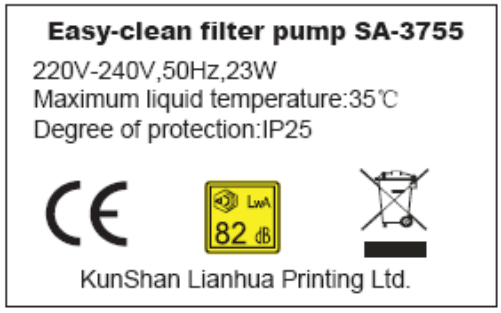
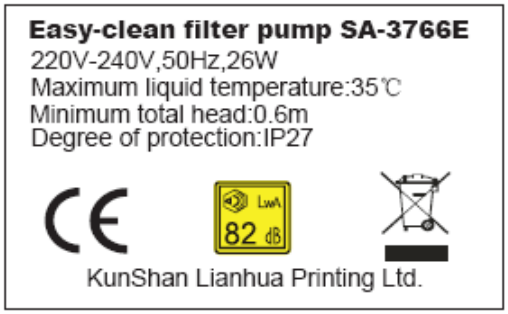
COPY OF RATING PLATE:

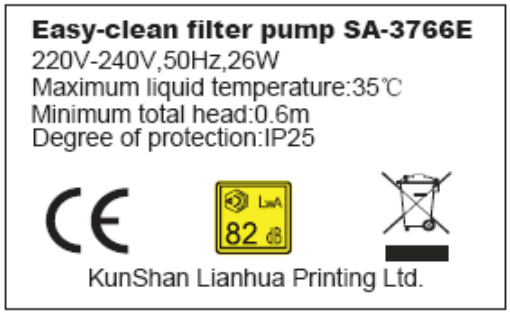
Model: SA-3755



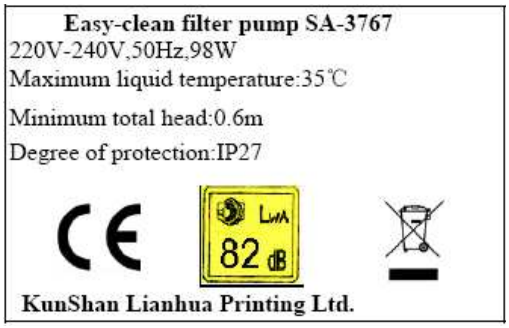


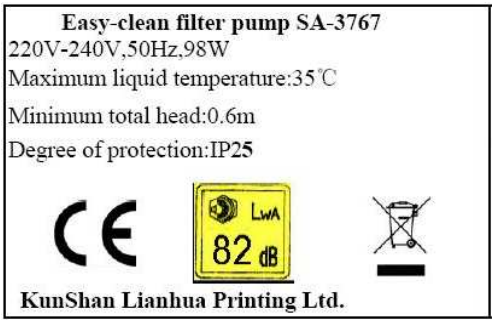
Model: SA-3766E



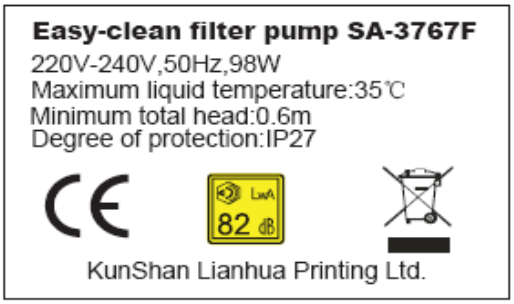


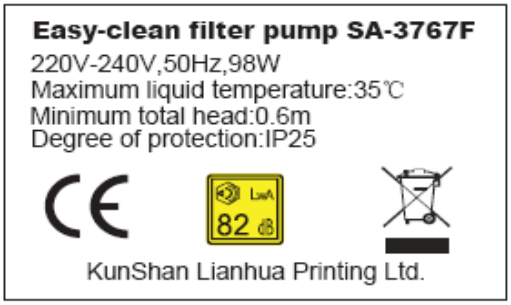
Model :SA-3767





Model: SA-3767F





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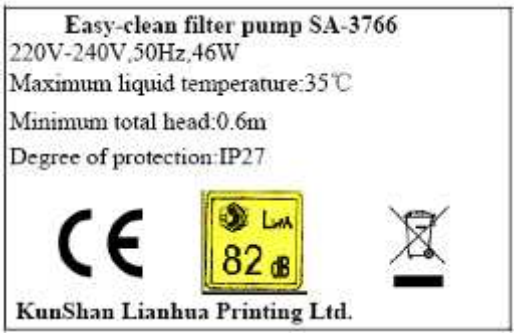
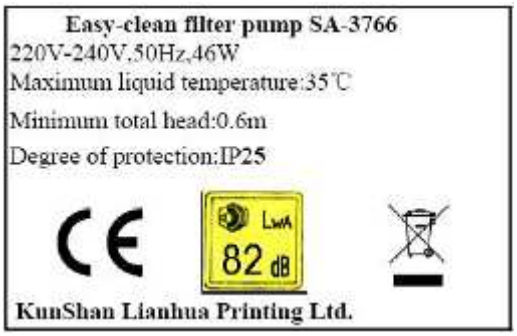
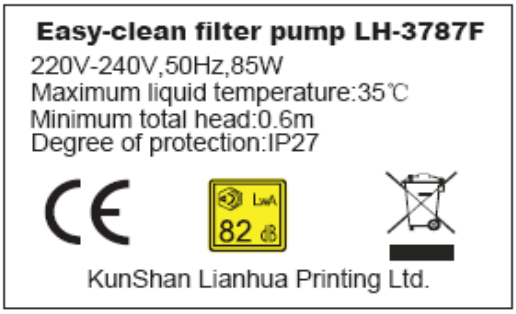
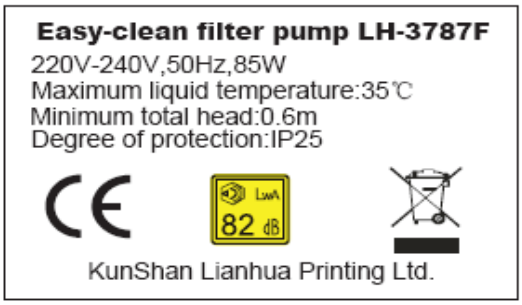
Model: SA-3766





Model: LH-3787F





NOTE 1: Only markings in English and instruction sheet in French were checked and validated during this examination.
The text required by the standard should be translated into the official language of the country where the appliance will be sold.

Summary of the test:

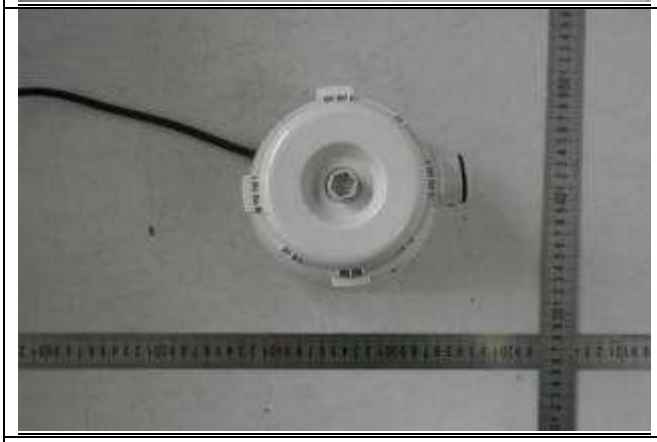
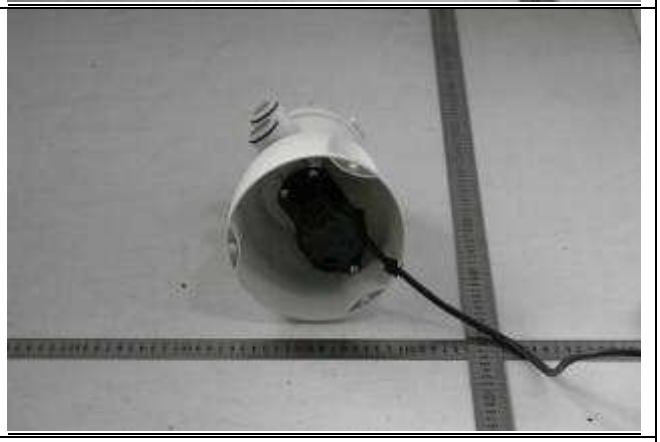
This report is based on LCIE history report No. LIA-08OC152HTSP dated on 2008-11-27, LIA-08OC152HTSP-A1 dated on 2009-02-10 , LIA-08OC152HTSP-A2 dated on 2010-08-24 & LIA-08OC152HTSP-A3 dated on 2011-09-28 for updating the standard **EN 60335-1:2002+A14:2010 +A15:2011.**

Just with alternative motor for SA-3755 & SA-3766 added into CDF and added three new type: SA-3766E, SA-3767F & LH-3787F.
SA-3766E has the same electric configuration with SA-3766 except the rated power input and the motor. SA-3767F has the same electric configuration and the rated power input with SA-3767 except the motor. The materials used in all models are the same.
After checking, all clauses were performed on SA-3766E & SA-3767F. Clause 10, 11, 13, 19, 24 & 30 were performed on SA-3755 & SA-3766. Clause 6-8, 10, 11, 13, 19 & 20-29 were performed on LH-3787F. Clause 7 & 24 were performed on SA-3767. The test results fulfilled the requirements of the standards.

PICTURES OF THE SAMPLE TESTED

Model SA-3755



Model SA-3766 & SA-3766E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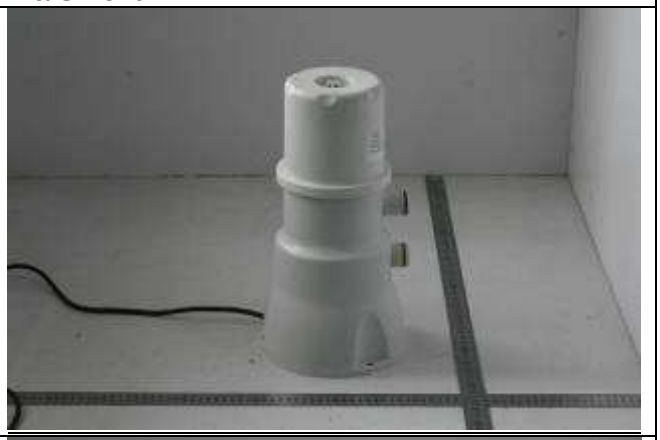
Model SA-3767F & SA-3767

Model LH-3787F

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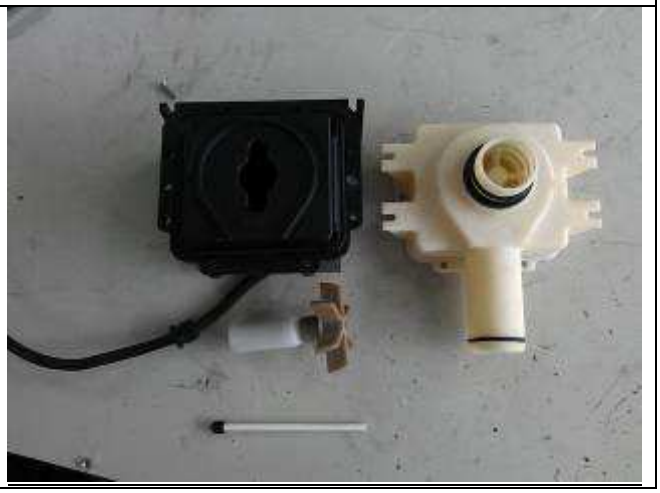
Open view

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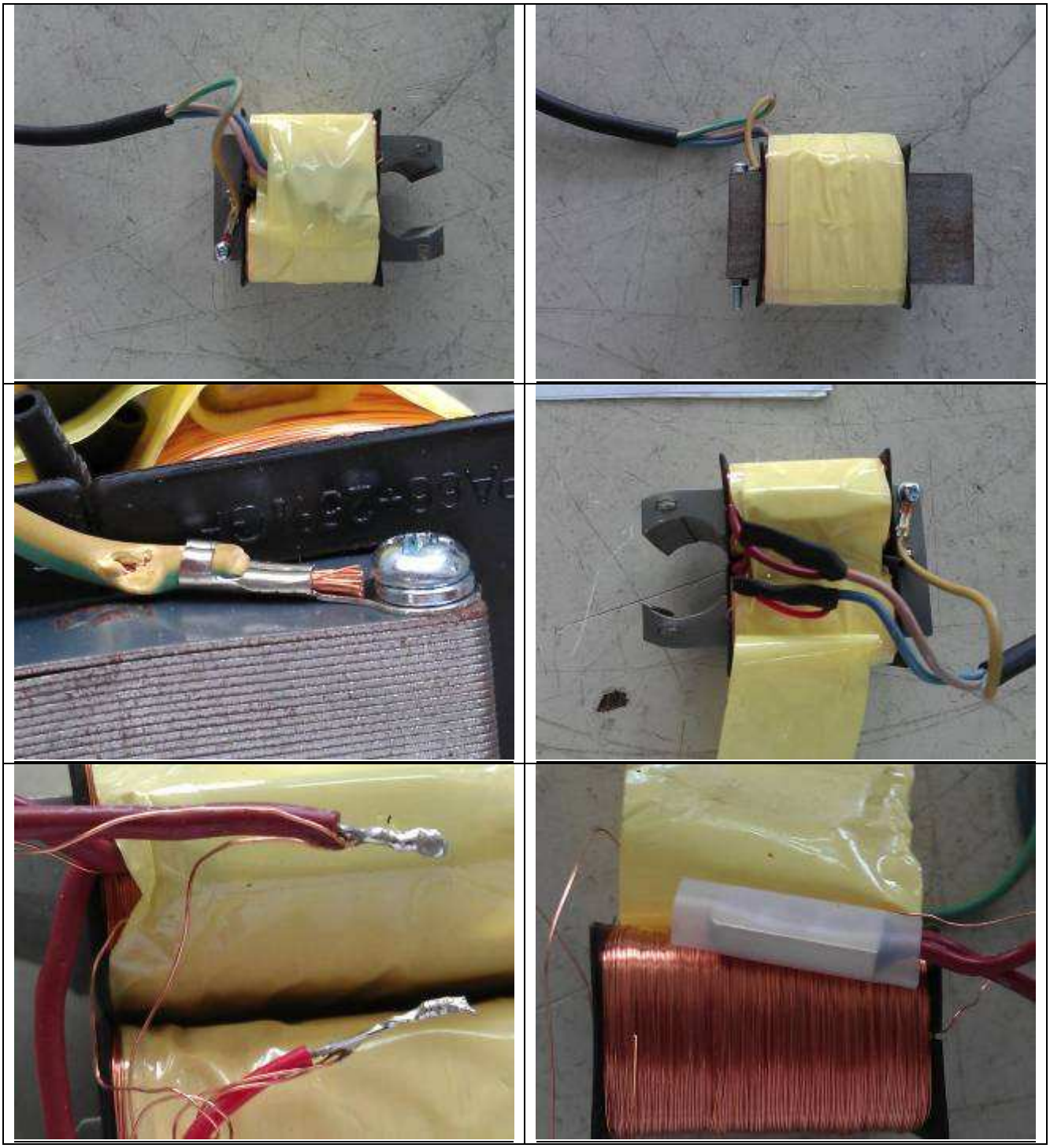

	NONE

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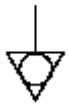
DESCRIPTION	
Test item particulars:	Easy clean filter pump
Nature of supply:	~
Class of protection against electrical shock:	Class I
Degree of protection against moisture:	IP25 / IP27
Type of cord attachment:	Type Z
Type of mounting:	
- Building-in:	No
- Independent:	No
- To be fixed to a support:	Yes
- Hand-held:	No
Switch:	No
Thermostat:	No
Temperature limiter:	No
Thermal cut-out:	Yes (motor protector)
Electronic circuit:	No
Program controller:	No
Timer:	No
Appliance kept in the hand:	No
Appliance continuously loaded by hand:	No
Power supply cord provided:	Yes
Thermostat without an OFF position:	No
Energy regulator without an OFF position:	No
Motor with capacitor in auxiliary winding:	No
Automatic control in flexible cable or cord:	No
Series motors incorporated:	No
Connection to water supply mains:	No
Length of cord:	2,05 m
Appliance inlet provided:	No
Stand provided with appliance:	No

Possible test case verdicts:	
- test object does meet the requirement :	P (Pass)
- test case does not apply to the test object :	NA (Not applicable)
- test object does not meet the requirement :	F (Fail)
- test object does not demand	ND (Not demanded)
General remarks:	
"(See remark #)" refers to a remark appended to the report. Throughout this report a comma is used as the decimal separator. ***All the modifications applied in this document are identified by a vertical line on the left at the place where information has been modified regarding to the previous edition of the document.***	

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		—
	Tests performed according to cl. 5, e.g. nature of supply, sequence of testing, etc.		P
5.2	If the test of Annex D has to be carried out, an additional appliance may be used. (IEC 60335-1/A1)		NA
5.3	The tests of Clause 14 and 21.2 and 22.24 are carried out after the tests of Clause 29. (IEC 60335-1/A1)		P
5.7	Temperature of liquid is maintained within +0, -5K of the temperaturemarked on the pump. (IEC 60 335-2-41)	30-35˚C	P
5.14	NOTE: Guidance is given in Annex P for enhanced requirements that may be used to ensure an acceptable level of protection against electrical and thermal hazards for particular types of appliances used in an installation without a protective earthing conductor in countries that have warm damp equable climates. (IEC 60335-1/A1)		NA
5.101	Pumps are tested as portable appliances, unless they are intended to be fixed (IEC 60 335-2-41)	Fixed pump	NA
5.102	Stationary pumps having a three-phase motor which does not incorporate a protective device are installed with an appropiate device, in accordance with the instructions (IEC 60 335-2-41)		NA
6	CLASSIFICATION		—
6.1	Protection against electric shock: Class 0, 0I, I, II, III: (IEC 60335-1)	Class: I	P
	Protection against electric shock: Class ~~0, 0I (IEC 60335-1)~~, I, II, III (EN 60335-1)	Class: I	P
	Submersible pumps for use in swimming pools when persons are in the pool shall be of class III with a rated voltage < 12V (IEC 60 335-2-41)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Other submersible pumps for use in water and other conducting liquids shall be of class I or class III. However, aquarium pumps may be of class II (IEC 60 335-2-41)		P
	Portable pumps for cleaning and other maintenance of swimming pools shall be of class I or class III (IEC 60 335-2-41)		NA
	Other pumps shall be class I, class II or class III (IEC 60 335-2-41)	Class I	P
	Table fountain pumps for indoor use may also be class II as long as their rated power input does not exceed 25 W. (IEC 60 335-2-41/A1)		NA
6.2	Submersible pumps shall be at least IP X8 (IEC 60 335-2-41)		NA
	Portable pumps for cleaning and other maintenance of swimming pools shall be at least IP X7 (IEC 60 335-2-41)		NA
	Other pumps shall be at least IP X4 (IEC 60 335-2-41)	IP25 & IP27	P
	Shower-boost pumps intended for installation outside of zones 1 and 2, as specified in IEC 60364-7-701, shall be at least IPX2. (IEC 60 335-2-41/A1)		NA
7	MARKING AND INSTRUCTIONS		—
7.1	Rated voltage or voltage range (V)	220-240V~	P
	Rated voltage or voltage range shall cover - 230 V for single-phase appliances - 400 V for multi-phase appliances (EN 60335-1)		P
	Nature of supply	~	P
	Rated frequency (Hz)	50Hz	P
	Rated power input (W):	See labels	P
	Rated current (A)		NA
	Manufacturer's or responsible vendor's name, trademark or identification mark	See labels	P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Model or type reference.....	See labels	P
	Symbol 5172 of IEC 60417, for Class II appliances		NA
	IP number, other than IPX0.....	IP25 & IP27	P
	The enclosure of electrically-operated water valves incorporated in external hose-sets for connection of an appliance to the water mains shall be marked with symbol IEC 60417-5036 (DB:2002-10) if their working voltage exceeds extra-low voltage. (IEC 60335-1/A1)		NA
	Pumps having a rated power input exceeding 50 W shall be marked with: (IEC 60 335-2-41)		—
	-the minimum total head in metres, if > 0 metres) (IEC 60 335-2-41)	See labels	P
	-the maximum operating depth in metres, if > 1 metres (for submersible pumps) (IEC 60 335-2-41)		NA
	-the direction of rotation (three phase motor only) (IEC 60 335-2-41)		NA
	Pumps shall be marked with the maximum liquid temperature which shall not be less than 35℃. (IEC 60 335-2-41)	Maximum 35℃	P
	If the temperature exceeds 35 ℃, they shall be marked with the maximum period of operation, unless they are intended for continuous operation. (IEC 60 335-2-41)		NA
7.2	Warning for stationary appliances for multiple supply		NA
	Warning placed in vicinity of terminal cover		NA
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		NA
	Different rated values marked with the values separated by an oblique stroke		NA
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
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		NA
	the power input is related to the arithmetic mean value of the rated voltage range		NA
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		NA
7.6	Correct symbols used		P
	[symbol IEC 60417-5021 (DB:2002-10)] equipotentiality (IEC 60335-1/A1)		NA
	symbol IEC 60417-5036 (DB:2002-10)] dangerous voltage (IEC 60335-1/A1)		NA
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply		NA
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		—
	- marking of terminals exclusively for the neutral conductor (N)		NA
	- marking of protective earthing terminals (symbol 5019 of IEC 60417)	Type Z	NA
	- marking not placed on removable parts		NA
7.9	Marking or placing of switches which may cause a hazard		NA
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means		NA
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		NA
7.11	Indication for direction of adjustment of controls		NA
7.12	Instructions for safe use provided		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	The instructions state that:		P
	- the appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction		P
	- children being supervised not to play with the appliance		P
	The instruction for use of class I portable pumps for cleaning and other maintenance of swimming pools shall include the substance of the following: (IEC 60 335-2-41)		—
	-the pump must not be used when people are staying in the water (IEC 60 335-2-41)		NA
	-the pump must supplied through a residual current device (RCD) with a rated residual operating current < 30 mA (IEC 60 335-2-41)		NA
	The instructions for use for pumps marked with a temperature exceeding 35 ℃ shall state the maximum period of operation and the minimum rest period, unless the pump is intended for continuous operation at this temperature. (IEC 60 335-2-41)		NA
7.12.1	Sufficient details for installation supplied		P
	The installation instruction shall provide information on requirements specified for the electrical installation and shall include reference to national wiring rules		P
	If reference is made to zones, the corresponding shall be included		NA
	The installation instruction shall state the substance of the following: (IEC 60 335-2-41)		—
	- the maximum total head, in meters (for pumps having a rated power input >50W) (IEC 60 335-2-41)		NA
	- pollution of the liquid could occur due to leakage of lubricants (for submersible pumps and vertical wet pit pumps contaiming lubricants) (IEC 60 335-2-41)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	- Additional information for installation of stationary pumps having a three-phase motor not incorporating a protective device as specified (IEC 60 335-2-41)		NA
	The instructions for installation shall state that pumps for outdoor fountains, garden ponds and similar places have to be supplied through a RCD (operating current < 30 mA) (IEC 60 335-2-41)		P
	The instructions for installation shall give full informations for installation of class I pumps for operating in swimming pools as specified (IEC 60 335-2-41)		NA
	The installation instructions for class III pumps intended to be installed in zone 0 of a swimming pool shall state that the transformer is located outside zone1 (IEC 60 335-2-41)		NA
	The installation instructions for class II pumps intended to be fixed in zone 1 of a swimming pool, or fixed close to a garden pond or similar place, shall state that the pump is to be located where flooding cannot occur (IEC 60 335-2-41)		NA
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		NA
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions stating that the fixed wiring must be protected		NA
7.12.4	Instructions for built-in appliances:		—
	- dimensions of space		NA
	- dimensions and position of supporting means		NA
	- distances between parts and surrounding structure		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	- dimensions of ventilation openings and arrangement		NA
	- connection to supply mains and interconnection of separate components		NA
	- necessity to allow disconnection of the appliance from the supply after installation, unless the appliance incorporates a switch complying with 24.3. (IEC 60335-1/A1)		NA
	The disconnection may be achieved by having the plug accessible or by incorporating a switch in the fixed wiring in accordance with the wiring rules. (IEC 60335-1/A1)		NA
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		NA
	Replacement cord instructions, type Y attachment		NA
	Replacement cord instructions, type Z attachment		P
7.12.6	The instructions for heating appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains shall contain the substance of the following: (IEC 60335-1/A1)		—
	CAUTION: In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility. (IEC 60335-1/A1)		NA
7.12.7	The instructions for fixed appliances shall state how the appliance is to be fixed to its support. (IEC 60335-1/A1)		P
7.12.8	The instructions for appliances connected to the water mains shall state (IEC 60335-1/A1)		—
	- the maximum inlet water pressure, in pascals; (IEC 60335-1/A1)		NA
	- the minimum inlet water pressure, in pascals, if this is necessary for the correct operation of the appliance. (IEC 60335-1/A1)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	The instructions for appliances connected to the water mains by detachable hose-sets shall state that the new hose-sets supplied with the appliance are to be used and that old hose-sets should not be reused. (IEC 60335-1/A1)		NA
7.13	Instructions and other texts in an official language	In French	P
7.14	Marking clearly legible and durable		P
7.15	Marking on a main part		P
	Marking clearly discernible from the outside, if necessary after removal of a cover		P
	For portable appliances, cover can be removed or opened without a tool		NA
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		NA
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		P
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		NA
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		NA
8	PROTECTION AGAINST ACCESS TO LIVE PARTS		—
8.1	Adequate protection against accidental contact with live parts		P
8.1.1	Requirement applies for all positions, detachable parts removed		P
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		NA
	Use of test probe B of IEC 61032: no contact with live parts		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
8.1.2	Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		NA
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032: no contact with live parts of visible glowing heating elements		NA
8.1.4	Accessible part not considered live if:		—
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		NA
	- safety extra-low d.c. voltage: not exceeding 42.4 V		NA
	- or separated from live parts by protective impedance		NA
	If protective impedance: d.c. current not exceeding 2 mA, and		NA
	a.c. peak value not exceeding 0.7 mA		NA
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 µF		NA
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 µC		NA
	The quantity of electricity in the discharge is measured using a resistor having a nominal non-inductive resistance of 2 000 Ω (IEC 60335-1/A1)		NA
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		—
	- built-in appliances		NA
	- fixed appliances		P
	- appliances delivered in separate units		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
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		—
	Requirements and tests are specified in part 2 when necessary		NA
10	POWER INPUT AND CURRENT		—
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1	(see appended table)	P
	Test for an appliance with one or more rated voltage ranges		NA
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2		NA
	Test for an appliance with one or more rated voltage ranges		NA
11	HEATING		—
11.1	No excessive temperatures in normal use		P
11.2	Placing and mounting of appliance 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 makes it difficult to make the necessary connections		NA
11.4	Heating appliances operated under normal operation at 1.15 times rated power input		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
11.5	Motor-operated appliances operated under normal operation at most unfavorable voltage between 0.94 and 1.06 times rated voltage.....	206,8V and 254,4V 254,4V is more unfavourable	P
11.6	Combined appliances operated under normal operation at most unfavorable voltage between 0.94 and 1.06 times rated voltage.....		NA
11.7	Pumps are operated with the liquid maintained at the temperature marked on the pump. (IEC 60 335-2-41/A1)	30-35˚C	P
	They are operated until steady conditions are established unless they are marked with a maximum period of operation. In this case, they are operated for the marked period followed by the rest period specified in the instructions, the test being carried out for three cycles of operation. (IEC 60 335-2-41/A1)		P
	Shower-boost pumps that are also supplied with cold water are operated with the cold water at 15 ºC ± 2 ºC. (IEC 60 335-2-41/A1)		NA
	Pumps, other than shower-boost pumps, marked with a maximum period of operation are also operated with the liquid maintained at 35 ºC until steady conditions are established. (IEC 60 335-2-41/A1)		NA
	If the pump is marked with a maximum period of operation- - the liquid temperature is 35℃ instead of the marked temperature; it is also operated for this period followed by the rest period specified in the instructions for use, the liquid being maintained at the marked temperature. This test is carried out for three cycles of operation. (IEC 60335-2-41)		NA
11.8	Temperature rises not exceeding values in table 3	(see appended tables)	P
	Protective devices do not operate		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	However, components in protective electronic circuits are allowed to operate provided they are tested for the number of cycles of operation specified in 24.1.4 (IEC 60335-1/A1)		NA
	The temperature rise limit does not apply to switches or controls tested in accordance with the conditions occurring in the appliance. (IEC 60335-1/A1)		NA
	Sealing compound does not flow out		P
	For pumps marked with a temperature exceeding 35 ℃, the temperature rise of the external enclosure is not measured. (IEC 60 335-2-41)		NA
13	LEAKAGE CURRENT AND ELECTRIC STRENGTH AT OPERATING TEMPERATURE		—
13.1	Leakage current not excessive and electric strength adequate		P
	Heating appliances operated at 1.15 times rated power input		NA
	Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage..	254,4V	P
	Protective impedance and radio interference filters disconnected before carrying out the tests		NA
13.2	Leakage current measured by means of the circuit described in figure 4 of IEC 60990		P
	Leakage current measurements	(see appended table)	P
13.3	The appliance is disconnected from the supply and the insulation is immediately subjected to a voltage having a frequency of 50 Hz or 60 Hz for 1 min, in accordance with IEC 61180-1. (IEC 60335-1/A1)		P
	The high-voltage source used for the test is to be capable of supplying a short circuit current Is between the output terminals after the output voltage has been adjusted to the appropriate test voltage. (IEC 60335-1/A1)		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	The overload release of the circuit is not to be operated by any current below the tripping current Ir. The values of Is and Ir are given in Table 5 for various high-voltage sources. (IEC 60335-1/A1)		P
	No breakdown during the tests		P
14	TRANSIENT OVERVOLTAGES		—
	Appliances withstand the transient overvoltages to which they may be subjected		NA
	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)	NA
	No flashover during the test, unless of functional insulation		NA
	In case of flashover of functional insulation, the appliance complies with clause 19 with the clearance short circuited		NA
15	MOISTURE RESISTANCE		—
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 and creepage distances below values specified in clause 29		P
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529.....	IP25 & IP27	P
	Water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains are subjected to the test specified for IPX7 appliances. (IEC 60335-1/A1)		NA
	Shower-boost pumps are subjected to the appropriate test of IEC 60529 both at rest and in operation while supplied at rated voltage. (IEC 60335-2-41/A1)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
15.1.2	Hand-held appliance turned continuously through the most unfavorable positions during the test		NA
	Built-in appliances installed according to the instructions		NA
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		NA
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		NA
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		NA
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube		NA
	However, for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		NA
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		NA
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support that is constructed to prevent water spraying onto its top surface. The pivot axis of the oscillating tube is located at the same level as the underside of the support and aligned centrally with the appliance. The spray is directed upwards. (IEC 60335-1/A1)		NA
	For IPX4 appliances, the movement of the tube is limited to two times 90º from the vertical for a period of 5 min. (IEC 60335-1/A1)		NA
	Appliances with type X attachment fitted with a flexible cord as described		NA
	Detachable parts tested as specified		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	IP X4 pumps are tested as specified (IEC 60 335-2-41)		NA
	IP X7-pumps (submersible pumps) are immersed for 24 h in water as specified (IEC 60 335-2-41)	IP27	P
	– 1,5 times the pressure occurring at the maximum operation depth, when this depth does not exceed 10m (IEC 60 335-2-41)		P
	– 1,3 times the pressure occurring at • the maximum operating depth, or • 15 m, if this is higher. (IEC 60 335-2-41/A1)		NA
15.2	Spillage of liquid does not affect the electrical insulation		NA
	Appliances with type X attachment fitted with a flexible cord as described		NA
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavorable		NA
	Detachable parts removed		NA
	Overfilling test with additional amount of water, over a period of 1 min (l).....		NA
	The appliance withstands the electric strength test of 16.3		NA
	No trace of water on insulation that can result in a reduction of clearances and creepage distances below values specified in clause 29		NA
15.3	Appliances proof against humid conditions	IP25 & IP27	P
	Humidity test for 48 h in a humidity cabinet (not for submersible pumps) (IEC 60335-2-41)		P
	The appliance withstands the tests of clause 16		P
16	LEAKAGE CURRENT AND ELECTRIC STRENGTH		—
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
16.2	Single-phase appliances: test voltage 1.06 times rated voltage.....		P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3.....		NA
	Leakage current measurements	(see appended table)	P
16.3	Electric strength tests according to table 7	(see appended table)	P
	No breakdown during the tests		P
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		—
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use		NA
	Appliance supplied with 1.06 or 0.94 times rated voltage and the most unfavourable short-circuit or overload likely to occur in normal use applied.....		NA
	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		NA
	Temperature of the winding not exceeding the value specified in table 8,		NA
	however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		NA
18	ENDURANCE		—
	Requirements and tests are specified in part 2 when necessary		NA
19	ABNORMAL OPERATION		—
19.1	The risk of fire or mechanical damage under abnormal or careless operation obviated		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe		NA
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Pumps are also subjected to the tests of 19.101 and 19.102 (IEC 60335-2-41)		P
19.2	Test of appliance with heating elements with restricted heat dissipation; test voltage (V): power input of 0.85 times rated power input.....		NA
19.3	Test of 19.2 repeated; test voltage (V): power input of 1.24 times rated power input.....		NA
19.4	Test conditions as in cl. 11, any control limiting the temperature during tests of cl. 11 short-circuited		NA
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the elements sheath		NA
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		NA
	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		NA
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		NA
	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		NA
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts of other appliances		P
	Locked rotor, motor capacitors open-circuited or short-circuited, if required		P
	Locked rotor, capacitors open-circuited one at a time		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Test repeated with capacitors short-circuited one at a time, if required		NA
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		NA
	Other appliances supplied with rated voltage for a period as specified		P
	Winding temperatures not exceeding values specified in table 8	(see appended table)	P
19.8	Three-phase motors operated at rated voltage with one phase disconnected		NA
19.10	Series motor operated at 1.3 times rated voltage for 1 min.....		NA
	During the test, parts not being ejected from the appliance		NA
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless they comply with the conditions specified in 19.11.1		NA
	Appliances incorporating a protective electronic circuit are subjected to the tests of 19.11.3 and 19.11.4. (IEC 60335-1/A1)		NA
	Appliances having a switch with an off position obtained by electronic disconnection, or a switch placing the appliance in a stand-by mode, subjected to the tests of 19.11.4		NA
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8		NA
	During and after each test the following is checked:		—
	- the temperature rise of the windings do not exceed the values specified in table 8		NA
	- the appliance complies with the conditions specified in 19.13		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		NA
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided all three of the following conditions are met:		—
	- the material of the printed circuit board withstands the burning test of annex E		NA
	- any loosened conductor does not reduce the clearances or creepage distances between live parts and accessible metal parts below the values specified in cl. 29		NA
	- the appliance withstands the tests of 19.11.2 with open-circuited conductor bridged		NA
19.11.1	Before applying the fault conditions a) to f) in 19.11.2, it is checked if circuits or parts of circuit meet both of the following conditions:		—
	- 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		NA
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction in other parts of the appliance does not rely on the correct functioning of the electronic circuit		NA
19.11.2	Fault conditions applied one at a time, the appliance operated under conditions specified in cl. 11, but supplied at rated voltage, the duration of the tests as specified:		—
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in 29		NA
	b) open circuit at the terminals of any component		NA
	c) short circuit of capacitors, unless they comply with IEC 60384-14		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	d) short circuit of any two terminals of an electronic component, other than integrated circuits. This fault condition is not applied between the two circuits of an optocoupler		NA
	e) failure of triacs in the diode mode		NA
	f) failure of an integrated circuit.		NA
	In each case, the test is ended if a non-self-resetting interruption of the supply occurs within the appliance. (IEC 60335-1/A1)		NA
19.11.3	If the appliance incorporates a protective electronic circuit which operates to ensure compliance with clause 19, the relevant test is repeated with a single fault simulated, as indicated in a) to f) of 19.11.2		NA
19.11.4	Appliances having a switch with an off position obtained by electronic disconnection, or a switch that can be placed in the stand-by mode, are subjected to the tests of 19.11.4.1 to 19.11.4.7. The tests are carried out with the appliance supplied at rated voltage, the switch being set in the off position or in the stand-by mode. (IEC 60335-1/A1)		NA
	Appliances incorporating a protective electronic circuit are subjected to the tests of 19.11.4.1 to 19.11.4.7. The tests are carried out after the protective electronic circuit has operated during the relevant tests of Clause 19 except 19.2, 19.6 and 19.11.3. However, appliances that are operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena. (IEC 60335-1/A1)		NA
	The tests are carried out with surge arresters disconnected, unless they incorporate spark gaps (IEC 60335-1/A1)		NA
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4 being applicable. Ten discharges having a positive polarity and ten discharges having a negative polarity are applied at each preselected point (IEC 60335-1/A1)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3 being applicable. (IEC 60335-1/A1)		NA
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4. Test level 3 s applicable for signal and control lines. Test level 4 is applicable for the power supply lines. The bursts are applied for 2 min with a positive polarity and for 2 min with a negative polarity (IEC 60335-1/A1)		NA
19.11.4.4	The power supply terminals of the appliance are subjected to voltage surges in accordance with IEC 61000-4-5, five positive impulses and five negative impulses being applied at the selected points. Test level 3 is applicable for the line-to-line coupling mode, a generator having a source impedance of 2 Ω being used. Test level 4 is applicable for the line-to-earth coupling mode, a generator having a source impedance of 12 Ω being used. (IEC 60335-1/A1)		NA
	Earthed heating elements in class I appliances are disconnected during this test (IEC 60335-1/A1)		NA
	For appliances having surge arresters incorporating spark gaps, the test is repeated at a level that is 95 % of the flashover voltage (IEC 60335-1/A1)		NA
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3 being applicable. During the test, all frequencies between 0,15 MHz to 80 MHz are covered. (IEC 60335-1/A1)		NA
19.11.4.6	The appliance is subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		NA
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2 being applicable (IEC 60335-1/A1)		NA

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Clause	Requirement - Test	Result - Remark	Verdict
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60s the power supply is reduces to a level such that the appliance ceases to respond or a programmable component cease to operate.		NA
	The appliance continues to operate normally or requires a manual operation to restart		NA
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)		NA
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
	Enclosures not deformed to such an extent that compliance with cl. 8 is impaired		P
	If the appliance can still be operated it complies with 20.2		P
	The appliance shall not undergo a dangerous malfunction, and there shall be no failure of protective electronic circuits if the appliance is still operable. (IEC 60335-1/A1)		NA
	Appliances tested with an electronic switch in the off position, or in the stand-by mode, shall not become operational (IEC 60335-1/A1)		NA
	Insulation, other than of class III appliance, withstand the electric strength test of 16.3, the test voltage specified in table 4:		—
	- basic insulation	1000V	P
	- supplementary insulation.....	1750V	P
	- reinforced insulation.....	3000V	P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	After operation or interruption of a control, clearances and creepage distances across the functional insulation withstanding the electric strength test of 16.3. the test voltage being twice the working voltage		NA
	The appliance does not undergo a dangerous malfunction, and		NA
	no failure of protective electronic circuits, if the appliance is still operable		NA
	Appliances tested with an electronic switch in the off position, or in the stand-by mode:		NA
	- do not become operational, or		NA
	- if they become operational, do not result in a dangerous malfunction during or after the tests of 19.11.4		NA
19.101	The pump is supplied at rated voltage and operated at approximately half at the maximum total head for 5 min, (IEC 60335-2-41)		P
	After which the inlet is removed from the liquid and the operation continued for 7h (IEC 60335-2-41)		P
	Pumps are operated again for 5 min at approximately half the maximum total head (IEC 60335-2-41)		P
	If the pump becomes inoperable during the test., it is disconnected from the supply and filled with water (IEC 60335-2-41)		P
19.102	Pumps marked with a maximum period of operation are supplied at rated voltage and operated under normal operation until steady conditions are established. (IEC 60335-2-41)		NA
20	STABILITY AND MECHANICAL HAZARDS		—
20.1	Adequate stability	Fixed	NA
	Submersible pumps are not subjected to the test (IEC 60335-2-41)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Tilting test through an angle of 10° (appliance placed on an inclined plane/horizontal plane); appliance does not overturn		NA
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		NA
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		NA
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		P
	Protective enclosures, guards and similar parts are non-detachable		P
	Adequate mechanical strength and fixing of protective enclosures		P
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure		NA
	Not possible to touch dangerous moving parts with test probe		P
21	MECHANICAL STRENGTH		—
	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	Compliance is checked by applying blows to the appliance in accordance with test Ehb of IEC 60068-2-75, the spring hammer test. (IEC 60335-1/A1)		P
	The appliance is rigidly supported and three blows, having an impact energy of 0,5 J, are applied to every point of the enclosure that is likely to be weak. (IEC 60335-1/A1)		P
	For pumps, other than shower-boost pumps, the impact energy is increased to 1,0 J. No damage after three blows applied to various parts of the enclosure (IEC 60335-2-41)		P
	If necessary, repetition of groups of three blows on a new sample		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3		NA
21.2	Accessible parts of solid insulation shall have sufficient strength to prevent penetration by sharp implements. (IEC 60335-1/A1)		P
	Compliance is checked by subjecting the insulation to the following test, unless the thickness of supplementary insulation is at least 1 mm and that of reinforced insulation is at least 2 mm. (IEC 60335-1/A1)		P
	The insulation is raised to the temperature measured during the test of Clause 11. (IEC 60335-1/A1)		NA
	The surface of the insulation is then scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. (IEC 60335-1/A1)		NA
	The pin is held at an angle of 80°- 85°to the horizontal and loaded so that the force exerted along its axis is 10 N ± 0,5 N. (IEC 60335-1/A1)		NA
	The scratches are made by drawing the pin along the surface of the insulation at a speed of approximately 20 mm/s. Two parallel scratches are made. (IEC 60335-1/A1)		NA
	They are spaced sufficiently apart so that they are not affected by each other, their length covering approximately 25 % of the length of the insulation. (IEC 60335-1/A1)		NA
	Two similar scratches are made at 90o to the first pair without crossing them. (IEC 60335-1/A1)		NA
	The test fingernail of Figure 7 is then applied to the scratched surface with a force of approximately 10 N. No further damage, such as separation of the material, shall occur. The insulation shall then withstand the electric strength test of 16.3. (IEC 60335-1/A1)		NA

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Clause	Requirement - Test	Result - Remark	Verdict
	The hardened steel pin is then applied perpendicularly with a force of 30 N 0,5 N to an unscratched part of the surface. The insulation shall then withstand the electric strength test of 16.3 with the pin still applied and used as one of the electrodes. (IEC 60335-1/A1)		NA
22	CONSTRUCTION		—
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled		P
22.2	Stationary appliance: means to provide all-pole disconnection from the supply provided, the following means being available:		—
	- a supply cord fitted with a plug		P
	- a switch complying with 24.3		NA
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided		NA
	- an appliance inlet		NA
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase permanently connected class I appliances, connected in the phase conductor		NA
22.3	Appliance provided with pins: no undue strain on socket-outlets		NA
	Applied torque not exceeding 0.25 Nm		NA
	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		NA
	Each pin subjected to a tork of 0.4Nm; the pins are not rotating unless rotating does not impair compliance with the standard		NA
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
22.5	No risk of electric shock when touching the pins of the plug	No capacitor	NA
	The appliance is supplied at rated voltage. Any switch is then placed in the off position and the appliance is disconnected from the supply mains at the instant of voltage peak. One second after disconnection, the voltage between the pins of the plug is measured with an instrument that does not appreciably affect the value to be measured. (IEC 60335-1/A1)		NA
	The voltage shall not exceed 34 V		NA
22.6	Electrical insulation not affected by condensing water or leaking liquid		P
	Compliance is checked by inspection and for pumps of class II by the test with removal seal of the pump shaft as specified (IEC 60 335-2-41)		NA
	Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak		NA
	Shower-boost pumps having a separate enclosure shall have a drain hole in the enclosure positioned so that the water can drain out without impairing electrical insulation, unless water cannot accumulate within the enclosure in normal use. (IEC 60 335-2-41)		NA
	The hole shall be at least 5 mm in diameter or 20 mm2 in area with a width of least 3 mm. (IEC 60 335-2-41)		NA
22.7	Adequate safeguards against the risk of excessive pressure in appliances provided with steam-producing devices		NA
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		NA
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Adequate insulating properties of oil or grease to which insulation is exposed		NA
22.10	It shall not be possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance. (IEC 60335-1/A1)		NA
	NOTE 1 : Voltage-maintained controls will automatically reset if they become deenergized (IEC 60335-1/A1)		NA
	Non-self-resetting thermal motor protectors shall have a trip-free action unless they are voltage maintained. (IEC 60335-1/A1)		NA
	NOTE 2: Trip-free is an automatic action that is independent of manipulation or position of the actuating member. (IEC 60335-1/A1)		NA
	Reset buttons of non-self-resetting controls shall be located or protected so that their accidental resetting is unlikely to occur if this could result in a hazard. (IEC 60335-1/A1)		NA
	NOTE 3: For example, this requirement precludes the location of reset buttons on the back of an appliance, which could result in them being reset by pushing the appliance against a wall. (IEC 60335-1/A1)		NA
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		NA
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		NA
	Tests as described	50N	P
22.12	Handles, knobs etc. fixed in a reliable manner		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		NA
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		NA
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		NA
22.13	Unlikely that handles, when gripped as in normal use, make the operators hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		NA
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 etc., liable to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded		NA
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands, no undue wear of contacts		NA
	Cord reel tested with 6000 operations, as specified		NA
	Electric strength test of 16.3, voltage of 1000 V applied		NA
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		NA
22.18	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use. Direct contact between opper and aluminium or their alloys is to be avoided (IEC 60 335-2-41)		P
22.19	Driving belts not used as electrical insulation		NA
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless material used is non-corrosive, non-hygroscopic and non-combustible		NA
	Compliance is checked by inspection and, if necessary, by appropriate test		NA
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless impregnated		P
22.22	Appliances not containing asbestos		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements adequately supported		NA
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		NA
22.25	Sagging heating conductors cannot come into contact with accessible metal parts		NA
22.26	The insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		NA
22.27	Parts connected by protective impedance separated by double or reinforced insulation		NA
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		NA
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		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Clearances and creepage distances over supplementary and reinforced insulation not reduced below values specified for supplementary insulation		P
	Creepage distances and clearances over supplementary or reinforced insulation not reduced to less than 50% of values specified in 29 if wires, screws etc. becomes loose		P
22.32	Supplementary and reinforced insulation designed or protected against deposition of dirt or dust		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		NA
	Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation		NA
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		NA
22.33	Conductive liquids that are or may become accessible in normal use are not in direct contact with live parts		P
	Electrodes not used for heating liquids		NA
	For class II constructions, conductive liquids that are or may become accessible in normal use, not in direct contact with basic or reinforced insulation		P
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
22.34	Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed		NA
22.35	Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation		NA
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of an insulation fault, they are either adequately covered by insulation material, or their accessible parts are separated from their shafts or fixings by supplementary insulation		NA
	This requirement does not apply to handles, levers and knobs on stationary appliances other than those of electrical components, provided they are either reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		NA
22.36	Handles continuously held in the hand in normal use are so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless they are separated from live parts by double or reinforced insulation		NA
22.37	Capacitors in Class II appliances not connected to accessible metal parts, unless complying with 22.42		NA
	Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42		NA
22.38	Capacitors not connected between the contacts of a thermal cut-out		NA
22.39	Lamp holders used only for the connection of lamps		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
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		NA
	The requirement is not applicable to submersible pumps and vertical wet pit pumps (IEC 60 335-2-41)		P
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		NA
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		NA
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		NA
22.44	Appliances are not allowed to have an enclosure that is shaped and decorated so that the appliance is likely to be treated as a toy by children		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.4 due to deformation as a result of an external force applied to the enclosure		NA
22.46	Software used in protective electronic circuits shall be software class B or software class C (IEC 60335-1/A1)		NA
	NOTE 1: Failure of software class B in the presence of another fault in the appliance, or failure of software class C alone, could result in dangerous malfunction, electric shock, fire, mechanical or other hazards. Software class A denotes software used for functional purposes. (IEC 60335-1/A1)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Compliance is checked by evaluating the software in accordance with Annex R. (IEC 60335-1/A1)		NA
	NOTE 2: If the software program is modified, the evaluation and relevant tests are repeated if the modification can influence the results of the test involving protective electronic circuits. (IEC 60335-1/A1)		NA
22.47	Appliances intended to be connected to the water mains shall withstand the water pressure expected in normal use. (IEC 60335-1/A1)		NA
	Compliance is checked by connecting the appliance to a water supply having a static pressure equal to twice the maximum inlet water pressure or 1,2 MPa, whichever is higher, for a period of 5 min (IEC 60335-1/A1)		NA
	There shall be no leakage from any part, including any inlet water hose (IEC 60335-1/A1)		NA
22.48	Appliances intended to be connected to the water mains shall be constructed to prevent backsiphonage of non-potable water into the water mains. (IEC 60335-1/A1)		NA
	Compliance is checked by the relevant tests of IEC 61770 (IEC 60335-1/A1)		NA
22.49	For remote operation, the duration of operation shall be set before the appliance can be started, unless		NA
	the appliance switches off automatically or can operate continuously without hazard		NA
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		NA
22.51	A control on the appliance being manually adjusted to the setting for remote operation before the appliance can be operated in this mode		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	There is a visual indication showing that the appliance is adjusted for remote operation		NA
	Manual setting and visual indication not necessary on appliances that can operate as follows, without giving rise to a hazard:		NA
	- operate continuously,		NA
	- operate automatically, or		NA
	- be operated remotely		NA
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		NA
22.101	Pumps shall withstand the static liquid pressure occuring in normal use as specified: (Submersible pumps and vertical wet pit pumps are not subjected to this test) (IEC 60 335-2-41)		NA
	The pressure test is carried out for 1 min at a pressure of 1,2 times the pressure occuring at maximum pump total head: ..... m (IEC 60 335-2-41)		NA
22.102	The material of the pump shall not be affected by the liquid for which the pump is intended if a hazard could result (IEC 60 335-2-41)		P
22.103	Submersible pumps and vertical wet pit pumps shall be constructed so that pollution of liquid by lubricants is prevented as far as possible (IEC 60335-2-41)		NA
22.104	Submersible pumps and vertical wet pit pumps having a mass > 3 Kg shall be constructed so that means for hoisting can be attached (IEC 60 335-2-41)		NA
22.105	Class I submersible pumps having a plastic enclosure shall be so constructed so that leakage of liquid into the motor does not result in a hazard (IEC 60 335-2-41)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	After the specified test the accumulating water shall come in contact with earthed metal before it reaches live parts (IEC 60 335-2-41)		NA
22.106	Shower-boost pumps shall be constructed so that they can be permanently connected to the water supply. (IEC 60 335-2-41/A1)		NA
	Shower-boost pumps for wall mounting shall be constructed so that they can be securely fixed independently of the connection to the water supply. (IEC 60 335-2-41/A1)		NA
23	INTERNAL WIRING		—
23.1	Wireways smooth and free from sharp edges		P
	Wires protected against contact with burrs, cooling fins etc.		P
	Wire holes in metal well rounded or provided with bushings		NA
	Wiring effectively prevented from coming into contact with moving parts		P
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges or corners		NA
	Beads inside flexible metal conduits contained within an insulating sleeve		NA
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		NA
	Flexible metallic tubes not causing damage to insulation of conductors		NA
	Open-coil springs not used		NA
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		NA
	No damage after 10 000 flexings for conductors flexed during normal use or 100 flexings for conductors flexed during user maintenance		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Electric strength test, 1000 V between live parts and accessible metal parts		NA
23.4	Bare internal wiring sufficiently rigid and fixed		NA
23.5	The insulation of internal wiring withstanding the electrical stress likely to occur in normal use		P
	No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by positive means		NA
23.7	The colour combination green/yellow used only for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	No lead-tin soldering of stranded conductors where they are subject to contact pressure, unless		P
	clamping means so constructed that there is no risk of bad contact due to cold flow of the solder		NA
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, shall be at least equivalent to that of light polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 52). (IEC 60335-1/A1)		NA
	NOTE The mechanical characteristics specified in IEC 60227 are not evaluated (IEC 60335-1/A1)		NA

24	COMPONENTS		—
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components	(see appended table)	P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Components not tested and found to comply with relevant IEC standard for the number of cycles specified are tested in accordance with 24.1.1 to 24.1.6		NA
	Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
	Motors are not required to comply with IEC 60034-1. (IEC 60335-1/A1)		P
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14, or		NA
	tested according to annex F		NA
24.1.2	Safety isolating transformers complying with IEC 61558-2-6, or		NA
	tested according to annex G		NA
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000, or		NA
	tested according to annex H		NA
	Level switches are tested for 50 000 cycles of operation (IEC 60 335-2-41)		NA
24.1.4	Automatic controls complying with IEC 60730-1 with relevant part 2. The number of cycles of operation being:		——
	- thermostats: 10 000		NA
	- temperature limiters: 1 000		NA
	- self-resetting thermal cut-outs: 300		P
	- voltage-maintained non-self-resetting thermal cut-outs: 1 000		NA
	- other non-self-resetting thermal cut-outs: 30		NA
	- timers: 3 000		NA
	- energy regulators: 10 000		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D. (IEC 60335-1/A1)		NA
	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 provided by enclosures against harmful ingress of water declared for subclause 6.5.2 of IEC 60730-2-8 shall be IPX7 (IEC 60335-1/A1)		NA
24.1.5	Appliance couplers complying with IEC 60320-1		NA
	However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		NA
	The relevant standard for interconnection couplers is IEC 60320-2-2. (IEC 60335-1/A1)		NA
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		NA
24.1.7	If the remote operation of the appliance is via a telecommunication network, the relevant standards for the telecommunication interface circuitry in the appliance are EN 41003 and EN 60950-1:2006, Subclause 6.3. (EN 60335-1/A13)		NA
24.1.8	The relevant standard for thermal links is IEC 60691. Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of Clause 19		NA
24.1.9	Relays, other than motor starting relays, tested as part of the appliance		NA
	They are also tested in accordance with Clause 17 of IEC 60730-1, the number of operations in 24.1.4 selected according to the relay function in the appliance		NA
24.2	No switches or automatic controls in flexible cords		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	No devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		NA
	No thermal cut-outs that can be reset by soldering		P
	Level switches may be incorporated in interconnection cords (IEC 60335-2-41)		NA
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and having a contact separation in all poles, providing full disconnection under overvoltage category III conditions		NA
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		NA
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance and used accordingly		NA
	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		NA
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42V.		NA
	In addition, the motors are complying with the requirements of Annex I		NA
24.7	Hose-sets for the connection of appliances to the water mains shall comply with IEC 61770. They shall be supplied with the appliance. (IEC 60335-1/A1)		NA

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IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		—
25.1	Submersible pumps, other than class III, shall be provided with a supply cord fitted with a plug (IEC 60335-2-41)		NA
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		NA
25.3	Connection of supply conductors for appliance intended to be permanently connected to fixed wiring possible after the appliance has been fixed to its support		NA
	Appliance provided with a set of terminals for the connection of cables or fixed wiring, cross-sectional areas specified in 26.6		NA
	Appliance provided with a set of terminals allowing the connection of a flexible cord		NA
	Appliance provided with a set of supply leads accommodated in a suitable compartment		NA
	Appliance provided with a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate type of cable or conduit		NA
	Submersible pumps, other than class III, shall be provided with a flexible cord (IEC 60335-2-41)		NA
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 10		NA
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in 29		NA
25.5	Method for assemble supply cord with the appliance:		—
	- type X attachment is not allowed for submersible pumps (IEC 60335-2-41)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	- type Y attachment		NA
	- type Z attachment, allowed for pumps having a rated power input not exceeding 100W and for pumps for garden ponds (IEC 60335-2-41)		P
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		NA
25.6	Plugs fitted with only one flexible cord		P
	Supply cords of single-phase portable appliances having a rated current not exceeding 16 A shall be provided with a plug complying with the following standard sheets of IEC 60083 : 1975: (EN 60335-1)		P
	- for Class I appliances (standard sheet C2b, C3b or C4) (EN 60335-1)		P
	- for Class II appliances (standard sheet C5 or C6) (EN 60335-1)		NA
25.7	Supply cord not lighter than:		—
	- 60245 IEC 66 (for pumps intended for outdoor use having a rated input > 1000 W and portable pumps having a mass > 5 Kg) (IEC 60 335-2-41)		NA
	- 60245 IEC 66 (for pumps intended for use in swimming pools other than class III pumps) (IEC 60 335-2-41)		NA
	- 60227 IEC 57 (for fixed pumps having a rated input < 1000 W and portable pumps for outdoor use having a mass < 5 Kg) (IEC 60 335-2-41)		NA
	- 60245 IEC 57 (for pumps for indoor use, except table fountain pumps and aquarium pumps , shower-boost pumps and class III pumps (IEC 60 335-2-41/A1)	H05RN-F	P
	Supply cords being one of the following types:		P
	- rubber sheathed (at least 60245 IEC 53)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	- polychloroprene sheathed (at least 60245 IEC 57)	H05RN-F	P
	- cross-linked polyvinyl chloride sheathed (at least 60245 IEC 87)		NA
	Polyvinyl chloride sheathed: Not used if they are likely to touch metal parts having a temperature rise exceeding 75K during the test of Clause 11.		NA
	- light polyvinyl chloride sheathed cord (at least 60227 IEC 52), appliances not exceeding 3 kg		NA
	- ordinary polyvinyl chloride sheathed cord (at least 60227 IEC 53), other appliances		NA
	Heat resistant polyvinyl chloride sheathed: Not used for type X attachment other than specially prepared cords.		NA
	- Heat-resistant light polyvinyl chloride sheathed cord (at least 60227 IEC 56), appliances not exceeding 3 kg		NA
	- heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), other appliances		NA
	Add - ordinary polychloroprene sheathed flexible cord (code designation 60245 IEC 57) (H05RN-F) (EN 60335-1)	H05RN-F	P
	When supply cords having high flexibility are used, they shall not be lighter than : (EN 60335-1)		NA
	- rubber insulated and sheathed cord (code designation 60245 IEC 86) (H03RR-H);		NA
	- rubber insulated, cross linked PVC sheathed cord (code designation 60245 IEC 87) (H03RV4-H);		NA
	- cross linked PVC insulated and sheathed cord (code designation 60245 IEC 88) (H03V4V4-H).		NA
	NOTE Z1 The harmonized code designations corresponding to the IEC cord types are given in Annex ZD. (EN 60335-1)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
25.8	Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area (mm²).....	<6A, 0,75 mm²	P
	The supply cord of submersible pumps other than class III pumps intended for outdoor use shall have a length of at least 10 m (IEC 60 335-2-41)		NA
25.9	Supply cord not in contact with sharp points or edges		P
25.10	Green/yellow core for earthing purposes in Class I appliance		P
25.11	Conductors of supply cords not consolidated by lead-tin soldering where they are subject to contact pressure, unless		P
	clamping means so constructed that there is no risk of bad contacts due to cold flow of the solder		NA
25.12	Moulding the cord to part of the enclosure does not damage the insulation of the supply cord		NA
25.13	Inlet opening so shaped as to prevent damage to the supply cord		P
	Unless the enclosure at the inlet opening is of insulation material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		P
	If unsheathed supply cord, a similar additional bushing or lining is required, unless		NA
	the appliance is class 0		NA
25.14	Supply cords adequately protected against excessive flexing		NA
	Portable pumps, except table fountain pumps and aquarium pumps, are subjected to the test (EN 60335-2-41/A1)		NA
	Flexing test:		—
	- applied force (N)		NA
	- number of flexings		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	The test does not result in:		—
	- short circuit between the conductors		NA
	- breakage of more than 10% of the strands of any conductor		NA
	- separation of the conductor from its terminal		NA
	- loosening of any cord guard		NA
	- damage, within the meaning of the standard, to the cord or the cord guard		NA
	- broken strands piercing the insulation and becoming accessible		NA
25.15	Conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord, values shown in table 10: pull (N); torque (not on automatic cord reel) (Nm).....	100N, 0,35Nm	P
	Max. 2 mm displacement of the cord, and conductors not moved more than 1 mm in the terminals		P
	Creepage distances and clearances not reduced below values specified in 29.1		P
25.16	Cord anchorages for type X attachments constructed and located so that:		—
	- replacement of the cord is easily possible		NA
	- it is clear how the relief from strain and the prevention of twisting are obtained		NA
	- they are suitable for different types of cord		NA
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless separated from accessible metal parts by supplementary insulation		NA
	- the cord is not clamped by a metal screw which bears directly on the cord		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	- at least one part of the cord anchorage securely fixed to the appliance, unless part of a specially prepared cord		NA
	- screws which have to be operated when replacing the cord do not fix any other component, if applicable		NA
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		NA
	- for Class 0, 0I and I appliances: they are of insulating material or are provided with an insulating lining, unless a failure of the insulation of the cord does not make accessible metal parts live		NA
	- for Class II appliances: they are of insulating material, or if of metal, they are insulated from accessible metal parts by supplementary insulation		NA
25.17	Adequate cord anchorages for type Y and Z attachment		P
25.18	Cord anchorages only accessible with the aid of a tool, or		P
	so constructed that the cord can only be fitted with the aid of a tool		NA
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		NA
	Tying the cord into a knot or tying the cord with string not used		NA
25.20	Conductors of the supply cord for type Y and Z attachment adequately additionally insulated		P
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed to permit checking of conductors with respect to correct positioning and connection before fitting any cover, no risk of damage to the conductors when fitting the cover, no contact with accessible metal parts if a conductor becomes loose, etc.		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	For portable appliances, the uninsulated end of a conductor prevented from any contact with accessible metal parts, unless the end of the cord is such that the conductors are unlikely to slip free		NA
25.22	Appliance inlet:		—
	- live parts not accessible during insertion or removal		NA
	- connector can be inserted without difficulty		NA
	- the appliance is not supported by the connector		NA
	- is not for cold conditions if temp. Rise of external metal parts exceeds 75 K, unless the supply cord is not likely to touch such metal parts		NA
25.23	Interconnection cords comply with the requirements for the supply cord, except as specified		P
	If necessary, electric strength test of 16.3		NA
25.24	Interconnection cords not detachable without the aid of a tool if compliance with the standard is impaired when they are disconnected		NA
25.25	Dimensions of pins compatible with the dimensions of the relevant socket-outlet. Dimensions of pins and engagement face in accordance with the relevant plug in IEC 60083		NA
26	TERMINALS FOR EXTERNAL CONDUCTORS		—
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	However, earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection. (IEC 60335-1/A1)		NA
	Terminals only accessible after removal of a non-detachable cover		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
26.2	Appliances with type X attachment and appliances for connection to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless the connections are soldered		NA
	Screws and nuts serve only to clamp supply conductors, except		NA
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		NA
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone		NA
	Soldering alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free at the soldered joint		NA
26.3	Terminals for type X attachment and for connection to fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure and without damaging the conductor		NA
	Terminals for type X attachment and those for connection to fixed wiring so fixed that when tightening or loosening the clamping means:		—
	- the terminal does not loosen		NA
	- internal wiring is not subjected to stress		NA
	- clearances and creepage distances are not reduced below the values in 29		NA
	Compliance checked by inspection and by the test of subclause 8.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified. Nominal diameter of thread (mm); screw category; torque (Nm)		NA
26.4	Terminals for type X attachment, except those with a specially prepared cord, and those for connection to fixed wiring, no special preparation of conductors required, and so constructed or placed that conductors prevented from slipping out		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
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		NA
	Stranded conductor test, 8 mm insulation removed		NA
	No contact between live parts and accessible metal parts and, for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		NA
26.6	Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm^2) .		NA
	Terminals only suitable for a specially prepared cord		NA
26.7	Terminals for type X attachment accessible after removal of a cover or part of the enclosure		NA
26.8	Terminals for the connection to fixed wiring, including the earthing terminal, located close to each other		NA
26.9	Terminals of the pillar type constructed and located as specified		NA
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless conductors ends fitted with a device suitable for screw terminals		P
	Pull test of 5 N to the connection		P
26.11	For type Y and Z attachment: soldered, welded, crimped and 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		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	For Class II appliances: soldering, welding or crimping alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free		NA
27	PROVISION FOR EARTHING		—
27.1	Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal or contact of the appliance inlet		P
	Earthing terminals not connected to neutral terminal		P
	Class 0, II and III appliance have no provision for earthing		NA
	Safety extra-low voltage circuits not earthed, unless protective extra-low voltage circuits		NA
27.2	Clamping means adequately secured against accidental loosening		P
	Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm², and		NA
	do not provide earthing continuity between different parts of the appliance		NA
	Conductors cannot be loosened without the aid of a tool		P
27.3	For appliances with supply cord, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		P
	If a detachable part having an earth connection is plugged into another part of the appliance, the earth connection shall be made before the current-carrying connections are established. The current-carrying connections shall be separated before the earth connection when removing the part. (IEC 60335-1/A1)		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
27.4	No risk of corrosion resulting from contact between metal of earthing terminal and other metal		P
	Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure		P
	Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5 µm		NA
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		P
	In case of aluminium alloys precautions taken to avoid risk of corrosion		NA
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 that clearances of basic insulation are based on the rated voltage of the appliance		NA
	Resistance not exceeding 0,1 Ω at the specified low-resistance test	0,031 Ω	P
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand held appliances		NA
	They may be used in other appliances if:		—
	- at least two tracks are used with independent soldering points and the appliance complies with requirements of 27.5 for each circuit		NA
	- the material of the printed circuit board complies with IEC 60249-2-4 or IEC 60249-2-5		NA
28	SCREWS AND CONNECTIONS		—
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm		NA
	Screws of insulating material not used for any electrical connection or connections providing earthing continuity		P
	Screws used for electrical connections or connections providing earthing continuity screw into metal		P
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		P
	Type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw can impair basic insulation		NA
	For screws and nuts; test as specified	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure not transmitted through insulating material liable to shrink or distort, unless shrinkage or distortion compensated		P
	This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0.5A		NA
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		NA
	Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread		NA
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	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:		NA
	- in normal use,		NA
	- during user maintenance,		NA
	- when replacing a supply cord having a type X attachment, or		NA
	- during installation		NA
	At least two screws being used for each connection providing earthing continuity, unless		NA
	the screw forms a thread having a length of at least half the diameter of the screw		NA
	Thread-cutting and space-threaded screws may be used in connections providing earthing continuity, provided unnecessary to disturb the connection and at least two screws are used for each connection		NA
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		NA
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion		NA
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		—
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), annex J applies		NA
	The microenvironment is pollution degree 1 under Type 1 coating		NA
	No clearance or creepage distance requirements under Type 2 coating		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
29.1	Clearances shall not be less than the values specified in Table 16, taking into account the rated impulse voltage for the overvoltage categories of Table 15, unless, for basic insulation and functional insulation, they comply with the impulse voltage test of Clause 14.However, if the construction is such that the distances could be affected by wear, by distortion, by movement of the parts or during assembly, the clearances for rated impulse voltages of 1 500 V and above are increased by 0,5 mm and the impulse voltage test is not applicable. (IEC 60335-1/A1)		P
	The impulse voltage test is not applicable when the microenvironment is pollution degree 3 or for basic insulation of class 0 appliances and class 0I appliances. (IEC 60335-1/A1)		NA
	Appliances are in overvoltage category II		P
	Compliance is checked by inspection and measurements as specified		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1mm if the microenvironment is pollution degree 1		NA
	Lacquered conductors of windings are considered to be bare conductors. (IEC 60335-1/A1)		P
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16		P
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, but using the next higher step for rated impulse voltage		P
29.1.4	For functional insulation, the values of table 16 are applicable, unless		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	the appliance complies with clause 19 with the functional insulation short-circuited		NA
	Clearances at crossover points of lacquered conductors not measured		P
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		NA
	Lacquered conductors of windings are considered to be bare conductors. However, clearances at crossover points are not measured. (IEC 60335-1/A1)		P
29.1.5	Appliances having higher working voltage than rated voltage, the voltage used for determining clearances from table 16 is the sum of the rated impulse voltage and the difference between the peak value of the working voltage and the peak value of the rated voltage		NA
	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		NA
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation based on the working voltage used as the rated voltage in table 15		NA
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree		P
	Pollution degree 2 applies, unless		NA
	precautions taken to protect the insulation; pollution degree 1		P
	insulation subjected to conductive pollution; pollution degree 3		NA
	Compliance is checked by inspection and measurements as specified		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
29.2.1	Creepage distances of basic insulation not less than specified in table 17		P
	For pollution degree 1, creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14		NA
29.2.2	Creepage distances of supplementary insulation at least as specified for basic insulation in table 17		P
29.2.3	Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17		P
29.2.4	Creepage distances of functional insulation not less than specified in table 18		P
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		NA
29.3	Supplementary and reinforced insulation having adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked by:		P
	- measurement, in accordance with 29.3.1, or		P
	- an electric strength test in accordance with 29.3.2, or		NA
	- an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3 and for accessible insulation consisting of a single layer, measurement in accordance with 29.3.Z1.		NA
29.3.1	The thickness of the insulation shall be at least	(IEC 60335-1/A1)	—
	- 1 mm for supplementary insulation; (IEC 60335-1/A1)		P
	- 2 mm for reinforced insulation. (IEC 60335-1/A1)		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
29.3.2	Each layer of material shall withstand the electric strength test of 16.3 for supplementary insulation. Supplementary insulation shall consist of at least 2 layers of material and reinforced insulation of at least 3 layers. (IEC 60335-1/A1)		NA
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2 for 48 h at a temperature of 50 K in excess of the maximum temperature rise measured during the test of Clause 19. At the end of the period, the insulation is subjected to the electric strength test of 16.3 at the conditioning temperature and also after it has cooled down to room temperature. (IEC 60335-1/A1)		NA

30	RESISTANCE TO HEAT AND FIRE		—
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		P
	thermoplastic material providing supplementary or reinforced insulation,		NA
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts: at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C)	(see appended table)	P
	Parts supporting live parts: at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125°C, whichever is the higher; temperature (°C).....	(see appended table)	P
	Parts of thermoplastic material providing supplementary or reinforced insulation, 25°C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C).....		NA
30.2	Parts of non-metallic material adequately resistant to ignition and spread of fire		P

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Clause	Requirement - Test	Result - Remark	Verdict
	This requirement does not apply to decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		NA
	Compliance checked by the test of 30.2.1. In addition:		P
	- attended appliances, 30.2.2 applies		NA
	- unattended appliances, 30.2.3 applies		P
	Appliances for remote operation, 30.2.3 applies		NA
	Base material of printed circuit board, 30.2.4 applies		NA
30.2.1	Glow-wire test of IEC 60695-2-11 at 550 °C, unless		P
	the material is classified at least HB40 according to IEC 60695-11-10		NA
	Parts for which the glow-wire test cannot be carried out meet the requirements in ISO9772 for category HBF material		NA
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	Test not applicable to conditions as specified		NA
30.2.3.1	Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and		P
	parts of insulating material within a distance of 3mm,		P
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850℃		P
	Glow-wire test not carried out on parts of material classified as having a glow-wire flammability index of at least 850℃ according to IEC 60695-2-12		NA
	Glow-wire test not carried out on small parts that comply with the needle-flame test of Annex E or on small parts of material classified as V-0 or V-1 according to IEC 60695-11-10		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Test as specified for an interposed shielding material		P
30.2.3.2	Parts of insulating material supporting current-carrying connections, and		P
	parts of insulating material within a distance of 3mm,		P
	subjected to glow-wire test of IEC 60695-2-11		P
	Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		NA
	-775°C, for connections carrying a current exceeding 0,2A during normal operation		NA
	-675°C, for other connections		NA
	When the glow-wire test of IEC 60695-2-11 is carried out, the temperatures are:		—
	-750°C, for connections carrying a current exceeding 0,2A during normal operation		P
	-650°C, for other connections		NA
	Parts that during the test produce a flame persisting longer than 2 s, tested as specified		NA
	If a flame persists longer than 2 s during the test, parts above the connection, as specified, subjected to the needle-flame test of annex E, unless		NA
	the material is classified as V-0 or V-1 according to IEC 60695-11-10		NA
30.2.4	Base material of printed circuit boards subjected to needle-flame test of annex E		NA
	Test not applicable to conditions as specified		NA
31	RESISTANCE TO RUSTING		—
	Relevant ferrous parts adequately protected against rusting		P

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		—
	Appliance shall not emit harmful radiation, present a toxic or similar hazard due to their operation in normal use		P
	Relevant tests specified in part 2, if necessary		NA
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		—
	Description of routine tests to be carried out by the manufacturer		NA
B	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES		—
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		NA
	This annex does not apply to battery chargers		NA
3.1.9	Appliance operated under the following conditions:		—
	-the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		NA
	-the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		NA
	-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		NA
	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		NA
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		NA
5.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		NA
7.12	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		NA
	Details about how to remove batteries containing materials hazardous to the environment given		NA
7.15	Markings placed on the part of the appliance connected to the supply mains		NA
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		NA
	If the appliance can be operated without batteries, double or reinforced insulation required		NA
11.7	The battery is charged for the period described		NA
19.1	Appliances subjected to tests of 19.101, 19.102 and 19.103		NA
19.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		NA
19.102	Short-circuiting of the terminals of the battery, being fully charged, for appliances having batteries that can be removed without the aid of a tool		NA
19.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		NA
21.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength, checked according to procedure 2 of IEC 68-2-32		NA
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-32, the number of falls being:		—

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	- 100, the mass of part does not exceed 250 g		NA
	- 50, the mass of part exceeds 250 g		NA
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		NA
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		NA
25.13	An additional lining or bushing not required for interconnection cords operating at safety extra-low voltage		NA
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		NA
	For other parts, 30.2.2 applies		NA
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		—
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		NA
D	ANNEX D (NORMATIVE) THERMAL MOTOR PROTECTORS		—
	Applicable to appliances having motors that incorporate thermal motor protectors		NA
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		—
	Needle-flame test carried out in accordance with IEC 60695-2-2, with the following modifications:		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
7	Severities		——
	The duration of application of the test flame is 30 s ± 1 s		NA
9	Test procedure		——
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		NA
9.2	The first paragraph does not apply		NA
	If possible, the flame is applied at least 10 mm from a corner		NA
9.3	The test is carried out on one specimen		NA
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		NA
11	Evaluation of test results		——
	The duration of burning not exceeding 30 s		NA
	However, for printed circuit boards, the duration of burning not exceeding 15 s		NA
F	ANNEX F (NORMATIVE) CAPACITORS		—
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		NA
1.5	Terminology		——
1.5.3	Class X capacitors tested according to subclass X2		NA
1.5.4	This subclause is applicable		NA
1.6	Marking		——
	Items a) and b) are applicable		NA
3.4	Approval testing		——
3.4.3.2	Table II is applicable as described		NA
4.1	Visual examination and check of dimensions		——

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	This subclause is applicable		NA
4.2	Electrical tests		——
4.2.1	This subclause is applicable		NA
4.2.5	This subclause is applicable		NA
4.2.5.2	Only table IX is applicable		NA
	Values for test A apply		NA
	However, for capacitors in heating appliances the values for test B or C apply		NA
4.12	Damp heat, steady state		——
	This subclause is applicable		NA
	Only insulation resistance and voltage proof are checked		NA
4.13	Impulse voltage		——
	This subclause is applicable		NA
4.14	Endurance		——
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		NA
4.14.7	Only insulation resistance and voltage proof are checked		NA
	Visual examination, no visible damage		NA
4.17	Passive flammability test		——
	This subclause is applicable		NA
4.18	Active flammability test		——
	This subclause is applicable		NA
G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		—
	The following modifications to this standard are applicable for safety isolating transformers:		NA
7	Marking and instructions		——
7.1	Transformers for specific use marked with:		——

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	-name, trademark or identification mark of the manufacturer or responsible vendor		NA
	-model or type reference		NA
17	Overload protection of transformers and associated circuits		——
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		NA
22	Construction		——
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		NA
29	Clearances, creepage distances and solid insulation		——
29.1, 29.2 and 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		NA
H	ANNEX H (NORMATIVE) SWITCHES		—
	Switches comply with the following clauses of IEC 61058-1, as modified:		——
	-The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		NA
	-Before being tested, switches are operated 20 times without load		NA
8	Marking and documentation		——
	Switches are not required to be marked		NA
	However, switches that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		NA
13	Mechanism		——
	The tests may be carried out on a separate sample		NA
15	Insulation resistance and dielectric strength		——
15.1	Not applicable		NA
15.2	Not applicable		NA
15.3	Applicable for full disconnection and micro-disconnection		NA

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Clause	Requirement - Test	Result - Remark	Verdict
17	Endurance		——
	Compliance is checked on three separate appliances or switches		NA
	For 17.2.4.4, the number of cycles is 10 000, unless otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335		NA
	Switches for operation under no load and which can be operated only by a tool and switches operated by hand that are interlocked so that they cannot be operated under load, are not subjected to the tests		NA
	Subclauses 17.2.2 and 17.2.5.2 not applicable (IEC 60335-1:2001/A1)		NA
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1 (IEC 60335-1:2001/A1)		NA
	Temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1		NA
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		——
	This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in table 24		NA
I	ANNEX I (NORMATIVE) MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE		—
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		NA
8	Protection against access to live parts		——
8.1	Metal parts of the motor are considered to be bare live parts		NA
11	Heating		——

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
11.3	Temperature rise of the body of the motor is determined instead of the temperature rise of the windings		NA
11.8	Temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		NA
16	Leakage current and electric strength		——
16.3	Insulation between live parts of the motor and its other metal parts not subjected to the test		NA
19	Abnormal operation		——
19.1	The tests of 19.7 to 19.9 not carried out		NA
19.101	Appliance operated at rated voltage with each of the following fault conditions:		——
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		NA
	- short circuit of each diode of the rectifier		NA
	- open circuit of the supply to the motor		NA
	- open circuit of any parallel resistor, the motor being in operation		NA
	Only one fault simulated at a time, the tests carried out consecutively		NA
22	Construction		——
22.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		NA
	Compliance checked by the tests specified for double and reinforced insulation		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
J	ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS		—
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		NA
5.7	Conditioning of the test specimens		NA
	When production samples are used, three samples of the printed circuit board are tested		NA
5.7.1	Cold		NA
	The test is carried out at -25°C		NA
5.7.3	Rapid change of temperature		——
	Severity 1 is specified		NA
5.9	Additional tests		——
	This subclause is not applicable		NA
K	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		—
	The information on overvoltage categories is extracted from IEC 60664-1		P
	Overvoltage category is a numeral defining a transient overvoltage condition		P
	Equipment of overvoltage category IV is for use at the origin of the installation		NA
	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		NA
	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		NA
	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		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		—
	Sequences for the determination of clearances and creepage distances		P
M	ANNEX M (NORMATIVE) POLLUTION DEGREE		—
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		—
	The microenvironment determines the effect of pollution on the insulation, taking into account the microenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		—
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		—
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		P
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		NA
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		NA
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		NA

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		—
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		P
7	Test apparatus		—
7.3	Test solutions		—
	Test solution A is used (IEC 60335-1:2001/A1)		P
10	Determination of proof tracking index (PTI) (IEC 60335-1:2001/A1)		—
10.1	Procedure (IEC 60335-1:2001/A1)		—
	The proof voltage is 100V, 175V, 400V or 600V . (IEC 60335-1:2001/A1)	175V	P
	The last paragraph of Clause 3 applies (IEC 60335-1:2001/A1)		P
	The test is carried out on five specimens (IEC 60335-1:2001/A1)		P
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100 (IEC 60335-1:2001/A1)		NA
10.2	Report		—
	The report stating if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V (IEC 60335-1:2001/A1)		NA
O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		—
	Description of tests for determination of resistance to heat and fire		P
P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES (IEC 60335-1:2001/A1)		—
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WDaE (IEC 60335-1:2001/A1)		——

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WdaE, if liable to be connected to a supply mains that excludes the protective earthing conductor (IEC 60335-1:2001/A1)		——
5	General conditions for the tests (IEC 60335-1:2001/A1)		—
5.7	The ambient temperature for the tests of Clauses 11 and 13 is 40 $^{+3}/_{0}$ (IEC 60335-1:2001/A1)		NA
7	Marking and instructions (IEC 60335-1:2001/A1)		—
7.1	The appliance marked with the letters WDaE (IEC 60335-1:2001/A1)		NA
7.12	The instructions state that the appliance is to be supplied through a RCD having a rated residual operating current not exceeding 30 mA (IEC 60335-1:2001/A1)		NA
	The instructions state that the appliance is considered to be suitable for use in countries having a warm damp equable climate, but may also be used in other countries (IEC 60335-1:2001/A1)		NA
11	Heating (IEC 60335-1:2001/A1)		—
11.8	The values of Table 3 are reduced by 15 K (IEC 60335-1:2001/A1)		NA
13	Leakage current and electric strength at operating temperature (IEC 60335-1:2001/A1)		—
13.2	The leakage current for class I appliances not exceeding 0,5 mA (IEC 60335-1:2001/A1)		NA
15	Moisture resistance (IEC 60335-1:2001/A1)		—
15.3	The value of t is 37 °C (IEC 60335-1:2001/A1)		NA
16	Leakage current and electric strength (IEC 60335-1:2001/A1)		—
16.2	The leakage current for class I appliances not exceeding 0,5 mA (IEC 60335-1:2001/A1)		NA
19	Abnormal operation (IEC 60335-1:2001/A1)		—

IEC / EN 60335-2-41			
Clause	Requirement - Test	Result - Remark	Verdict
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3 (IEC 60335-1:2001/A1)		NA
Q	ANNEX Q (INFORMATIVE) SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS		NA
	Description of tests for appliances incorporating electronic circuits		NA
R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION (IEC 60335-1:2001/A1)		—
	Software evaluated in accordance with the following clauses of Annex H of IEC 60730-1, as modified (IEC 60335-1:2001/A1)		—
H.2	Definitions (IEC 60335-1:2001/A1)		—
	Only definitions H.2.16 to H.2.20 applicable (IEC 60335-1:2001/A1)		NA
H.7	Information (IEC 60335-1:2001/A1)		—
	Only footnotes 12) to 18) of Table 7.2, as modified, applicable (IEC 60335-1:2001/A1)		NA
H.11.12	Controls using software (IEC 60335-1:2001/A1)		—
	All the subclauses of H.11.12, as modified, except H.11.12.6 and H.11.12.6.1, applicable (IEC 60335-1:2001/A1)		NA
H.11.12.7	Delete text (IEC 60335-1:2001/A1)		—
H.11.12.7.1	For appliances using software class C having a single channel with self-test and monitoring structure, the manufacturer provides the measures necessary to address the fault/errors in safety related segments and data (IEC 60335-1:2001/A1)		NA
H.11.12.8	Software fault/error detection occurs before compliance with 19.13 of IEC 60335-1 is impaired (IEC 60335-1:2001/A1)		NA
H.11.12.8.1	Replace text (IEC 60335-1:2001/A1)		NA
H.11.12.13	Software and safety related hardware under its control initializes and terminates before compliance with 19.13 of IEC 60335-1 is impaired (IEC 60335-1:2001/A1)		NA

ZA	ANNEX ZA, SPECIAL NATIONAL CONDITIONS (EN 60335-1:2002)		——
7.12	DENMARK: requirements regarding marking tag of power supply cord and connecting of earthing wire		ND
19.5	NORWAY: the test is also applicable to appliances intended to be permanently connected to fixed wiring		ND
22.2	FRANCE, NORWAY: The second paragraph of this subclause dealing with single-phase Class I permanently connected appliances with heating elements is not applicable due to the supply system	For France	NA
25.6	BELGIUM, FRANCE, SPAIN , UNITED KINGDOM: plugs according to Standard Sheet C2b not allowed	For France	P
	AUSTRIA, FINLAND, GERMANY, ICELAND, IRELAND, ITALY, LUXEMBOURG, NETHERLANDS, NORWAY, PORTUGAL, SPAIN, SWEDEN, SWITZERLAND, UNITED KINGDOM: plugs according to Standard C3b not allowed		ND
	DENMARK: Supply cords of single-phase portable appliances having a rated current not exceeding 13 A provided with a plug according to the following:		——
	- Class I appliances: Section 107-2-D1 Standard Sheet DK2-1a		ND
	For appliances covered by a Part 2 of EN 60 335, also plugs in accordance with Section 107-2-D1 Standard Sheet C2b, C3b or C4 are allowed		ND
	- Class II appliances: Section 107-2-D1, Standard Sheet C1b ,C5, C6, DKA2-1a and DKA2-1b		ND
	Stationary single-phase appliances, having a rated current not exceeding 13 A, and provided with a plug, the plug is in accordance with the requirements above		ND
	Multi-phase appliances and single-phase appliances having a rated current exceeding 13 A, and provided with a plug, the plug is in accordance with the requirements below:		——

	- Class I appliances: Section 107-2-D1, Standard Sheet DK6-1a/EN 60 309-2, Standard Sheet 2-II, 2-IV		ND
	- Class II appliances: Section 107-2-D1, Standard Sheet DK6-1a*/2-II, 2-IV*		ND
	For max. allowed current values see EN 60335-1		ND
	IRELAND: plug is in accordance with Standard Sheets B2 and C2b (see annex ZB as well)		ND
	ITALY: Only plugs listed in CENELEC Report ROBT-005:2001 are allowed		ND
	SPAIN: For household appliances the following plugs only are allowed:		——
	- UNE 20315:ESC 10-1b, C2b, C4, C6, or ESB 25-5b;		ND
	- UNE-EN 50075		ND
	SWITZERLAND: supply cords of portable household and similar electrical appliances, 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:		——
	SEV 6532-2:1991 plug type 15 3P+N+PE 250/400 V, 10 A		ND
	SEV 6533-2:1991 plug type 11 L+N 250 V, 10 A		ND
	SEV 6534-2:1991 plug type 12 L+N+PE 250 V, 10 A		ND
	UNITED KINGDOM: plug according to Standard Sheet B2 or C5 used (refer to Annex ZB)		ND
25.8	IRELAND, UNITED KINGDOM: replacement of figures (rated current/cross-sectional area) in the table		ND
ZB	ANNEX ZB, A-DEVIATIONS (EN 60335-1:2002)		——
4	SWITZERLAND: information about batteries		ND
7.1	ITALY: the voltage is 220 V/380 V		ND
	SPAIN: the voltages are 127 V/220 V and 220 V/380 V		ND

25.6	IRELAND / UNITED KINGDOM: regulations concerning plugs to be fitted to domestic appliances		ND
	UNITED KINGDOM: 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.		ND
ANNEX ZC (normative)	Normative references to international publications with their corresponding European publications (EN 60335-1)		P
ANNEX ZD (informative)	IEC and CENELEC code designations for flexible cords (EN 60335-1)		P

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
19.14	Appliances are operated under the conditions of Clause 11. Any contactor or relay contact that operates under the conditions of Clause 11 is short-circuited.		NA
	If a relay or contactor with more than one contact is used, all contacts are short-circuited at the same time.		NA
24.1	Components shall comply with the safety requirements specified in the relevant standards as far as they reasonably apply.		P
	Unless otherwise specified, the requirements of Clause 29 of this standard apply between live parts of components and accessible parts of the appliance.		P
	Unless otherwise specified, the requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components.		NA
	Components that have not been previously tested or do not comply with the standard for the relevant component are tested according to the requirements of 30.2 of this standard.		NA

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
	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.		NA
	Components that have not been separately tested and found to comply with the relevant standard, components that are not marked or not used in accordance with their marking, are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard.		P
	Lampholders and starterholders that have not been previously tested and found to comply with the relevant standard are tested as a part of the appliance and shall additionally comply with the gauging and interchangeability requirements of the relevant standard under the conditions occurring in the appliance.	No such parts	NA
	Where the relevant standard for lampholders and starterholders specifies gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of Clause 11 are used.		NA
	When no standard does exist for a component, there are no additional tests specified.		NA
25.7	Their properties shall be at least those of ordinary tough rubber sheathed cords (code designation 60245 IEC 53).		P
	These cords are not suitable for appliances intended to be used outdoors or when they are liable to be exposed to significant amounts of ultraviolet radiation.		NA
26.2	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain it in position unless they are held in place near the terminals independently of the solder.		NA
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 it in position unless they are held in place near the terminals independently of the solder.		NA

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
29.2	In a double insulation system, the working voltage for both the basic insulation and supplementary insulation is taken as the working voltage across the complete double insulation system. It is not divided according to thickness and dielectric constant of the basic insulation and supplementary insulation.		NA
32	Compliance regarding electromagnetic fields is checked according to EN 50366 or EN 62233.		P
ANNEX ZC	(INFORMATIVE)		—
	EN standards and EN standards used		P
ANNEX ZE	Specific additional requirements for appliances and machines intended for commercial use (INFORMATIVE)		—
7.1	Replace the fourth and fifth dashed items by:	Not for commercial use	—
	- business name and full address of the manufacturer and, where applicable, his authorized representative;		NA
	- model or type reference, serial number, if any, and production year.		NA
	Add a new dashed item:		—
	- designation of the appliance.		NA
7.12	Replace the first sentence in the requirement by:		—
	Instructions shall be provided with the appliance so that the appliance can be used safely.		NA
	Add:		—
	The instructions shall contain at least the following information:		NA
	- the business name and full address of the manufacturer and, where applicable, his authorized representative;		NA
	- model or type reference of the appliance as marked on the appliance itself, except for the serial number;		NA
	- the designation of the appliance together with its explanation in case it is given by a combination of letters and/or numbers.		NA
	- the general description of the appliance, when needed due to the complexity of the appliance;		NA
	- specific precautions if required during installation, operation, adjusting, user maintenance, cleaning, repairing or moving;		NA

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
	- when needed drawings, diagrams, descriptions and explanations necessary for the safe use and user maintenance of the appliance;		NA
	- the possible reasonably foreseeable misuse and, whenever relevant, a warning against the effects it may have on the safe use of the appliance		NA
	The words “Original instructions” shall appear on the language version(s) verified by the manufacturer or by the authorized representative.		NA
	When a translation of the original instructions has been provided by a person introducing the appliance on the market; the meaning of the sentence “Translation of the original instructions” has to appear in the relevant instructions delivered with the appliance.		NA
	The instructions for maintenance/service to be done by specialized personnel, mandated by the manufacturer or the authorized representative may be supplied in only one Community language which the specialized personnel understand.		NA
	The instructions shall indicate the type and frequency of inspections and maintenance required for safe operation including the preventive maintenance measures.		NA
7.12.Z1	Wherever needed for specific appliances, information shall be given:		NA
	- on use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns, if these operations have consequences on stability of the appliance in order to avoid overturning, falling or uncontrolled movements of the appliance or of its component parts;		NA
	- on how to maintain adequate mechanical stability when in use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance;		NA
	- on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided;		NA
	- on the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur the operating method to safely unblock the appliance;		NA
	- on the specifications on the spare parts to be used, when these affect the health and safety of the operator;		NA

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
	-on airborne noise emissions, determined and declared in accordance with the relevant Part 2. This includes:		NA
	the A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A); where this level does not exceed 70 dB(A), this fact shall be indicated,		NA
	the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 μPa),		NA
	the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A).		NA
19.11.4.8	Replace the second paragraph by:		—
	The appliance shall continue to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage fluctuation occurred, or a manual operation shall be required to restart it.		NA
20.1	Add at the end:		—
	Appliances and their components and fittings shall have adequate mechanical stability during transportation, assembly, dismantling and any other action involving the appliance.		NA
	Compliance is checked by verifying the instruction and by the relevant tests, if necessary, as specified in the relevant Part 2.		NA
20.2	Replace the requirements and notes by:		—
	Dangerous moving transmission parts shall be safeguarded either by design or guards. When guards are used, they shall be fixed guards, interlocking movable guards or protective devices.		NA
	Moving parts directly involved in the function of the appliance which cannot be made completely inaccessible shall be fitted with:		NA
	— fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work; and		NA
	— adjustable guards restricting access to those sections of the moving parts where access is necessary.		NA
	Interlocking movable guards (e.g. the door of a washing machine) shall be used where frequent access is required.		NA
21.1	Replace the first paragraph by:		—

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliances and their components and fittings shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance.		NA
22.ZE.1	For appliances provided with a seat, the seat has to give adequate stability. The distance between the seat and the control devices shall be capable of being adapted to the operator.		NA
	Compliance is checked by inspection.		NA
22.ZE.2	For appliances provided with separate devices for the start and the stop functions, the stop function shall be unambiguously identifiable and shall always override the start function.		NA
	For appliances provided with one device performing the start and the stop function, the stop function shall be unambiguously identifiable and shall always override the start function.		NA
	Compliance is checked by inspection and by manual test.		NA
22.ZE.3	Appliances shall be designed in such a way that incorrect mounting is avoided, if this can lead to an unsafe situation. If this is not possible, information on the correct mounting shall be given directly on the part and/or the enclosure.		NA
	Compliance is checked by inspection.		NA
22.ZE.4	Where the weight, size or shape prevents appliances from being moved manually, they shall be fitted with attachments for lifting gear or be designed so they can be fitted with such attachments, or be shaped in such a way that standard lifting gear can easily be used.		NA
	Appliances to be moved manually shall be constructed or shall be equipped so that they can be moved easily and safely.		NA
	Compliance is checked by inspection.		NA
22.ZE.5	The fixing systems of fixed guards which prevent access to dangerous moving transmission parts shall only be removable with the use of tools.		NA
	If such guards have to be removed frequently their fixing systems shall remain attached to the fixed guards or to the machine after removal. Where possible, guards shall be incapable of remaining in place without their fixings.		NA

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
	This does not apply if, after removal of the screws, or if the component is incorrectly repositioned, the appliance becomes inoperative.		NA
	If movable guards are interlocked, the interlocking devices shall prevent the start of hazardous appliance functions until the guards are fixed in their position, and give a stop command whenever they are no longer closed.		NA
	Where it is possible for an operator to reach the danger zone before the risk due to hazardous appliance functions has ceased, movable guards shall be associated with a guard locking device in addition to an interlocking device that		NA
	— prevents the start of hazardous appliance functions until the guard is closed and locked, and		NA
	— keeps the guard closed and locked until the risk of injury from the hazardous appliance functions has ceased.		NA
	Interlocking movable guards shall remain attached to the appliance when open and they shall be designed and constructed in such a way that they can be adjusted only by means of an intentional action.		NA
	Compliance is checked by inspection.		NA
	Interlocking movable guards shall be designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous appliance functions.		NA
	Compliance is checked by inspection and by the following tests.		NA
	The guard is opened to the extent needed to cause the interlocking to operate and is then closed. This operation is carried out for the number of cycles as defined, if relevant, in the specific Part 2.		NA
	After this test any defect that may be expected in normal use is applied to the interlock system, including interruption of the supply, only one defect being simulated at a time.		NA
	After these tests the interlock system shall be fit for further use.		NA
	Adjustable guards restricting access to those areas of the moving parts strictly necessary for the work shall be		NA
	— adjustable manually or automatically, depending on the type of work involved, and		NA
	— readily adjustable without the use of tools.		NA

EN 60335-1/A14: 2010			
Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by inspection.		NA
22.ZE.6	In case of interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply, the appliance shall not restart, however automatic restarting of the operation is allowed if the appliance may continue to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage interruption or fluctuation occurred.		NA
	Compliance is checked by inspection		N/A
ANNEX ZF	Criteria applied for the allocation of products covered by standards in the EN 60335 series under LVD or MD (INFORMATIVE)		P
ANNEX ZZ	Coverage of Essential Requirements of EC Directives (INFORMATIVE)		P

EN 60335-1/ A15: 2011			
Clause	Requirement – Test	Result - Remark	Verdict
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		—
25.7	Add the following text after the last dash and before the paragraph regarding “Supply cords for class III appliance“		NA
	-Halogen-free thermoplastic compound sheathed. Their properties shall be at least those of:		NA
	Halogen-free thermoplastic compound sheathed cords(code designation H03Z1Z1H2-F, H03Z1Z1-F), for appliances having a mass not exceeding 3kg		NA
	Halogen-free thermoplastic compound sheathed cords(code designation H05Z1Z1H2-F, H05Z1Z1-F), for other appliances		NA
	-Cross-linked halogen-free compound sheathed. Their properties shall be at least those of cross-linked halogen-free compound sheathed cords(code designation H07ZZ-F)		NA

EN 60335-2-41/ A2: 2010			
Clause	Requirement – Test	Result - Remark	Verdict
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		—
25.8	Add the following new paragraph to the addition: The supply cord of submersible pumps, other than		NA

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	class III pumps, aquarium pumps and table fountain pumps, shall have a length of at least 3 m in excess of the maximum operating depth marked on the pump.		
30	RESISTANCE TO HEAT AND FIRE		—
30.2	Modification: For all pumps, 30.2.2 is not applicable. In addition, 30.2.3 is not applicable to submersible pumps if their live parts are completely contained within an enclosure of metal or porcelain and the instructions state that the pump shall be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.		P

ANNEX EMF	**for all models**		
	The Tested product also complies to the requirements of EN 62233:2008		P
	Limit ……100%	Measured max. :1,762%	P

10.1	TABLE: Power input deviation				P
Input deviation of/at:	P rated (W)	P measured (W)	dP	Required dP	Remark
230V, 50Hz (for SA-3766E)	26	28,8	+10,7%	+20%	P
230V, 50Hz (for LH-3787F)	85	79,4	-6,5%	+20%	P
230V, 50Hz (for SA-3767F)	98	113,4	+15,7%	+20%	P
230V, 50Hz (for SA-3755)	23	22,3	-3%	+20%	P
230V, 50Hz (for SA-3766)	46	41,8	-9,1%	+20%	P
230V, 50Hz (for SA-3767)	98	81,9	-16,4%	+20%	P

11.8	TABLE: Heating test, thermocouples (1,06 times is more unfavourable) SA-3766E		P
	Test voltage (V)…:	254,4	—
	Ambient, t_1 (°C)…:	19,5	—
	Ambient, t_2 (°C)…:	19,5	—

Thermocouple locations	dT (K)	Max. dT (K)
Separation of cord	26	50
Enclosure of motor	38	For clause 30
Enclosure	18	60 / For clause 30
Test corner	8	65
Water temperature (°C)	34,5	

Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	Max. dT (K)	Insulation class
Stator of pump	237,3	290,84	57	95	Class130

11.8	TABLE: Heating test, thermocouples (1,06 times is more unfavourable) SA-3755		P
	Test voltage (V).....:	254,4	—
	Ambient, t_1 (°C).....:	22,2	—
	Ambient, t_2 (°C).....:	22,2	—

Thermocouple locations	dT (K)	Max. dT (K)
Separation of cord	26	50
Enclosure of motor	28	For clause 30
Enclosure	16	60 / For clause 30
Test corner	5	65
Water temperature (°C)	35,0	

Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	Max. dT (K)	Insulation class
Stator of pump	377,3	454,05	50	95	Class130

11.8	TABLE: Heating test, thermocouples (1,06 times is more unfavourable) LH-3787F		P
	Test voltage (V).....:	254,4	—
	Ambient, t_1 (°C).....:	24,2	—
	Ambient, t_2 (°C).....:	24,4	—

Thermocouple locations	dT (K)	Max. dT (K)
Separation of cord	29	50
Enclosure of motor	31	For clause 30
Enclosure	15	60 / For clause 30
Test corner	7	65
Water temperature (°C)	34,5	

Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	Max. dT (K)	Insulation class
Stator of pump	33,32	41,207	61	95	Class130

11.8	TABLE: Heating test, thermocouples (1,06 times is more unfavourable) SA-3767F		P
	Test voltage (V).....:	254,4	—
	Ambient, t_1 (°C).....:	21,9	—

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	Ambient, t_2 (°C).....:		22,0		—
Thermocouple locations		dT (K)		Max. dT (K)	
Separation of cord		28		50	
Enclosure of motor		24		For clause 30	
Enclosure		20		60 / For clause 30	
Test corner		3		65	
Water temperature (°C)		34,6			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	Max. dT (K)	Insulation class
Stator of pump	59,7	74,4	65	95	Class130

11.8	TABLE: Heating test, thermocouples (1,06 times is more unfavourable) SA-3766				P
	Test voltage (V).....:		254,4		—
	Ambient, t_1 (°C).....:		19,7		—
	Ambient, t_2 (°C).....:		19,8		—
Thermocouple locations		dT (K)		Max. dT (K)	
Separation of cord		38		50	
Enclosure of motor		40		For clause 30	
Enclosure		15		For clause 30	
Test corner		6		65	
Water temperature (°C)		34,5			
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	Max. dT (K)	Insulation class
Stator of pump	138,1	170	63	95	Class130

11.8	TABLE: Heating test, thermocouples (1,06 times is more unfavourable) SA-3767				P
	Test voltage (V).....:		254,4		—
	Ambient, t_1 (°C).....:		18,0		—
	Ambient, t_2 (°C).....:		18,6		—
Thermocouple locations		dT (K)		Max. dT (K)	
Separation of cord		18		50	
Enclosure of motor		46		For clause 30	
Enclosure		10		For clause 30	
Test corner		8		65	

Water temperature (°C)			34,5		
Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	Max. dT (K)	Insulation class
Stator of pump	32,1	41,5	73	95	Class130

13.2	TABLE: Leakage current (for all models)		P
	Heating appliances: 1.15 x rated input .....:	-	—
	Motor-operated and combined appliances: 1.06 x rated voltage .....:	254,4	—

Leakage current between	I (mA)	Max. allowed I (mA)
L/N and motor enclosure	Max: 0,029	0,25
L/N and earthing conductor	Max: 0,028	0,75

13.3	TABLE: Electric strength (for all models)	P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
L/N and enclosure	3000	No
L/N and earthing conductor	1000	No

16.2	TABLE: Leakage current (for SA-3766E & SA-3767F)		P
	Single phase appliances: 1.06 x rated voltage.....:	254,4	—
	Three phase appliances 1.06 x rated voltage divided by √3:.....:	—	—

Leakage current between	I (mA)	Max. allowed I (mA)
L/N and enclosure	Max: 0,033	0,25
L/N and earthing conductor	Max: 0,029	0,75

16.3	TABLE: Electric strength (for SA-3766E & SA-3767F)	P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
L/N and earthing conductor	1250	No
L/N and enclosure	3000	No

19.7	TABLE: Abnormal operation, locked rotor/moving parts (for SA-3766E)		P
	Test voltage (V).....:	240	—
	Ambient, t_1 (°C).....:	19,8	—

	Ambient, t_2 (°C).....:		19,9		—
Temperature of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (℃)
Stator of pump	237,3	312,29	78	98	225
Note : Motor protector was operated during the test					

19.7	TABLE: Abnormal operation, locked rotor/moving parts (for SA-3755)				P
	Test voltage (V).....:		240		—
	Ambient, t_1 (°C).....:		20,3		—
	Ambient, t_2 (°C).....:		20,4		—
Temperature of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (℃)
Stator of pump	377,3	495,4	79	99	225
Note : Motor protector was operated during the test					

19.7	TABLE: Abnormal operation, locked rotor/moving parts (for SA-3767F)				P
	Test voltage (V).....:		240		—
	Ambient, t_1 (°C).....:		21,4		—
	Ambient, t_2 (°C).....:		21,6		—
Temperature of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (℃)
Stator of pump	59,7	78,8	85	106	225
Note : Motor protector was operated during the test					

19.7	TABLE: Abnormal operation, locked rotor/moving parts (for SA-3766)				P
	Test voltage (V).....:		240		—
	Ambient, t_1 (°C).....:		21,1		—
	Ambient, t_2 (°C).....:		21,3		—
Temperature of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (℃)
Stator of pump	138,1	181,4	82	104	225
Note : Motor protector was operated during the test					

19.7	TABLE: Abnormal operation, locked rotor/moving parts (for SA-3787F)				P
	Test voltage (V).....:		240		—
	Ambient, t_1 (°C).....:		21,8		—
	Ambient, t_2 (°C).....:		22,0		—

Temperature of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (℃)
Stator of pump	33,3	42,2	71	93	225
Note : Motor protector was operated during the test					

19.7	TABLE: Abnormal operation, locked rotor/moving parts (for SA-3767)				P
	Test voltage (V).....:	240			—
	Ambient, t_1 (°C).....:	18,0			—
	Ambient, t_2 (°C).....:	20,1			—
Temperature of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (℃)
Stator of pump	32,1	43,4	87	107	225
Note : Motor protector was operated during the test					

19.13	TABLE: Abnormal operation, temperature rises (for all models)	P
Thermocouple locations	dT (K)	Max. dT (K)
Separation of cord	41	150
Enclosure of motor	54	For clause 30
Enclosure	26	For clause 30
Test corner	12	150
Note : only the most unfavourable result were recorded.		

24.1	TABLE: Components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Plug	Ningbo Qiaopu Electric Co., Ltd	D03-F	AC250V, 16A	DIN VDE 0620	VDE 40003059
Alternative	Ningbo Haoda Electronics Co., Ltd.	YD-3F	AC250V, 16A	DIN VDE 0620	VDE 40023203
Alternative	Ningbo Linsheng Electric Co., Ltd.	LA017D	AC250V, 16A	DIN VDE 0620	VDE 40027581
Alternative	NINGBO XUANHUA ELECTRIC CO. LTD.	XH03-F	AC250V, 16A	DIN VDE 0620	VDE 40017189
Alternative	Yuyao Jingyi Electronics Co., Ltd.	JY03-F	AC250V, 16A	DIN VDE 0620	VDE 40020796

Alternative	Kunshan Baideli Electronics Co., Ltd.	BDL-021A	AC250V, 16A	DIN VDE 0620	TUV R 50164871
Alternative	Shangyu Jintao Electron Co., Ltd.	JT003-F	AC250V, 16A	DIN VDE 0620	VDE 40023496
Supply cord	Ningbo Qiaopu Electric Co., Ltd.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40035531
Alternative	Zhejiang Shuangyang Group Co., Ltd.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40027140
Alternative	Ningbo Haoda Electronics Co., Ltd.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40016320
Alternative	Ningbo Linsheng Electric Co., Ltd.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40027485
Alternative	NINGBO XUANHUA ELECTRIC CO. LTD.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40016551
Alternative	Yuyao Jingyi Electronics Co., Ltd.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40017356
Alternative	Zheng Yu Electric Appliance Fittings (Kunshan) Co., Ltd.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40016693
Alternative	Shangyu Jintao Electron Co., Ltd.	H05RN-F	3G0,75mm²	DIN VDE 0282	VDE 40018106
Thermal cut-out	Wuxi Jinbiao Electric Appliance Co., Ltd.	JWa	AC250V 90ºC	EN 60730	VDE 40016105
Alternative	Baoying Electric Appliances Factory	JW6-II-90	AC250V 90ºC	EN 60730	VDE 40025431
Motor (for model SA-3767)	Kunshan Lianhua printing Ltd.	-	AC220-240V 98W 50Hz Winding resistance: 34,8Ω (at22ºC)	EN 60335-2-41	Test with appliance

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Motor (for model SA-3766)	Kunshan Lianhua printing Ltd.	-	AC220-240V 46W 50Hz Winding resistance: 74,9Ω (at22ºC)	EN 60335-2-41	Test with appliance
Alternative	**Kunshan Lianhua printing Ltd.**	**-**	**AC220-240V 46W 50Hz Winding resistance: 138,1Ω (at22ºC)**	**EN 60335-2-41**	**Test with appliance**
Motor (for model SA-3755)	Kunshan Lianhua printing Ltd.	-	AC220-240V 23W 50Hz Winding resistance: 200 Ω (at22ºC)	EN 60335-2-41	Test with appliance
Alternative	**Kunshan Lianhua printing Ltd.**	**-**	**AC220-240V 23W 50Hz Winding resistance: 385 Ω (at22ºC)**	**EN 60335-2-41**	**Test with appliance**
Motor (for model SA-3766E)	**Kunshan Lianhua printing Ltd.**	**-**	**AC220-240V 26W 50Hz Winding resistance: 239,2Ω (at22ºC)**	**EN 60335-2-41**	**Test with appliance**
Motor (for model SA-3767F)	**Kunshan Lianhua printing Ltd.**	**-**	**AC220-240V 98W 50Hz Winding resistance: 59,7Ω (at22ºC)**	**EN 60335-2-41**	**Test with appliance**
Motor (for model LH-3787F)	**Kunshan Lianhua printing Ltd.**	**-**	**AC220-240V 85W 50Hz Winding resistance: 33,3Ω (at22ºC)**	**EN 60335-2-41**	**Test 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)
Earthing screw	3,77	II	1,2

29.1	TABLE: Clearances					P
	Overvoltage category ...	II				—
		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic	Functional	Supplementary	Reinforced	Verdict / Remark
330	0,5					NA

500	0,5					NA
800	0,5					NA
1 500	0,5					NA
2 500	1,5	X	X	X		P
4 000	3,0				X	P
6 000	5,5					NA
8 000	8,0					NA
10 000	11,0					NA

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree										
	1	2			3			Type of insulation			
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb	B*)	S*)	R*)	Verdict
>50	0,2	0,6	0,9	1,2	1,5	1,7	1,9		—	—	NA
>50	0,2	0,6	0,9	1,2	1,5	1,7	1,9	—		—	NA
>50	0,4	1,2	1,8	2,4	3,0	3,4	3,8	—	—		NA
>50 and ≤ 125	0,3	0,8	1,1	1,5	1,9	2,1	2,4		—	—	NA
>50 and ≤ 125	0,3	0,8	1,1	1,5	1,9	2,1	2,4	—		—	NA
>50 and ≤ 125	0,6	1,6	2,2	3,0	3,8	4,2	4,8	—	—		NA
>125 and ≤ 250	0,6	1,3	1,8	2,5	3,2	3,6	4,0	x	—	—	P
>125 and ≤ 250	0,6	1,3	1,8	2,5	3,2	3,6	4,0	—	x		P
>125 and ≤ 250	1,2	2,6	3,6	5,0	6,4	7,2	8,0	—	—	x	P
>250 and ≤ 400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	NA
>250 and ≤ 400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	NA
>250 and ≤ 400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		NA
>400 and ≤ 500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	NA
>400 and ≤ 500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	NA
>400 and ≤ 500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		NA
>500 and ≤ 800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		—	—	NA
>500 and ≤ 800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—		—	NA
>500 and ≤ 800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—		NA

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

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>8000 and ≤ 10000	64,0	80,0	112,0	160,0	200,0	220,0	250,0	—	—		NA
>10000 and ≤ 12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0		—	—	NA
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—		—	NA
>10000 and ≤12500	80,0	100,0	142,0	200,0	250,0	280,0	320,0	—	—		NA
*), B=Basic, S=Supplementary and R=Reinforced											

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

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

Enclosure of motor	80	1,2	2,0
Enclosure	75	1,1	2,0
Bobbin	125	1,5	2,0

30.2	TABLE: Glow-wire test	P

Part	Test temperature (°C)	Test result
Enclosure of motor	550	P
Enclosure	550	P
Bobbin	750 & 850	P
Heat shrinkable tube	750 & 850	P

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