

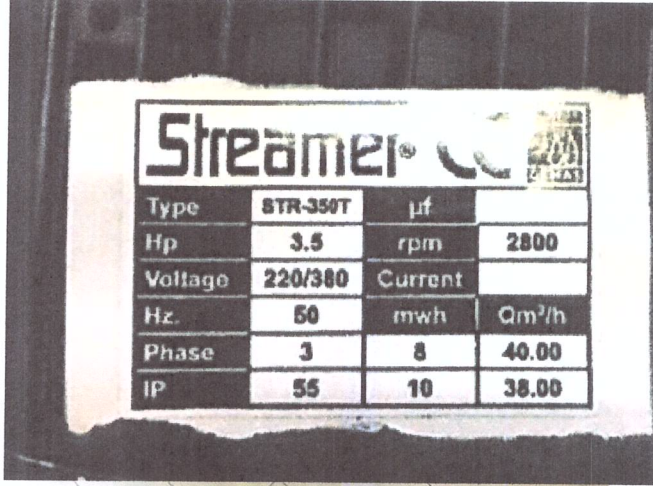
TEST REPORT IEC 60335-2-41 Safety of household and similar electrical appliances Part 2: Particular requirements for pumps	
Report Reference No.....	20180115-002
Compiled by (+ signature)	Cihangir HURSI TOĞLU
Approved by (+ signature)	Cengiz TAHIR
Date of issue.....	2018-10-12
CB Testing Laboratory	CETÜRK TEST VE BELGELENDİRME LİMİTED ŞİRKETİ
Address	İskitler Kazım Karabekir No:105/37 ALTINDAĞ/ANKARA – TÜRKİYE
Testing location/procedure.....	CBTL [] SMT [] TMP []
Address	
Applicant's name	GEMAŞ GENEL MÜHENDİSLİK MEKANİK SAN. TİC. A.Ş.
Address	İTOB OSB.1001 Sok. No:28 Menderes İZMİR-TURKIYE
Test specification:	
Standard	IEC 60335-2-41:2003 IEC 60335-1:2010 ,
Test procedure	CB Scheme
Non-standard test method.....	EN 60335-1: 2010 EN 60335-2-41: 2003
Test Report Form No	IEC60335_2_41F
TRF Originator.....	VDE
Master TRF.....	Dated 2013-12
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Test item description	
Manufacturer.....	GEMAŞ GENEL MÜHENDİSLİK MEKANİK SAN. TİC. A.Ş.
Trade Mark.....	GEMAS
Model/Type reference.....	STRN-80T, STRN-100T, STRN-150T, STRN-200T, STRN-300T, STRN-350T, STRM-80T, STRM-100T, STRM-150T
Ratings	380V~50 Hz; 0,55 KW – 2,60 KW

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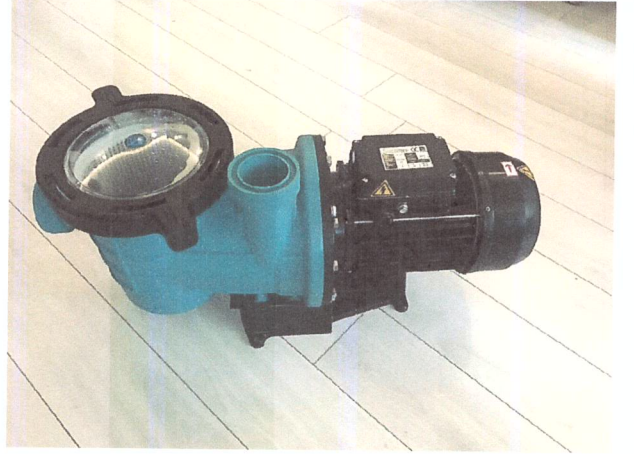
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Copy of marking plate and summary of test results (information/comments):



Streamer			
Type	STR-350T	µf	
Hp	3.5	rpm	2800
Vollage	220/380	Current	
Hz.	50	mwh	Qm ³ /h
Phase	3	8	40.00
IP	55	10	38.00



Summary of testing:

The appliance is in accordance with the standards:

IEC 60335-2-41:2002 (Third edition) used in conjunction with IEC 60335-1:2001 (Fourth Edition)

Testing conducted in accordance with the standard. Correct ambient temperature range, nature of supply, sequence of testing and most unfavourable position observed.

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MUAYENE VE DENEY RAPORU TEST REPORT

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Test item particulars	
Classification of installation and use	Class I
Supply Connection.....	Type Z
Nature of Supply	AC
Degree of protection against moisture	IPX7
Thermal Cut-out	Yes
Appliance Intlet provided	No
Appliance for unattended use	Yes
Appliance for outdoor use	No
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement	P(Pass)
- test object does not meet the requirement	F(Fail)
Testing	
Date of receipt of test item	2018-10-12
Date (s) of performance of tests	2018-10-12 to 2015-10-08
Attachments:	National Deviations (8 pages)
	Photos (7 pages)
	Test data (67 pages)
General remarks:	
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IEC 02.	
The test results presented in this report relate only to the object tested.	
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.	
"(see Enclosure #)" refers to additional information appended to the report.	
"(see appended table)" refers to a table appended to the report.	
Throughout this report a comma (point) is used as the decimal separator.	

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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
5.7	Temperature of liquid is maintained within +0, -5K of the temperature marked on the pump. (IEC 60 335-2-41)		P
5.101	Pumps are tested as portable appliances, unless they are intended to be fixed (IEC 60 335-2-41)		P
5.102	Stationary pumps having a three-phase motor which does not incorporate a protective device are installed with an appropriate device, in accordance with the instructions (IEC 60 335-2-41)	Single phase	N
6	CLASSIFICATION		—
6.1	Protection against electric shock: Class 0, 0I, I, II, III	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)	Use to pool	N
	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)	pool pump	P
	Portable pumps for cleaning and other maintenance of swimming pools shall be of class I or class III (IEC 60 335-2-41)	Use pool pump	N
	Other pumps shall be class I, class II or class III (IEC 60 335-2-41)		N
6.2	Submersible pumps shall be at least IP X8 (IEC 60 335-2-41)	IPX7	P
	Portable pumps for cleaning and other maintenance of swimming pools shall be at least IP X7 (IEC 60 335-2-41)		N
	Other pumps shall be at least IP X4 (IEC 60 335-2-41)		N
7	MARKING AND INSTRUCTIONS		—
7.1	Rated voltage or voltage range (V)	380V	P
	Nature of supply	AC	P

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Clause	Requirement - Test	Result - Remark	Verdict
	Rated frequency (Hz)	50Hz	P
	Rated power input (W):	0,55 KW – 2,60 KW	P
	Rated current (A)		N
	Manufacturer's or responsible vendor's name, trademark or identification mark.....	GEMAŞ	P
	Model or type reference.....	STRN-80T, STRN-100T, STRN-150T, STRN-200T, STRN-300T, STRN-350T, STRM-80T, STRM-100T, STRM-150T	P
	Symbol 5172 of IEC 60417, for Class II appliances		P
	IP number, other than IPX0.....	IPX7	P
	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)	= 0	P
	-the maximum operating depth in metres, if > 1 metres (for submersible pumps) (IEC 60 335-2-41)	1 m	P
	-the direction of rotation (three phase motor only) (IEC 60 335-2-41)	Single phase	N
	Pumps shall be marked with the maximum liquid temperature which shall not be less than 35°C. (IEC 60 335-2-41)	= 35 °C	P
	If the temperature exceeds 35 °C, they shall be marked with the maximum period of operation, unless they are intended for continuous operation. (IEC 60 335-2-41)		N
7.2	Warning for stationary appliances for multiple supply	Not stationary	N
	Warning placed in vicinity of terminal cover		N
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen	Single voltage	N
	Different rated values marked with the values separated by an oblique stroke		N

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Clause	Requirement - Test	Result - Remark	Verdict
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible	Single voltage	N
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N
	the power input is related to the mean value of the rated voltage range		N
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N
7.6	Correct symbols used		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply		N
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		—
	- marking of terminals exclusively for the neutral conductor (N)	Type Z	N
	- marking of protective earthing terminals (symbol 5019 of IEC 60417)		N
	- marking not placed on removable parts		N
7.9	Marking or placing of switches which may cause a hazard	No switches	N
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means		N
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		N
7.11	Indication for direction of adjustment of controls		N
7.12	Instructions for safe use provided		P
	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)	pool pump	N
	-the pump must supplied through a residual current device (RCD) with a rated residual operating current < 30 mA (IEC 60 335-2-41)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	The instructions for use for pumps marked with a temperature exceeding 35 °C 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)	= 35 °C	N
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		N
	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)	<50W	N
	- pollution of the liquid could occur due to leakage of lubricants (for submersible pumps and vertical wet pit pumps containing lubricants) (IEC 60 335-2-41)		N
	- Additional information for installation of stationary pumps having a three-phase motor not incorporating a protective device as specified (IEC 60 335-2-41)	Single phase	N
	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)	pool pump	N
	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)	Not for pool use	N
	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)	Not for pool use	N
	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)		N

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Clause	Requirement - Test	Result - Remark	Verdict
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules	Not stationary	N
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions stating that the fixed wiring must be protected		N
7.12.4	Instructions for built-in appliances:		—
	- dimensions of space	Not built-in	N
	- dimensions and position of supporting means		N
	- distances between parts and surrounding structure		N
	- dimensions of ventilation openings and arrangement		N
	- connection to supply mains and interconnection of separate components		N
	- plug accessible after installation, unless		N
	a switch complying with 24.3		N
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord	Type Z	N
	Replacement cord instructions, type Y attachment		N
	Replacement cord instructions, type Z attachment		P
7.13	Instructions and other texts in an official language	2 Languages (TURKISH-ENGLISH)	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		N
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation	Not stationary	N
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions	Not fixed	N

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Clause	Requirement - Test	Result - Remark	Verdict
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		N
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		N
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		N
	Use of test probe B of IEC 61032: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		N
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	Class I	N
8.1.4	Accessible part not considered live if:		—
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N
	- safety extra-low d.c. voltage: not exceeding 42.4 V		N
	- or separated from live parts by protective impedance		N
	If protective impedance: d.c. current not exceeding 2 mA, and		N
	a.c. peak value not exceeding 0.7 mA		N
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μ F		N
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μ C		N
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		—

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Clause	Requirement - Test	Result - Remark	Verdict
	- built-in appliances		N
	- fixed appliances		N
	- appliances delivered in separate units		N
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only		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		N/A
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
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2	(see appended table)	N
11	HEATING		—
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		N
11.4	Heating appliances operated under normal operation at 1.15 times rated power input		N
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage.....		P

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Clause	Requirement - Test	Result - Remark	Verdict
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage.....:		N
11.7	Pumps are operated until steady conditions are established (IEC 60 335-2-41)		P
	If the pump is marked with a maximum period of operation- - the liquid temperature is 35°C 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)		N
11.8	Temperature rises not exceeding values in table 3	(see appended tables)	P
	Protective devices do not operate		N
	Sealing compound does not flow out		N
	For pumps marked with a temperature exceeding 35 °C, the temperature rise of the external enclosure is not measured. (IEC 60 335-2-41)		N
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	No heating element	N
	Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage		P
	Protective impedance and radio interference filters disconnected before carrying out the tests		N
13.2	Leakage current measured by means of the circuit described in figure 4 of IEC 60990		P
	Leakage current measurements	(see appended table)	P
13.3	Electric strength tests according to table 4	(see appended table)	P
	No breakdown during the tests		P

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Clause	Requirement - Test	Result - Remark	Verdict
14	TRANSIENT OVERVOLTAGES		—
	Appliances withstand the transient overvoltages to which they may be subjected		N
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6	(see appended table)	N
	No flashover during the test, unless of functional insulation		N
	In case of flashover of functional insulation, the appliance complies with clause 19 with the clearance short circuited		N
15	MOISTURE RESISTANCE		—
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	IPX7	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.....:		P
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N
	Built-in appliances installed according to the instructions		N
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		N
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube		N

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Clause	Requirement - Test	Result - Remark	Verdict
	However, for appliances normally used on the floor or table, the movement is limited to two times 90° for a period of 5 min, the support being placed at the level of the pivot axis of the oscillating tube		N
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N
	Appliances with type X attachment fitted with a flexible cord as described		N
	Detachable parts tested as specified		N
	IP X4 pumps are tested as specified (IEC 60 335-2-41)		N
	IP X7-pumps (submersible pumps) are immersed for 24 h in water as specified (IEC 60 335-2-41)		N
15.2	Spillage of liquid does not affect the electrical insulation		N
	Appliances with type X attachment fitted with a flexible cord as described		N
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N
	Detachable parts removed		N
	Overfilling test with additional amount of water, over a period of 1 min (l).....:		N
	The appliance withstands the electric strength test of 16.3		N
	No trace of water on insulation that can result in a reduction of clearances and creepage distances below values specified in clause 29		N
15.3	Appliances proof against humid conditions		N
	Humidity test for 48 h in a humidity cabinet (not for submersible pumps) (IEC 60335-2-41)		N
	The appliance withstands the tests of clause 16		N
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		N

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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 $\sqrt{3}$		N
	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	(see appended table)	N
	Appliance supplied with 1.06 or 0.94 times rated voltage and the most unfavourable short-circuit or overload likely to occur in normal use applied		N
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		N
	Temperature of the winding not exceeding the value specified in table 8,		N
	however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N
18	ENDURANCE		—
	Requirements and tests are specified in part 2 when necessary		N
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	No electronic circuits	N
	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.....	No heating element	N
19.3	Test of 19.2 repeated; test voltage (V): power input of 1.24 times rated power input.....		N
19.4	Test conditions as in cl. 11, any control limiting the temperature during tests of cl. 11 short-circuited		N

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Clause	Requirement - Test	Result - Remark	Verdict
19.5	Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the elements sheath		N
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		N
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N
	The working voltage of the PTC heating element is increased by 5% and the appliance is operated until steady conditions are re-established. The voltage is then increased in similar steps until 1.5 times working voltage or until the PTC heating element ruptures		N
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts of other appliances		P
	Locked rotor, motor capacitors open-circuited or short-circuited, if required		N
	Locked rotor, capacitors open-circuited one at a time		N
	Test repeated with capacitors short-circuited one at a time, if required		N
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		N
	Other appliances supplied with rated voltage for a period as specified		N
	Winding temperatures not exceeding values specified in table 8	(see appended table)	P
19.8	Three-phase motors operated at rated voltage with one phase disconnected	Single phase	N
19.10	Series motor operated at 1.3 times rated voltage for 1 min	Not series	N
	During the test, parts not being ejected from the appliance		N

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Clause	Requirement - Test	Result - Remark	Verdict
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	No electronic circuits	N
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		N
	- the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction in other parts of the appliance does not rely on the correct functioning of the electronic circuit		N
19.11.2	Fault conditions applied one at a time, the appliance operated under conditions specified in cl. 11, but supplied at rated voltage, the duration of the tests as specified:		—
	a) short circuit of functional insulation if clearances or creepage distances are less than the values specified in 29		N
	b) open circuit at the terminals of any component		N
	c) short circuit of capacitors, unless they comply with IEC 60384-14		N
	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		N
	e) failure of triacs in the diode mode		N
	f) failure of an integrated circuit. The possible hazardous situations of the appliance are assessed to ensure that safety does not rely on the correct functioning of such a component		N
19.11.3	If the appliance incorporates a protective electronic circuit which operates to ensure compliance with clause 19, the relevant test is repeated with a single fault simulated, as indicated in a) to f) of 19.11.2		N
	During and after each test the following is checked:		—
	- the temperature rise of the windings do not exceed the values specified in table 8		N
	- the appliance complies with the conditions specified in 19.13		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		N
	If a conductor of a printed board becomes open-circuited, the appliance is considered to have withstood the particular test, provided all three of the following conditions are met:		—
	- the material of the printed circuit board withstands the burning test of annex E		N
	- any loosened conductor does not reduce the clearances or creepage distances between live parts and accessible metal parts below the values specified in cl. 29		N
	- the appliance withstands the tests of 19.11.2 with open-circuited conductor bridged		N
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A)		N
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in table 9	(see appended table)	P
	Enclosures not deformed to such an extent that compliance with cl. 8 is impaired		P
	If the appliance can still be operated it complies with 20.2		P
	Insulation, other than of class III appliance, withstand the electric strength test of 16.3, the test voltage specified in table 4:		—
	- basic insulation		N
	- supplementary insulation		N
	- reinforced insulation	3000V	P
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

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Clause	Requirement - Test	Result - Remark	Verdict
	If the pump becomes inoperable during the test., it is disconnected from the supply and filled with water (IEC 60335-2-41)		N
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)		N
20	STABILITY AND MECHANICAL HAZARDS		—
20.1	Adequate stability		N
	Submersible pumps are not subjected to the test (IEC 60335-2-41)	Submersible	P
	Tilting test through an angle of 10° (appliance placed on an inclined plane/horizontal plane); appliance does not overturn		N
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		N
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		P
	Protective enclosures, guards and similar parts are non-detachable		P
	Adequate mechanical strength and fixing of protective enclosures		P
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure		N
	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
	No damage after three blows applied to various parts of the enclosure, impact energy 1,0 ± 0,04 J (IEC 60335-2-41)		P
	If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N

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Clause	Requirement - Test	Result - Remark	Verdict
	If necessary, repetition of groups of three blows on a new sample		N
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	Not stationary	N
	- a switch complying with 24.3		N
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided		N
	- an appliance inlet		N
	Single-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase permanently connected class I appliances, connected in the phase conductor		N
22.3	Appliance provided with pins: no undue strain on socket-outlets		N
	Applied torque not exceeding 0.25 Nm		N
	Pull force of 50N to each pin after the appliance has been placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N
	Each pin subjected to a torque of 0.4Nm; the pins are not rotating unless rotating does not impair compliance with the standard		N
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		N
22.5	No risk of electric shock when touching the pins of the plug		N
22.6	Electrical insulation not affected by condensing water or leaking liquid		N
	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)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak		N
22.7	Adequate safeguards against the risk of excessive pressure in appliances provided with steam-producing devices		N
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		P
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances		P
	Adequate insulating properties of oil or grease to which insulation is exposed		N
22.10	Location or protection of reset buttons of non-self-resetting controls is so that accidental resetting is unlikely		N
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		P
	Obvious locked position of snap-in devices used for fixing such parts		N
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		P
	Tests as described		P
22.12	Handles, knobs etc. fixed in a reliable manner		N
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		N
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N
22.13	Unlikely that handles, when gripped as in normal use, make the operators hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P

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Clause	Requirement - Test	Result - Remark	Verdict
	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		N
22.16	Automatic cord reels cause no undue abrasion or damage to the sheath of the flexible cord, no breakage of conductors strands, no undue wear of contacts		N
	Cord reel tested with 6000 operations, as specified		N
	Electric strength test of 16.3, voltage of 1000 V applied		N
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N
22.18	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use		P
	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use. Direct contact between copper and aluminium or their alloys is to be avoided (IEC 60 335-2-41)		P
22.19	Driving belts not used as electrical insulation		N
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless material used is non-corrosive, non-hygroscopic and non-combustible		N
	Compliance is checked by inspection and, if necessary, by appropriate test		N
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		N
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N
22.25	Sagging heating conductors cannot come into contact with accessible metal parts		N

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Clause	Requirement - Test	Result - Remark	Verdict
22.26	The insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		N
22.27	Parts connected by protective impedance separated by double or reinforced insulation	No protective impedance	N
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water: separated from live parts by double or reinforced insulation		N
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		N
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Clearances and creepage distances over supplementary and reinforced insulation not reduced below values specified for supplementary insulation		P
	Creepage distances and clearances over supplementary or reinforced insulation not reduced to less than 50% of values specified in 29 if wires, screws etc. becomes loose		P
22.32	Supplementary and reinforced insulation designed or protected against deposition of dirt or dust		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		N
	Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation		N
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N
22.33	Conductive liquids that are or may become accessible in normal use are not in direct contact with live parts		P
	Electrodes not used for heating liquids		N

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Clause	Requirement - Test	Result - Remark	Verdict
	For class II constructions, conductive liquids that are or may become accessible in normal use, not in direct contact with basic or reinforced insulation		N
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation		N
22.34	Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed		N
22.35	Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault		N
	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		N
	This requirement does not apply to handles, levers and knobs on stationary appliances other than those of electrical components, provided they are either reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N
22.36	Handles continuously held in the hand in normal use are so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless they are separated from live parts by double or reinforced insulation		N
22.37	Capacitors in Class II appliances not connected to accessible metal parts, unless complying with 22.42		N
	Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42		N
22.38	Capacitors not connected between the contacts of a thermal cut-out		N
22.39	Lamp holders used only for the connection of lamps		N
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N

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Clause	Requirement - Test	Result - Remark	Verdict
	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		N
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N
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		N
22.101	Pumps shall withstand the static liquid pressure occurring in normal use as specified: (Submersible pumps and vertical wet pit pumps are not subjected to this test) (IEC 60 335-2-41)	IPX7	N
	The pressure test is carried out for 1 min at a pressure of 1,2 times the pressure occurring at maximum pump total head: m (IEC 60 335-2-41)		N
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)		N
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)	< 3 Kg	N
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)	Class I	N

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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)		N
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		N
	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		N
	Beads inside flexible metal conduits contained within an insulating sleeve		N
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N
	Flexible metallic tubes not causing damage to insulation of conductors		N
	Open-coil springs not used		N
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N
	No damage after 10 000 flexings for conductors flexed during normal use or 100 flexings for conductors flexed during user maintenance		N
	Electric strength test, 1000 V between live parts and accessible metal parts		N
23.4	Bare internal wiring sufficiently rigid and fixed		N
23.5	The insulation of internal wiring withstanding the electrical stress likely to occur in normal use		N
	No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		N
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by positive means		N
23.7	The colour combination green/yellow used only for earthing conductors		N

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Clause	Requirement - Test	Result - Remark	Verdict
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		N
	clamping means so constructed that there is no risk of bad contact due to cold flow of the solder		N
24	COMPONENTS		—
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components	(see appended table)	P
	Components not tested and found to comply with relevant IEC standard for the number of cycles specified are tested in accordance with 24.1.1 to 24.1.6		N
	Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		N
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14, or		N
	tested according to annex F		N
24.1.2	Safety isolating transformers complying with IEC 61558-2-6, or		N
	tested according to annex G		N
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000, or		N
	tested according to annex H		N
	Level switches are tested for 50 000 cycles of operation (IEC 60 335-2-41)		N
24.1.4	Automatic controls complying with IEC 60730-1 with relevant part 2. The number of cycles of operation being:		
	- thermostats: 10 000		N
	- temperature limiters: 1 000		N
	- self-resetting thermal cut-outs: 300		N
	- non-self-resetting thermal cut-outs: 30		N
	- timers: 3 000		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- energy regulators: 10 000		N
24.1.5	Appliance couplers complying with IEC 60320-1		N
	However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		N
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		N
24.2	No switches or automatic controls in flexible cords		P
	No devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		N
	No thermal cut-outs that can be reset by soldering		N
	Level switches may be incorporated in interconnection cords (IEC 60335-2-41)		N
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and having a contact separation in all poles, providing full disconnection under overvoltage category III conditions		N
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance and used accordingly		N
	Capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, are of class P1 or P2 of IEC 60252		N
	Voltage across capacitors in series with a motor winding does not exceed 1,1 times rated voltage, when the appliance is supplied at 1,1 times rated voltage under minimum load		N
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42V.		N
	In addition, the motors are complying with the requirements of Annex I		N

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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)		P
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown	Not stationary, Single supply	N
25.3	Submersible pumps, other than class III, shall be provided with a flexible cord (IEC 60335-2-41)		P
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 10		N
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in 29		N
25.5	Method for assemble supply cord with the appliance:		—
	- type X attachment is not allowed for submersible pumps (IEC 60335-2-41)		P
	- type Y attachment		N
	- type Z attachment, allowed for pumps having a rated power input not exceeding 100W and for pumps for garden ponds (IEC 60335-2-41)	Type Z, < 100W	P
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N
25.6	Plugs fitted with only one flexible cord		P
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)		N
	- 60245 IEC 66 (for pumps intended for use in swimming pools other than class III pumps) (IEC 60 335-2-41)	H03VVH2-F	P
	- 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)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- 60245 IEC 57 (for pumps for indoor use, except table fountain pumps and aquarium pumps and class III pumps) (IEC 60 335-2-41)		N
	Temperature rise of external metal parts exceeding 75 K, PVC cord not used, unless		N
	appliance so constructed that the supply cord is not likely to touch external metal parts in normal use, or		N
	the supply cord is appropriate for higher temperatures, type Y or type Z attachment used		N
25.8	Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area (mm ²)	Less than 0,3A 0,5 mm	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)	Indoor use	N
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		N
25.11	Conductors of supply cords not consolidated by lead-tin soldering where they are subject to contact pressure, unless		N
	clamping means so constructed that there is no risk of bad contacts due to cold flow of the solder		N
25.12	Moulding the cord to part of the enclosure does not damage the insulation of the supply cord		N
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		N
	If unsheathed supply cord, a similar additional bushing or lining is required, unless		N
	the appliance is class 0		N
25.14	Supply cords adequately protected against excessive flexing		N
	Portable pumps are subjected to the test (EN 60335-2-41)		N
	Flexing test:		—

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Clause	Requirement - Test	Result - Remark	Verdict
	- applied force (N).....:		N
	- number of flexings.....:		N
	The test does not result in:		—
	- short circuit between the conductors		N
	- breakage of more than 10% of the strands of any conductor		N
	- separation of the conductor from its terminal		N
	- loosening of any cord guard		N
	- damage, within the meaning of the standard, to the cord or the cord guard		N
	- broken strands piercing the insulation and becoming accessible		N
25.15	Conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	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).....:		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		N
	- it is clear how the relief from strain and the prevention of twisting are obtained		N
	- they are suitable for different types of cord		N
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless separated from accessible metal parts by supplementary insulation		N
	- the cord is not clamped by a metal screw which bears directly on the cord		N
	- at least one part of the cord anchorage securely fixed to the appliance, unless part of a specially prepared cord		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- screws which have to be operated when replacing the cord do not fix any other component, if applicable		N
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N
	- for Class 0, 0I and I appliances: they are of insulating material or are provided with an insulating lining, unless a failure of the insulation of the cord does not make accessible metal parts live		N
	- for Class II appliances: they are of insulating material, or if of metal, they are insulated from accessible metal parts by supplementary insulation		N
25.17	Adequate cord anchorages for type Y and Z attachment		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		N
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N
	Tying the cord into a knot or tying the cord with string not used		N
25.20	Conductors of the supply cord for type Y and Z attachment adequately additionally insulated		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.		N
	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		N
25.22	Appliance inlet:		—
	- live parts not accessible during insertion or removal		N
	- connector can be inserted without difficulty		N
	- the appliance is not supported by the connector		N

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

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Clause	Requirement - Test	Result - Remark	Verdict
	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		N
	- internal wiring is not subjected to stress		N
	- clearances and creepage distances are not reduced below the values in 29		N
	Compliance checked by inspection and by the test of subclause 8.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified. Nominal diameter of thread (mm); screw category; torque (Nm)		N
26.4	Terminals for type X attachment, except those with a specially prepared cord, and those for connection to fixed wiring, no special preparation of conductors required, and so constructed or placed that conductors prevented from slipping out		N
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N
	Stranded conductor test, 8 mm insulation removed		N
	No contact between live parts and accessible metal parts and, for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N
26.6	Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm ²).....		N
	Terminals only suitable for a specially prepared cord		N
26.7	Terminals for type X attachment accessible after removal of a cover or part of the enclosure		N
26.8	Terminals for the connection to fixed wiring, including the earthing terminal, located close to each other		N
26.9	Terminals of the pillar type constructed and located as specified		N
26.10	Terminals with screw clamping and screwless terminals not used for flat twin tinsel cords, unless conductors ends fitted with a device suitable for screw terminals		N

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

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Clause	Requirement - Test	Result - Remark	Verdict
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N
	In case of aluminium alloys precautions taken to avoid risk of corrosion		N
27.5	Low resistance of connection between earthing terminal and earthed metal parts		N
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided that clearances of basic insulation are based on the rated voltage of the appliance		N
	Resistance not exceeding 0,1 Ω at the specified low-resistance test		N
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand held appliances		N
	They may be used in other appliances if:		—
	- at least two tracks are used with independent soldering points and the appliance complies with requirements of 27.5 for each circuit		N
	- the material of the printed circuit board complies with IEC 60249-2-4 or IEC 60249-2-5		N
28	SCREWS AND CONNECTIONS		—
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		N
	Screws not of soft metal liable to creep, such as zinc or aluminium		N
	Diameter of screws of insulating material min. 3 mm		N
	Screws of insulating material not used for any electrical connection or connections providing earthing continuity		N
	Screws used for electrical connections or connections providing earthing continuity screw into metal		N
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw can impair basic insulation		N
	For screws and nuts; test as specified	(see appended table)	N
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		N
	This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0.5A		N
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N
	Thread-cutting (self-tapping) screws only used for electrical connections if they generate a full form standard machine screw thread		N
	Such screws not used if they are likely to be operated by the user or installer unless the thread is formed by a swaging action		N
	Thread-cutting and space-threaded screws may be used in connections providing earthing continuity, provided unnecessary to disturb the connection and at least two screws are used for each connection		N
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		N
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion		N
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		—
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment or to provide basic insulation, annex J applies		N
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15		P

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Clause	Requirement - Test	Result - Remark	Verdict
	The values specified may be smaller for basic insulation and functional insulation if the clearance meets the impulse voltage test of clause 14		N
	Appliances are in overvoltage category II		P
	Clearances less than specified in table 16 not allowed for basic insulation of class 0 and class 0I appliances,		N
	or if pollution degree 3 is applicable		N
	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		N
	Lacquered conductors of windings assumed to be bare conductors, but the clearances specified in table 16 are reduced by 0.5mm for rated impulse voltages of at least 1500V		P
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16		N
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		N
	the appliance complies with clause 19 with the functional insulation short-circuited		N
	Clearances at crossover points of lacquered conductors not measured		P
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		P
	Lacquered conductors of windings assumed to be bare conductors, but the clearances specified in table 16 are reduced by 0.5mm for rated impulse voltages of at least 1500V		N

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Clause	Requirement - Test	Result - Remark	Verdict
29.1.5	Appliances having higher working voltage than rated voltage, the voltage used for determining clearances from table 16 is the sum of the rated impulse voltage and the difference between the peak value of the working voltage and the peak value of the rated voltage		N
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation based on the working voltage used as the rated voltage in table 15		N
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		P
	precautions taken to protect the insulation; pollution degree 1		P
	insulation subjected to conductive pollution; pollution degree 3		N
	Compliance is checked by inspection and measurements as specified		P
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		P
29.2.2	Creepage distances of supplementary insulation at least as specified for basic insulation in table 17		N
29.2.3	Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17		P
29.2.4	Creepage distances of functional insulation not less than specified in table 18		N
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N

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Clause	Requirement - Test	Result - Remark	Verdict
29.3	Solid insulation having a minimum thickness of 1mm for supplementary insulation,		N
	and 2mm for reinforced insulation		P
	This requirement does not apply if the supplementary insulation, other than mica or similar scaly material, consists of at least two layers, each of the layers withstands the electric strength test of 16.3		N
	This requirement does not apply if the reinforced insulation, other than mica or similar scaly material, consists of at least three layers, any two layers together withstand the electric strength test of 16.3		N
	This requirement also does not apply to inaccessible insulation and does not exceed the maximum permissible temperature values, or		N
	if the insulation, after conditioning as specified, withstands the electric strength test of 16.3		N
30	RESISTANCE TO HEAT AND FIRE		—
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		P
	thermoplastic material providing supplementary or reinforced insulation,		P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts: at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C).....:	75°C	P
	Parts supporting live parts: at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125°C, whichever is the higher; temperature (°C).....:	125°C	P
	Parts of thermoplastic material providing supplementary or reinforced insulation, 25°C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C).....:		N
30.2	Relevant parts of non-metallic material adequately resistant to ignition and spread of fire		P
30.2.1	Glow-wire test of IEC 60695-2-11 at 550 °C, unless		N

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Clause	Requirement - Test	Result - Remark	Verdict
	the material is classified at least HB40 according to IEC 60695-11-10		N
	Parts for which the glow-wire test cannot be carried out meet the requirements in ISO9772 for category FH3 material		N
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		N
	Test not applicable to conditions as specified		N
30.2.3.1	Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and		N
	parts of insulating material within a distance of 3mm,		N
	having a glow-wire flammability index of at least 850°C according to IEC 60695-2-12		N
30.2.3.2	Parts of insulating material supporting current-carrying connections, and		N
	parts of insulating material within a distance of 3mm,		N
	subjected to glow-wire test of IEC 60695-2-11		N
	Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 as specified		N
	Glow-wire test of IEC 60695-2-11, the temperature being:		—
	- 750°C, for connections carrying a current exceeding 0,2A during normal operation		N
	- 650°C, for other connections		N
	Parts that during the test produce a flame persisting longer than 2 s, tested as specified		N
	If a flame persists longer than 2 s during the test, parts above the connection, as specified, subjected to the needle-flame test of annex E, unless		N
	the material is classified as V-0 or V-1 according to IEC 60695-11-10		N
30.2.4	Base material of printed circuit boards subjected to needle-flame test of annex E		N
	Test not applicable to conditions as specified		N
31	RESISTANCE TO RUSTING		—
	Relevant ferrous parts adequately protected against rusting		N

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Clause	Requirement - Test	Result - Remark	Verdict
32	RADIATION, TOXICITY AND SIMILAR HAZARDS		—
	Appliance does not emit harmful radiation		P
	Appliance does not present a toxic or similar hazard		P
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		—
	Description of routine tests to be carried out by the manufacturer		P
B	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES		—
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N
	This annex does not apply to battery chargers		N
3.1.9	Appliance operated under the following conditions:		—
	-the appliance, supplied by its fully charged battery, operated as specified in relevant part 2		N
	-the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		N
	If the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		N
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N
5.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N
7.12	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Details about how to remove batteries containing materials hazardous to the environment given		N
7.15	Markings placed on the part of the appliance connected to the supply mains		N
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		N
	If the appliance can be operated without batteries, double or reinforced insulation required		N
11.7	The battery is charged for the period described		N
19.1	Appliances subjected to tests of 19.101, 19.102 and 19.103		N
19.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N
19.102	Short-circuiting of the terminals of the battery, being fully charged, for appliances having batteries that can be removed without the aid of a tool		N
19.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N
21.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength, checked according to procedure 2 of IEC 68-2-32		N
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-32, the number of falls being:		—
	- 100, the mass of part does not exceed 250 g		N
	- 50, the mass of part exceeds 250 g		N
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N
25.13	An additional lining or bushing not required for interconnection cords operating at safety extra-low voltage		N
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N
	For other parts, 30.2.2 applies		N

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Clause	Requirement - Test	Result - Remark	Verdict
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		—
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N
D	ANNEX D (NORMATIVE) ALTERNATIVE REQUIREMENTS FOR PROTECTED MOTORS		—
	Applicable to protected motors for unattended use, test of 19.7 carried out on a separate sample according to the specification		N
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		—
	Needle-flame test carried out in accordance with IEC 60695-2-2, with the following modifications:		N
5	Severities		—
	The duration of application of the test flame is 30 s ± 1 s		N
8	Test procedure		—
8.2	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of figure 1		N
8.4	The first paragraph does not apply		N
	If possible, the flame is applied at least 10 mm from a corner		N
8.5	The test is carried out on one specimen		N
	If the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N
10	Evaluation of test results		—
	The duration of burning not exceeding 30 s		N
	However, for printed circuit boards, the duration of burning not exceeding 15 s		N
F	ANNEX F (NORMATIVE) CAPACITORS		—

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Clause	Requirement - Test	Result - Remark	Verdict
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		N
1.5	Terminology		—
1.5.3	Class X capacitors tested according to subclass X2		N
1.5.4	This subclass is applicable		N
1.6	Marking		—
	Items a) and b) are applicable		N
3.4	Approval testing		—
3.4.3.2	Table II is applicable as described		N
4.1	Visual examination and check of dimensions		—
	This subclass is applicable		N
4.2	Electrical tests		—
4.2.1	This subclass is applicable		N
4.2.5	This subclass is applicable		N
4.2.5.2	Only table IX is applicable		N
	Values for test A apply		N
	However, for capacitors in heating appliances the values for test B or C apply		N
4.12	Damp heat, steady state		—
	This subclass is applicable		N
	Only insulation resistance and voltage proof are checked		N
4.13	Impulse voltage		—
	This subclass is applicable		N
4.14	Endurance		—
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		N
4.14.7	Only insulation resistance and voltage proof are checked		N
	Visual examination, no visible damage		N

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Clause	Requirement - Test	Result - Remark	Verdict
4.17	Passive flammability test		—
	This subclause is applicable		N
4.18	Active flammability test		—
	This subclause is applicable		N
G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		—
	The following modifications to this standard are applicable for safety isolating transformers:		N
7	Marking and instructions		—
7.1	Transformers for specific use marked with:		—
	-name, trademark or identification mark of the manufacturer or responsible vendor		N
	-model or type reference		N
17	Overload protection of transformers and associated circuits		—
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N
22	Construction		N
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N
29	Clearances, creepage distances and solid insulation		—
29.1 and 29.2	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N
H	ANNEX H (NORMATIVE) SWITCHES		—
	Switches comply with the following clauses of IEC 61058-1, as modified:		N
	-The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N
	-Before being tested, switches are operated 20 times without load		N
8	Marking and documentation		—
	Switches are not required to be marked		N
	However, switches that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N
13	Mechanism		—

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

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Clause	Requirement - Test	Result - Remark	Verdict
11.8	Temperature rise of the body of the motor, where in contact with insulating material, not exceeding values in table 3 for the relevant insulating material		N
16	Leakage current and electric strength		—
16.3	Insulation between live parts of the motor and its other metal parts not subjected to the test		N
19	Abnormal operation		—
19.1	The tests of 19.7 to 19.9 not carried out		N
19.101	Appliance operated at rated voltage with each of the following fault conditions:		—
	- short circuit of the terminals of the motor, including any capacitor incorporated in the motor circuit		N
	- short circuit of each diode of the rectifier		N
	- open circuit of the supply to the motor		N
	- open circuit of any parallel resistor, the motor being in operation		N
	Only one fault simulated at a time, the tests carried out consecutively		N
22	Construction		—
22.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		N
	Compliance checked by the tests specified for double and reinforced insulation		N
J	ANNEX J (NORMATIVE) COATED PRINTED CIRCUIT BOARDS		—
	Testing of protective coatings of printed circuit boards carried out in accordance with IEC 60664-3 with the following modifications:		N
6.6	Climatic sequence		—
	When production samples are used, three samples of the printed circuit board are tested		N
6.6.1	Cold		—
	The test is carried out at -25°C		N
6.6.3	Rapid change of temperature		—
	Severity 1 is specified		N

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Clause	Requirement - Test	Result - Remark	Verdict
6.8.6	Partial discharge extinction voltage		—
	Type A coatings not subjected to a partial discharge test		N
6.9	Additional tests		—
	This subclause is not applicable		N
K	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		—
	The information on overvoltage categories is extracted from IEC 60664-1		N
	Overvoltage category is a numeral defining a transient overvoltage condition		N
	Equipment of overvoltage category IV is for use at the origin of the installation		N
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		N
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		—
	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

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Clause	Requirement - Test	Result - Remark	Verdict
	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		P
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		P
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		P
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		—
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		N
5	Test apparatus		—
5.1	Electrodes		—
	The note does not apply		N
5.4	Test solutions		—
	Test solution A is used		N
6	Procedure		—
6.3	Proof tracking test		—
	Voltage is 100V, 175V, 400V or 600V.....:		N
	Note 3 of clause 3 applies		N
	The test is carried out on five specimens		N
	In case of doubt, additional test with voltage reduced by 25V, the number of drops increased to 100		N

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Clause	Requirement - Test	Result - Remark	Verdict
7	Report		—
	The report stating if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N
O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		—
	Description of tests for determination of resistance to heat and fire		P

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10.1	TABLE: Power input deviation						P
Model	Input deviation of/at:	P rated (W)	P measured (W)	dP	Required dP	Remark	
STRN-80T	380	160	156	-3,8%	+20%	M250P	
STRN-100T		250	248	-2,3%	+20%	M250P	
STRN-150T		250	247	-2,7%	+20%	M250P	
STRN-150T		250	248	-1,8%	+20%	M250P	
STRN-200T		250	249	-0,8%	+20%	M250P	
STRN-300T		320	318	-1,9%	+20%	M350P	
STRN-350T		320	317	-2,8%	+20%	M350P	
STRM-80T		320	316	-3,8%	+20%	M350P	
STRM-100T		330	325	-4,9%	+20%	M350P	
STRM-150T		400	398	-1,9%	+20%	M350P	

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

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11.8	TABLE: Heating test, thermocouples (1,06x rated voltage)			P
Model	STRN-350T	Motor	M250P	
Test voltage (V)	402,8		—	
Ambient (°C).....	20,5		—	
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	32,1	---	(30-35 °C)	
Supply cord	36,8	18,1	50	
Interconnection cord of water level operating control	36,6	18,0	50	
Internal cord	59,1	38,6	50	
Surface of motor	57,5	36,9	Referance	
Enclosure of pump (surface)	35,8	16,8	60	
Enclosure of pump (inside)	40,1	20,1	For cl.30,1	
Pump cover (inside)	50,2	30,2	For cl.30,1	
Pump base (inside)	38,1	17,5	For cl.30,1	
Capacitor surface	34,5	14,2	45(T-25)	
Water level operating control ambient	33,6	12,8	30	

11.8	TABLE: Heating test, resistance method (1,06x rated voltage)					P
Test voltage (V)	402,8		—			
Ambient, t ₁ (°C)	20,3		—			
Ambient, t ₂ (°C)	20,5		—			
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	58,9	73,6	58,4	95	B	
Auxiliary Winding	119,6	146,8	59,5	95	B	

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11.8	TABLE: Heating test, thermocouples (1,06x rated voltage)			P
Model	STRN-350T	Motor	M250P	
Test voltage (V)	402,8			—
Ambient (°C).....	20,5			—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	32,0	---	(30-35 °C)	
Supply cord	36,5	18,3	50	
Interconnection cord of water level operating control	36,9	18,8	50	
Internal cord	59,2	38,5	50	
Surface of motor	57,9	36,8	Referance	
Enclosure of pump (surface)	35,9	16,9	60	
Enclosure of pump (inside)	40,3	19,8	For cl.30,1	
Pump cover (inside)	49,8	31,2	For cl.30,1	
Pump base (inside)	38,6	19,5	For cl.30,1	
Capacitor surface	34,5	16,2	45(T-25)	
Water level operating control ambient	33,6	15,8	30	

11.8	TABLE: Heating test, resistance method (1,06x rated voltage)					P
Test voltage (V)	402,8				—	
Ambient, t ₁ (°C)	20,3				—	
Ambient, t ₂ (°C)	20,5				—	
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	58,9	73,6	58,4	95	B	
Auxiliary Winding	119,5	143,8	57,5	95	B	

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11.8	TABLE: Heating test, thermocouples (1,06x rated voltage)			P
Model	VİLLA 3	Motor	M250P	
Test voltage (V)	402,8			—
Ambient (°C).....	20,5			—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	32,1	---	(30-35 °C)	
Supply cord	35,8	19,1	50	
Interconnection cord of water level operating control	37,6	17,0	50	
Internal cord	57,1	39,6	50	
Surface of motor	57,5	36,9	Referance	
Enclosure of pump (surface)	35,8	16,8	60	
Enclosure of pump (inside)	42,1	22,1	For cl.30,1	
Pump cover (inside)	50,2	30,2	For cl.30,1	
Pump base (inside)	36,1	18,5	For cl.30,1	
Capacitor surface	36,5	15,2	45(T-25)	
Water level operating control ambient	38,6	14,8	30	

11.8	TABLE: Heating test, resistance method (1,06x rated voltage)					P
Test voltage (V)	402,8				—	
Ambient, t ₁ (°C)	20,3				—	
Ambient, t ₂ (°C)	20,5				—	
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	58,9	73,6	56,2	95	B	
Auxiliary Winding	115,8	142,2	57,3	95	B	

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11.8 TABLE: Heating test, thermocouples (1,06x rated voltage)				P
Model	STRN-350T	Motor	M350P	
Test voltage (V)		402,8		—
Ambient (°C).....		20,5		—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	31,1	---	(30-35 °C)	
Supply cord	35,7	18,1	50	
Interconnection cord of water level operating control	36,3	18,2	50	
Internal cord	58,1	38,5	50	
Surface of motor	57,5	36,9	Referance	
Enclosure of pump (surface)	36,8	16,8	60	
Enclosure of pump (inside)	42,7	20,9	For cl.30,1	
Pump cover (inside)	50,8	32,1	For cl.30,1	
Pump base (inside)	34,6	18,5	For cl.30,1	
Capacitor surface	39,6	14,8	45(T-25)	
Water level operating control ambient	33,6	16,2	30	

11.8 TABLE: Heating test, resistance method (1,06x rated voltage)						P
Test voltage (V)				402,8		—
Ambient, t ₁ (°C)				20,3		—
Ambient, t ₂ (°C)				20,5		—
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	58,9	78,2	55,3	95	B	
Auxiliary Winding	120,8	142,8	57,6	95	B	

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11.8	TABLE: Heating test, thermocouples (1,06x rated voltage)			P
Model	SKD 83-5	Motor	M500P	
Test voltage (V)			402,8	—
Ambient (°C).....			20,5	—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	32,4	---	(30-35 °C)	
Supply cord	37,6	16,6	50	
Interconnection cord of water level operating control	37,8	16,8	50	
Internal cord	60,2	39,2	50	
Surface of motor	59,8	38,8	Referance	
Enclosure of pump (surface)	37,1	16,1	60	
Enclosure of pump (inside)	42,4	21,4	For cl.30,1	
Pump cover (inside)	51,0	30,0	For cl.30,1	
Pump base (inside)	37,3	16,3	For cl.30,1	
Capacitor surface	34,8	13,8	45(T-25)	
Water level operating control ambient	34,2	13,2	30	

11.8	TABLE: Heating test, resistance method (1,06x rated voltage)					P
Test voltage (V)			402,8			—
Ambient, t ₁ (°C)			20,3			—
Ambient, t ₂ (°C)			20,5			—
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	26,8	33,8	66,0	95	B	
Auxiliary Winding	32,8	41,1	63,9	95	B	

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11.8	TABLE: Heating test, thermocouples (1,06x rated voltage)			P
Model	STRN-350T	Motor	M550P	
Test voltage (V)			402,8	—
Ambient (°C).....			20,5	—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	32,5	---	(30-35 °C)	
Supply cord	38,9	18,1	50	
Interconnection cord of water level operating control	38,7	17,9	50	
Internal cord	58,9	38,1	50	
Surface of motor	60,7	39,9	Referance	
Enclosure of pump (surface)	40,5	19,7	60	
Pump cover (inside)	48,9	28,1	For cl.30,1	
Pump base (inside)	38,5	17,7	For cl.30,1	
Capacitor surface	33,9	13,1	45(T-25)	
Water level operating control ambient	33,8	13	30	

11.8	TABLE: Heating test, resistance method (1,06x rated voltage)					P
Test voltage (V)			402,8			—
Ambient, t ₁ (°C)			20,3			—
Ambient, t ₂ (°C)			20,5			—
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	17,9	22,1	59,2	95	B	
Auxiliary Winding	30,6	37,6	57,7	95	B	

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11.8	TABLE: Heating test, thermocouples (1,06x rated voltage)			P
Model	K 80	Motor	M850P	
Test voltage (V)	402,8			—
Ambient (°C).....	20,5			—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	34,1	---	(30-35 °C)	
Supply cord	39,2	16,2	50	
Interconnection cord of water level operating control	39,1	17,1	50	
Internal cord	58,2	34,8	50	
Surface of motor	54,1	30,6	Referance	
Enclosure of pump (surface)	39,7	18,6	60	
Pump cover (inside)	47,6	24,8	For cl.30,1	
Pump base (inside)	38,1	15,9	For cl.30,1	
Capacitor surface	35,3	12,8	45(T-25)	
Water level operating control ambient	34,4	13,5	30	

11.8	TABLE: Heating test, resistance method (1,06x rated voltage)					P
Test voltage (V)	402,8				—	
Ambient, t ₁ (°C)	20,3				—	
Ambient, t ₂ (°C)	20,5				—	
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	10,4	12,3	57,8	95	B	
Auxiliary Winding	14,2	17,1	55,9	95	B	

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11.8	TABLE: Heating test, thermocouples (1,06x rated voltage)			P
Model	JP 100	Motor	M1100P	
Test voltage (V)	402,8			—
Ambient (°C).....	20,5			—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	34,1	---	(30-35 °C)	
Supply cord	39,2	16,2	50	
Interconnection cord of water level operating control	39,1	17,1	50	
Internal cord	58,2	34,8	50	
Surface of motor	54,1	30,6	Referance	
Enclosure of pump (surface)	39,7	18,6	60	
Pump cover (inside)	47,6	24,8	For cl.30,1	
Pump base (inside)	38,1	15,9	For cl.30,1	
Capacitor surface	35,3	12,8	45(T-25)	
Water level operating control ambient	34,4	13,5	30	

11.8	TABLE: Heating test, resistance method (1,06x rated voltage)					P
Test voltage (V)	402,8				—	
Ambient, t ₁ (°C)	20,3				—	
Ambient, t ₂ (°C)	20,5				—	
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	10,4	12,3	57,8	95	B	
Auxiliary Winding	14,2	17,1	55,9	95	B	

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11.8 TABLE: Heating test, thermocouples (1,06x rated voltage)				P
Model	STRN-350T	Motor	M850P	
Test voltage (V)			402,8	—
Ambient (°C).....			20,5	—
Thermocouple locations	T (°C)	dT (K)	Max. dT (K)	
Water temperature	34,1	---	(30-35 °C)	
Supply cord	39,2	16,2	50	
Interconnection cord of water level operating control	39,1	17,1	50	
Internal cord	58,2	34,8	50	
Surface of motor	54,1	30,6	Reference	
Enclosure of pump (surface)	39,7	18,6	60	
Pump cover (inside)	47,6	24,8	For cl.30,1	
Pump base (inside)	38,1	15,9	For cl.30,1	
Capacitor surface	35,3	12,8	45(T-25)	
Water level operating control ambient	34,4	13,5	30	

11.8 TABLE: Heating test, resistance method (1,06x rated voltage)						P
Test voltage (V)					402,8	—
Ambient, t ₁ (°C)					20,3	—
Ambient, t ₂ (°C)					20,5	—
Temperature rise of winding	R ₁ (Ω)	R ₂ (Ω)	dT (K)	Max. dT (K)	Insulation class	
Main Winding	10,4	12,3	57,8	95	B	
Auxiliary Winding	14,2	17,1	55,9	95	B	

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13.2	TABLE: Leakage current (Model STRN-350T)		P
	Heating appliances: 1.15 x rated input	N/A	—
	Motor-operated and combined appliances: 1.06 x rated voltage.....	233 V	—
Leakage current between		I (mA)	Max. allowed I (mA)
L/N- metal enclosure		0,050 / 0,020	0,25
L/N- earthing part		0,10 / 0,080	0,75
L/N- Water level operating control		0,040 / 0,020	0,25

13.3	TABLE: Electric strength (Model STRN-350T)		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
L/N- metal enclosure		3000	No
L/N- earthing part		1000	No
L/N- Water level operating control		3000	No

13.2	TABLE: Leakage current (Model STRN-350T)		P
	Heating appliances: 1.15 x rated input	N/A	—
	Motor-operated and combined appliances: 1.06 x rated voltage.....	233 V	—
Leakage current between		I (mA)	Max. allowed I (mA)
L/N- metal enclosure		0,060 / 0,028	0,25
L/N- earthing part		0,11 / 0,092	0,75
L/N- Water level operating control		0,048 / 0,025	0,25

13.3	TABLE: Electric strength (Model STRN-350T)		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
L/N- metal enclosure		3000	No

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L/N- earthing part	1000	No
L/N- Water level operating control	3000	No

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

16.2	TABLE: Leakage current			P
	Single phase appliances: 1.06 x rated voltage			—
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$:	See attached data sheets		—
Leakage current between		I (mA)	Max. allowed I (mA)	

16.3	TABLE: Electric strength		P
Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)	
L/N- metal enclosure	3000	No	
L/N- earthing part	1250	No	
L/N- Water level operating control	3000	No	

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

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19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	STRN-350T	Motor	M250P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	20,1	15-25	
	Main winding	150,4	175	
	Auxiliary winding	121,5	175	
	Pump rear cover (inside)	34,2	For cl.30,1	

19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	STRN-350T	Motor	M250P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	20,4	15-25	
	Main winding	151,2	175	
	Auxiliary winding	120,7	175	
	Pump rear cover (inside)	33,1	For cl.30,1	

19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	VİLLA 3	Motor	M250P
	Test voltage (V)		233	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	21,1	15-25	
	Main winding	155,2	175	
	Auxiliary winding	123,6	175	
	Pump rear cover (inside)	34,6	For cl.30,1	

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19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	STRN-350T	Motor	M250P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	20,4	15-25	
	Main winding	151,1	175	
	Auxiliary winding	120,3	175	
	Pump rear cover (inside)	33,6	For cl.30,1	

19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	SKD 83-5	Motor	M550P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	23,1	15-25	
	Main winding	151,5	175	
	Auxiliary winding	120,7	175	
	Pump rear cover (inside)	32,9	For cl.30,1	

19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	STRN-350T	Motor	M800P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	19,8	15-25	
	Main winding	149,9	175	
	Auxiliary winding	118,8	175	
	Pump rear cover (inside)	30,8	For cl.30,1	

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19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	K 80	Motor	M550P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	24,2	15-25	
	Main winding	150,8	175	
	Auxiliary winding	129,6	175	
	Pump rear cover (inside)	32,8	For cl.30,1	

19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	JP 100	Motor	M550P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	24,3	15-25	
	Main winding	151,5	175	
	Auxiliary winding	124,7	175	
	Pump rear cover (inside)	31,9	For cl.30,1	

19.7	TABLE: Abnormal operation, locked rotor/moving parts			P
	Model	STRN-350T	Motor	M550P
	Test voltage (V)		402,8	—
	Thermocouple locations	T (°C)	Max. T (°C)	
	Ambient	24,3	15-25	
	Main winding	149,5	175	
	Auxiliary winding	118,7	175	
	Pump rear cover (inside)	30,1	For cl.30,1	

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19.9	TABLE: Abnormal operation, running overload					P
	Test voltage (V)					—
	Ambient, t_1 (°C)					—
	Ambient, t_2 (°C)					—
	Temperature of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (°C)
	See attached data sheets					

19.101	TABLE: Abnormal operation,			P
	Model	STRN-350T	Motor	M250P
	Test voltage (V)			402,8
	Thermocouple locations		T (°C)	Max. T (°C)
	Ambient		20,1	15-25
	Main winding		150,4	175
	Auxiliary winding		121,5	175
	Pump rear cover (inside)		34,2	For cl.30,1

19.101	TABLE: Abnormal operation,			P
	Model	BAHÇE 6	Motor	M250P
	Test voltage (V)			402,8
	Thermocouple locations		T (°C)	Max. T (°C)
	Ambient		20,4	15-25
	Main winding		151,2	175
	Auxiliary winding		120,7	175
	Pump rear cover (inside)		33,1	For cl.30,1

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19.101	TABLE: Abnormal operation,			P
Model	VILLA 3	Motor	M250P	
Test voltage (V)	402,8		—	
Thermocouple locations	T (°C)	Max. T (°C)		
Ambient	20,4	15-25		
Main winding	151,1	175		
Auxiliary winding	120,3	175		
Pump rear cover (inside)	33,6	For cl.30,1		

19.101	TABLE: Abnormal operation,			P
Model	STRN-350T	Motor	M350P	
Test voltage (V)	402,8		—	
Thermocouple locations	T (°C)	Max. T (°C)		
Ambient	21,4	15-25		
Main winding	155,6	175		
Auxiliary winding	124,2	175		
Pump rear cover (inside)	32,5	For cl.30,1		

19.101	TABLE: Abnormal operation,			P
Model	SKD 83-5	Motor	M500P	
Test voltage (V)	402,8		—	
Thermocouple locations	T (°C)	Max. T (°C)		
Ambient	21,3	15-25		
Main winding	154,4	175		
Auxiliary winding	119,8	175		
Pump rear cover (inside)	35,1	For cl.30,1		

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19.101	TABLE: Abnormal operation,		
Model	STRN-350T	Motor	M550P
Test voltage (V)		402,8	—
Thermocouple locations	T (°C)	Max. T (°C)	
Ambient	23,1	15-25	
Main winding	151,5	175	
Auxiliary winding	120,7	175	
Pump rear cover (inside)	32,9	For cl.30,1	

19.101	TABLE: Abnormal operation,			P
Model	K 80	Motor	M800P	
Test voltage (V)		402,8	—	
Thermocouple locations	T (°C)	Max. T (°C)		
Ambient	19,8	15-25		
Main winding	149,9	175		
Auxiliary winding	118,8	175		
Pump rear cover (inside)	30,8	For cl.30,1		

19.101	TABLE: Abnormal operation,			P
Model	JP 100	Motor	M550P	
Test voltage (V)		402,8	—	
Thermocouple locations	T (°C)	Max. T (°C)		
Ambient	□□ 15-25	15-25		
Main winding	151,5	175		
Auxiliary winding	124,7	175		
Pump rear cover (inside)	31,9	For cl.30,1		

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19.101	TABLE: Abnormal operation,			P
Model	STRN-350T	Motor	M550P	
Test voltage (V)	402,8		—	
Thermocouple locations	T (°C)	Max. T (°C)		
Ambient	24,3	15-25		
Main winding	149,5	175		
Auxiliary winding	118,7	175		
Pump rear cover (inside)	30,1	For cl.30,1		

24.1	TABLE: Components				
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Motor	Volt Elektrical Motors	V1EA 63M 2A	3000 rpm 380Volt 0,18kW	IEC 60034-1, IEC 60034-2-1, IEC 60034-2-2, IEC 60034-5 IEC	EMC 1401 EMC-140512- 06
	Volt Elektrical Motors	V1EA 63M 2B	3000 rpm 380Volt 0,25kW		EMC 1401 EMC-140512- 06
	Volt Elektrical Motors	V1EA 71M 2A	3000 rpm 380Volt 0,37kW	EMC 1401	EMC 1401 EMC-140512- 06
	Volt Elektrical Motors	V1EA 71M 2B	3000 rpm 380Volt 0,55kW		EMC 1401 EMC-140512- 06
	Volt Elektrical Motors	V2EA 80M 2A	3000 rpm 380Volt 0,75kW		EMC 1401 EMC-140512- 06
	Volt Elektrical Motors	V2EA 80M 2B	3000 rpm 380Volt 1,1kW		EMC 1401 EMC-140512- 06
	Volt Elektrical Motors	V2EA 90S 2A	3000 rpm 380Volt 1,5kW		EMC 1401 EMC-140512- 06

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	Volt Elektrical Motors	V2EA 90L 2A	3000 rpm 380Volt 2,2kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 100L 2A	3000 rpm 380Volt 3kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 112M 2A	3000 rpm 380Volt 4kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 100L 2C	3000 rpm 380Volt 4kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 132S 2A	3000 rpm 380Volt 5.5kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EG 132S 2A	3000 rpm 380Volt 5.5kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 112M 2C	3000 rpm 380Volt 5,5kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 132S 2B	3000 rpm 380Volt 7,5kW	IEC 60034-1, IEC 60034-2-1, IEC 60034-2-2, IEC 60034-5 IEC	EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EG 132S 2B	3000 rpm 380Volt 7,5kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 160M 2A	3000 rpm 380Volt 11kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EG 160M 2A	3000 rpm 380Volt 11kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 132M 2C	3000 rpm 380Volt 11kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 160M 2B	3000 rpm 380Volt 15kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EG 160M 2B	3000 rpm 380Volt 15kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 160L 2A	3000 rpm 380Volt 18,5kW		EMC 1401 EMC-140512-06

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	Volt Elektrical Motors	V2EG 160L 2A	3000 rpm 380Volt 18,5kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V1EA 63M 4A	1500 rpm 380Volt 0,12kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V1EA 63M 4B	1500 rpm 380Volt 0,18kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V1EA 71M 4A	1500 rpm 380Volt 0,25kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V1EA 71M 4B	1500 rpm 380Volt 0,37kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V1EA 80M 4A	1500 rpm 380Volt 0,55kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V1EA 71M 4C	1500 rpm 380Volt 0,55kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 80M 4B	1500 rpm 380Volt 0,75kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 90S 4A	1500 rpm 380Volt 1,1kW	IEC 60034-1, IEC 60034-2-1, IEC 60034-2-2, IEC 60034-5 IEC	EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 90L 4A	1500 rpm 380Volt 1,5kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 100L 4A	1500 rpm 380Volt 2,2kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 100L 4B	1500 rpm 380Volt 3kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 112M 4A	1500 rpm 380Volt 4kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EA 132S 4A	1500 rpm 380Volt 5,5kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EG 132S 4A	1500 rpm 380Volt 5,5kW		EMC 1401 EMC-140512-06

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Volt Elektrical Motors	V2EA 112M 4C	1500 rpm 380Volt 5,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 132M 4A	1500 rpm 380Volt 7,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 132M 4A	1500 rpm 380Volt 7,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 160M 4A	1500 rpm 380Volt 11kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 160M 4A	1500 rpm 380Volt 11kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 132M 4C	1500 rpm 380Volt 11kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 160L 4A	1500 rpm 380Volt 15kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 160L 4A	1500 rpm 380Volt 15kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 180M 4A	1500 rpm 380Volt 18,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 180M 4A	1500 rpm 380Volt 18,5kW	IEC 60034-1, IEC 60034-2-1, IEC 60034-2-2, IEC 60034-5, IEC	EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 160L 4C	1500 rpm 380Volt 18,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V1EA 71M 6A	1000 rpm 380Volt 0,18kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V1EA 71M 6B	1000 rpm 380Volt 0,25kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V1EA 80M 6A	1000 rpm 380Volt 0,37kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V1EA 80M 6B	1000 rpm 380Volt 0,55kW		EMC 1401 EMC-140512-06

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Volt Elektrical Motors	V2EA 90S 6A	1000 rpm 380Volt 0,75kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 90L 6A	1000 rpm 380Volt 1,1kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 100L 6A	1000 rpm 380Volt 1,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 112M 6A	1000 rpm 380Volt 2,2kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 132S 6A	1000 rpm 380Volt 3kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 132S 6A	1000 rpm 380Volt 3kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 132M 6A	1000 rpm 380Volt 3kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 132M 6A	1000 rpm 380Volt 4kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 132M 6B	1000 rpm 380Volt 5,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 132M 6B	1000 rpm 380Volt 5,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 160M 6A	1000 rpm 380Volt 7,5kW	IEC 60034-1, IEC 60034-2-1, IEC 60034-2-2, IEC 60034-5 IEC	EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 160M 6A	1000 rpm 380Volt 7,5kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 160L 6A	1000 rpm 380Volt 11kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EG 160L 6A	1000 rpm 380Volt 15kW		EMC 1401 EMC-140512-06
Volt Elektrical Motors	V2EA 180L 6A	1000 rpm 380Volt 11kW		EMC 1401 EMC-140512-06

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	Volt Elektrical Motors	V2EG 180L 6A	1000 rpm 380Volt 15kW		EMC 1401 EMC-140512-06
	Volt Elektrical Motors	V2EG 200L 6A	1000 rpm 380Volt 18,5kW		EMC 1401 EMC-140512-06
Pomp Body	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	JP AND JPM SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	SERA SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	K SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	SKD SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
Impeller	GEMAŞ A.Ş.	Open Impeller	6 or 4 wings	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	Closed Impeller	6 or 4 wings	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
Shaft	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573

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	GEMAŞ A.Ş.	JP AND JPM SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	SERA SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	K SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	SKD SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
POMP SUPPORT	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	JP AND JPM SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573
	GEMAŞ A.Ş.	SERA SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/573

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	GEMAŞ A.Ş.	K SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
	GEMAŞ A.Ş.	SKD SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
PUMP STAND	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
	GEMAŞ A.Ş.	JP AND JPM SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
	GEMAŞ A.Ş.	STRN SERIES	220V 380V	TS EN ISO 9001 TS EN ISO 22000	AQ/TR/5022 AQ/22000/57 3
BLEEDING	GEMAŞ A.Ş.	STOPPER	1/2"	TS EN ISO 9001	AQ/TR/5022
	GEMAŞ A.Ş.	STOPPER	M12	TS EN ISO 9001	AQ/TR/5022
O-RING	EGE CONTA KEÇE	O RING	NBR -	ISO18001	10400
MECHANICAL	DUYAR MOTOR	FA	6BAR -	DIN24960	IT-000613
	DUYAR MOTOR	EUROPA	12BAR -	DIN24960	IT-000613
	DUYAR MOTOR	SİMPLEX	10BAR -	DIN24960	IT-000613
	EMSE	EM 300	10 BAR	DIN24960	50141
	EMSE	EM 808	10BAR	DIN24960	50141
NUT	NORM CİVATA	HEXAGON	M6	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M8	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M10	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M12	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M16	EN 14399-1	TR32678

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	NORM CİVATA	HEXAGON	M24	EN 14399-1	TR32678
BOLT	NORM CİVATA	HEXAGON	M6	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M8	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M10	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M12	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M16	EN 14399-1	TR32678
	NORM CİVATA	HEXAGON	M24	EN 14399-1	TR32678

1) An asterisk indicates a mark which assures the agreed level of surveillance

28.1	TABLE: Threaded part torque test			N/A
Threaded part identification		Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Enclosure screw		4,5	II	1,8
Earthing screw		4,0	II	1,2

29.1	TABLE: Clearances					P
	Overvoltage category :					—
		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic	Functional	Supplementary	Reinforced	Verdict / Remark
330	0,5					N/A
500	0,5					N/A
800	0,5					N/A
1 500	1,0					N/A
2 500	2,0					N/A
4 000	3,5					P
6 000	6,0					P
8 000	8,5					N/A
10 000	11,5					N/A

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation				P
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Working voltage (V)	Creepage distance (mm) Pollution degree											Verdict
	1	2			3			4				
		Material group			Material group			Type of insulation				
	I	II	IIIa/IIIb	I	II	IIIa/IIIb	B*)	S*)	R*)			
>50	0,2	0,6	0,9	1,2	1,5	1,7	1,9		—	—	N/A	
>50	0,2	0,6	0,9	1,2	1,5	1,7	1,9	—		—	N/A	
>50	0,4	1,2	1,8	2,4	3,0	3,4	3,8	—	—		N/A	
>50 and = 125	0,3	0,8	1,1	1,5	1,9	2,1	2,4		—	—	N/A	
>50 and = 125	0,3	0,8	1,1	1,5	1,9	2,1	2,4	—		—	N/A	
>50 and = 125	0,6	1,6	2,2	3,0	3,8	4,2	4,8	—	—		N/A	
>125 and = 250	0,6	1,3	1,8	2,5	3,2	3,6	4,0		—	—	N/A	
>125 and = 250	0,6	1,3	1,8	2,5	3,2	3,6	4,0	—			N/A	
>125 and = 250	1,2	2,6	3,6	5,0	6,4	7,2	8,0	—	—		N/A	
>250 and = 400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	N/A	
>250 and = 400	1,0	2,0	2,8	4,0	5,0	5,6	6,3	—		—	N/A	
>250 and = 400	2,0	4,0	5,6	8,0	10,0	11,2	12,6	—	—		N/A	
>400 and = 500	1,3	2,5	3,6	5,0	6,3	7,1	8,0		—	—	N/A	
>400 and = 500	1,3	2,5	3,6	5,0	6,3	7,1	8,0	—		—	N/A	
>400 and = 500	2,6	5,0	7,2	10,0	12,6	14,2	16,0	—	—		N/A	
>500 and = 800	1,8	3,2	4,5	6,3	8,0	9,0	10,0		—	—	N/A	
>500 and = 800	1,8	3,2	4,5	6,3	8,0	9,0	10,0	—		—	N/A	
>500 and = 800	3,6	6,4	9,0	12,6	16,0	18,0	20,0	—	—		N/A	
>800 and = 1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—	—	N/A	
>800 and = 1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—		—	N/A	
>800 and = 1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—		N/A	
>1000 and = 1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0		—	—	N/A	
>1000 and = 1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—		—	N/A	
>1000 and = 1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0	—	—		N/A	
>1250 and = 1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0		—	—	N/A	
>1250 and = 1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—		—	N/A	

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

*) , B=Basic, S=Supplementary and R=Reinforced

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

30.1	TABLE: Ball pressure			P
Part	Test temperature (°C)	Impression diameter (mm)	Allowed impression diameter (mm)	
Enclosure	75	0,5	2,0	
Pump Cover	75	0,5	2,0	
Pump Base	75	0,6	2,0	
Water level operating control	125	1,0	2,0	

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30.2	TABLE: Glow-wire test		P
Part	Test temperature (°C)	verdict	
Enclosure	550	P	
Pump Cover	550	P	
Wire connector	850	P	
Water level operating control	850	P	

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