IEC IECEE CB SCHEME

Ref. Certif. No.

SG-HS-00125

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE)METHODE OC

CB TEST CERTIFICATE
CERTIFICAT D' ESSAI OC

Product Produit	Water Dispenser (Hot & Cold Water Purifier System)
Name and address of the applicant Nom et adresse du demandeur	HYUNDAI WacorTec. Co., Ltd. 684-49, Gongreung-Dong, Nowon-Ku Seoul 139-808, REPUBLIC OF KOREA
Name and address of the manufacturer Nom et adresse du fabricant	HYUNDAI WacorTec. Co., Ltd., 684-49, Gongreung-Dong, Nowon-Ku, Seoul 139-808, REPUBLIC OF KOREA
Name and address of the factory Nom et adresse de l'usine	HYUNDAI WacorTec. Co., Ltd., 684-49, Gongreung-Dong, Nowon-Ku, Seoul 139-808, REPUBLIC OF KOREA
Rating and principal characteristics Valeurs nominales et caractéristiques principales	Rated voltage: 220-240 V ~ Rated frequency: 50 Hz Rated current: 0.8 A (Cold) Rated Input 540 W (Hot) Protection class: I Climate class: N
Trade mark (if any) Marque de fabrique (si elle existe)	HYUNDAI
Model/type Ref. Ref. de type	W2-340E, W2-340S, W2-340H, W2-360E, W2-300P, W2-310L, W2-310P, ROMEO-2, ROMEO-3
Additional information (if necessary) Information complémentaire (si nécessaire)	
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60335-1/A1:2004 IEC 60335-2-24/A1:2005 IEC 60335-2-21/A1:2004
as shown in the Test Report Ref. No. which form part of this certificate comme indiqué dans le Rapport d'essais numéro de référence qui constitue une partie de ce certificat	TÜV SÜD PSB Pte Ltd 077-203928-000

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification

Date, 2008-02-29
CBS 08 02 58097 003

Vincent
(Vincent Wee)

TÜV SÜD

TÜV SÜD PSB Pte Ltd · 1 Science Park Drive · Singapore 118221

PSB Singapore

Test Report issued under the responsibility of :

NCB TÜV SÜD PSB Pte Ltd

1 Science Park Drive, Singapore 118221

TEST REPORT

IEC 60 335-2-24

Safety of household and similar electrical appliances

Part 2: Particular requirements for

refrigerating appliances, ice-cream appliances and ice-makers

Report reference No. ..... :	077-203928-000
Tested by (name + signature)..... :	Mr Wong Weng Chung
Witnessed bye (name + signature):	N/A
Supervised by (name + signature):	N/A
Approved by (name + signature) . :	Mr Jimmy Tan
Date of issue ..... :	2008-02-22
CB Testing Laboratory..... :	TÜV SÜD PSB Pte Ltd
Address ..... :	1 Science Park Drive, Singapore 118221
Testing location/procedure..... :	CBTL ☒ RMT ☐ SMT ☐ WMT ☐ TMP ☐
Address ..... :	Same as above
Applicant's Name ..... :	HYUNDAI WacorTec Co., Ltd.
Address ..... :	684-49, Gongreung-dong, Nowon-Ku, Seoul, Korea
Test specification	
Standard ..... :	IEC 60 335-2-24:2002 (Sixth edition) + A1:2005 in conj. with IEC 60335-1:01 incl. Corr. 1:2002 + A1:2004
Test procedure ..... :	CB
Procedure deviation ..... :	N/A
Non-standard test method ..... :	N/A
Test Report Form	IEC60335_2_24F
TRF originator. ..... :	SEV
Master TRF (date) ..... :	Dated 2005-08

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

Test item description .....:	Hot & Cold Water Purifier System
Trade Mark .....:	HYUNDAI
Manufacturer .....:	HYUNDAI WacorTec Co., Ltd. 684-49, Gongreung-dong, Nowon-Ku, Seoul, Korea
Model /Type reference .....:	W2-340E, ROMEO-3, W2-340S, W2-340H, W2-360E, ROMEO-2, W2-300P, W2-310L, W2-310P
Ratings .....:	220 – 240 V ~; 50 Hz; 0.8 A (Cold); 540 W (Hot); Climate class N; IPX1

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

Summary of testing:

- The items tested were found to be in compliance with the test standards of IEC 60 335-2-24:2002 (Sixth edition) + A1:2005 in conj. with IEC 60335-1:01 incl. Corr. 1:2002 + A1:2004 concerning cold water storage system in the product and test standards of IEC 60335-2-21:2002 (Fifth Edition) + A1:2004 concerning hot water storage system in the product.

Test items particulars : Hot & Cold Water Purifier System

Classification of installation and use.....: Stationary appliances

Supply Connection .....: Supply cord with plug

Possible test case verdicts :

Test case does not apply to the test object.....: N/A

Test item does meet the requirement .....: P(ass)

Test item does not meet the requirement .....: F(ail)

Testing

Date of receipt of test item .....: 2008-01-25

Date(s) of performance of test.....: 2008-01-29 until 2008-02-12

Product verification per IECEE 02, Clause 6.2.5 . : N/A

Steps taken by the NCB to ensure that the products from all the factories stated in the CB Test Certificate are equal .....:

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 IECEE 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 point is used as the decimal separator.

- This report should be read in conjunction with CB report reference: 077-203928/1-000.

General product information:

- Model ROMEO-3 is hot and cold water purifier system having a compressor and a sheathed heater and it is tested as the represented model for counter-top or table-top type.

- Model W2-340E is a floor standing type hot and cold water purifier and it is tested as the represented model for floor standing type.

- Model difference and external dimension

1) Model W2-340H is similar with the tested model ROMEO-3 except for the small external dimension of enclosure and cosmetic design.

2) Model W2-340S, W2-360E, ROMEO-2, W2-300P, W2-310L, W2-310P are similar with the tested model W2-340E except for the small difference of external dimension of enclosure and the cosmetic design.

3) The same critical components including a compressor and a sheathed heater are provided for the each model.

4) Water purifying filter system for floor standing type is located in the lower side of enclosure, and for counter-top or table-top type is placed in the left side of enclosure.

Model no.	Dimension (mm)	Installation and use
W2-340E	340 (W) x 420 (D) x 1240 (H)	Floor standing type
W2-340S	340 (W) x 420 (D) x 1160 (H)	Floor standing type
W2-360E	360 (W) x 420 (D) x 1240 (H)	Floor standing type
ROMEO-2	370 (W) x 410 (D) x 1200 (H)	Floor standing type
W2-300P	300 (W) x 310 (D) x 970 (H)	Floor standing type
W2-310L	310 (W) x 310 (D) x 1090 (H)	Floor standing type
W2-310P	310 (W) x 310 (D) x 970 (H)	Floor standing type
ROMEO-3	370 (W) x 410 (D) x 510 (H)	Counter-top or table top
W2-340H	340 (W) x 420 (D) x 520 (H)	Counter-top or table top

IEC 60 335-2-24			
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
5.3	Before starting the tests (IEC 60335-2-24:2002):		
	- ice cream appliances are operated empty of rated voltage for 1 h		N/A
	- other compression-type appliances shall be operated at rated voltage for 24 h then switched off for 12 h		P
5.4	Tests are additionally carried out with all combinations of energy sources supplied simultaneously unless this is prevented by interlocking devices (IEC 60335-2-24:2002)		N/A
5.7	Tests according to sub-clause 10, 11,13 and subcl. 19.103 at ambient temperature of (IEC 60335-2-24:2002) :		
	(23 ± 2) °C for ice-cream appliances		N/A
	(32 ± 1) °C Climatic class	SN ☐	N/A
	(32 ± 1) °C Climatic class	N ☒	P
	(38 ± 1) °C Climatic class	ST ☐	N/A
	(43 ± 1) °C Climatic class	T ☐	N/A
5.102	Compression-type appliances with heating systems and Peltier-type appliances are tested as combined appliances (IEC 60335-2-24:2002)		P

6	CLASSIFICATION		
6.1	Protection against electric shock: Class 0, 0I, I, II, III	Class I	P
6.2	Protection against harmful ingress of water	IPX1	P
6.101	Appliances, other than ice-cream appliances, shall be of one or more of the following climatic classes: SN, N, ST, T (IEC 60335-2-24:2002)		

7	MARKING AND INSTRUCTIONS		
7.1	Rated voltage or voltage range (V):	220 – 240 V	P
	Nature of supply:	~	P
	Rated frequency (Hz):	50 Hz	P
	Rated power input (W):	540 W (hot water)	P
	Rated current (A):	0.8 A (Cold water)	P
	Manufacturer's or responsible vendor's name, trademark or identification mark:	HYUNDAI WacorTec Co., Ltd.	P
	Model or type reference:	See marking plate	P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Symbol 5172 of IEC 60417, for Class II appliances		N/A
	IP number, other than IPX0:	IPX1	P
	Power input of heating systems, if greater than 100 W, (W) (IEC 60335-2-24:2002)	540 W (hot water)	P
	Defrosting input, in W, if greater than the rated power input, (W) (IEC 60335-2-24:2002)		N/A
	Rated power input in Watts (IEC 60335-2-24:2002)		N/A
	Rated current in Amperes for compression-type appliances (IEC 60335-2-24:2002)	0.8A	P
	Climatic class of the appliance (SN, N, ST or T) (IEC 60335-2-24:2002)	N	P
	Maximum rated input of lamps in Watts (IEC 60335-2-24:2002)		N/A
	Total mass of the refrigerant (IEC 60335-2-24:2002)	See marking plate	P
	For a single component refrigerant, at least one of the following (IEC 60335-2-24:2002) :		
	- the chemical name		N/A
	- the chemical formula		N/A
	- the refrigerant number	R-134a	P
	For a blended refrigerant, at least one of the following (IEC 60335-2-24:2002) :		
	- the chemical name and nominal proportion of each of the components		N/A
	- the chemical formula and nominal proportion for each of the components		N/A
	- the refrigerant numbers and nominal proportion of each of the components		N/A
	- the refrigerant number of the refrigerant blend		N/A
	The chemical name or refrigerant number of the insulation blowing gas (IEC 60335-2-24:2002)		N/A
	Battery voltage for appliances which can be mains and battery operated (IEC 60335-2-24:2002)		N/A
	Max. power input for incorporated ice-maker, if greater than 100 W (IEC 60335-2-24:2002)		N/A
	Ice-makers shall be marked with the maximum permissible water level (IEC 60335-2-24:2002)		N/A
	Compression-type refrigerating systems appliance shall be marked with mass of the refrigerant for each separate refrigerant circuit (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Compression-type appliances flammable which use refrigerants shall be marked with warning sign B.3.2 from ISO 3864 (IEC 60335-2-24:2002)		N/A
A	The enclosure of electrically-operated water valves incorporated in external hose-sets for connection of an appliance to the water mains shall be marked with symbol IEC 60417-5036 (DB:2002-10) if their working voltage exceeds extra-low voltage (IEC 60335-1:01 + A1:2004)		N/A
7.2	Warning for stationary appliances for multiple supply		N/A
	Warning placed in vicinity of terminal cover		N/A
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen	220 – 240 V	P
	Different rated values marked with the values separated by an oblique stroke		N/A
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible		N/A
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N/A
	the power input is related to the mean value of the rated voltage range		P
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N/A
7.6	Correct symbols used		P
	The perpendicular height of the triangle shall be at least 15 mm (IEC 60335-2-24:2002)		N/A
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply		N/A
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)		N/A
	- marking of protective earthing terminals (symbol 5019 of IEC 60417)		P
	- marking not placed on removable parts		P
7.9	Marking or placing of switches which may cause a hazard		P
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means:		P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	The figure 0 indicates only OFF position, unless no confusion with the OFF position	Hot water switch: ON / OFF	N/A
	See Note (IEC 60335-2-24:2002)		N/A
7.11	Indication for direction of adjustment of controls		N/A
7.12	Instructions for safe use provided		P
	Instructions for refrigerating appliances and ice-makers for camping or similar use include the substance of the following (IEC 60335-2-24:2002) :		
	- suitable for camping use		N/A
	- the appliances connected to more than one source of energy		N/A
	- the appliances shall not be exposed to rain unless at least IPX4		N/A
	- for ice-makers not intended to be connected to the water supply WARNING: fill with potable water only		N/A
	For compression-type appliances which use flammable refrigerants, instructions shall include information pertaining to the installation, handling, servicing (IEC 60335-2-24:2002)		N/A
	The instructions shall include the warnings (IEC 60335-2-24:2002)		N/A
	WARNING – Keep ventilation openings, in the appliance enclosure or in the built-in structure, clear of obstruction (IEC 60335-2-24:2002)		N/A
	WARNING – Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer (IEC 60335-2-24:2002)		N/A
	WARNING – Do not damage the refrigerant circuit (IEC 60335-2-24:2002)		N/A
	WARNING – Do not use electrical appliances inside the food storage compartments of the appliance, unless they are of the type recommended by the manufacturer (IEC 60335-2-24:2002)		N/A
	Appliances which use flammable insulation blowing gases, instructions shall include information regarding disposal of the appliance (IEC 60335-2-24:2002)		N/A
	Instructions for ice-cream appliances shall include ingredients and max. quantity of mixtures that can be used in the appliance (IEC 60335-2-24:2002)		N/A
7.12.1	Sufficient details for installation supplied		P
	The method for replacing illuminating lamps included (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Appliances designed for incorporating ice-makers, the types of ice-makers (IEC 60335-2-24:2002)		N/A
	Information on the installation of incorporated ice-makers as optional accessories (IEC 60335-2-24:2002)		N/A
	Incorporated ice-makers installed only by the manufacturer or its service agent (IEC 60335-2-24:2002)		N/A
	Ice makers intended to be connected to the water supply (IEC 60335-2-24:2002) :		
	- the maximum permissible inlet water pressure, (Pa) or (bar)		N/A
	- the minimum permissible inlet water pressure, if necessary (Pa) or (bar)		N/A
	WARNING: connect to potable water supply only (IEC 60335-2-24:2002)		N/A
	Instructions for fixed appliances shall include the following warning (IEC 60335-2-24:2002) :		
	WARNING: To avoid a hazard due to instability of the appliance, it must be fixed in accordance with the instructions (IEC 60335-2-24:2002)		N/A
7.12.2	Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules		N/A
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions stating that the fixed wiring must be protected		N/A
7.12.4	Instructions for built-in appliances:		
	- dimensions of space		N/A
	- dimensions and position of supporting means		N/A
	- distances between parts and surrounding structure		N/A
	- dimensions of ventilation openings and arrangement		N/A
	- connection to supply mains and interconnection of separate components		N/A
	- plug accessible after installation, unless		N/A
	a switch complying with 24.3		N/A
	Applicable to fixed appliances (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24				
Clause		Requirement – Test	Result – Remark	Verdict
	R	- necessity to allow disconnection of the appliance from the supply after installation, unless the appliance incorporates a switch complying with 24.3 (IEC 60335-1:01 + A1:2004)		N/A
	R	- The disconnection may be achieved by having the plug accessible or by incorporating a switch in the fixed wiring in accordance with the wiring rules (IEC 60335-1:01 + A1:2004)		N/A
7.12.5		Replacement cord instructions, type X attachment with a specially prepared cord		N/A
		Replacement cord instructions, type Y attachment		P
		Replacement cord instructions, type Z attachment		N/A
7.12.6	A	The instructions for heating appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains shall contain the substance of the following: (IEC 60335-1:01 + A1:2004)		N/A
	A	CAUTION: In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility. (IEC 60335-1:01 + A1:2004)		N/A
7.12.7		The instructions for fixed appliances shall state how the appliance is to be fixed to its support (IEC 60335-1:01 + A1:2004)		N/A
7.12.8		The instructions for appliances connected to the water mains shall state (IEC 60335-1:01 + A1:2004)		P
		- the maximum inlet water pressure, in pascals;		P
		- the minimum inlet water pressure, in pascals, if this is necessary for the correct operation of the appliance.		P
		The instructions for appliances connected to the water mains by detachable hose-sets shall state that the new hose-sets supplied with the appliance are to be used and that old hose-sets should not be reused. (IEC 60335-1:01 + A1:2004)		P
7.13		Instructions and other texts in an official language		P
7.14		Marking clearly legible and durable (IEC 60335-1:01 + A1:2004)		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/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		P
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N/A
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		P
	Max. rated input of lamps discernible (IEC 60335-2-24:2002)		N/A
	Compression-type appliances the marking of the type of flammable refrigerant and of the flammable insulation blowing gas, as well as the warning sign B.3.2 from ISO 3864, shall be visible when gaining access to the motor-compressors (IEC 60335-2-24:2002)		N/A
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		P
7.101	Appliances which can be battery operated the connection shall be indicated by the symbol “+” or the colour red and “-“ or black (IEC 60335-2-24:2002)		N/A

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/A
	Use of test probe B of IEC 61032: no contact with live parts		P
	Removal of lamps: protection against contact with live parts (IEC 60335-2-24:2002)		N/A
8.1.2	Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		P
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032: no contact with live parts of visible glowing heating elements		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
8.1.4	Accessible part not considered live if:		
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N/A
	- safety extra-low d.c. voltage: not exceeding 42.4 V		N/A
	- or separated from live parts by protective impedance		N/A
	If protective impedance: d.c. current not exceeding 2 mA, and		N/A
	a.c. peak value not exceeding 0.7 mA		N/A
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μF		N/A
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC		N/A
	The quantity of electricity in the discharge is measured using a resistor having a nominal non-inductive resistance of 2 000 Q. (IEC 60335-1:01 + A1:2004)		N/A
	Number the existing note as Note 1 and add the following note: (IEC 60335-1:01 + A1:2004)		N/A
	NOTE 2 The quantity of electricity is calculated from the sum of all areas recorded on the voltage/time graph without taking voltage polarity into account. (IEC 60335-1:01 + A1:2004)		
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		
	- built-in appliances		N/A
	- fixed appliances		N/A
	- appliances delivered in separate units		N/A
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only		P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P

9	STARTING OF MOTOR-OPERATED APPLIANCES		
	Not applicable		

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) Hot water storage heater	P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Appliances being operated under normal operation, user adjustable temperature controls are set to give the lowest temperature (IEC 60335-2-24:2002)		N/A
	The power input stabilized, steady conditions established (IEC 60335-2-24:2002)		P
	A period between the making and the breaking of the temperature control, or highest and lowest values of power input measured (IEC 60335-2-24:2002)		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) Compressor for cold water	P
	The appliance being operated under normal operation, user adjustable temperature controls are set to give the lowest temperature (IEC 60335-2-24:2002)		P
	The appliance is operated for 1 h. The max. value of the current averaged over any 5 min period is obtained. The interval shall not exceed 30s. Starting after 1 min (IEC 60335-2-24:2002)		P
10.101	The power input of the defrosting system, deviation shown in table 1 (IEC 60335-2-24:2002)		N/A
10.102	The power input of any heating system, deviation shown in table 1 (IEC 60335-2-24:2002)		P

11	HEATING		
11.1	No excessive temperatures in normal use		P
	If the winding temperatures of motor-compressors exceed the values given in table 101, compliance is checked by the test of 11.101 (IEC 60335-2-24:2002)		N/A
	The winding temperatures of motor-compressors conforming IEC 60335-2-34 (incl. Annex AA) are not measured (IEC 60335-2-24:2002)		N/A
11.2	Placing and mounting of appliance as described (IEC 60335-2-24:2002)		P
	- according to instructions for installation		N/A
	- in a test corner		N/A
	- test enclosure		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/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
11.4	Heating appliances operated under normal operation at 1.15 times rated power input:		N/A
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage:		N/A
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage:		P
11.7	The appliances is operated until steady conditions are established (IEC 60335-2-24:2002)		P
11.8	Temperature rises not exceeding values in table 3	(see appended tables)	P
	During the test protective devices do not operate (IEC 60335-2-24:2002)		P
	During the test sealing compound doesn't flow out (IEC 60335-2-24:2002)		P
	During the test temperatures are monitored continuously (IEC 60335-2-24:2002)		P
	For (SN) and (N) class, the temperature rises not exceeding values in table 3 (IEC 60335-2-24:2002)		P
	For (ST) and (T) class, the temperature rises not exceeding values in table 3 reduced by 7 K (IEC 60335-2-24:2002)		N/A
	The temperature rise of the external enclosure of motor-operated appliances not applicable for: (IEC 60335-2-24:2002)		
	- built-in appliances		N/A
	- other appliances (distance from a wall $\leq$ 75 mm)		P
	- max. temperature rises specified in table 101		P
	- temperatures are not measured for motor-compressors complying with (IEC 60 335-2-34) (IEC 60335-2-24:2002)		N/A
A	However, components in protective electronic circuits are allowed to operate provided they are tested for the number of cycles of operation specified in 24.1.4. (IEC 60335-1:01 + A1:2004)		N/A
A	The temperature of ballast windings and their associated wiring shall not exceed the values specified in 12.4 of IEC 60598-1, when measured under the conditions stated. (IEC 60335-2-24:2002/A1:2005)		N/A
11.101	If the temperatures exceed the limits, the test is carried out again (IEC 60335-2-24:2002) :		
	- winding temperatures at the end of a running cycle not higher than the limits given in table 101		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
11.102	Any defrosting system, temperature rises don't exceed the values given in 11.8 (IEC 60335-2-24:2002)		N/A
	Manual defrosting (IEC 60335-2-24:2002)		N/A
	Automatic defrosting (IEC 60335-2-24:2002)		N/A
11.103	Heating systems, other than defrosting, temperature rises don't exceed the values given in 11.8 (IEC 60335-2-24:2002)		P

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:		N/A
	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/A
	The test of 13.2 does not apply to battery circuit (IEC 60335-2-24:2002)		N/A
13.2	Leakage current measured by means of the circuit described in figure 4 of IEC 60990		P
	Leakage current measurements and limits (IEC 60335-2-24:2002)	(see appended table)	P
13.3	Electric strength tests according to table 4	(see appended table)	P
	No breakdown during the tests		P
	The test voltage for reinforced insulation is applied between separate circuits for battery operation and mains supply operation (IEC 60335-2-24:2002)		N/A
	The appliance is disconnected from the supply and the insulation is immediately subjected to a voltage having a frequency of 50 Hz or 60 Hz for 1 min, in accordance with IEC 61180-1.(IEC 60335-1:01 + A1:2004)		P
	The high-voltage source used for the test is to be capable of supplying a short circuit current I_s between the output terminals after the output voltage has been adjusted to the appropriate test voltage. (IEC 60335-1:01 + A1:2004)		P
	The overload release of the circuit is not to be operated by any current below the tripping current I_r The values of I_s and I_r are given in Table 5 for various high-voltage sources. (IEC 60335-1:01 + A1:2004)		P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
14	TRANSIENT OVERVOLTAGES		
	Appliances withstand the transient overvoltages to which they may be subjected		N/A
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6	(see appended table)	N/A
	No flashover during the test, unless of functional insulation		N/A
	In case of flashover of functional insulation, the appliance complies with clause 19 with the clearance short circuited		N/A
15	MOISTURE RESISTANCE		
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	IPX1	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
A	Water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains are subjected to the test specified for IPX7 appliances. (IEC 60335-1:01 + A1:2004)		N/A
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N/A
	Built-in appliances installed according to the instructions		N/A
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		P
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N/A
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N/A
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube		N/A

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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/A
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Detachable parts tested as specified		P
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support that is constructed to prevent water spraying onto its top surface. The pivot axis of the oscillating tube is located at the same level as the underside of the support and aligned centrally with the appliance. The spray is directed upwards. (IEC 60335-1:01 + A1:2004)		N/A
	For IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min. (IEC 60335-1:01 + A1:2004)		N/A
15.2	Spillage of liquid does not affect the electrical insulation		P
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N/A
	Detachable parts removed		P
	Overfilling test with additional amount of water, over a period of 1 min (l):	0.6 (l)	P
	The appliance withstands the electric strength test of 16.3		P
	No trace of water on insulation that can result in a reduction of clearances and creepage distances below values specified in clause 29		P
	Lamp covers are not removed (IEC 60335-2-24:2002)		N/A
15.3	Appliances proof against humid conditions	93 %RH, 30℃	P
	Humidity test for 48 h in a humidity cabinet		P
	The appliance withstands the tests of clause 16		P
15.101	Spillage of liquid from inside does not affect their electrical insulation (IEC 60335-2-24:2002)		N/A
	The relevant tests of 15.102, 15.103 and 15.104. are carried out (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
15.102	The apparatus shown in figure 101 is filled with water containing 1% NaCl and 0,6% of acid rinsing agent (IEC 60335-2-24:2002)		N/A
15.103	Appliances, other than built-in appliances, ice-makers and ice-cream appliances, are tilted at an angle of up to 2° (IEC 60335-2-24:2002)		N/A
	Test with 0,5 l water containing 1% NaCl and 0,6% of acid rinsing agent over the top of the appliance (IEC 60335-2-24:2002)		N/A
15.104	Ice-makers which are directly connected to the water supply, is filled with water as in normal use. The inlet valve is then held open for 1 min (IEC 60335-2-24:2002)		N/A
15.105	Operation of a defrosting system does not affect the electrical insulation of defrost heating elements (IEC 60335-2-24:2002)		N/A
	If the water is in contact with the defrost heating element or its insulation, test of 22.102 is carried out (IEC 60335-2-24:2002)		N/A

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/A
	The test of 16.2 does not apply to battery circuits (IEC 60335-2-24:2002)		N/A
16.2	Single-phase appliances: test voltage 1.06 times rated voltage:		P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3:		N/A
	Leakage current measurements	(see appended table)	P
	Limits for class 0I appliances and the various types of class I appliances (IEC 60335-2-24:2002)	(see appended table)	P
16.3	Electric strength tests according to table 7	(see appended table)	P
	No breakdown during the tests		P
	The test voltage specified in Table 7 for reinforced insulation is applied between separate circuits for battery operation and mains supply operation (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
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/A
	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/A
	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/A
	Temperature of the winding not exceeding the value specified in table 8,		N/A
	however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N/A

18	ENDURANCE		
	Not applicable		

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		P
		Subclauses 19.2 and 19.3 do not apply to heating systems (IEC 60335-2-24:2002)		N/A
		Motor compressors not conforming to IEC 60335-2-34 are subjected to the tests specified in IEC 60335-2-34 19.101, 19.102 and 19.104 (IEC60335-2-24:2002)		N/A
		Fan motors of ice-cream appliances are not subject to the locked-rotor test specified in Annex (IEC 60335-2-24:2002)		N/A
19.2	A	Controls that operate during the test of Clause 11 are allowed to operate (IEC 60335-1:01 + A1:2004)		
19.3	A	Controls that operate during the test of Clause 11 are allowed to operate (IEC 60335-1:01 + A1:2004)		
19.4		Test conditions as in cl. 11, any control limiting the temperature during tests of cl. 11 short-circuited		P
19.5		Test of 19.4 repeated on Class 0I and I appliances with tubular sheathed or embedded heating elements. No short-circuiting, but one end of the element connected to the elements sheath		P

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Clause	Requirement – Test	Result – Remark	Verdict
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		P
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N/A
	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/A
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts of other appliances		N/A
	Locked rotor, motor capacitors open-circuited or short-circuited, if required		N/A
	Locked rotor, capacitors open-circuited one at a time		N/A
	Test repeated with capacitors short-circuited one at a time, if required		N/A
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		N/A
	Other appliances supplied with rated voltage for a period as specified		N/A
	Winding temperatures not exceeding values specified in table 8	(see appended table)	N/A
	Fan motors of ice-cream appliances are tested for 5 min (IEC 60335-2-24:2002)		N/A
19.8	Three-phase motors operated at rated voltage with one phase disconnected		N/A
	Three-phase motor compressors operated at rated voltage with one phase disconnected, unless complying with IEC 60335-2-34 (IEC 60335-2-24:2002)		N/A
19.9	Not applicable		
19.10	Series motor operated at 1.3 times rated voltage for 1 min:		N/A
	During the test, parts not being ejected from the appliance		N/A

IEC 60 335-2-24			
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		P
R	Appliances incorporating a protective electronic circuit are subjected to the tests of 19.11.3 and 19.11.4. (IEC 60335-1:01 + A1:2004)		N/A
R	Appliances having a switch with an off position obtained by electronic disconnection, or a switch that can place the appliance in a stand-by mode, are subjected to the tests of 19.11.4. (IEC 60335-1:01 + A1:2004)		N/A
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/A
	- 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/A
	- 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 (IEC 60335-1:01 + A1:2004)		N/A
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/A
	b) open circuit at the terminals of any component		P
	c) short circuit of capacitors, unless they comply with IEC 60384-14		N/A
	d) short circuit of any two terminals of an electronic component, other than integrated circuits. This fault condition is not applied between the two circuits of an optocoupler		P
	e) failure of triacs in the diode mode		N/A
	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/A
	In this case the possible hazardous (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
R	In each case, the test is ended if a non-self-resetting interruption of the supply occurs within the appliance (IEC 60335-1:01 + A1:2004)		N/A
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/A
	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/A
	- the appliance complies with the conditions specified in 19.13		N/A
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		N/A
	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/A
	- 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/A
	- the appliance withstands the tests of 19.11.2 with open-circuited conductor bridged		N/A
19.11.4 A	Appliances having a switch with an off position obtained by electronic disconnection, or a switch that can be placed in the stand-by mode, are subjected to the tests of 19.11.4.1 to 19.11.4.7. The tests are carried out with the appliance supplied at rated voltage, the switch being set in the off position or in the stand-by mode. (IEC 60335-1:01 + A1:2004)		N/A
A	Appliances incorporating a protective electronic circuit are subjected to the tests of 19.11.4.1 to 19.11.4.7. The tests are carried out after the protective electronic circuit has operated during the relevant tests of Clause 19 except 19.2, 19.6 and 19.11.3. However, appliances that are operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena. (IEC 60335-1:01 + A1:2004)		N/A
A	The tests are carried out with surge arresters disconnected, unless they incorporate spark gaps. (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
A	NOTE 1 If the appliance has several modes of operation, the tests are carried out with the appliance operating in each mode, if necessary. (IEC 60335-1:01 + A1:2004)		
A	NOTE 2 Appliances incorporating electronic controls complying with the IEC 60730 series are not exempt from the tests. (IEC 60335-1:01 + A1:2004)		
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4 being applicable. Ten discharges having a positive polarity and ten discharges having a negative polarity are applied at each preselected point. (IEC 60335-1:01 + A1:2004)		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3 being applicable. (IEC 60335-1:01 + A1:2004)		N/A
19.11.4.3 A	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4. (IEC 60335-1:01 + A1:2004)		N/A
A	Test level 3 is applicable for signal and control lines. (IEC 60335-1:01 + A1:2004)		N/A
A	Test level 4 is applicable for the power supply lines. (IEC 60335-1:01 + A1:2004)		N/A
A	The bursts are applied for 2 min with a positive polarity and for 2 min with a negative polarity. (IEC 60335-1:01 + A1:2004)		N/A
A	The power supply terminals of the appliance are subjected to voltage surges in accordance with IEC 61000-4-5, five positive impulses and five negative impulses being applied at the selected points. (IEC 60335-1:01 + A1:2004)		N/A
A	Test level 3 is applicable for the line-to-line coupling mode, a generator having a source impedance of 2 Ω being used. (IEC 60335-1:01 + A1:2004)		N/A
A	Test level 4 is applicable for the line-to-earth coupling mode, a generator having a source impedance of 12 Ω being used. (IEC 60335-1:01 + A1:2004)		N/A
A	Earthed heating elements in class I appliances are disconnected during this test. (IEC 60335-1:01 + A1:2004)		N/A
A	NOTE: If a feedback system depends on inputs related to a disconnected heating element, an artificial network may be needed. (IEC 60335-1:01 + A1:2004)		
A	For appliances having surge arresters incorporating spark gaps, the test is repeated at a level that is 95 % of the flashover voltage. (IEC 60335-1:01 + A1:2004)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
19.11.4.5 A	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3 being applicable. (IEC 60335-1:01 + A1:2004)		N/A
A	During the test, all frequencies between 0,15 MHz to 80 MHz are covered. (IEC 60335-1:01 + A1:2004)		N/A
A	NOTE The dwell time for each frequency is to be sufficient to observe a possible malfunction of the protective electronic circuit. (IEC 60335-1:01 + A1:2004)		
19.11.4.6 A	The appliance is subjected to voltage dips and interruptions in accordance with IEC 61000-4-11 (IEC 60335-1:01 + A1:2004)		N/A
A	The durations specified in Table 1 of IEC 61000-4-11 are applied to each test level, the dips and interruptions being applied at zero crossing of the supply voltage. (IEC 60335-1:01 + A1:2004)		N/A
19.11.4.7 A	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2 being applicable (IEC 60335-1:01 + A1:2004)		N/A
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A):		N/A
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)	N/A
	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:	1250V	P
	- supplementary insulation:	1750V	P
	- reinforced insulation:	3000V	P
	Temperature rises not exceeding the values shown in table 7 or 150 °C for housing of motor-compressors (IEC 60335-2-24:2002)		P
A	The appliance does not undergo a dangerous malfunction, and (IEC 60335-1:01 + A1:2004)		N/A
A	no failure of protective electronic circuits, if the appliance is still operable (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
A	Appliances tested with an electronic switch in the off position or in the stand-by mode, do not become operational (IEC 60335-1:01 + A1:2004)		N/A
19.101	Heating systems dimensioned and located properly and comply with 19.13 during and after the test (IEC 60335-2-24:2002)		P
19.102	Ice-makers and ice-cream appliances so constructed that they do not cause any risk and comply with 19.13 during and after the tests (IEC 60335-2-24:2002)		N/A
19.103	Appliances intended for camping and similar use tested on an inclined support (5°) and comply with 19.13 during and after the test (IEC 60335-2-24:2002)		N/A
19.104	Illuminating equipment shall not cause any fire hazard under abnormal operating conditions (IEC 60335-2-24:2002/A1:2005)		N/A
	Test as specified (IEC 60335-2-24:2002/A1:2005)		N/A
	Illuminating equipment having discharge lamps is operated under the fault conditions specified in items a), d) and e) of 12.5.1 of IEC 60598-1, the appliance being supplied at rated voltage (IEC 60335-2-24:2002/A1:2005)		N/A
	During the test, surrounding plastic parts shall not show any distortion which may affect safety in the sense of this standard (IEC 60335-2-24:2002/A1:2005)		N/A
	The temperature of ballast windings shall not exceed the values specified in 12.5 of IEC 60598-1 when measured under the conditions specified (IEC 60335-2-24:2002/A1:2005)		N/A
19.105	Appliances intended for battery operation properly constructed and comply with 19.13 during and after the test (IEC 60335-2-24:2002)		N/A

20	STABILITY AND MECHANICAL HAZARDS		
20.1	Adequate stability		P
	Tilting test through an angle of 10° (appliance placed on an inclined plane/horizontal plane); appliance does not overturn		P
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		P
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Ice-cream appliances shall have adequate stability (IEC 60335-2-24:2002)		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		N/A
	Protective enclosures, guards and similar parts are non-detachable		N/A
	Adequate mechanical strength and fixing of protective enclosures		N/A
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure		N/A
	Not possible to touch dangerous moving parts with test probe		N/A
20.101	Refrigeration appliances and ice-makers shall have adequate stability. Tests according to 20.102, 20.103 and 20.104 (IEC 60335-2-24:2002)		N/A
	This requirement does not apply to built-in appliances (IEC 60335-2-24:2002)		N/A
20.102	Test with door opened to 90° (IEC60335-2-24:2002 + A1:05)		N/A
	Test with door opened to 180° or to the limit of door stop (IEC60335-2-24:2002 + A1:05)		N/A
20.103	Test with one of the drawers is pulled to the most onerous out position (IEC 60335-2-24:2002)		N/A
	Test with two drawers are pulled to the most onerous out position (IEC 60335-2-24:2002)		N/A
20.104	Test with sliding drawers accessible without opening a door (IEC 60335-2-24:2002)		N/A
	Doors shelves are loaded as specified in 20.102 and opened 90° (IEC 60335-2-24:2002)		N/A

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 0,5 ± 0,04 J		P
	If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N/A
	If necessary, repetition of groups of three blows on a new sample		N/A
	Covers of lamps within the appliance are considered likely to be damaged in normal use. Lamps are not tested (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
21.1 R	Compliance is checked by applying blows to the appliance in accordance with test Ehb of IEC 60068-2-75, the spring hammer test. (IEC 60335-1:01 + A1:2004)		P
R	The appliance is rigidly supported and three blows, having an impact energy of 0,5 J, are applied to every point of the enclosure that is likely to be weak. (IEC 60335-1:01 + A1:2004)		P
21.2	Accessible parts of solid insulation shall have sufficient strength to prevent Penetration by sharp implements. (IEC 60335-1:01 + A1:2004)	Results of cl.30.1 shows that no further tests are necessary	N/A
A	Compliance is checked by subjecting the insulation to the following test, unless the thickness of supplementary insulation is at least 1 mm and that of reinforced insulation is at least 2 mm. (IEC 60335-1:01 + A1:2004)	Reinforced insulation is at least 2 mm	N/A
A	The insulation is raised to the temperature measured during the test of Clause 11. Its tip is rounded with a radius of 0,25 mm ± 0,02 mm. (IEC 60335-1:01 + A1:2004)		N/A
A	The surface of the insulation is then scratched by means of a hardened steel pin, the end of which has the form of a cone with an angle of 40°. (IEC 60335-1:01 + A1:2004)		N/A
A	The pin is held at an angle of 80° - 85° to the horizontal and loaded so that the force exerted along its axis is 10 N ±0,5 N. (IEC 60335-1:01 + A1:2004)		N/A
A	The scratches are made by drawing the pin along the surface of the insulation at a speed of approximately 20 mm/s. (IEC 60335-1:01 + A1:2004)		N/A
A	Two parallel scratches are made. (IEC 60335-1:01 + A1:2004)		N/A
A	They are spaced sufficiently apart so that they are not affected by each other, their length covering approximately 25 % of the length of the insulation. (IEC 60335-1:01 + A1:2004)		N/A
A	Two similar scratches are made at 90° to the first pair without crossing them. (IEC 60335-1:01 + A1:2004)		N/A
A	The test fingernail of Figure 7 is then applied to the scratched surface with a force of approximately 10 N. (IEC 60335-1:01 + A1:2004)		N/A
A	No further damage, such as separation of the material, shall occur. (IEC 60335-1:01 + A1:2004)		N/A
A	The insulation shall then withstand the electric strength test of 16.3. (IEC 60335-1:01 + A1:2004)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
A	The hardened steel pin is then applied perpendicularly with a force of 30 N ± 0,5 N to an unscratched part of the surface. (IEC 60335-1:01 + A1:2004)		N/A
A	The insulation shall then withstand the electric strength test of 16.3 with the pin still applied and used as one of the electrodes (IEC 60335-1:01 + A1:2004)		N/A
21.101	Appliances for camping or similar use tested against the effects of dropping and vibration as specified (IEC 60335-2-24:2002)		N/A
21.102	Lamps are protected against mechanical shocks (IEC 60335-2-24:2002)		N/A

22	CONSTRUCTION		
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	IPX1	N/A
22.2	Stationary appliance: means to provide all-pole disconnection from the supply provided, the following means being available:		
	- a supply cord fitted with a plug		P
	- a switch complying with 24.3		N/A
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided		N/A
	- an appliance inlet		N/A
	Singe-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase permanently connected class I appliances, connected in the phase conductor		N/A
22.3	Appliance provided with pins: no undue strain on socket-outlets		N/A
	Applied torque not exceeding 0.25 Nm		N/A
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N/A
	Each pin subjected to a tork of 0.4Nm; the pins are not rotating unless rotating does not impair compliance with the standard		N/A
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		P
22.5	No risk of electric shock when touching the pins of the plug		P

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Clause	Requirement – Test	Result – Remark	Verdict
R	The appliance is supplied at rated voltage. Any switch is then placed in the off position and the appliance is disconnected from the supply mains at the instant of voltage peak. One second after disconnection, the voltage between the pins of the plug is measured with an instrument that does not appreciably affect the value to be measured (IEC 60335-1:01 + A1:2004)		P
22.6	Electrical insulation not affected by condensing water or leaking liquid		P
	Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak		P
	Thermostats are not in contact with the evaporator unless they are adequately protected (IEC 60335-2-24:2002)		P
	Fluids don't flow along parts such as stems and tubes of thermostats (IEC 60335-2-24:2002)		P
22.7	Compression-type appliances, including protective enclosures of a protected cooling system, using flammable refrigerants shall withstand (IEC 60335-2-24:2002)		
	- a pressure of 3,5 times the saturated vapour pressure (70 °C)		N/A
	- a pressure of 5 times the saturated vapour pressure (20 °C)		N/A
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		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/A
22.10	Location or protection of reset buttons of non-self-resetting controls is so that accidental resetting is unlikely		P
22.10 R	It shall not be possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance. (IEC 60335-1:01 + A1:2004)		N/A
R	Non-self-resetting thermal motor protectors shall have a trip-free action unless they are voltage maintained. (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	NOTE 2 Trip-free is an automatic action that is independent of manipulation or position of the actuating member. (IEC 60335-1:01 + A1:2004)		
R	Reset buttons of non-self-resetting controls shall be located or protected so that their accidental resetting is unlikely to occur if this could result in a hazard. (IEC 60335-1:01 + A1:2004)		P
	NOTE 3 For example, this requirement precludes the location of reset buttons on the back of an appliance, which could result in them being reset by pushing the appliance against a wall. (IEC 60335-1:01 + A1:2004)		
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/A
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N/A
	Tests as described		P
22.12	Handles, knobs etc. fixed in a reliable manner		P
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N/A
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		P
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/A
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	No exposed pointed ends of self tapping screws 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/A
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/A
	Cord reel tested with 6000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1000 V applied		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Not applicable to refrigeration appliances and ice-makers (IEC 60335-2-24:2002)		
22.18	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use		P
22.19	Driving belts not used as electrical insulation		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless material used is non-corrosive, non-hygroscopic and non-combustible		N/A
	Compliance is checked by inspection and, if necessary, by appropriate test		N/A
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/A
	In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N/A
22.25	Sagging heating conductors cannot come into contact with accessible metal parts		N/A
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/A
22.27	Parts connected by protective impedance separated by double or reinforced insulation		N/A
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water: separated from live parts by double or reinforced insulation		N/A
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		N/A
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31 TME	Clearances and creepage distances over supplementary and reinforced insulation not reduced below values specified in clause 29 as result of war		P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
TME	Clearances and creeping distances between live parts and accessible parts not reduced below values for supplementary insulation, if wires, screws, etc. become 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/A
	Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation		N/A
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N/A
22.33	Conductive liquids that are or may become accessible in normal use are not in direct contact with live parts		P
	Electrodes not used for heating liquids	not used	P
	For class II constructions, conductive liquids that are or may become accessible in normal use, not in direct contact with basic or reinforced insulation		P
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation		N/A
	Heating conductors having only one layer of insulation are not in direct contact with water or ice during normal use (IEC 60335-2-24:2002)		N/A
	NOTE : Frozen water is regarded as a conducting liquid (IEC 60335-2-24:2002)		P
22.34	Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed		P
22.35	Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault		P
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of an insulation fault, they are either adequately covered by insulation material, or their accessible parts are separated from their shafts or fixings by supplementary insulation		N/A
	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/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
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/A
22.37	Capacitors in Class II appliances not connected to accessible metal parts, unless complying with 22.42		N/A
	Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42		N/A
22.38	Capacitors not connected between the contacts of a thermal cut-out		N/A
22.39	Lamp holders used only for the connection of lamps		N/A
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N/A
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		N/A
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N/A
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N/A
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		P
22.46 A	Software used in protective electronic circuits shall be software class B or software class C. (IEC 60335-1:01 + A1:2004)		N/A
A	NOTE 1 Failure of software class B in the presence of another fault in the appliance, or failure of software class C alone, could result in dangerous malfunction, electric shock, fire, mechanical or other hazards. Software class A denotes software used for functional purposes. (IEC 60335-1:01 + A1:2004)		
A	*Compliance is checked by evaluating the software in accordance with Annex R.* (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24				
Clause		Requirement – Test	Result – Remark	Verdict
	A	NOTE 2 If the software program is modified, the evaluation and relevant tests are repeated if the modification can influence the results of the test involving protective electronic circuits. (IEC 60335-1:01 + A1:2004)		
22.47	A	Appliances intended to be connected to the water mains shall withstand the water pressure expected in normal use. (IEC 60335-1:01 + A1:2004)		P
	A	No leakage from any part, including any inlet water hose (IEC 60335-1:01 + A1:2004)		P
	A	Compliance is checked by connecting the appliance to a water supply having a static pressure equal to twice the maximum inlet water pressure or 1,2 MPa, whichever is higher, for a period of 5 min. (IEC 60335-1:01 + A1:2004)		P
		There shall be no leakage from any part, including any inlet water hose. (IEC 60335-1:01 + A1:2004)		P
22.48	A	Appliances intended to be connected to the water mains shall be constructed to prevent backsiphonage of non-potable water into the water mains. (IEC 60335-1:01 + A1:2004)		N/A
	A	Compliance is checked by the relevant tests of IEC 61770 (IEC 60335-1:01 + A1:2004)		N/A
22.101		Lampholders properly fixed (IEC 60335-2-24:2002)		N/A
		NOTE: Normal use includes replacement of lamps (IEC 60335-2-24:2002)		N/A
		Test with torque of (IEC 60335-2-24:2002) :		N/A
22.102		Insulated wire heaters and their joints protected against entry of water (IEC 60335-2-24:2002)		N/A
		3 heating elements: 24 h immersion in water with 1% NaCl; electric strength test between heating conductor and water (1250 V 15 min) (IEC 60335-2-24:2002)		N/A
22.103		Ice-makers and appliances incorporating ice-makers withstand the water pressure as specified (IEC 60335-2-24:2002)		N/A
22.104		Appliances with two or more temperature control devices controlling the same motor-compressor don’t cause undue operation of the thermal motor-protector (IEC 60335-2-24:2002)		N/A
		The test is carried out separately with each combination of control devices (IEC 60335-2-24:2002)		N/A
22.105		Appliances which can also be battery operated, the battery circuit is insulated from live parts by double insulation or reinforced insulation (IEC 60335-2-24:2002)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	It is not possible to touch live parts when making the connections to the battery (IEC 60335-2-24:2002)		N/A
	Specified for double insulation or reinforced insulation (IEC 60335-2-24:2002)		N/A
22.106	The mass of refrigerant (flammable refrigerant) shall not exceed 150g (IEC 60335-2-24:2002)		N/A
22.107	Compression-type appliances with a protected cooling system and which use flammable refrigerants shall be constructed to avoid any fire or explosion hazard, in the event of leakage of the cooling system (IEC 60335-2-24:2002)	use non-flammable refrigerants	N/A
22.107.1	A leakage is simulated at the most critical point of the cooling system (method as specified) (IEC60335-2-24:2002 + A1:05)		N/A
	The measured value shall not exceed 75% LEL of the refrigerant (table 102) and shall not exceed 50% LEL for a period exceeding 5 min. (IEC 60335-2-24:2002)		N/A
22.107.2	All accessible surfaces of protected cooling system components, are scratched using the tool whose tip is shown in figure 102 (IEC 60335-2-24:2002)		N/a
	The tool is applied using the following parameters (IEC 60335-2-24:2002) :		
	- force at right angles to the surface to be tested 35 N $\pm$ 3 N		N/A
	- force parallel to the surface to be tested 250 N		N/A
	The appropriate part shall withstand the test of 22.7 reduced by 50% (IEC 60335-2-24:2002)		N/A
22.108	Compression-type appliances with unprotected cooling systems and which use flammable refrigerants, any electrical apparatus other than non-self resetting protective devices, shall be tested and found to comply with the requirements in Annex CC for group IIA gases or the refrigerant used (IEC60335-2-24:2002 + A1:05)		N/A
	Refrigerant leakage into food storage shall not result in an explosive atmosphere outside the food storage compartment in areas where electrical apparatus are mounted, except in those areas which contain only non-self resetting protective devices, necessary for compliance with the requirements in Annex CC for group IIA gases or the refrigerant used (IEC60335-2-24:2002 + A1:05)		N/A
	The measured value shall not exceed 75% LEL of the refrigerant (table 102) and shall not exceed 50% LEL for a period exceeding 5 min (IEC60335-2-24:2002 + A1:05)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
22.109	Compression-type appliance which use flammable refrigerants shall be constructed so that leaked refrigerant will not stagnate so as to cause a fire hazard in areas outside the food storage compartments where the appliance's electrical components, other than non-self-resetting protective devices necessary for compliance with clause 19, are fitted (IEC60335-2-24:2002 + A1:05)		N/A
	Unless the electrical components comply least with the requirements in Annex CC for group IIA gases or the refrigerant used (IEC60335-2-24:2002 + A1:05)		N/A
	Test: A quantity equal to 50% $\pm$ 1,5g of the refrigerant charge is injected into the considered area (IEC 60335-2-24:2002)		N/A
	The measured value shall not exceed 75% LEL of the refrigerant (table 102) and shall not exceed 50% LEL for a period exceeding 5 min (IEC60335-2-24:2002 + A1:05)		N/A
22.110	Temperatures on surfaces be exposed to leakage of flammable refrigerants shall not exceed the ignition temperature (table 102) reduced by 100 K (IEC 60335-2-24:2002)		N/A
22.111	Doors and lids of compartments in appliances with a free space shall be capable of being opened from the inside (IEC 60335-2-24:2002)		N/A
	The door shall open before the force exceeds 70 N (IEC 60335-2-24:2002)		N/A
22.112	Drawers which are only accessible after openings a door or lid shall not contain a free space (IEC 60335-2-24:2002)		N/A
22.113	Drawers which are accessible with out opening a door and which contain a free space shall have an opening in their rear wall and be capable of being opened from the inside (IEC 60335-2-24:2002)		N/A
	The drawers shall open before the force exceeds 70 N (IEC 60335-2-24:2002)		N/A
22.114	Appliances for household use which contain compartments with a free space any door or drawer shall not be fitted with a self-latching lock (IEC 60335-2-24:2002)		N/A
	Key operated locks shall require two independent movements to actuate the lock or be of a type that automatically ejects the key when unlocked (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
22.115	The fixing means for fixed appliances shall have adequate mechanical strength (IEC 60335-2-24:2002)		N/A

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		P
	Wiring effectively prevented from coming into contact with moving parts		N/A
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges or corners		N/A
	Beads inside flexible metal conduits contained within an insulating sleeve		N/A
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N/A
	Flexible metallic tubes not causing damage to insulation of conductors		N/A
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N/A
	No damage after 10 000 flexings for conductors flexed during normal use or 100 flexings for conductors flexed during user maintenance		N/A
	Electric strength test, 1000 V between live parts and accessible metal parts		N/A
	Open-coil springs not used. NOTE : It does not apply to external conductors (IEC 60335-2-24:2002)		N/A
23.4	Bare internal wiring sufficiently rigid and fixed		N/A
23.5	The insulation of internal wiring withstanding the electrical stress likely to occur in normal use		P
	No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by positive means		N/A
23.7	The colour combination green/yellow used only for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P

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Clause	Requirement – Test	Result – Remark	Verdict
23.9	No lead-tin soldering of stranded conductors where they are subject to contact pressure, unless		P
	clamping means so constructed that there is no risk of bad contact due to cold flow of the solder		N/A
23.10 A	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, shall be at least equivalent to that of light polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 52) (IEC 60335-1:01 + A1:2004)		N/A
A	NOTE The mechanical characteristics specified in IEC 60227 are not evaluated. (IEC 60335-1:01 + A1:2004)		

24	COMPONENTS		
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components	(see appendix components)	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		P
	Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
	Motor-compressors are not required to be separately tested according to (IEC 60 335-2-34) nor are they required to meet the requirements of (IEC 60 335-2-34) if they meet the requirements of this standard (IEC 60335-2-24:2002)		P
A	Motors are not required to comply with IEC 60034-1. (IEC 60335-1:01 + A1:2004)		N/A
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14, or		N/A
	tested according to annex F		N/A
24.1.2	Safety isolating transformers complying with IEC 61558-2-6, or		N/A
	tested according to annex G		N/A
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000, or		P
	tested according to annex H		N/A
	The number of operations for other switches (IEC 60335-2-24:2002) :		
	- quick-freeze switches:	300	N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	- manual and semi-automatic defrost switches	300	N/A
	- door switches	50’000	N/A
	- on/off switches	300	N/A
A	If the switch operates a relay or contactor, the complete switching system is subjected to the test (IEC 60335-1:01 + A1:2004)		N/A
A	NOTE 2: Motor starting relays complying with IEC 60730-2-10 are not retested (IEC 60335-1:01 + A1:2004)		
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/A
	- temperature limiters:	1 000	N/A
	- self-resetting thermal cut-outs:	300	N/A
	- non-self-resetting thermal cut-outs:	30	P
R	- voltage maintained non-self-resetting thermal cut-outs: (IEC 60335-1:01 + A1:2004)	1000	N/A
R	- other non-self-resetting thermal cut-outs: (IEC 60335-1:01 + A1:2004)	30	N/A
	- timers:	3 000	N/A
	- energy regulators:	10 000	N/A
	- thermostats which control the motor-compressor: (IEC 60335-2-24:2002)	100'000	P
	- self-resetting thermal cut-outs which may influence the test results of 19.101 and which are not short-circuited during this test: (IEC 60335-2-24:2002)	100'000	N/A
	- motor-compressor starting relays: (IEC 60335-2-24:2002)	100'000	P
	- automatic thermal motor-protectors for motor-compressors of the hermetic and semi-hermetic type: minimum 2000, but not less than the number of operations during the locked-rotor test (IEC 60335-2-24:2002)		N/A
	- manual reset thermal motor-protectors for motor-compressors of the hermetic and semi-hermetic type: 50 (IEC 60335-2-24:2002)		N/A
	- other automatic thermal motor-protectors: (IEC 60335-2-24:2002)	2000	N/A
	- other manual test thermal motor protectors: (IEC 60335-2-24:2002)	30	N/A

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Clause	Requirement – Test	Result – Remark	Verdict
A	NOTE 3 The ambient temperature during the test of Clause 17 of IEC 60730-1 is that occurring during the test of Clause 11 in the appliance, as specified in footnote b of Table 3. (IEC 60335-1:01 + A1:2004)		
R	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D (IEC 60335-1:01 + A1:2004)		N/A
R	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IEC 60730-2-8 is IPX7 (IEC 60335-1:01 + A1:2004)		N/A
24.1.5	Appliance couplers complying with IEC 60320-1		N/A
	However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		N/A
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		N/A
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		P
	No thermal cut-outs that can be reset by soldering		P
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/A
	Appliances for camping or similar use (IEC 60335-2-24:2002) :		
	Voltage selection switches used in appliances for camping or similar use shall have a contact separation in all poles that provide full disconnection from the supply under overvoltage category III conditions (IEC 60335-2-24:2002)		N/A
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N/A
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance and used accordingly		N/A
	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/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	For starting capacitors, the voltage across the capacitors shall not exceed 1,3 times the rated voltage of the capacitor at $1.1xU_n$ (IEC 60335-2-24:2002)		N/A
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/A
	In addition, the motors are complying with the requirements of Annex I		N/A
24.7 A	Hose-sets for connection of appliances to the water mains, complying with IEC 61770 and supplied with the appliance (IEC 60335-1:01 + A1:2004)		P
24.101	Lampholders shall be of the insulated type (IEC 60335-2-24:2002)		N/A

25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
	Motor-compressors with facilities for connecting a supply cord, complying with the appropriate requirements of IEC 60 335-2-34 are not subjects to the following tests (IEC 60335-2-24:2002)		N/A
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		
	- supply cord fitted with a plug		P
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance		N/A
	- pins for insertion into socket-outlets		N/A
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		N/A
	Mains-operated appliances provided with not more than one means of connection to the supply unless (IEC 60335-2-24:2002)		P
	- the appliance consists of two or more completely independent units built together in one enclosure (IEC 60335-2-24:2002)		N/A
	- the relevant circuits are adequately insulated from each other (IEC 60335-2-24:2002)		N/A
	Appliances which can be both mains and battery operated shall be provided with a separate means for connection (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
25.3	Connection of supply conductors for appliance intended to be permanently connected to fixed wiring possible after the appliance has been fixed to its support		N/A
	Appliance provided with a set of terminals for the connection of cables or fixed wiring, cross-sectional areas specified in 26.6		N/A
	Appliance provided with a set of terminals allowing the connection of a flexible cord		N/A
	Appliance provided with a set of supply leads accommodated in a suitable compartment		N/A
	Appliance provided with a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate type of cable or conduit		N/A
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 10		N/A
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in 29		N/A
25.5	Method for assemble supply cord with the appliance:		
	- type X attachment		N/A
	- type Y attachment		P
	- type Z attachment, if allowed in part 2		N/A
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N/A
25.6	Plugs fitted with only one flexible cord		P
25.7	Supply cord not lighter than:		
	- braided cord (60245 IEC 51)		N/A
	- ordinary tough rubber sheathed cord (60245 IEC 53)		N/A
	- flat twin tinsel cord (60227 IEC 41)		N/A
	- ordinary polyvinyl chloride sheathed cord (60227 IEC 53), appliance exceeding 3 kg	H05VV-F	P
	Temperature rise of external metal parts exceeding 75 K, PVC cord not used, unless		N/A
	appliance so constructed that the supply cord is not likely to touch external metal parts in normal use, or		N/A
	the supply cord is appropriate for higher temperatures, type Y or type Z attachment used		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Appliance supply cord other then SELV power supply not lighter than (IEC 60335-2-24:2002) :		
	- light polyvinyl chloride sheathed cord (code designation 60227 IEC 52)		N/A
25.8	Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area (mm²):	3.1A; 0.75 mm²	P
25.9	Supply cord not in contact with sharp points or edges		P
25.10	Green/yellow core for earthing purposes in Class I appliance		P
25.11	Conductors of supply cords not consolidated by lead-tin soldering where they are subject to contact pressure, unless		P
	clamping means so constructed that there is no risk of bad contacts due to cold flow of the solder		N/A
25.12	Moulding the cord to part of the enclosure does not damage the insulation of the supply cord		N/A
25.13	Inlet opening so shaped as to prevent damage to the supply cord		P
	Unless the enclosure at the inlet opening is of insulation material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		P
	If unsheathed supply cord, a similar additional bushing or lining is required, unless		N/A
	the appliance is class 0		N/A
	Does not apply to flexible leads used to connected an appliance to a SELV power supply (IEC 60335-2-24:2002)		N/A
25.14	Supply cords adequately protected against excessive flexing		N/A
	Flexing test:		
	- applied force (N):		N/A
	- number of flexings:		N/A
	The test does not result in:		
	- short circuit between the conductors		N/A
	- breakage of more than 10% of the strands of any conductor		N/A
	- separation of the conductor from its terminal		N/A
	- loosening of any cord guard		N/A
	- damage, within the meaning of the standard, to the cord or the cord guard		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	- broken strands piercing the insulation and becoming accessible		N/A
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) :	100 N; 0.35 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/A
	- it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	- they are suitable for different types of cord		N/A
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless separated from accessible metal parts by supplementary insulation		N/A
	- the cord is not clamped by a metal screw which bears directly on the cord		N/A
	- at least one part of the cord anchorage securely fixed to the appliance, unless part of a specially prepared cord		N/A
	- screws which have to be operated when replacing the cord do not fix any other component, if applicable		N/A
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N/A
	- for Class 0, 0I and I appliances: they are of insulating material or are provided with an insulating lining, unless a failure of the insulation of the cord does not make accessible metal parts live		N/A
	- for Class II appliances: they are of insulating material, or if of metal, they are insulated from accessible metal parts by supplementary insulation		N/A
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

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	so constructed that the cord can only be fitted with the aid of a tool		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N/A
	Tying the cord into a knot or tying the cord with string not used		N/A
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/A
	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/A
25.22	Appliance inlet:		
	- live parts not accessible during insertion or removal		N/A
	- connector can be inserted without difficulty		N/A
	- the appliance is not supported by the connector		N/A
	- 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/A
25.23	Interconnection cords comply with the requirements for the supply cord, except as specified		N/A
	If necessary, electric strength test of 16.3		N/A
	Interconnection cord for battery operated appliances (IEC 60335-2-24:2002)		N/A
25.24	Interconnection cords not detachable without the aid of a tool if compliance with the standard is impaired when they are disconnected		N/A
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/A
25.101	Appliances which can be battery operated shall have suitable means for connection of the battery (IEC 60335-2-24:2002)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
26	TERMINALS FOR EXTERNAL CONDUCTORS		
	This clause of part 1 is not applicable to those parts of motor-compressors with facilities for connecting a supply cord and complying with IEC 60 335-2-34 (IEC 60335-2-24:2002)		N/A
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	Terminals only accessible after removal of a non-detachable cover		P
A	However, earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection (IEC 60335-1:01 + A1:2004)		P
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/A
	Screws and nuts serve only to clamp supply conductors, except		N/A
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N/A
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone		N/A
	Soldering alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free at the soldered joint		N/A
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/A
	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/A
	- internal wiring is not subjected to stress		N/A
	- clearances and creepage distances are not reduced below the values in 29		N/A
	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/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
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/A
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N/A
	Stranded conductor test, 8 mm insulation removed		N/A
	No contact between live parts and accessible metal parts and, for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N/A
26.6	Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm²):		N/A
	Terminals only suitable for a specially prepared cord		N/A
26.7	Terminals for type X attachment accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection to fixed wiring, including the earthing terminal, located close to each other		N/A
26.9	Terminals of the pillar type constructed and located as specified		N/A
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/A
	Pull test of 5 N to the connection		N/A
26.11	For type Y and Z attachment: soldered, welded, crimped and similar connections may be used		P
	For Class II appliances: the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N/A
	For Class II appliances: soldering, welding or crimping alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection between live parts and accessible metal parts, between battery supply terminals if any (IEC 60335-2-24:2002)		N/A

27	PROVISION FOR EARTHING		
	Compliance is not checked on parts related to motor-compressors if the motor-compressor complies with IEC 60 335-2-34 (IEC 60335-2-24:2002)		P
27.1	Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal or contact of the appliance inlet		P
	Earthing terminals not connected to neutral terminal		P
	Class 0, II and III appliance have no provision for earthing		N/A
	Safety extra-low voltage circuits not earthed, unless protective extra-low voltage circuits		N/A
27.2	Clamping means adequately secured against accidental loosening		P
	Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm², and		N/A
	do not provide earthing continuity between different parts of the appliance		N/A
	Conductors cannot be loosened without the aid of a tool		N/A
27.3	For appliances with supply cord, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		P
27.3 A	If a detachable part having an earth connection is plugged into another part of the appliance, the earth connection shall be made before the current-carrying connections are established. (IEC 60335-1:01 + A1:2004)		N/A
A	The current-carrying connections shall be separated before the earth connection when removing the part (IEC 60335-1:01 + A1:2004)		N/A
27.4	No risk of corrosion resulting from contact between metal of earthing terminal and other metal		P
	Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure		P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5 µm		P
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		P
	In case of aluminium alloys precautions taken to avoid risk of corrosion		N/A
27.5	Low resistance of connection between earthing terminal and earthed metal parts		P
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided that clearances of basic insulation are based on the rated voltage of the appliance		N/A
	Resistance not exceeding 0,1 Ω at the specified low-resistance test	0.053 Ω	P
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand held appliances		N/A
	They may be used 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/A
	- the material of the printed circuit board complies with IEC 60249-2-4 or IEC 60249-2-5		N/A

28	SCREWS AND CONNECTIONS		
	Compliance is not checked on parts related to motor-compressors if the motor-compressor complies with IEC 60 335-2-34 (IEC 60335-2-24:2002)		P
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm		N/A
	Screws of insulating material not used for any electrical connection or connections providing earthing continuity		P
	Screws used for electrical connections or connections providing earthing continuity screw into metal		P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		P
	Type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw can impair basic insulation		N/A
	For screws and nuts; test as specified	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure not transmitted through insulating material liable to shrink or distort, unless shrinkage or distortion compensated		P
	This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0.5A		N/A
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N/A
	Thread-cutting (self-tapping) screws only used for electrical connections if they generate a full form standard machine screw thread		N/A
	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/A
	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		P
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		P
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion		N/A

29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		
	Compliance is not checked on parts related to motor-compressors if the motor-compressor complies with IEC 60 335-2-34 (IEC 60335-2-24:2002)		P
	Clearances, creepage distances and solid insulation withstand electrical stress		P

IEC 60 335-2-24				
Clause		Requirement – Test	Result – Remark	Verdict
		For coatings used on printed circuits boards to protect the microenvironment or to provide basic insulation, annex J applies		N/A
	R	If coatings are used on printed circuit boards to protect the microenvironment (Type A coating) or to provide basic insulation (Type B coating), Annex J applies. (IEC 60335-1:01 + A1:2004)		N/A
	R	The microenvironment is pollution degree 1 under Type A coating. (IEC 60335-1:01 + A1:2004)		N/A
	R	There are no creepage distance or clearance requirements under Type B coating. (IEC 60335-1:01 + A1:2004)		N/A
29.1		Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15	(see appended table)	P
		The values specified may be smaller for basic insulation and functional insulation if the clearance meets the impulse voltage test of clause 14		N/A
		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/A
		or if pollution degree 3 is applicable		N/A
		Compliance is checked by inspection and measurements as specified		P
29.1	R	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless for basic insulation and functional insulation they comply with the impulse voltage test of clause 14 (IEC 60335-1:01 + A1:2004)		P
	R	However, if the construction is affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable (IEC 60335-1:01 + A1:2004)		N/A
	R	The impulse voltage test is not applicable when the microenvironment is pollution degree 3 or for basic insulation of class 0 appliances and class 0I appliances (IEC 60335-1:01 + A1:2004)		N/A
	R	Lacquered conductors of windings considered to be bare conductors (IEC 60335-1:01 + A1:2004)		N/A
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

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
29.1.4	For functional insulation, the values of table 16 are applicable, unless		P
	the appliance complies with clause 19 with the functional insulation short-circuited		N/A
	Clearances at crossover points of lacquered conductors not measured		N/A
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N/A
	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/A
R	Lacquered conductors of windings considered to be bare conductors (IEC 60335-1:01 + A1:2004)		N/A
R	However, clearances at crossover points are not measured (IEC 60335-1:01 + A1:2004)		N/A
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/A
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N/A
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation based on the working voltage used as the rated voltage in table 15		N/A
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		N/A
	insulation subjected to conductive pollution; pollution degree 3		P
	Compliance is checked by inspection and measurements as specified		P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Insulation in refrigeration appliances and ice-makers is in pollution degree 3 and shall have a CTI value of 250 unless the insulation to be protected to pollution by condensation (IEC 60335-2-24:2002)		P
29.2.1	Creepage distances of basic insulation not less than specified in table 17	(see appended table)	P
	For pollution degree 1, creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14		N/A
29.2.2	Creepage distances of supplementary insulation at least as specified for basic insulation in table 17		P
29.2.3	Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17		P
29.2.4	Creepage distances of functional insulation not less than specified in table 18		P
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
29.3 R	Supplementary insulation and reinforced insulation shall have adequate thickness, or have a sufficient number of layers, to withstand the electrical stresses that can be expected during the use of the appliance. (IEC 60335-1:01 + A1:2004)		P
R	Compliance checked by: (IEC 60335-1:01 + A1:2004)		
	- measurement, in accordance with 29.3.1, or		P
R	- an electric strength test in accordance with 29.3.2, if the insulation consists of more than one separate layer, other than natural mica or similar flaky material, or by (IEC 60335-1:01 + A1:2004)		N/A
R	- an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3 (IEC 60335-1:01 + A1:2004)		N/A
29.3.1 R	*The thickness of the insulation shall be at least* (IEC 60335-1:01 + A1:2004)		
	- 1 mm for supplementary insulation; - 2 mm for reinforced insulation.		P
29.3.2 R	Each layer of material shall withstand the electric strength test of 16.3 for supplementary insulation. (IEC 60335-1:01 + A1:2004)		N/A
R	Supplementary insulation shall consist of at least 2 layers of material and reinforced insulation of at least 3 layers (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24				
Clause		Requirement – Test	Result – Remark	Verdict
29.3.3	R	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2 for 48 h at a temperature of 50 K in excess of the maximum temperature rise measured during the test of Clause 19. (IEC 60335-1:01 + A1:2004)		N/A
	R	At the end of the period, the insulation is subjected to the electric strength test of 16.3 at the conditioning temperature and also after it has cooled down to room temperature (IEC 60335-1:01 + A1:2004)		N/A
	R	If the temperature rise of the insulation measured during the tests of Clause 19 does not exceed the value specified in Table 3, the test of IEC 60068-2-2 is not carried out. (IEC 60335-1:01 + A1:2004)		N/A

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	(see appended table)	P
	External parts: at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C):		P
	Parts supporting live parts: at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125°C, whichever is the higher; temperature (°C):		P
	Parts of thermoplastic material providing supplementary or reinforced insulation, 25°C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C):		N/A
	Relevant external parts of non-metallic material also within the storage compartment parts (IEC 60335-2-24:2002)		N/A
	Accessible parts within the storage compartment 65 °C (IEC 60335-2-24:2002)		N/A
	Following tests do not apply to parts related to the motor-compressor if the motor-compressor complies with IEC 60 335-2-34 (IEC 60335-2-24:2002)		P
30.2	Relevant parts of non-metallic material adequately resistant to ignition and spread of fire	(see appended table)	P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Following tests do not apply to parts related to the motor-compressor if the motor-compressor complies with IEC 60 335-2-34 with no ignition (IEC 60335-2-24:2002)		P
30.2.1	Glow-wire test of IEC 60695-2-11 at 550 °C, unless		P
	the material is classified at least HB40 according to IEC 60695-11-10		N/A
	Parts for which the glow-wire test cannot be carried out meet the requirements in ISO9772 for category FH3 material		N/A
	Parts for which the glow-wire test cannot be carried out meet the requirements in ISO9772 for category HBF material (IEC 60335-1:01 + A1:2004)		N/A
30.2.2	Not applicable		
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	Test not applicable to conditions as specified		N/A
30.2.3.1	Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and		P
	parts of insulating material within a distance of 3mm,		P
	having a glow-wire flammability index of at least 850°C according to IEC 60695-2-12		P
30.2.3.2	Parts of insulating material supporting current-carrying connections, and		P
	parts of insulating material within a distance of 3mm,		P
	subjected to glow-wire test of IEC 60695-2-11		P
	Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 as specified		N/A
	Glow-wire test of IEC 60695-2-11, the temperature being:		
	-750°C, for connections carrying a current exceeding 0,2A during normal operation		P
	-650°C, for other connections		N/A
	Parts that during the test produce a flame persisting longer than 2 s, tested as specified		N/A
	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/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	the material is classified as V-0 or V-1 according to IEC 60695-11-10		N/A
30.2.4	Base material of printed circuit boards subjected to needle-flame test of annex E		P
	Test not applicable to conditions as specified		N/A

31	RESISTANCE TO RUSTING		
	Relevant ferrous parts adequately protected against rusting		P

32	RADIATION, TOXICITY AND SIMILAR HAZARDS		
	Not applicable		

A	ANNEX A (INFORMATIVE) ROUTINE TESTS		
	Description of routine tests to be carried out by the manufacturer		P

AA	ANNEX AA, (NORMATIVE) LOCKED-ROTOR TEST OF FAN MOTORS (IEC 60335-2-24:2002)		
	The winding of a fan motor does not reach excessive temperatures if the motor locks or fails to start	(see appended table)	N/A
	The motor is supplied at rated voltage according to supply circuit fig. AA.1.		N/A

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/A
	This annex does not apply to battery chargers		N/A
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/A
	-the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N/A
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	If the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		N/A
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N/A
5.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N/A
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N/A
7.12	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N/A
	Details about how to remove batteries containing materials hazardous to the environment given		N/A
7.15	Markings placed on the part of the appliance connected to the supply mains		N/A
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		N/A
	If the appliance can be operated without batteries, double or reinforced insulation required		N/A
11.7	The battery is charged for the period described		N/A
19.1	Appliances subjected to tests of 19.101, 19.102 and 19.103		N/A
19.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
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/A
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/A
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/A
	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/A
	- 50, the mass of part exceeds 250 g		N/A
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N/A
25.13	An additional lining or bushing not required for interconnection cords operating at safety extra-low voltage		N/A
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N/A
	For other parts, 30.2.2 applies		N/A

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/A
	This annex does not apply to motor-compressors (IEC 60335-2-24:2002)		N/A

CC	ANNEX CC (NORMATIVE) NON-SPARKING “N” ELECTRICAL APPARATUS		
	Where reference is made to IEC 60079-15, the following clauses are applicable as modified below (IEC 60335-2-24:2002/A1:2005)		
21	Supplementary requirements for non-sparking luminaires (IEC 60335-2-24:2002/A1:2005)		
	All of subclauses of Clause 21 are applicable, except 21.2.5.1, 21.2.5.5, 21.2.7, 21.2.8, 21.2.9, 21.2.10, 21.2.11, 21.2.12 and 21.3 (IEC 60335-2-24:2002/A1:2005)		N/A
29	Supplementary requirements for sealed devices or encapsulated devices producing arcs, sparks or hot surfaces (IEC 60335-2-24:2002/A1:2005)		
	All of the subclauses of Clause 29 are applicable, except 29.1 and 29.8, which are replaced by the following (IEC 60335-2-24:2002/A1:2005)		N/A
29.1	Non metallic materials (IEC 60335-2-24:2002/A1:2005)		
	Seals are tested using 33.5. However if the device is tested in the appliance, then 33.5.1 and 33.5.1 are not applicable. (IEC 60335-2-24:2002/A1:2005)		N/A
	However, after the tests of Clause 19 in IEC 60335-2-24, by inspection, no damage of the encapsulation that could impair the type of protection shall be evident, such as cracks in the resin or exposure of encapsulated parts (IEC 60335-2-24:2002/A1:2005)		N/A
29.8	Type tests (IEC 60335-2-24:2002/A1:2005)		

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	The type tests described in 33.5 shall be performed where relevant (IEC 60335-2-24:2002/A1:2005)		N/A
30	Supplementary requirements for energy-limited apparatus and circuits producing arcs, sparks or hot surfaces (IEC 60335-2-24:2002/A1:2005)		
	All of the subclauses of Clause 30 are applicable, except 30.5, 30.6 and 30.10		N/A
31	Supplementary requirements for restricted-breathing enclosures protecting apparatus producing arcs, sparks or hot surfaces (IEC 60335-2-24:2002/A1:2005)		
	All of the subclauses of Clause 31 are applicable, except 31.6 which is replaced by the following		N/A
31.6	Restricted-breathing enclosures shall be type tested, including the cable entry devices (IEC 60335-2-24:2002/A1:2005)		N/A

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/A
	This annex does not apply to motor-compressors or condenser fan motors (IEC 60335-2-24:2002)		N/A
	This annex is applicable to appliances having motors that incorporate thermal motor protectors (IEC 60335-1:01 + A1:2004).		N/A
	The appliance is supplied at rated voltage with the rotor of the motor locked. (IEC 60335-1:01 + A1:2004)		N/A
	The duration of the test is as follows: (IEC 60335-1:01 + A1:2004)		
	- motors having self-resetting thermal motor protectors are operated for 300 cycles or for 72 h, whichever occurs first, unless they are likely to be permanently subjected to the supply voltage in which case the duration is 432 h; (IEC 60335-1:01 + A1:2004)		N/A
	- motors having non-self-resetting thermal motor protectors are operated for 30 cycles, the thermal motor protector being reset as soon as possible after each operation, but in not less than 30 s; (IEC 60335-1:01 + A1:2004)		N/A
	During the test, temperatures shall not exceed the values specified in 19.7 and the appliance shall comply with 19.13 (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	NOTE This test may be carried out on a separate appliance. (IEC 60335-1:01 + A1:2004)		

E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		
	Needle-flame test carried out in accordance with IEC 60695-2-2, with the following modifications:		P
5	Severities		
	The duration of application of the test flame is 30 s ± 1 s		N/A
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		P
8.4	The first paragraph does not apply		P
	If possible, the flame is applied at least 10 mm from a corner		P
8.5	The test is carried out on one specimen		P
	If the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N/A
10	Evaluation of test results		
	The duration of burning not exceeding 30 s		N/A
	However, for printed circuit boards, the duration of burning not exceeding 15 s		P

F	ANNEX F (NORMATIVE) CAPACITORS		
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		-
1.5	Terminology		
1.5.3	Class X capacitors tested according to subclass X2		N/A
1.5.4	This subclause is applicable		N/A
1.6	Marking		
	Items a) and b) are applicable		N/A
3.4	Approval testing		
3.4.3.2	Table II is applicable as described		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
4.1	Visual examination and check of dimensions		
	This subclause is applicable		N/A
4.2	Electrical tests		
4.2.1	This subclause is applicable		N/A
4.2.5	This subclause is applicable		N/A
4.2.5.2	Only table IX is applicable		N/A
	Values for test A apply		N/A
	However, for capacitors in heating appliances the values for test B or C apply		N/A
4.12	Damp heat, steady state		
	This subclause is applicable		N/A
	Only insulation resistance and voltage proof are checked		N/A
4.13	Impulse voltage		
	This subclause is applicable		N/A
4.14	Endurance		
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		N/A
4.14.7	Only insulation resistance and voltage proof are checked		N/A
	Visual examination, no visible damage		N/A
4.17	Passive flammability test		
	This subclause is applicable		N/A
4.18	Active flammability test		
	This subclause is applicable		N/A

G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		
	The following modifications to this standard are applicable for safety isolating transformers:		N/A
7	Marking and instructions		
7.1	Transformers for specific use marked with:		
	-name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	-model or type reference		N/A
17	Overload protection of transformers and associated circuits		
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
22	Construction		
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N/A
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/A

H	ANNEX H (NORMATIVE) SWITCHES		
	Switches comply with the following clauses of IEC 61058-1, as modified:		
	-The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N/A
	-Before being tested, switches are operated 20 times without load		N/A
8	Marking and documentation		
	Switches are not required to be marked		N/A
	However, switches that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N/A
13	Mechanism		
	The tests may be carried out on a separate sample		N/A
15	Insulation resistance and dielectric strength		
15.1	Not applicable		N/A
15.2	Not applicable		N/A
15.3	Applicable for full disconnection and micro-disconnection		N/A
17	Endurance		
	Compliance is checked on three separate appliances or switches		N/A
	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/A
	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/A
	Subclause 17.2.5.2 is not applicable		N/A
	Temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Subclauses 17.2.2 and 17.2.5.2 are not applicable. The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1, as specified in footnote b of Table 3. (IEC 60335-1:01 + A1:2004)		N/A
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/A

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/A
8	Protection against access to live parts		
8.1	Metal parts of the motor are considered to be bare live parts		N/A
11	Heating		
11.3	Temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N/A
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/A
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/A
19	Abnormal operation		
19.1	The tests of 19.7 to 19.9 not carried out		N/A
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/A
	- short circuit of each diode of the rectifier		N/A
	- open circuit of the supply to the motor		N/A
	- open circuit of any parallel resistor, the motor being in operation		N/A
	Only one fault simulated at a time, the tests carried out consecutively		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
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/A
	Compliance checked by the tests specified for double and reinforced insulation		N/A

J TME	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/A

K TME	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		
	The information on overvoltage categories is extracted from IEC 60664-1		P

L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		
	Sequences for the determination of clearances and creepage distances		P

M TME	ANNEX M (NORMATIVE) POLLUTION DEGREE		
	The information on pollution degrees is extracted from IEC 60664-1		P

N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		-
5	Test apparatus		
5.1	Electrodes		
	The note does not apply		N/A
5.4	Test solutions		
	Test solution A is used		P
6	Procedure		
6.3	Proof tracking test		
	Voltage is 100V, 175V, 400V or 600V:		P

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Note 3 of clause 3 applies		P
	The test is carried out on five specimens		P
	In case of doubt, additional test with voltage reduced by 25V, the number of drops increased to 100		N/A
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		P
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications: (IEC 60335-1:01 + A1:2004)		P
	Test apparatus (IEC 60335-1:01 + A1:2004)		
7.3	Test solutions (IEC 60335-1:01 + A1:2004)		
	Test solution A is used (IEC 60335-1:01 + A1:2004)		P
10	Determination of proof tracking index (PTI) (IEC 60335-1:01 + A1:2004)		
10.1	The last paragraph of Clause 3 applies (IEC 60335-1:01 + A1:2004)		P
	The test is carried out on five specimens (IEC 60335-1:01 + A1:2004)		P
	In case of doubt, a material is considered to have a PTI of the specified value if it withstands the test at a voltage equal to the proof voltage reduced by 25 V, the number of drops being increased to 100. (IEC 60335-1:01 + A1:2004)		N/A
10.2	The report shall state if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V (IEC 60335-1:01 + A1:2004)		P

O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30		
	Description of tests for determination of resistance to heat and fire		P

P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES		
	The following modifications to this standard are applicable for class 0 appliances and class OI appliances having a rated voltage exceeding 150 V, that are intended to be used in countries having a warm damp equable climate and that are marked WDaE. (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	NOTE Warm damp equable climates are characterized by high humidity and high ambient temperatures with little variation, as specified in IEC 60721-2-1. (IEC 60335-1:01 + A1:2004)		
	They may also be applied to class I appliances having a rated voltage exceeding 150 V that are intended to be used in countries having a warm damp equable climate and that are marked WDaE, if they are able to be connected to a supply mains that excludes the protective earthing conductor due to deficiencies in the fixed wiring system. (IEC 60335-1:01 + A1:2004)		
5.7	The ambient temperature for the tests of Clauses 11 and 13 is 40 +3/0 (IEC 60335-1:01 + A1:2004)		
7.1	The appliance marked with the letters WdaE (IEC 60335-1:01 + A1:2004)		
7.12	The instructions shall state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA. (IEC 60335-1:01 + A1:2004)		
	The instructions shall state the substance of the following: (IEC 60335-1:01 + A1:2004)		
11.8	The values of Table 3 are reduced by 15 K (IEC 60335-1:01 + A1:2004)		N/A
13.2	The leakage current for class I appliances not exceeding 0,5 mA (IEC 60335-1:01 + A1:2004)		N/A
15.3	The value of t is 37 °C (IEC 60335-1:01 + A1:2004)		N/A
16.2	The leakage current for class I appliances not exceeding 0,5 mA (IEC 60335-1:01 + A1:2004)		N/A
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3 (IEC 60335-1:01 + A1:2004)		N/A

R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION		
	Software evaluated in accordance with the following clauses of Annex H of IEC 60730-1, as modified (IEC 60335-1:01 + A1:2004)		
H.2	Definitions		
	Only definitions H.2.16 to H.2.20 applicable (IEC 60335-1:01 + A1:2004)		N/A
H.7	Information		
	Only footnotes 12) to 18) of Table 7.2, as modified, applicable (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
H.11.12	Controls using software		
	All of the subclauses of H.11.12 as modified below are applicable, except subclauses H.11.12.6 and H.11.12.6.1 which are not applicable. (IEC 60335-1:01 + A1:2004)		N/A
	In the second paragraph, replace "required in items 66 to 72 inclusive" by "referred to in footnotes 12) to 18) inclusive". (IEC 60335-1:01 + A1:2004)		N/A
H.11.12.7	*Delete "and identified in table 7.2, requirement 68* (IEC 60335-1:01 + A1:2004)		
H.11.12.7.1	For appliances using software class C having a single channel with self-test and monitoring structure, the manufacturer shall provide the measures necessary to address the fault/errors in safety related segments and data indicated in Table H. 11.12.7-1. (IEC 60335-1:01 + A1:2004)		N/A
H.11.12.8	Software fault/error detection shall occur before compliance with 19.13 of IEC 60335-1 is impaired. (IEC 60335-1:01 + A1:2004)		N/A
H.11.12.8.1F	*Replace* "result in the response declared in table 7.2, requirement 72" *by* "occur before compliance with 19.13 of IEC 60335-1 is impaired". (IEC 60335-1:01 + A1:2004)		
H.11.12.13	The software and safety related hardware under its control shall initialize and terminate before compliance with 19.13 of IEC 60335-1 is impaired. (IEC 60335-1:01 + A1:2004)		N/A

IEC 60 335-2-24

10.1	TABLE: Power input deviation				P
Input deviation of/at:	P rated (W)	P measured (W)	dP	Required dP	Remark
230 V (hot water storage tank)	540	537	- 0.6 %	+5%, - 10 %	Heater

10.2	TABLE: Current deviation				P
Current deviation of/at:	I rated (A)	I measured (A)	dI	Required dI	Remark
230 V (cold water storage tank)	0.8	0.801	+ 0.1 %	+ 20 %	Compressor

11.8 TME	TABLE: Heating test, thermocouples		P
	Ambient, t1 (°C) :	32.4	-
	Ambient, t2 (°C) :	32.5	-
	test voltage (V) :	254.4	-

Thermocouple locations	dT (K)	required dT (K)
1. Power cord sheath	25.8	35
2. Power cord internal wire	26.3	50
3. Heater switch	33.9	60
4. PCB connector	25.6	cl. 30.1
5. AC connector	40.6	cl. 30.1
6. Internal wire of heater	30.0	105 °C
7. Internal wire of compressor	42.8	50
8. Internal wire of cooling thermostat	37.2	50
9. PCB	37.6	105 °C
10. Cooling thermostat surface	31.0	T85
11. Compressor top	41.2	150 °C
12. Hot water outlet enclosure	41.6	60
13. External enclosure (Front)	25.3	60
14. Side enclosure	18.2	60
15. Fuse holder surface (plastic)	26.0	cl. 30.1
16. Test wall (Rear)	22.6	60
17. Bottom wall	16.3	60
18. Top enclosure	16.5	60

	Heating test, resistance method:		-
	insulation class :		-

temperature rise of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	required dT (K)	insulation class
Compressor main winding	12.533	15.444	61.9	140°C	Synthetic insulation
Compressor sub winding	33.761	40.764	55.3	140°C	Synthetic insulation

13.2 TME	TABLE: Leakage current		P
	Heating appliances: 1.15 x rated input .....:		
	Motor-operated and combined appliances: 1.06 x rated voltage .....:	254,4 V	

Leakage current between		Max. allowed I (mA)
accessible metal parts and N	0.1	3.5
accessible metal parts and L	0.21	3.5
Other accessible non-metallic parts and N	0.01	0.25
Other accessible non-metal parts and L	0.01	0.25
L1/L2/L3 (Switches a, b and c in ON position)	-	-
L1 (Switch a is opened)	-	-
L2 (Switch b is opened)	-	-
L3 (Switch c is opened)	-	-

13.3 TME	TABLE: Electric strength	P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
live parts and accessible parts over basic insulation	500	-
live parts and accessible parts over basic insulation	1000	No
live parts and accessible parts over supplementary insulation	1750	No
live parts and accessible parts over reinforced insulation	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 TME	TABLE: Leakage current		P
	Single phase appliances: 1.06 x rated voltage.....:		-
	Three phase appliances 1.06 x rated voltage divided by √3:.....:		-

Leakage current between	I (mA)	Max. allowed I (mA)
Class I Between live parts and metal parts – basic insulation only	0.21	3.5
Class II Between live parts and accessible parts – reinforced insulation	0.01	0.25
Between metal enclosures or covers lined with insulating material and metal foil in contact with the inner surface of the lining.		

16.3 TME	TABLE: Electric strength		P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
basic insulation	500	-
basic insulation	1250	No
reinforced insulation	3000	No
supplementary insulation	1750	No

17 TME	TABLE: Overload protection of transformers and associated circuits	N/A

Temperature rise of part/at:	dT (K)	Max. dT (K)

	Heating test, resistance method:	-

temperature rise of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	required dT (K)	insulation class

19.7	TABLE: Abnormal operation, locked rotor/moving parts		N/A
	Test voltage (V).....:		-
	Ambient, t_1 (°C) .....:		-
	Ambient, t_2 (°C) .....:		-

Temperature of winding	R_1 (Ω)	R_2 (Ω)	(°C)	required (°C)	insulation class

19.9	TABLE: Abnormal operation, running overload		N/A
	Test voltage (V).....:		-
	Ambient, t_1 (°C) .....:		-
	Ambient, t_2 (°C) .....:		-

Temperature of winding	R_1 (Ω)	R_2 (Ω)	(°C)	required (°C)	insulation class

19.11	TABLE: Abnormal operation, running overload		N/A
	Test voltage (V).....:		-
	Ambient, t_1 (°C) .....:		-
	Ambient, t_2 (°C) .....:		-

Temperature of winding	R_1 (Ω)	R_2 (Ω)	(°C)	required (°C)	insulation class

19.13	TABLE: Abnormal operation, temperature rises	P

Thermocouple locations	dT (K)	Max. dT (K)
Power cord sheath	21.5	150
Test wall	22.7	150
External enclosure	22.6	cl.30.1

28.1	TABLE: Threaded part torque test	P

Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Rear enclosure A	>3.6 and ≤ 4.1	II	1.2
Rear enclosure B	>3.6 and ≤ 4.1	II	1.2
P.E. screw	>3.6 and ≤ 4.1	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
1500	1,0					N/A
2500	2,0	>2.0	>2.0	>2.0	-	P
4000	3,5	-	-	-	>3.5	P
6000	6,0					N/A
8000	8,5					N/A
10000	11,5					N/A

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

30.1 TME	TABLE: ball pressure test	P

part	temperature (°C)	Verdict
External non-metallic parts	75	P
External non-metallic parts	according §11	N/A
External non-metallic parts as supplementary or reinforced insulation	75	N/A
External non-metallic parts as supplementary or reinforced insulation	according §11	N/A
Supplementary and reinforced insulation of plastic material	according §19	N/A
Insulating material retaining live parts in position (reinforced insulation)	125	P
Insulating material retaining live parts in position (reinforced insulation)	according §11	N/A
Insulating material retaining live parts in position	125	P
Insulating material retaining live parts in position	according §11/19	N/A

30.2 TME	TABLE: glow-wire test	P

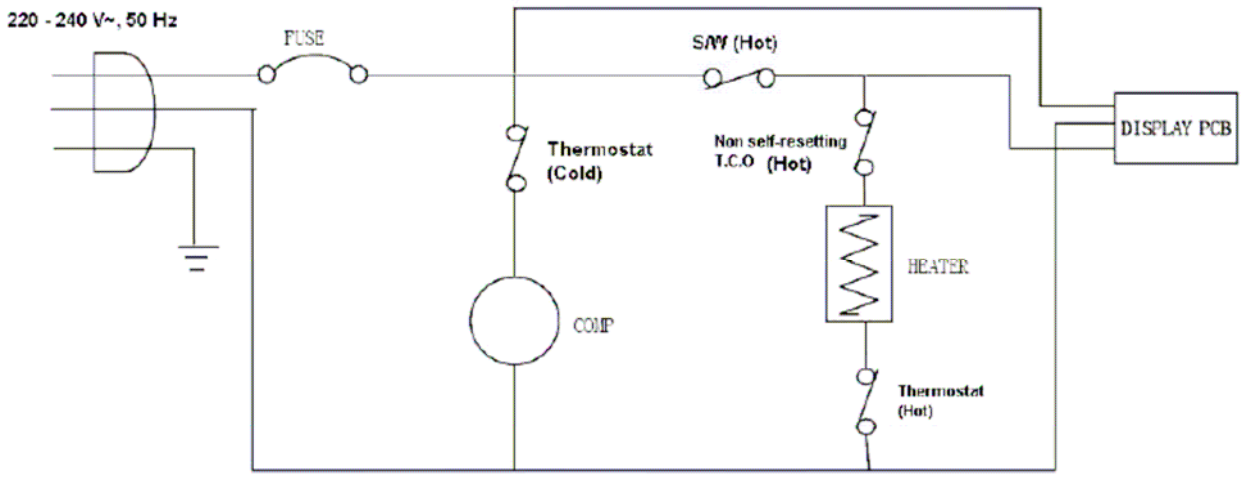
part	temperature (°C)	Verdict
Parts of non-metallic material(unattended or attended and handheld)	550	P
Insulating material carrying connections > 0.2A (unattended)	750	P
Insulating material carrying connections <= 0.2A (unattended)	650	N/A
Insulating material carrying connections > 0.5A (attended)	750	N/A
Insulating material carrying connections <= 0.5A (attended)	650	N/A
Insulating material carrying connections > 0.2A (unattended, GWFI)	850	P
Insulating material carrying connections > 0.2A (unattended, GWTI)	775	N/A

30.2 TME	TABLE: other Tests	P

part	test	Verdict
Parts of non-metallic material	HB40	N/A
Parts of non-metallic material	FH3	N/A
PCB’s	Needle-flame test	P
Surrounding parts	Needle-flame test	N/A
Surrounding parts	V-0	N/A
PCB’s	V-1	N/A

IEC 60 335-2-24
Remarks

Wiring diagram



IEC 60 335-2-24
Remarks

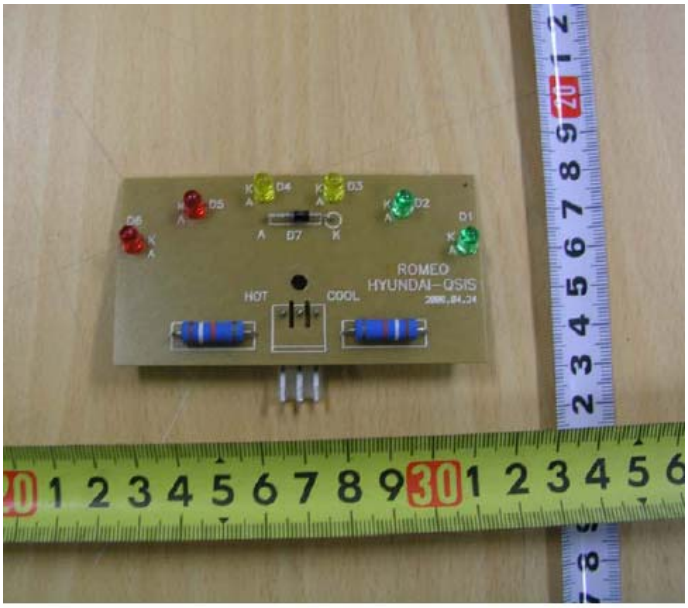
Photos : Model ROMEO-3

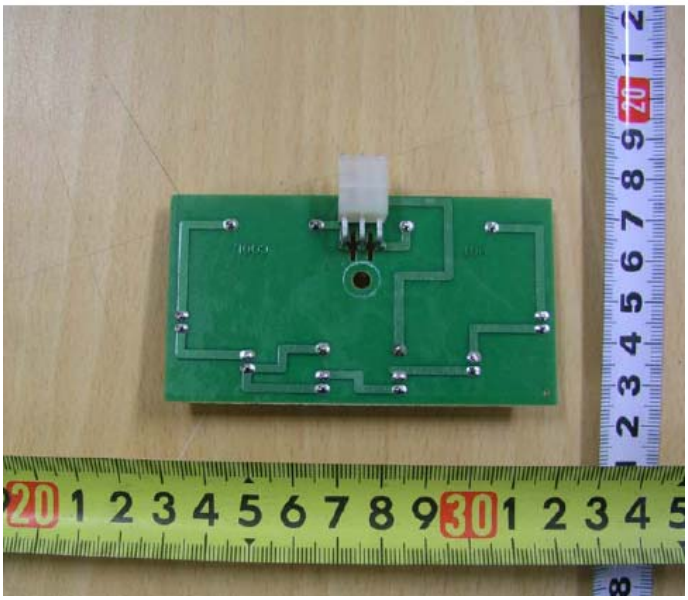
IEC 60 335-2-24
Remarks

Photos : Model ROMEO-3

IEC 60 335-2-24
Remarks

Photos : Model ROMEO-3





IEC 60 335-2-24
Remarks

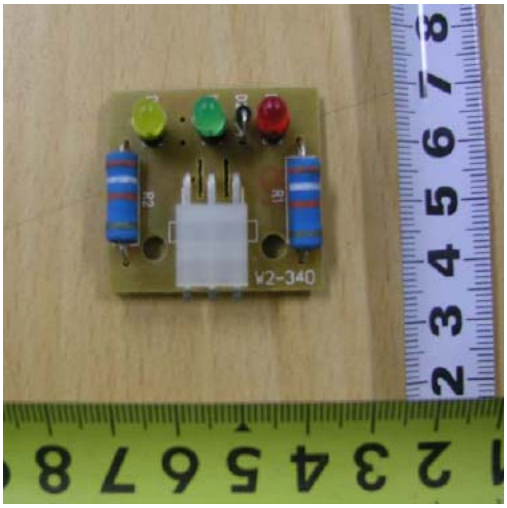
Photos : Model W2-340E

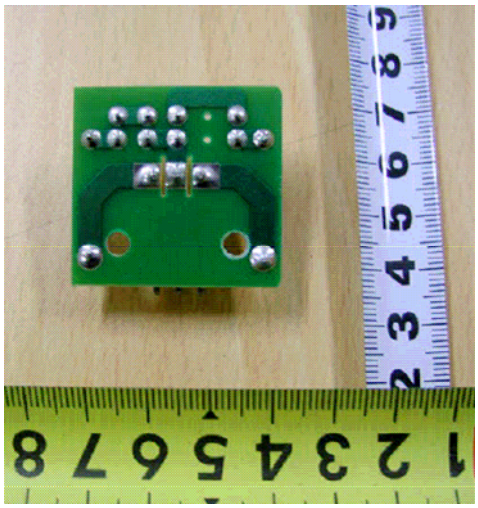
IEC 60 335-2-24
Remarks

Photos : Model W2-340E

IEC 60 335-2-24
Remarks

Photos : Model W2-340E





- End of Test Report -

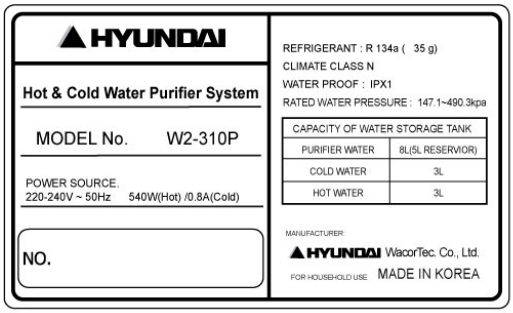
TEST REPORT
IEC 60335-2-21 / EN 60335-2-21
Safety of household and similar electrical appliances
Part 2: Particular requirements for water heaters

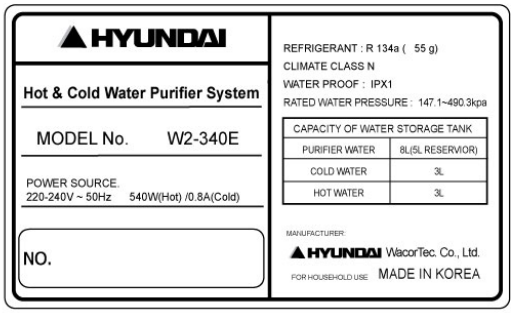
Report Reference No. ..... :	077-203928/1-000
Compiled by (+ signature) ..... :	Mr Wong Weng Chung
Approved by (+ signature) ..... :	Mr Jimmy Tan
Date of issue ..... :	2008-02-22

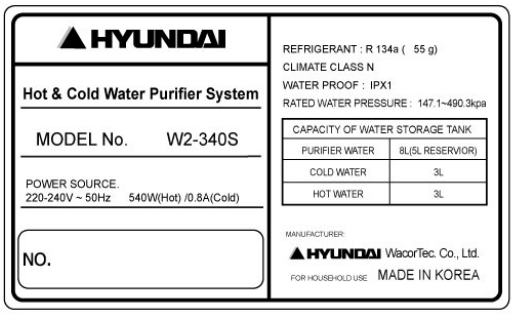
CB Testing Laboratory ..... :	TÜV SÜD PSB Pte Ltd
Address ..... :	1 Science Park Drive, Singapore 118221
Testing location/procedure ..... :	CBTL [x] SMT [ ] TMP [ ] WMP [ ]
Address ..... :	Same as above
Applicant's name ..... :	HYUNDAI WacorTec Co., Ltd.
Address ..... :	684-49, Gongreung-dong, Nowon-Ku, Seoul, Korea
Test specification:	
Standard ..... :	IEC 60335-2-21:2002 (Fifth Edition) + A1:2004 used in conjunction with IEC 60335-1:2001 (Fourth Edition) + A1:2004
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IECEN60335_2_21C
TRF Originator ..... :	LCIE
Master TRF ..... :	Dated 2005-05

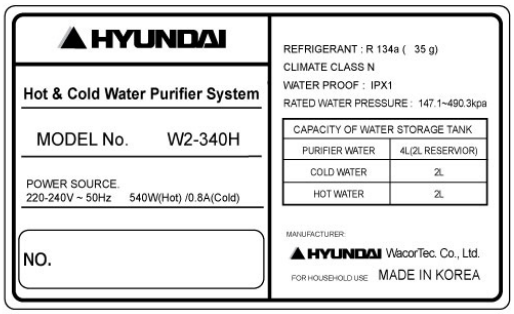
Test item description ..... :	Hot & Cold Water Purifier System
Trade Mark ..... :	HYUNDAI
Model/Type reference ..... :	W2-340E, ROMEO-3, W2-340S, W2-340H, W2-360E, ROMEO-2, W2-300P, W2-310L, W2-310P
Ratings ..... :	220 – 240 V ~; 50 Hz; 0.8 A (Cold); 540 W (Hot); Climate class N; IPX1
Manufacturer ..... :	HYUNDAI WacorTec Co., Ltd. 684-49, Gongreung-dong, Nowon-Ku, Seoul, Korea

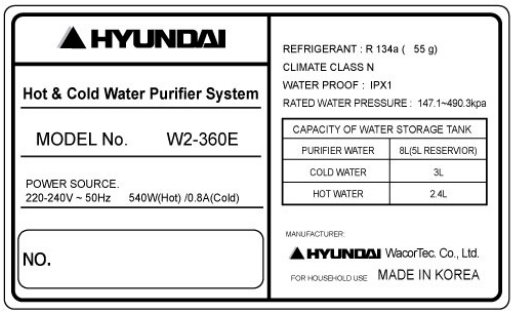
Copy of marking plate and summary of test results (information/comments):

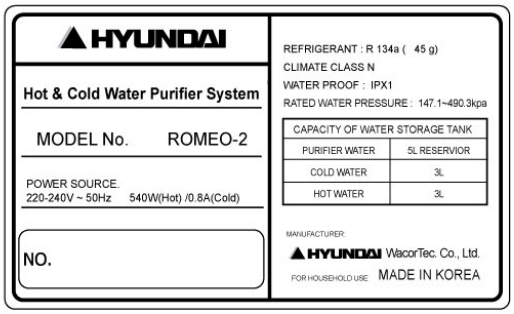


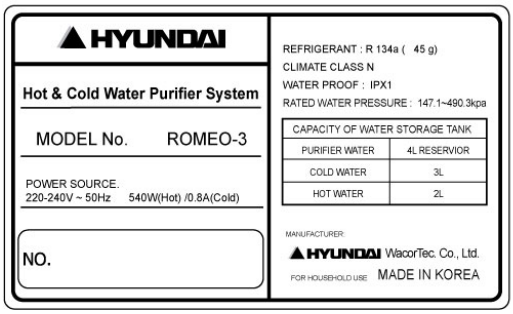


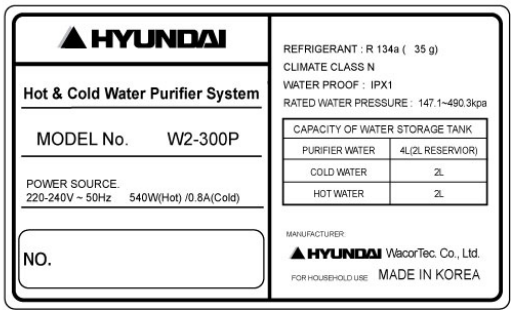


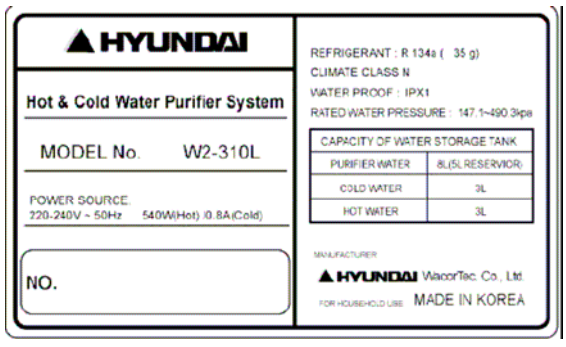












Summary of testing:

- The items tested were found to be in compliance with the test standards of IEC 60335-2-21:2002 (Fifth Edition) + A1:2004 used in conjunction with IEC 60335-1:2001 (Fourth Edition) + A1:2004 concerning hot water storage system in the product.

Test item particulars:	Hot & Cold Water Purifier System
Nature of supply ..... :	~
Class of protection against electrical shock ..... :	Class I
IP number ..... :	IPX1
Switch ..... :	Yes (Hot switch)
Electronic circuit..... :	Yes (display LED only)
Oscillating mechanism	No
Accessories	No
Type of supply cord attachment	Y attachment
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A (not applicable)
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Testing ..... :	
Date of receipt of test item ..... :	2008-01-25
Date (s) of performance of tests ..... :	2008-01-29 until 2008-02-12

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 IECEE 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 point is used as the decimal separator.

General product information:

- Model ROMEO-3 is hot and cold water purifier system having a compressor and a sheathed heater and it is tested as the represented model for counter-top or table-top type.
- Model W2-340E is a floor standing type hot and cold water purifier and it is tested as the represented model for floor standing type.
- Model difference and external dimension

1) Model W2-340H is similar with the tested model ROMEO-3 except for the small external dimension of enclosure and cosmetic design.
2) Model W2-340S, W2-360E, ROMEO-2, W2-300P, W2-310L, W2-310P are similar with the tested model W2-340E except for the small difference of external dimension of enclosure and the cosmetic design.
3) The same critical components including a compressor and a sheathed heater are provided for the each model.
4) Water purifying filter system for floor standing type is located in the lower side of enclosure, and for counter-top or table-top type is placed in the left side of enclosure.

Model no.	Dimension (mm)	Installation and use
W2-340E	340 (W) x 420 (D) x 1240 (H)	Floor standing type
W2-340S	340 (W) x 420 (D) x 1160 (H)	Floor standing type
W2-360E	360 (W) x 420 (D) x 1240 (H)	Floor standing type
ROMEO-2	370 (W) x 410 (D) x 1200 (H)	Floor standing type
W2-300P	300 (W) x 310 (D) x 970 (H)	Floor standing type
W2-310L	310 (W) x 310 (D) x 1090 (H)	Floor standing type
W2-310P	310 (W) x 310 (D) x 970 (H)	Floor standing type
ROMEO-3	370 (W) x 410 (D) x 510 (H)	Counter-top or table top
W2-340H	340 (W) x 420 (D) x 520 (H)	Counter-top or table top

EN 60335-2-21 / IEC 60335-2-21			
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
6	**CLASSIFICATION**		
6.1	Protection against electric shock: Class 0, 0I, I, II, III		P
	Water heaters shall be class I, class II or class III. (IEC 60335-2-21:2003)		P
6.2	Protection against harmful ingress of water. Water heaters for installation outdoors shall be at least IPX4. Other water heaters shall be at least IPX1; (IEC 60335-2-21:2003)		P
7	**MARKING AND INSTRUCTIONS**		
7.1	Rated voltage or voltage range (V) .....:	220 – 240 V	P
	Single-phase appliances: 230V covered: (EN 60335-1:2002)		P
	Multi-phase appliance: 400V covered: (EN 60335-1:2002)		N/A
	Nature of supply .....:	~	P
	Rated frequency (Hz) .....:	50 Hz	P
	Rated power input (W): .....:	540 W (hot water)	P
	Rated current (A) .....:	0.8 A (Cold water)	P
	Manufacturer's or responsible vendor's name, trademark or identification mark .....:	HYUNDAI WacorTec Co., Ltd.	P
	Model or type reference .....:	See marking plate	P
	Symbol 5172 of IEC 60417, for Class II appliances		N/A
	IP number, other than IPX0 .....:	IPX1	P
	Appliances, other than cistern-type water heaters, shall be marked with the rated pressure in pascals (bars**)** (IEC 60335-2-21:2003)		N/A
	Rated capacity in litres (IEC 60335-2-21:2003)	See marking plate	P
	Closed water heater shall be marked with a statement that pressure relief device is to be fitted unless incorporated in the appliance: (IEC 60335-2-21:2003)		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Closed water heater having rated pressure less than 0.6 Mpa and low pressure water heaters that a pressure reducing valve is to be fitted in the installation (IEC 60335-2-21:2003)		N/A
	Open-outlet water heaters marked with a warning about no connection to tap or any fitting not recommended by manufacturer (IEC 60335-2-21:2003)		N/A
7.2	Warning for stationary appliances for multiple supply		N/A
	Warning placed in vicinity of terminal cover		N/A
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen	220 – 240 V	P
	Different rated values marked with the values separated by an oblique stroke		N/A
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible		N/A
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N/A
	the power input is related to the mean value of the rated voltage range		P
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N/A
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/A
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)		N/A
	- marking of protective earthing terminals (symbol 5019 of IEC 60417)		P
	- marking not placed on removable parts		P
7.9	Marking or placing of switches which may cause a hazard		P
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means .....:		P

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Clause	Requirement - Test	Result - Remark	Verdict
	The figure 0 indicates only OFF position, unless no confusion with the OFF position	Hot water switch: ON / OFF	N/A
7.11	Indication for direction of adjustment of controls		N/A
7.12	Instructions for safe use provided		P
	The instructions for **closed water heaters** shall state the substance of the following: (IEC 60335-2-21:2003)		
	the water may drip from the discharge pipe of the pressure-relief device and that this pipe must be left open to the atmosphere;		N/A
	the pressure-relief device is to be operated regularly to remove lime deposits and to verify that it is not blocked;		N/A
	how the water heater can be drained.		N/A
7.12.1	Sufficient details for installation supplied		P
	Appliances, other than **cistern-type water heaters**, shall be marked with the **rated pressure** in Pascals (IEC 60335-2-21:2003)		P
	Closed water heaters:	(IEC 60335-2-21:2003)	
	-discharge pipe must be left open to the atmosphere		N/A
	-pressure relief is to be operated regularly		N/A
	-how to drain the water heater		N/A
	-type or characteristics of pressure relief device, how to connect unless incorporated in the appliance		N/A
	-discharge pipe connected to the pressure relief device installed downwards and frost-free		N/A
	-appliances with rated pressure<0.6 Mpa: characteristics of pressure reducing valve and installation		N/A
	- appliances incorporating heat exchanger: details on installation of control device and temp. setting.		N/A
	Open-outlet water heaters:	(IEC 60335-2-21:2003)	
	- outlet acts as a vent, not connected to any tap or fitting other than specified.		N/A
	Cistern-fed water heater and low pressure water heater: (IEC 60335-2-21:2003)		
	- warning against connecting pressure relief device to the vent pipe.		N/A

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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		N/A
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/A
7.12.4	Instructions for built-in appliances:		
	- dimensions of space		N/A
	- dimensions and position of supporting means		N/A
	- distances between parts and surrounding structure		N/A
	- dimensions of ventilation openings and arrangement		N/A
	- connection to supply mains and interconnection of separate components		N/A
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N/A
	a switch complying with 24.3 (IEC 60335-1/A1 : 2004)		N/A
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N/A
	Replacement cord instructions, type Y attachment		P
	Replacement cord instructions, type Z attachment		N/A
7.12.6	Caution in the instructions for heating appliances with a non-self-resetting thermal cut-out (IEC 60335-1/A1 : 2004)		N/A
7.12.6	Caution in the instructions for heating appliances with a non-self-resetting thermal cut-out (IEC 60335-1/A1 : 2004)		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed (IEC 60335-1/A1 : 2004)		N/A
7.12.8	Instructions for appliances connected to the water mains (IEC 60335-1/A1 : 2004):		
	- max. inlet water pressure (Pa):		P
	- min. inlet water pressure, if necessary (Pa):		P
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		P
7.13	Instructions and other texts in an official language		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/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		P
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		N/A
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		P
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		P
7.101	The water inlet and the water outlet shall be identified. This identification shall not be on **detachable parts**. If colours are used, blue shall be used for the inlet and red for the outlet. (IEC 60335-2-21:2003)		P
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
	Use of test probe B of IEC 61032: no contact with live parts		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
8.1.2	Use of test probe 13 of IEC 61032 through openings in class 0 appliances and class II appliances/ constructions: no contact with live parts		P
	Test probe 13 also applied through openings in earthed metal enclosures having a non-conductive coating: no contact with live parts		P
8.1.3	For appliances other than class II, use of test probe 41 of IEC 61032: no contact with live parts of visible glowing heating elements		N/A
8.1.4	Accessible part not considered live if:		
	- safety extra-low a.c. voltage: peak value not exceeding 42.4 V		N/A
	- safety extra-low d.c. voltage: not exceeding 42.4 V		N/A
	- or separated from live parts by protective impedance		N/A
	If protective impedance: d.c. current not exceeding 2 mA, and		N/A
	a.c. peak value not exceeding 0.7 mA		N/A
	- for peak values over 42.4 V up to and including 450 V, capacitance not exceeding 0,1 μF		N/A
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 μC		N/A
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		
	- built-in appliances		N/A
	- fixed appliances		N/A
	- appliances delivered in separate units		N/A
8.2	Class II appliances and constructions constructed so that there is adequate protection against accidental contact with basic insulation and metal parts separated from live parts by basic insulation only		P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P
9	STARTING OF MOTOR-OPERATED APPLIANCES		
	Requirements and tests are specified in part 2 when necessary		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	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) Hot water storage heater	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) Compressor for cold water	P
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		P
11.4	Heating appliances operated under normal operation at 1.15 times rated power input .....:		N/A
11.5	Motor-operated appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage.....:		N/A
11.6	Combined appliances operated under normal operation at most unfavourable voltage between 0.94 and 1.06 times rated voltage.....:		P
11.7	The appliance is operated until steady conditions are established or until the **thermostat** interrupts the current for the first time after 16 h, whichever is shorter. (IEC 60335-2-21:2003)		P
11.8	Temperature rises not exceeding values in table 3	(see appended tables)	P
	Protective devices do not operate , except		P
	components in protective electronic circuits tested for the number of cycles specified in 24.1.4 (IEC 60335-1/A1 : 2004)		N/A
	Sealing compound does not flow out		P
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.....:		N/A
	Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage .....:		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	Protective impedance and radio interference filters disconnected before carrying out the tests		N/A
13.2	Leakage current measured by means of the circuit described in figure 4 of IEC 60990		P
	Leakage current measurements	(see appended table)	P
13.3	The appliance is disconnected from the supply (IEC 60335-1/A1 : 2004)		P
	Electric strength tests according to table 4	(see appended table)	P
	No breakdown during the tests		P
14	**TRANSIENT OVERVOLTAGES**		
	Appliances withstand the transient overvoltages to which they may be subjected		N/A
	Clearances having a value less than specified in table 16 subjected to an impulse voltage test, the test voltage specified in table 6	(see appended table)	N/A
	No flashover during the test, unless of functional insulation		N/A
	In case of flashover of functional insulation, the appliance complies with clause 19 with the clearance short circuited		N/A
15	**MOISTURE RESISTANCE**		
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance	IPX1	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
	Water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains tested as specified for IPX7 appliances (IEC 60335-1/A1 : 2004)		N/A
15.1.2	Hand-held appliance turned continuously through the most unfavourable positions during the test		N/A
	Built-in appliances installed according to the instructions		N/A
	Appliances placed or used on the floor or table placed on a horizontal unperforated support		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Appliances normally fixed to a wall and appliances with pins for insertion into socket-outlets are mounted on a wooden board		N/A
	For IPX3 appliances, the base of wall mounted appliances is placed at the same level as the pivot axis of the oscillating tube		N/A
	For IPX4 appliances, the horizontal centre line of the appliance is aligned with the pivot axis of the oscillating tube		N/A
	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/A
	Appliances normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support (IEC 60335-1/A1 : 2004)		N/A
	For IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min (IEC 60335-1/A1 : 2004)		N/A
	Wall-mounted appliances, take into account the distance to the floor stated in the instructions		N/A
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Detachable parts tested as specified		P
15.2	Spillage of liquid does not affect the electrical insulation		P
	The test is only applicable to **cistern-type water heaters**. (IEC 60335-2-21:2003)		P
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable		N/A
	Detachable parts removed		P
	Overfilling test with additional amount of water, over a period of 1 min (l) .....:	1.2 (l)	P
	The appliance withstands the electric strength test of 16.3		P
	No trace of water on insulation that can result in a reduction of clearances and creepage distances below values specified in clause 29		P
15.3	Appliances proof against humid conditions	93 %RH, 30℃	P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	Humidity test for 48 h in a humidity cabinet		P
	The appliance withstands the tests of clause 16		P
16	**LEAKAGE CURRENT AND ELECTRIC STRENGTH**		
16.1	Leakage current not excessive and electric strength adequate		P
	Protective impedance disconnected from live parts before carrying out the tests		N/A
16.2	Single-phase appliances: test voltage 1.06 times rated voltage.....:		P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3.....:		N/A
	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/A
	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/A
	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/A
	Temperature of the winding not exceeding the value specified in table 8,		N/A
	however limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N/A
18	**ENDURANCE**		N/A
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		P
	For closed water heaters, low pressure water heaters and open-outlet water heaters: -compliance checked by 19.2, 19.3 and 19.4 (IEC 60335-2-21:2003)		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	- 19.101 applies for appliances not liable to be emptied in normal use and having all following features: - an outer enclosure of metal (see note 1) - non-combustible thermal insulation (see note 2) - a capacity exceeding 30 l - a rated power input not exceeding 6 kW (see notes 3 and 4) (IEC 60335-2-21:2003)		N/A
19.2	Appliance operated empty with thermal control operating in clause 11 short-circuited (see note) (IEC 60335-2-21:2003)		P
19.3	See note (IEC 60335-2-21:2003)		P
19.4	Open-outlet water heaters: -19.2 repeated with container filled with water min. 10mm above heater -1.15 times rated power input (IEC 60335-2-21:2003)		N/A
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		P
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		P
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions		N/A
	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/A
19.7	Stalling test by locking the rotor if the locked rotor torque is smaller than the full load torque or locking moving parts of other appliances		N/A
	Locked rotor, motor capacitors open-circuited or short-circuited, if required		N/A
	Locked rotor, capacitors open-circuited one at a time		N/A
	Test repeated with capacitors short-circuited one at a time, if required		N/A
	Appliances with timer or programmer supplied with rated voltage for each of the tests, for a period equal to the maximum period allowed		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Other appliances supplied with rated voltage for a period as specified		N/A
	Winding temperatures not exceeding values specified in table 8	(see appended table)	N/A
19.8	Three-phase motors operated at rated voltage with one phase disconnected		N/A
19.10	Series motor operated at 1.3 times rated voltage for 1 min.....:		N/A
	During the test, parts not being ejected from the appliance		N/A
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in 19.11.2 for all circuits or parts of circuits, unless they comply with the conditions specified in 19.11.1		P
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.3 and 19.11.4 (IEC 60335-1/A1 : 2004)		N/A
	Appliances having a switch with an off position obtained by electronic disconnection, or a switch placing the appliance in a stand-by mode, subjected to the tests of 19.11.4 (IEC 60335-1/A1 : 2004)		N/A
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/A
	- 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/A
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/A
	b) open circuit at the terminals of any component		P
	c) short circuit of capacitors, unless they comply with IEC 60384-14		N/A
	d) short circuit of any two terminals of an electronic component, other than integrated circuits. This fault condition is not applied between the two circuits of an optocoupler		P

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Clause	Requirement - Test	Result - Remark	Verdict
	e) failure of triacs in the diode mode		N/A
	f) failure of an integrated circuit (IEC 60335-1/A1 : 2004)		N/A
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/A
	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/A
	- the appliance complies with the conditions specified in 19.13		N/A
	- any current flowing through protective impedance not exceeding the limits specified in 8.1.4		N/A
	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/A
	- 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/A
	- the appliance withstands the tests of 19.11.2 with open-circuited conductor bridged		N/A
19.11.4	Appliances having a switch with an off position obtained by electronic disconnection, or		N/A
	a switch that can be placed in the stand-by mode,		N/A
	subjected to the tests of 19.11.4.1 to 19.11.4.7		N/A
	Appliances incorporating a protective electronic circuit subjected to the tests of 19.11.4.1 to 19.11.4.7, except that		N/A
	appliances operated for 30 s or 5 min during the test of 19.7 are not subjected to the tests for electromagnetic phenomena. (IEC 60335-1/A1 : 2004)		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4 (IEC 60335-1/A1 : 2004)		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3 (IEC 60335-1/A1 : 2004)		N/A
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified (IEC 60335-1/A1 : 2004)		N/A
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified (IEC 60335-1/A1 : 2004)		N/A
	Earthed heating elements in class I appliances disconnected (IEC 60335-1/A1 : 2004)		N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3 (IEC 60335-1/A1 : 2004)		N/A
19.11.4.6	The appliance is subjected to voltage dips and interruptions in accordance with IEC 61000-4-11 (IEC 60335-1/A1 : 2004)		N/A
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2 (IEC 60335-1/A1 : 2004)		N/A
19.12	If the safety of the appliance for any of the fault conditions specified in 19.11.2 depends on the operation of a miniature fuse-link complying with IEC 60127, the test is repeated, measuring the current flowing through the fuse-link; measured current (A); rated current of the fuse-link (A).....:		N/A
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)	N/A
	Enclosures not deformed to such an extent that compliance with cl. 8 is impaired		P
	There shall be no leakage from the container during the test (IEC 60335-2-21:2003/ EN 60335-2-21:99)		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:		

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Clause	Requirement - Test	Result - Remark	Verdict
	- basic insulation.....:	1250V	P
	- supplementary insulation .....:	1750V	P
	- reinforced insulation.....:	3000V	P
	The appliance does not undergo a dangerous malfunction, and		N/A
	no failure of protective electronic circuits, if the appliance is still operable		N/A
	Appliances tested with an electronic switch in the off position or in the stand-by mode, do not become operational (IEC 60335-1/A1 : 2004)		N/A
19.101	Appliance tested for 24h as specified in clause 11 but with empty container (IEC 60335-2-21:2003)		P
20	**STABILITY AND MECHANICAL HAZARDS**		
20.1	Adequate stability		P
	Tilting test through an angle of 10° (appliance placed on an inclined plane/horizontal plane); appliance does not overturn		P
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		P
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		N/A
	Protective enclosures, guards and similar parts are non-detachable		N/A
	Adequate mechanical strength and fixing of protective enclosures		N/A
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure		N/A
	Not possible to touch dangerous moving parts with test probe		N/A
21	**MECHANICAL STRENGTH**		
21.1	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 0,5 ± 0,04 J		P
	If necessary, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	If necessary, repetition of groups of three blows on a new sample		N/A
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements (IEC 60335-1/A1 : 2004)		N/A
	The insulation is tested as specified, unless		N/A
	the thickness of supplementary insulation is at least 1 mm and reinforced insulation is at least 2 mm (IEC 60335-1/A1 : 2004)		P

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Clause	Requirement - Test	Result - Remark	Verdict
22	**CONSTRUCTION**		
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled	IPX1	N/A
22.2	Stationary appliance: means to provide all-pole disconnection from the supply provided, the following means being available:		
	- a supply cord fitted with a plug		P
	- a switch complying with 24.3		N/A
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided		N/A
	- an appliance inlet		N/A
	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/A
22.3	Appliance provided with pins: no undue strain on socket-outlets		N/A
	Applied torque not exceeding 0.25 Nm		N/A
	Pull force of 50N to each pin after the appliance has being placed in the heating cabinet; when cooled to room temperature the pins are not displaced by more than 1mm		N/A
	Each pin subjected to a tork of 0.4Nm; the pins are not rotating unless rotating does not impair compliance with the standard		N/A
22.4	Appliance for heating liquids and appliance causing undue vibration not provided with pins for insertion into socket-outlets		P
22.5	No risk of electric shock when touching the pins of the plug, the appliance being disconnected from the supply at the instant of voltage peak. (IEC 60335-1/A1 : 2004)		P
22.6	Electrical insulation not affected by condensing water or leaking liquid		P
	Electrical insulation of Class II appliances not affected in case of a hose rupture or seal leak		P
	Drain hole correct positioned to prevent water from impairing electrical insulation (IEC 60335-2-21:2003)		P
	Dimension of drain hole: min. ∅=5mm or 20 mm^2 with width min. 3mm (IEC 60335-2-21:2003)		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
22.7	Adequate safeguards against the risk of excessive pressure in appliances provided with steam-producing devices		P
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/A
22.10	Not possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance (IEC 60335-1/A1 : 2004)		N/A
	Non-self resetting thermal motor protectors have a trip-free action, unless		N/A
	they are voltage maintained (IEC 60335-1/A1 : 2004)		N/A
	Location or protection of reset buttons of non-self-resetting controls is so that accidental resetting is unlikely (IEC 60335-1/A1 : 2004)		P
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/A
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		N/A
	Tests as described		P
22.12	Handles, knobs etc. fixed in a reliable manner		P
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N/A
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
22.13	Unlikely that handles, when gripped as in normal use, make the operators hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		N/A
22.14	No ragged or sharp edges creating a hazard for the user in normal use, or during user maintenance		P
	No exposed pointed ends of self tapping screws 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/A
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/A
	Cord reel tested with 6000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1000 V applied		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion under normal conditions of use		P
22.19	Driving belts not used as electrical insulation		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless material used is non-corrosive, non-hygroscopic and non-combustible		N/A
	Compliance is checked by inspection and, if necessary, by appropriate test		N/A
	Thermal insulation not used for basic insulation of internal wiring (IEC 60335-2-21:2003)		N/A
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 In case of rupture, the heating conductor is unlikely to come in contact with accessible metal parts		N/A
22.25	Sagging heating conductors cannot come into contact with accessible metal parts		N/A

EN 60335-2-21 / IEC 60335-2-21			
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/A
22.27	Parts connected by protective impedance separated by double or reinforced insulation		N/A
22.28	Metal parts of Class II appliances conductively connected to gas pipes or in contact with water: separated from live parts by double or reinforced insulation		N/A
22.29	Class II appliances permanently connected to fixed wiring so constructed that the required degree of access to live parts is maintained after installation		N/A
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or 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/A
	Ceramic material not tightly sintered, similar material or beads alone not used as supplementary or reinforced insulation		N/A
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N/A
22.33	Conductive liquids that are or may become accessible in normal use are not in direct contact with live parts		P
	Electrodes not used for heating liquids	not used	P
	For class II constructions, conductive liquids that are or may become accessible in normal use, not in direct contact with basic or reinforced insulation		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation		N/A
22.34	Shafts of operating knobs, handles, levers etc. not live, unless the shaft is not accessible when the part is removed		P
22.35	Handles, levers and knobs, held or actuated in normal use, not becoming live in the event of an insulation fault		P
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of an insulation fault, they are either adequately covered by insulation material, or their accessible parts are separated from their shafts or fixings by supplementary insulation		N/A
	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/A
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/A
22.37	Capacitors in Class II appliances not connected to accessible metal parts, unless complying with 22.42		N/A
	Metal casings of capacitors in Class II appliances separated from accessible metal parts by supplementary insulation, unless complying with 22.42		N/A
22.38	Capacitors not connected between the contacts of a thermal cut-out		N/A
22.39	Lamp holders used only for the connection of lamps		N/A
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N/A
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		N/A
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N/A
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		P
22.46	Software used in protective electronic circuits is software class B or C (IEC 60335-1/A1 : 2004)		N/A
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use (IEC 60335-1/A1 : 2004)		P
	No leakage from any part, including any inlet water hose (IEC 60335-1/A1 : 2004)		P
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water (IEC 60335-1/A1 : 2004)		N/A
22.101	The rated pressure of : (IEC 60335-2-21:2002)		
	- closed water heaters intended for direct connection to the water main shall be at least 0.6 MPa		N/A
	- closed water heaters and low pressure water heaters to be supplied by a pressure reducing valve which is not incorporated in the appliance shall be at least 0.1 MPa		N/A
	Cistern-fed water heaters: -rated pressure max. 0.2 Mpa (see Note)		N/A
22.102	Appliances shall withstand the water pressure occurring in normal use. (IEC 60335-2-21:2002)		
	twice the rated pressure, for closed water heaters. If the water heater is supplied through a pressure reducing valve, the container is subjected to twice the working pressure instead;		N/A
	-1,5 times rated pressure, for cistern-fed water heaters and low-pressure water heaters;		N/A
	- 0,15 MPa, for open-outlet water heaters		N/A
	- 0,03 MPa, for cistern-type water heaters.		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	Water shall not leak from the appliance and there shall be no permanent deformation to such an extent that compliance with this standard is impaired.		P
22.103	Closed water heaters: pressure relief devise prevent pressure from exceeding rated pressure by more than 0.1 Mpa. (IEC 60335-2-21:2002)		N/A
22.104	Outlet of **open-outlet water heaters** shall be constructed so that the water flow is not limited to such an extent that the container is subjected to a significant pressure. (IEC 60335-2-21:2002)		N/A
	The vent pipe of low pressure water heaters shall have an internal diameter of at least 20mm		N/A
22.105	Cistern-type water heaters shall be constructed so that the container is always at atmospheric pressure by means of a vent having an area of at least 30 mm^2 and a minimum dimension of at least 3 mm. (IEC 60335-2-21:2002)		P
22.106	Closed water heaters: thermal cut-out providing all-pole disconnection, independent from the thermostat (IEC 60335-2-21:2002)		N/A
22.107	Heating elements and thermal control sensors in contact with the outer surface of the container shall be held in position securely. (IEC 60335-2-21:2002)		P
22.108	Appliances for wall mounting shall have reliable provision for fixing to a wall, independent of the connection to the water mains. (IEC 60335-2-21:2002)		N/A
22.109	Appliances having a capacity of more than 15 l that cannot be emptied through a drain fitted in the water pipes shall incorporate means for draining that requires a tool for its operation. (IEC 60335-2-21:2002)		N/A
22.110	Open-outlet water heaters with plastic enclosure instructions ensure correct installation (see NOTE) (IEC 60335-2-21:2002)		N/A
22.111	Closed water heaters with heat exchanger shall be constructed so that during normal use the thermal cut-out does not operate due to heat from the exchanger. (IEC 60335-2-21:2002)		N/A
22.112	Closed water heaters shall be constructed so that repeated drawing off does not cause the water to boil. (IEC 60335-2-21:2002)		N/A
	Temperature of the water, measured by means of a thermocouple at the outlet, shall not exceed 98 °C		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
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		P
	Wiring effectively prevented from coming into contact with moving parts		N/A
23.2	Beads etc. on live wires cannot change their position, and are not resting on sharp edges or corners		N/A
	Beads inside flexible metal conduits contained within an insulating sleeve		N/A
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		N/A
	Flexible metallic tubes not causing damage to insulation of conductors		N/A
	Open-coil springs not used		N/A
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N/A
	No damage after 10 000 flexings for conductors flexed during normal use or 100 flexings for conductors flexed during user maintenance		N/A
	Electric strength test, 1000 V between live parts and accessible metal parts		N/A
23.4	Bare internal wiring sufficiently rigid and fixed		N/A
23.5	The insulation of internal wiring withstanding the electrical stress likely to occur in normal use		P
	No breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by positive means		N/A
23.7	The colour combination green/yellow used only for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	No lead-tin soldering of stranded conductors where they are subject to contact pressure, unless		P
	clamping means so constructed that there is no risk of bad contact due to cold flow of the solder		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52) (IEC 60335-1/A1 : 2004)		N/A
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		P
	Components not tested and found to comply with relevant IEC standard, components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
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/A
	tested according to annex F		N/A
24.1.2	Safety isolating transformers complying with IEC 61558-2-6, or		N/A
	tested according to annex G		N/A
24.1.3	Switches complying with IEC 61058-1, the number of cycles of operation being at least 10 000, or		P
	tested according to annex H		N/A
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/A
	- temperature limiters: 1 000		N/A
	- self-resetting thermal cut-outs: 300		N/A
	- non-self-resetting thermal cut-outs: 30		P
	- timers: 3 000		N/A
	- energy regulators: 10 000		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	-Thermal cut-outs incorporated in closed water heaters shall comply with the requirements of IEC 60730-1(EN 60730-1) for type 2B controls, unless they are tested with the appliance. (IEC 60335-2-21:2002)		N/A
24.1.5	Appliance couplers complying with IEC 60320-1		N/A
	However, appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		N/A
24.1.6	Small lamp holders similar to E10 lampholders complying with IEC 60238, the requirements for E10 lampholders being applicable		N/A
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		P
	No thermal cut-outs that can be reset by soldering		P
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/A
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N/A
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance and used accordingly		N/A
	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/A
	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/A
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/A
	In addition, the motors are complying with the requirements of Annex I		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
24.7	Hose-sets for connection of appliances to the water mains, complying with IEC 61770 and supplied with the appliance (IEC 60335-1/A1 : 2004)		P
24.101	Thermal cut-outs shall be non-self-resetting. They shall have a trip-free switching mechanism or be located so that they can only be reset after removal of a non-detachable cover. (IEC 60335-2-21:2002)		P
24.102	The operating temperature of the thermal cut-out of a closed water heater shall ensure that the water temperature cannot exceed either 99 °C or 130 °C. (IEC 60335-2-21:2002)		N/A
24.102	The operating temperature of the thermal cut-out of a closed water heater shall ensure that the water temperature cannot exceed either 99 °C or that the thermal cut out operate before its temperature exceeds 110 °C . (EN 60335-2-21:2003 / A1:2005)		
24.102.1	Tested as specified Water temperature not exceeding 99°C		N/A
24.102.2	Tested as specified The thermal cut-off temperature shall operate before its temperature exceeds 110°C. The water temperature shall not exceed 130°C (IEC 60335-2-21:2002)		N/A
24.102.2	Tested as specified The thermal cut-off temperature shall operate before its temperature exceeds 110°C. The water temperature shall not exceed 20K of the maximum permitted operating temperature of the thermal cut-out. (EN 60335-2-21:2003 / A1:2005)		N/A
25	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS**		
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		-
	- supply cord fitted with a plug		P
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance		N/A
	- pins for insertion into socket-outlets		N/A
	- appliance inlet not allowed (IEC 60335-2-21:2002)		N/A
25.2	Appliance not provided with more than one means of connection to the supply mains		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		N/A
25.3	Connection of supply conductors for appliance intended to be permanently connected to fixed wiring possible after the appliance has been fixed to its support		N/A
	Appliance provided with a set of terminals for the connection of cables or fixed wiring, cross-sectional areas specified in 26.6		N/A
	Appliance provided with a set of terminals allowing the connection of a flexible cord		N/A
	Appliance provided with a set of supply leads accommodated in a suitable compartment		N/A
	Appliance provided with a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate type of cable or conduit		N/A
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimensions according to table 10		N/A
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in 29		N/A
25.5	Method for assemble supply cord with the appliance:		
	- type X attachment		N/A
	- type Y attachment		P
	- type Z attachment, if allowed in part 2		N/A
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N/A
25.6	Plugs fitted with only one flexible cord		P
	Supply cords of single-phase portable appliances having a rated current not exceeding 16A: plug complying with the following standard sheets of IEC 60083:1975 (EN 60335-1:2002)		-
	- class I appliances: standard sheet C2b, C3b or C4 (EN 60335-1:2002)		P
	- class II appliances: standard sheet C5 or C6 (EN 60335-1:2002)		N/A
25.7	Supply cord not lighter than:		-
	- braided cord (60245 IEC 51)		N/A
	- ordinary tough rubber sheathed cord (60245 IEC 53)		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	-ordinary polychloroprene sheathed flexible cord [60245 IEC 57] (IEC 60335-1/A1 : 2004)		N/A
	- flat twin tinsel cord (60227 IEC 41)		N/A
	- light polyvinyl chloride sheathed cord (60227 IEC 52), appliance not exceeding 3 kg		N/A
	- ordinary polyvinyl chloride sheathed cord (60227 IEC 53), appliance exceeding 3 kg	H05VV-F	P
	-Sheathed cord and rubber isolation [60245 IEC 86] (EN 60335-1:02)		N/A
	-Polyvinyl chloride reticulated sheathed cord and rubber isolation [60245 IEC 87] (EN 60335-1:02)		N/A
	-Sheathed cord and polyvinyl chloride reticulated insulation (60245 IEC 88) (EN 60335-1:02)		N/A
	Temperature rise of external metal parts exceeding 75 K, PVC cord not used, unless		N/A
	appliance so constructed that the supply cord is not likely to touch external metal parts in normal use, or		P
	the supply cord is appropriate for higher temperatures, type Y or type Z attachment used		P
25.8	Nominal cross-sectional area of supply cords according to table 11; rated current (A); cross-sectional area (mm²) .....:	0.75 mm²	P
25.9	Supply cord not in contact with sharp points or edges		P
25.10	Green/yellow core for earthing purposes in Class I appliance		P
25.11	Conductors of supply cords not consolidated by lead-tin soldering where they are subject to contact pressure, unless		N/A
	clamping means so constructed that there is no risk of bad contacts due to cold flow of the solder		N/A
25.12	Moulding the cord to part of the enclosure does not damage the insulation of the supply cord		N/A
25.13	Inlet opening so shaped as to prevent damage to the supply cord		P
	Unless the enclosure at the inlet opening is of insulation material, a non-detachable lining or bushing complying with 29.3 for supplementary insulation provided		P
	If unsheathed supply cord, a similar additional bushing or lining is required, unless		N/A
	the appliance is class 0		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
25.14	Supply cords adequately protected against excessive flexing		N/A
	Flexing test:		-
	- applied force (N).....:		N/A
	- number of flexings.....:		N/A
	The test does not result in:		-
	- short circuit between the conductors		N/A
	- breakage of more than 10% of the strands of any conductor		N/A
	- separation of the conductor from its terminal		N/A
	- loosening of any cord guard		N/A
	- damage, within the meaning of the standard, to the cord or the cord guard		N/A
	- broken strands piercing the insulation and becoming accessible		N/A
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).....:	100 N; 0.35 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/A
	- it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	- they are suitable for different types of cord		N/A
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless separated from accessible metal parts by supplementary insulation		N/A
	- the cord is not clamped by a metal screw which bears directly on the cord		N/A

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

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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/A
25.23	Interconnection cords comply with the requirements for the supply cord, except as specified		N/A
	If necessary, electric strength test of 16.3		N/A
25.24	Interconnection cords not detachable without the aid of a tool if compliance with the standard is impaired when they are disconnected		N/A
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/A
26	**TERMINALS FOR EXTERNAL CONDUCTORS**		
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	Terminals only accessible after removal of a non-detachable cover		P
	However, earthing terminals may be accessible if a tool is required to make the connections and means are provided to clamp the wire independently from its connection (IEC 60335-1/A1 : 2004)		P
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/A
	Screws and nuts serve only to clamp supply conductors, except		N/A
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N/A
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone		N/A
	Soldering alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free at the soldered joint		N/A
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/A

EN 60335-2-21 / IEC 60335-2-21			
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/A
	- internal wiring is not subjected to stress		N/A
	- clearances and creepage distances are not reduced below the values in 29		N/A
	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/A
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/A
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		N/A
	Stranded conductor test, 8 mm insulation removed		N/A
	No contact between live parts and accessible metal parts and, for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N/A
26.6	Terminals for type X attachment and for connection to fixed wiring suitable for connection of conductors with required cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm²) .....:		N/A
	Terminals only suitable for a specially prepared cord		N/A
26.7	Terminals for type X attachment accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection to fixed wiring, including the earthing terminal, located close to each other		N/A
26.9	Terminals of the pillar type constructed and located as specified		N/A
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/A
	Pull test of 5 N to the connection		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
26.11	For type Y and Z attachment: soldered, welded, crimped and similar connections may be used		P
	For Class II appliances: the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N/A
	For Class II appliances: soldering, welding or crimping alone used, barriers provided, clearances and creepage distances satisfactory if the conductor becomes free		N/A
27	**PROVISION FOR EARTHING**		
27.1	Accessible metal parts of Class 0I and I appliances, permanently and reliably connected to an earthing terminal or contact of the appliance inlet		P
	Earthing terminals not connected to neutral terminal		P
	Class 0, II and III appliance have no provision for earthing		N/A
	Safety extra-low voltage circuits not earthed, unless protective extra-low voltage circuits		N/A
	Class I water heaters, sheath of heating element permanently and reliably connected to earthing terminal, unless (IEC 60335-2-21:2002)		N/A
	-provided with inlet and outlet pipes of metal permanently and reliably connected to earthing terminal (IEC 60335-2-21:2002)		N/A
	-other accessible metal parts in contact with the water permanently and reliably connected to earthing terminal (IEC 60335-2-21:2002)		N/A
27.2	Clamping means adequately secured against accidental loosening		P
	Terminals used for the connection of external equipotential bonding conductors allow connection of conductors of 2.5 to 6 mm², and		N/A
	do not provide earthing continuity between different parts of the appliance		N/A
	Conductors cannot be loosened without the aid of a tool		N/A
27.3	For detachable parts that are plugged into another part of the appliance, and having an earth connection, the earth connection made before and separated after current-carrying connections when removing the part (IEC 60335-1/A1 : 2004)		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	For appliances with supply cord, current-carrying conductors become taut before earthing conductor, if the cord slips out of the cord anchorage		P
27.4	No risk of corrosion resulting from contact between metal of earthing terminal and other metal		P
	Adequate resistance to corrosion of coated or uncoated parts providing earthing continuity, other than parts of a metal frame or enclosure		P
	Parts of steel providing earthing continuity provided at the essential areas with an electroplated coating, thickness at least 5 µm		P
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		P
	In case of aluminium alloys precautions taken to avoid risk of corrosion		N/A
27.5	Low resistance of connection between earthing terminal and earthed metal parts		P
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided that clearances of basic insulation are based on the rated voltage of the appliance		N/A
	Resistance not exceeding 0,1 Ω at the specified low-resistance test	0.053 Ω	P
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand held appliances		N/A
	They may be used 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/A
	- the material of the printed circuit board complies with IEC 60249-2-4 or IEC 60249-2-5		N/A
28	**SCREWS AND CONNECTIONS**		
28.1	Fixings, electrical connections and connections providing earthing continuity withstand mechanical stresses		P
	Screws not of soft metal liable to creep, such as zinc or aluminium		P
	Diameter of screws of insulating material min. 3 mm		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	Screws of insulating material not used for any electrical connection or connections providing earthing continuity		P
	Screws used for electrical connections or connections providing earthing continuity screw into metal		P
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		P
	Type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw can impair basic insulation		N/A
	For screws and nuts; test as specified	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure not transmitted through insulating material liable to shrink or distort, unless shrinkage or distortion compensated		P
	This requirement does not apply to electrical connections in circuits carrying a current not exceeding 0.5A		N/A
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N/A
	Thread-cutting (self-tapping) screws only used for electrical connections if they generate a full form standard machine screw thread		N/A
	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/A
	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		P
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity		P
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion		N/A
29	**CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION**		
	Clearances, creepage distances and solid insulation withstand electrical stress		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	For coatings used on printed circuits boards to protect the microenvironment (Type A) or to provide basic insulation (Type B), annex J applies (IEC 60335-1/A1 : 2004)		N/A
	The microenvironment is pollution degree 1 under Type A coating (IEC 60335-1/A1 : 2004)		N/A
	No creepage distance or clearance requirements under Type B coating (IEC 60335-1/A1 : 2004)		N/A
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless		P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14 (IEC 60335-1/A1 : 2004)		N/A
	However, if the construction is affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500V and above are increased by 0,5 mm and the impulse voltage test is not applicable (IEC 60335-1/A1 : 2004)		N/A
	Impulse voltage test not applicable: (IEC 60335-1/A1 : 2004)		-
	- when the microenvironment is pollution degree 3		N/A
	- for basic insulation of class 0 and class 01 appliances		N/A
	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/A
	or if pollution degree 3 is applicable		N/A
	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/A
	Lacquered conductors of windings considered to be bare conductors (IEC 60335-1/A1 : 2004)		N/A
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, but using the next higher step for rated impulse voltage		P
29.1.4	For functional insulation, the values of table 16 are applicable, unless		P
	the appliance complies with clause 19 with the functional insulation short-circuited		N/A
	Clearances at crossover points of lacquered conductors not measured		N/A
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		N/A
	Lacquered conductors of windings considered to be bare conductors (IEC 60335-1/A1 : 2004)		N/A
	However, clearances at crossover points are not measured (IEC 60335-1/A1 : 2004)		N/A
	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/A
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/A
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N/A
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation based on the working voltage used as the rated voltage in table 15		N/A
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		N/A
	insulation subjected to conductive pollution; pollution degree 3		P

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	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		N/A
29.2.2	Creepage distances of supplementary insulation at least as specified for basic insulation in table 17		N/A
29.2.3	Creepage distances of reinforced insulation at least double as specified for basic insulation in table 17		P
29.2.4	Creepage distances of functional insulation not less than specified in table 18		P
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
29.3	Supplementary and reinforced insulation having adequate thickness, or a sufficient number of layers, to withstand the electrical stresses (IEC 60335-1/A1 : 2004)		P
	Compliance checked by: (IEC 60335-1/A1 : 2004)		-
	- measurement, in accordance with 29.3.1, or		P
	- an electric strength test in accordance with 29.3.2, or		N/A
	- an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3		N/A
29.3.1	Supplementary insulation having a thickness of at least 1 mm (IEC 60335-1/A1 : 2004)		P
	Reinforced insulation having a thickness of at least 2 mm (IEC 60335-1/A1 : 2004)		P
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation (IEC 60335-1/A1 : 2004)		N/A
	Supplementary insulation consisting of at least 2 layers (IEC 60335-1/A1 : 2004)		N/A
	Reinforced insulation consisting of at least 3 layers (IEC 60335-1/A1 : 2004)		N/A
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	the electric strength test of 16.3 (IEC 60335-1/A1 : 2004)		N/A
	If the temperature rise during the tests of Clause 19 does not exceed the value specified in Table 3, the test of IEC 60068-2-2 is not carried out (IEC 60335-1/A1 : 2004)		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	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) .....:	(see appended table)	P
	Parts supporting live parts: at 40°C plus the maximum temperature rise determined during the test of clause 11, or at 125°C, whichever is the higher; temperature (°C) .....:	(see appended table)	P
	Parts of thermoplastic material providing supplementary or reinforced insulation, 25°C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C) .....:		N/A
	The temperature rises occurring during the tests of 19.2, 19.3 and 19.101 are not taken into account. (IEC 60335-2-21:2002)		P
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		P
	the material is classified at least HB40 according to IEC 60695-11-10		N/A
	Parts for which the glow-wire test cannot be carried out meet the requirements in ISO9772 for category FH3 material		N/A
30.2.2	Appliances operated while attended, parts of insulating material supporting current-carrying connections and parts within a distance of 3mm subjected to the glow-wire test of IEC 60695-2-11 at a temperature of:		
	-750°C, for connections carrying a current exceeding 0,5A during normal operation		N/A
	-650°C, for other connections		N/A
	Test not applicable to conditions as specified		N/A
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	Test not applicable to conditions as specified		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
30.2.3.1	Parts of insulating material supporting connections carrying a current exceeding 0.2A during normal operation, and		P
	parts of insulating material within a distance of 3mm,		P
	having a glow-wire flammability index of at least 850°C according to IEC 60695-2-12		P
30.2.3.2	Parts of insulating material supporting current-carrying connections, and		P
	parts of insulating material within a distance of 3mm,		P
	subjected to glow-wire test of IEC 60695-2-11		P
	Test not carried out on material having a glow-wire ignition temperature according to IEC 60695-2-13 as specified		N/A
	Glow-wire test of IEC 60695-2-11, the temperature being:		-
	-750°C, for connections carrying a current exceeding 0,2A during normal operation		P
	-650°C, for other connections		N/A
	Parts that during the test produce a flame persisting longer than 2 s, tested as specified		N/A
	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/A
	the material is classified as V-0 or V-1 according to IEC 60695-11-10		N/A
30.2.4	Base material of printed circuit boards subjected to needle-flame test of annex E		P
	Test not applicable to conditions as specified		N/A
31	**RESISTANCE TO RUSTING**		
	Relevant ferrous parts adequately protected against rusting		N/A
32	**RADIATION, TOXICITY AND SIMILAR HAZARDS**		
	Appliance does not emit harmful radiation		N/A
	Appliance does not present a toxic or similar hazard		N/A
A	**ANNEX A (INFORMATIVE)** **ROUTINE TESTS**		
	Description of routine tests to be carried out by the manufacturer		N/A
B	**ANNEX B(NORMATIVE)** **APPLIANCES POWERED BY RECHARGEABLE BATTERIES**		

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N/A
	This annex does not apply to battery chargers		N/A
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/A
	-the battery is charged, the battery being initially discharged to such an extent that the appliance cannot operate		N/A
	-if possible, the appliance is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the appliance cannot operate. The appliance is operated as specified in relevant part 2		N/A
	If the appliance incorporates inductive coupling between two parts that are detachable from each other, the appliance is supplied from the supply mains with the detachable part removed		N/A
3.6.2	Part to be removed in order to discard the battery is not considered to be detachable		N/A
5.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N/A
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N/A
7.12	The instructions for appliances incorporating batteries intended to be replaced by the user includes required information		N/A
	Details about how to remove batteries containing materials hazardous to the environment given		N/A
7.15	Markings placed on the part of the appliance connected to the supply mains		N/A
8.2	Appliances having batteries that according to the instruction may be replaced by the user need only have basic insulation between live parts and the inner surface of the battery compartment		N/A
	If the appliance can be operated without batteries, double or reinforced insulation required		N/A
11.7	The battery is charged for the period described		N/A
19.1	Appliances subjected to tests of 19.101, 19.102 and 19.103		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
19.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
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/A
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/A
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/A
	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/A
	- 50, the mass of part exceeds 250 g		N/A
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N/A
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N/A
25.13	An additional lining or bushing not required for interconnection cords operating at safety extra-low voltage		N/A
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N/A
	For other parts, 30.2.2 applies		N/A
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/A
D	**ANNEX D (NORMATIVE)** **THERMAL MOTOR PROTECTORS (IEC 60335-1/A1 : 2004)**		
	Applicable to appliances having motors that incorporate thermal motor protectors		N/A
E	**ANNEX E (NORMATIVE)** **NEEDLE-FLAME TEST**		
	Needle-flame test carried out in accordance with IEC 60695-2-2, with the following modifications:		P
5	Severities		-

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	The duration of application of the test flame is 30 s ± 1 s		N/A
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		P
8.4	The first paragraph does not apply		P
	If possible, the flame is applied at least 10 mm from a corner		P
8.5	The test is carried out on one specimen		P
	If the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N/A
10	Evaluation of test results		-
	The duration of burning not exceeding 30 s		N/A
	However, for printed circuit boards, the duration of burning not exceeding 15 s		P
F	**ANNEX F (NORMATIVE) CAPACITORS**		
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		-
1.5	Terminology		-
1.5.3	Class X capacitors tested according to subclass X2		N/A
1.5.4	This subclause is applicable		N/A
1.6	Marking		-
	Items a) and b) are applicable		N/A
3.4	Approval testing		-
3.4.3.2	Table II is applicable as described		N/A
4.1	Visual examination and check of dimensions		-
	This subclause is applicable		N/A
4.2	Electrical tests		-
4.2.1	This subclause is applicable		N/A
4.2.5	This subclause is applicable		N/A
4.2.5.2	Only table IX is applicable		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	Values for test A apply		N/A
	However, for capacitors in heating appliances the values for test B or C apply		N/A
4.12	Damp heat, steady state		-
	This subclause is applicable		N/A
	Only insulation resistance and voltage proof are checked		N/A
4.13	Impulse voltage		-
	This subclause is applicable		N/A
4.14	Endurance		-
	Subclauses 4.14.1, 4.14.3, 4.14.4 and 4.14.7 applicable		N/A
4.14.7	Only insulation resistance and voltage proof are checked		N/A
	Visual examination, no visible damage		N/A
4.17	Passive flammability test		-
	This subclause is applicable		N/A
4.18	Active flammability test		-
	This subclause is applicable		N/A
G	**ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS**		
	The following modifications to this standard are applicable for safety isolating transformers:		-
7	Marking and instructions		-
7.1	Transformers for specific use marked with:		-
	-name, trademark or identification mark of the manufacturer or responsible vendor		N/A
	-model or type reference		N/A
17	Overload protection of transformers and associated circuits		-
	Fail-safe transformers comply with subclause 15.5 of IEC 61558-1		N/A
22	Construction		-
	Subclauses 19.1 and 19.1.2 of IEC 61558-2-6 are applicable		N/A
29	Clearances, creepage distances and solid insulation (EN 60335-1/A11)		-
29.1 and 29.2	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
H	ANNEX H (NORMATIVE) SWITCHES		
	Switches comply with the following clauses of IEC 61058-1, as modified:		-
	-The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N/A
	-Before being tested, switches are operated 20 times without load		N/A
8	Marking and documentation		-
	Switches are not required to be marked		N/A
	However, switches that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N/A
13	Mechanism		-
	The tests may be carried out on a separate sample		N/A
15	Insulation resistance and dielectric strength		-
15.1	Not applicable		N/A
15.2	Not applicable		N/A
15.3	Applicable for full disconnection and micro-disconnection		N/A
17	Endurance		-
	Compliance is checked on three separate appliances or switches		N/A
	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/A
	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/A
	Subclauses 17.2.2 and 17.2.5.2 not applicable (IEC 60335-1/A1 : 2004)		N/A
	The ambient temperature during the test is that occurring in the appliance during the test of Clause 11 in IEC 60335-1 (IEC 60335-1/A1 : 2004)		N/A
	Temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1		N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		-

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	This clause is applicable to clearances and creepage distances for functional insulation, across full disconnection and micro-disconnection, as stated in table 24		N/A
I	**ANNEX I (NORMATIVE)** **MOTORS HAVING BASIC INSULATION THAT IS INADEQUATE FOR THE RATED VOLTAGE OF THE APPLIANCE**		
	The following modifications to this standard are applicable for motors having basic insulation that is inadequate for the rated voltage of the appliance:		N/A
8	Protection against access to live parts		-
8.1	Metal parts of the motor are considered to be bare live parts		N/A
11	Heating		-
11.3	Temperature rise of the body of the motor is determined instead of the temperature rise of the windings		N/A
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/A
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/A
19	Abnormal operation		-
19.1	The tests of 19.7 to 19.9 not carried out		N/A
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/A
	- short circuit of each diode of the rectifier		N/A
	- open circuit of the supply to the motor		N/A
	- open circuit of any parallel resistor, the motor being in operation		N/A
	Only one fault simulated at a time, the tests carried out consecutively		N/A
22	Construction		-
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/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	Compliance checked by the tests specified for double and reinforced insulation		N/A
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/A
6.6	Climatic sequence		-
	When production samples are used, three samples of the printed circuit board are tested		N/A
6.6.1	Cold		-
	The test is carried out at -25°C		N/A
6.6.3	Rapid change of temperature		-
	Severity 1 is specified		N/A
6.8.6	Partial discharge extinction voltage		-
	Type A coatings not subjected to a partial discharge test		N/A
6.9	Additional tests		-
	This subclause is not applicable		N/A
K	**ANNEX K (NORMATIVE)** **OVERVOLTAGE CATEGORIES**		
	The information on overvoltage categories is extracted from IEC 60664-1		P
	Overvoltage category is a numeral defining a transient overvoltage condition		P
	Equipment of overvoltage category IV is for use at the origin of the installation		N/A
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N/A
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		P
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N/A
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
L	**ANNEX L (INFORMATIVE)** **GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES**		
	Sequences for the determination of clearances and creepage distances		P
M	**ANNEX M (NORMATIVE)** **POLLUTION DEGREE**		
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		-
	The microenvironment determines the effect of pollution on the insulation, taking into account the microenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		-
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		-
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N/A
	- 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		N/A
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST (IEC 60335-1/A1 : 2004)		
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		-
7	Test apparatus		-

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
7.3	Test solutions		-
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		-
10.1	Procedure		-
	The proof voltage is 100V, 175V, 400V or 600V :		P
	The last paragraph of Clause 3 applies		P
	The test is carried out on five specimens		P
	In case of doubt, additional test with proof voltage reduced by 25V, the number of drops increased to 100		P
10.2	Report		-
	The report stating if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		P
5	Test apparatus		-
5.1	Electrodes		-
	The note does not apply		N/A
5.4	Test solutions		-
	Test solution A is used		P
6	Procedure		-
6.3	Proof tracking test		-
	Voltage is 100V, 175V, 400V or 600V .....:		P
	Note 3 of clause 3 applies		P
	The test is carried out on five specimens		P
	In case of doubt, additional test with voltage reduced by 25V, the number of drops increased to 100		N/A
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		P
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

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES (IEC 60335-1/A1 : 2004)		
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WDaE		-
	Modifications may also be applied to class 1 appliances having a rated voltage exceeding 150V, intended to be used in countries having a warm damp equable climate and that are marked WdaE, if liable to be connected to a supply mains that excludes the protective earthing conductor		-
	General conditions for the tests		
5.7	The ambient temperature for the tests of Clauses 11 and 13 is 40 $^{+3}_{0}$ *C.*		N/A
7	Marking and instructions		N/A
7.1	The appliance marked with the letters WDaE		N/A
7.12	The instructions state that the appliance is to be supplied through a RCD having a rated residual operating current not exceeding 30 mA		N/A
	The instructions state that the appliance is considered to be suitable for use in countries having a warm damp equable climate, but may also be used in other countries		N/A
11	Heating		-
11.8	The values of Table 3 are reduced by 15 K		N/A
13	Leakage current and electric strength at operating temperature		-
13.2	The leakage current for class I appliances not exceeding 0,5 mA		N/A
15	Moisture resistance		-
15.3	The value of t is 37 °C		N/A
16	Leakage current and electric strength		-
16.2	The leakage current for class I appliances not exceeding 0,5 mA		N/A
19	Abnormal operation		-
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		N/A
R	ANNEX R (NORMATIVE) SOFTWARE EVALUATION (IEC 60335-1/A1 : 2004)		
	Software evaluated in accordance with the following clauses of Annex H of IEC 60730-1, as modified		-

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
H.2	Definitions		-
	Only definitions H.2.16 to H.2.20 applicable		N/A
H.7	Information		-
	Only footnotes 12) to 18) of Table 7.2, as modified, applicable		N/A
H.11-12	Controls using software		N/A
	All the subclauses of H.11.12, as modified, except H.11.12.6 and H.11.12.6.1, applicable		N/A
H.11.12.71	For appliances using software class C having a single channel with self-test and monitoring structure, the manufacturer provides the measures necessary to address the fault/errors in safety related segments and data		N/A
H.11.12.8	Software fault/error detection occurs before compliance with 19.13 of IEC 60335-1 is impaired		N/A
H.11.12.81	Replace text		N/A
H.11.12.13	Software and safety related hardware under its control initializes and terminates before compliance with 19.13 of IEC 60335-1 is impaired		N/A
	ANNEX ZA to EN 60335-1:02 SPECIAL NATIONAL CONDITIONS (EN 60335-1:2002)		
7.12	DENMARK Requirements regarding marking tag of power supply cord and connection of earthing wire		N/A
19.5	NORWAY The test is also applicable to appliances intended to be permanently connected to fixed wiring		N/A
22.2	FRANCE and NORWAY The second paragraph of this subclause dealing with single-phase class I appliances with heating elements is not applicable due to the supply system.		N/A
25.6	Plugs according to standard sheet C 2b are not allowed in the following countries: Belgium, France, Spain and the United Kingdom		N/A
	Plugs according to standard sheet C 3b are not allowed in the following countries: Austria, Finland, Germany, Iceland, Ireland, Italy Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.		N/A
	DENMARK		N/A
	Supply cords of single-phase port-able appliances having a rated current not exceeding 13 A provided with a plug according to the following:		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
	Class I appliances: Section 107-2-D1 Standard Sheet DKA 2-1a		N/A
	For appliances covered by a part 2 of EN 60335, also plugs in accordance with section 107-2-D1, ed 3, 1998, Standard Sheet C 2b, C 3b or C 4		N/A
	Class II appliances: section 107-2-D1, ed 3, 1998, Standard Sheet C 5 or C 6, DKA 2-1a and DKA 2-1b		N/A
	Stationary single-phase appliances, having a rated current not exceeding 13 A, and provided with a plug, the plug is in accordance with the requirements above.		N/A
	Multi-phase appliances and single-phase appliances having a rated current exceeding 13 A, and provided with a plug, the plug is in accordance with the requirements below:		N/A
	Class I appliances: Section 107-2-D1, Standard Sheet DK 6-1a / EN 60309-2, Standard Sheet 2-II, 2-IV		N/A
	Class II appliances: Section 107-2-D1, Standard Sheet DK 6-1a / 2-II, 2-IV		N/A
	Current not exceeding C5: 2,5A, DKA 2-1a and 1b: 10A, DK 2-1a: 13A, C 1b, C 6, C 2b, C 3b, C 4: 16A		N/A
	IRELAND Plug is in accordance with standard sheets B2 and C5		N/A
	IITALY only plug mentioned on the test report R0BT-005:2001 are allowed		N/A
	SPAIN Household appliance, only plug provided complying with standard UNE 20 315		N/A
	ESC 10-1b, C2b, C4, C6 or ESB 25-5b		N/A
	complying with standard UNE-EN 50075		N/A
	SWITZERLAND Supply cords of portable household and similar electrical appliances, rated current not exceeding 10 A, provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets:		N/A
	SEV 6532-2.1991 Plug Type 15 3P+N+PE 250/400 V, 10 A		N/A
	SEV 6533-2.1991 Plug Type 11 L+N 250 V 10A		N/A
	SEV 6533-2.1991 Plug Type 12 L+N+PE 250 V, 10 A		N/A
	UNITED KINGDOM Plug according to standard sheet B2 or C5 used. Refer to annex ZB , ,		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict
25.8	IRELAND and UNITED KINGDOM Replacement of figures (rated current/cross-sectional area) in the table.		N/A
ZB	**ANNEX ZB TO EN 60335-1/A1: 2004 – NATIONAL DIVERGENCES**		
29.3	GERMANY 29.3 not apply to appliances when insulation is accessible		N/A
ZC	**ANNEX ZC TO EN 60335-1/A1 : 2004 (INFORMATIVE)**		
	IEC standards and EN standards used		
ZD	**ANNEX ZD (informative)**		
	IEC and CENELEC code designations for flexible cords		N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

10.1	TABLE: Power input deviation				P
Input deviation of/at:	P rated (W)	P measured (W)	dP	Required dP	Remark
230 V (hot water storage tank)	540	537	- 0.6 %	5%, - 10 %	Heater

10.2	TABLE: Current deviation				P
Current deviation of/at:	I rated (A)	I measured (A)	dI	Required dI	Remark
230 V (cold water storage tank)	0.8	0.801	+ 0.1 %	+ 20 %	Compressor

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

11.8	TABLE: Heating test, thermocouples		P
	Test voltage (V) .....:	254,4	—
	Ambient (°C) .....:	32,4 / 32,5	—

Thermocouple locations	dT (K)	Max. dT (K)
1. Power cord sheath	25.8	35
2. Power cord internal wire	26.3	50
3. Heater switch	33.9	60
4. PCB connector	25.6	cl. 30.1
5. AC connector	40.6	cl. 30.1
6. Internal wire of heater	30.0	105 °C
7. Internal wire of compressor	42.8	50
8. Internal wire of cooling thermostat	37.2	50
9. PCB	37.6	105 °C
10. Cooling thermostat surface	31.0	T85
11. Compressor top	41.2	150 °C
12. Hot water outlet enclosure	41.6	60
13. External enclosure (Front)	25.3	60
14. Side enclosure	18.2	60
15. Fuse holder surface (plastic)	26.0	cl. 30.1
16. Test wall (Rear)	22.6	60
17. Bottom wall	16.3	60
18. Top enclosure	16.5	60

11.8	TABLE: Heating test, resistance method		P
	Test voltage (V) .....:	254,4	—
	Ambiant, t_1 (°C) .....:	32,4	—
	Ambiant, t_2 (°C) .....:	32,5	—

Temperature rise of winding	R_1 (Ω)	R_2 (Ω)	dT (K)	Max. dT (K)	Insulation class
Compressor main winding	12.533	15.444	61.9	140°C	Synthetic insulation
Compressor sub winding	33.761	40.764	55.3	140°C	Synthetic insulation

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

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

Leakage current between	I (mA)	Max. allowed I (mA)
Live parts and external metal enclosure	0.21	3.5
Live parts and external enclosure (plastic)	0.01	0.25

13.3	TABLE: Electric strength		P

Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
Live parts and external metal enclosure	1000	No
Live parts and external enclosure (plastic)	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.....:	254,4 V	—
	Three phase appliances 1.06 x rated voltage divided by √3: .....:	-	—

Leakage current between	I (mA)	Max. allowed I (mA)
Live parts and external metal enclosure	0.21	3.5
Live parts and external enclosure (plastic)	0.01	0.25

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

16.3	TABLE: Electric strength		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
Live parts and external metal enclosure		1250	No
Live parts and external enclosure (plastic)		3000	No

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

19.7	TABLE: Abnormal operation, locked rotor/moving parts					N/A
	Test voltage (V) .....:					—
	Ambiant, t_1 (°C) .....:					—
	Ambiant, t_2 (°C) .....:					—
Temperature of winding		R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (°C)

19.9	TABLE: Abnormal operation, running overload					N/A
	Test voltage (V) .....:					—
	Ambiant, t_1 (°C) .....:					—
	Ambiant, t_2 (°C) .....:					—
Temperature of winding		R_1 (Ω)	R_2 (Ω)	dT (K)	T (°C)	Max. T (°C)

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

19.11	TABLE: abnormal operation, temperature rise measurements		P
Part	Fault condition		Result
	Short	Open	
R1 Resister	X		Normal operation. No part exceed limit Re: No hazard
D7 Diode (Rectifier)	X		Normal operation. No part exceed limit Re: No hazard

19.13	TABLE: Abnormal operation, temperature rises	P
Thermocouple locations	dT (K)	Max. dT (K)
Power cord sheath	21.5	150
Test wall	22.7	150
External enclosure	22.6	cl.30.1

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

24.1	TABLE: Components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Power cord set	Changzhou City Xuexiang Telecommunication co ltd	H05VV-F	3G 0.75mm²	GB5023.5-1997	CCC (2002010105010115)
	Sangle	DTII-3P-07	AC 250V 10A	GB2099.1-1996; GB1002-1996	CCC (2002010201002595)
Compressor	LG electronics	NS30LAEG	AC 220-240V, 50Hz	IEC 60335-2-34 GB4706.1-1998; GB4706.17-2004	VDE, CCC (2003010704037669)
OLP	Texas instrument (Sensata Technology)	4TM149NFB	OPEN TEMP : 120°C CLOSE TEMP: 61 °C	EN 60730-1; EN 60730-2-4	KEMA
Starting relay	Ohrung ind Co., Korea	P330MC	330Ω	EN 60730-1; EN 60730-2-10	VDE
Alt.)	Kyung sung mechatronics	P330MC	330Ω	EN 60730-1; EN 60730-2-10	VDE
Fuse	Schurter AG	FST 5x20-Serie(s)	AC 250V; 8 A	EN 60127-1	VDE
Fuse holder	E I dupont de nemours & co inc	FR7025V0F (+)	V-0; 130 ℃	IEC 60335-1	Tested in appliance (UL)
Heater-sheathed type	Shinhwa tech	SH-0504-0	AC 220 V 500 W	IEC 60335-1	Tested in appliance
Heater Switch	Ningbo Yinxian Lihe	RL3-...series	AC 125 V 10 A; AC 250 V 6(2) A	EN 61058-1	FIMKO
PCB	SE IN ELECTRONICS CO., LTD	1, 2	V-0; 105 ℃	IEC 60335-1	Tested in appliance (UL)
Thermostat for Compressor	Pacific control co., ltd	PFN series	AC 125 V / 250 V; 6A	EN 60730-1; EN 60730-2-9	SEMKO
Thermostat for heater	Pacific Controls Co., Ltd.	PW-2*	AC 250V 7.5A Max 150 ℃	EN 60730-1; EN 60730-2-9	VDE
Non-self resetting thermal cut-out	Pacific control co., ltd	PBR-380	AC 250 V 7.5 A; AC 125 V 15 A Max 150 ℃	EN 60730-1; EN 60730-2-9	TUV
Alt.)	Pacific control co., ltd	PBR-380-****	AC 250 V 7.5 A; AC 125 V 15 A Max 150 ℃	EN 60730-1; EN 60730-2-9	TUV
Enclosure	Basf co ltd	GP-35	HB; 90 ℃	IEC 60335-1	Tested in appliance (UL)
[1)] An asterisk indicates a mark which assures the agreed level of surveillance					

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

28.1	TABLE: Threaded part torque test		P
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Rear enclosure A	>3.6 and ≤ 4.1	II	1.2
Rear enclosure B	>3.6 and ≤ 4.1	II	1.2
P.E. screw	>3.6 and ≤ 4.1	II	1.2

29.1	TABLE: Clearances					P
	Overvoltage category....:	II				—
		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic	Functional	Supplementary	Reinforced	Verdict / Remark
330	0,5					N/A
500	0,5					N/A
800	0,5					N/A
1500	1,0					N/A
2500	2,0	>2.0	>2.0	>2.0	-	P
4000	3,5	-	-	-	>3.5	P
6000	6,0					N/A
8000	8,5					N/A
10000	11,5					N/A

EN 60335-2-21 / IEC 60335-2-21			
Clause	Requirement - Test	Result - Remark	Verdict

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree										
	1	2			3			Type of insulation			
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb	B*)	S*)	R*)	Verdict
=50	0,2	0,6	0,9	1,2	1,5	1,7	1,9		—	—	N/A
=50	0,2	0,6	0,9	1,2	1,5	1,7	1,9	—		—	N/A
=50	0,4	1,2	1,8	2,4	3,0	3,4	3,8	—	—		N/A
>50 and = 125	0,3	0,8	1,1	1,5	1,9	2,1	2,4		—	—	N/A
>50 and = 125	0,3	0,8	1,1	1,5	1,9	2,1	2,4	—		—	N/A
>50 and = 125	0,6	1,6	2,2	3,0	3,8	4,2	4,8	—	—		N/A
>125 and = 250	0,6	1,3	1,8	2,5	3,2	3,6	4,0	X	—	—	P
>125 and = 250	0,6	1,3	1,8	2,5	3,2	3,6	4,0	—	X		P
>125 and = 250	1,2	2,6	3,6	5,0	6,4	7,2	8,0	—	—	X	P
>250 and = 400	1,0	2,0	2,8	4,0	5,0	5,6	6,3		—	—	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
>1250 and = 1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0	—	—		N/A

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Clause	Requirement - Test	Result - Remark	Verdict

>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											

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Clause	Requirement - Test	Result - Remark	Verdict

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

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Clause	Requirement - Test	Result - Remark	Verdict

30.1	TABLE: Ball pressure			P
Part		Test temperature (°C)	Impression diameter (mm)	Allowed impression diameter (mm)
Enclosure (plastic)		75	0.8	2.0
Fuse holder		125	1.0	2.0
AC connector		125	1.0	2.0
PCB connector		125	1.0	2.0
PCB		125	0.7	2.0

30.2	TABLE: glow-wire test		P
Part		Test temperature (°C)	Verdict
Enclosure (plastic)		550	P
AC connector		850	P
PCB connector		850	P
Fuse holder		850	P
Heater terminal tube		850	P

- End of Test Report -