Test Report issued under the responsibility of:

SGS Fimko Ltd.

TEST REPORT
IEC 60335-2-24
Safety of household and similar electrical appliances
Part 2: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers

Report reference No. ..... :	**F690501/RF-SAF007903**
Date of issue ..... :	July 06, 2016
Total number of pages..... :	107 pages
CB Testing Laboratory..... :	SGS Korea Co., Ltd. Gunpo Laboratory
Address..... :	10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Repubilc of Korea
Applicant's name.....:	HYUNDAI Wacortec Co., Ltd.
Address ..... :	A-301, Hagye Technotown, 10, Nowon-ro15-gil, Nowon-gu, Seoul, 01788, Republic of Korea
Test specification:	
Standard ..... :	IEC 60335-2-24:2010 (Seventh Edition) + A1:2012 used in conjunction with IEC 60335-1:2010 (Fifth Edition)
Test procedure ..... :	CB Scheme
Non-standard test method..... :	N/A
Test Report Form No.....:	IEC60335_2_24N
Test Report Form(s) Originator ..... :	Electrosuisse
Master TRF..... :	Dated 2014-02

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description .....:	Hot and cold water dispenser with purifier system
Trade Mark .....:	HYUNDAI WACORTEC Co., Ltd.
Manufacturer .....:	Same as applicant
Model/Type reference .....:	W2-170P, W2-150, W2-150P, W2-160, W2-160P, W2-170, W2-170S, W2-170SP
Ratings .....:	For model W2-170P, W2-150, W2-150P, W2-160, W2-160P, W2-170 220 – 240 V~, 50 Hz, 570 – 650 W, 450 – 520 W (Hot), 0.8 – 0.9 A (Cold) For model W2-170S, W2-170SP 220 – 240 V~, 50 Hz, 450 – 530 W, 320 – 380 W (Hot), 0.8 – 0.9 A (Cold)

Testing procedure and testing location:		
☒ **CB Testing Laboratory:**	SGS Korea Co., Ltd. Gunpo Laboratory	
Testing location/ address :	10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Repubilc of Korea	
☐ **Associated CB Testing Laboratory:**		
Testing location/ address..... :		
Tested by (name + signature)..... :	Jongseon Park	
Approved by (name + signature) ..... :	Evan Lim	
☐ Testing procedure: TMP/CTF Stage 1:	N/A	
Testing location/ address..... :		
Tested by (name + signature)..... :		
Approved by (name + signature) ..... :		
☐ Testing procedure: WMT/CTF Stage 2:	N/A	
Testing location/ address..... :		
Tested by (name + signature)..... :		
Witnessed by (name + signature)..... :		
Approved by (name + signature) ..... :		
☐ Testing procedure: SMT/CTF Stage 3 or 4:	N/A	
Testing location/ address..... :		
Tested by (name + signature)..... :		
Witnessed by (name + signature)..... :		
Approved by (name + signature) ..... :		
Supervised by (name + signature)..... :		

List of Attachments (including a total number of pages in each attachment):

Attachment 1 TEST REPORT IEC 60335-2-21 Safety of household and similar electrical appliances Part 2: Particular requirements for water heaters

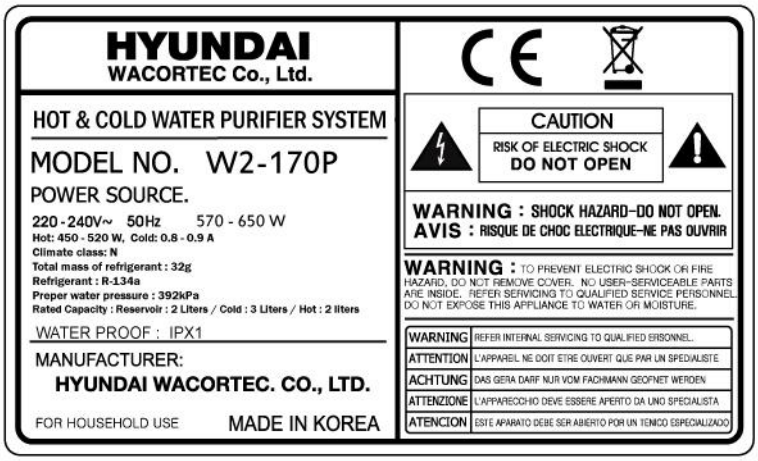
Summary of testing:
- All tests were performed on basic model W2-170P.
- Model W2-170S was partially tested.
- The items tested were found to be in compliance with the test standards of IEC 60335-2-24:2010 (Seventh Edition) + A1:2012 and IEC 60335-1:2010 (Fifth Edition).

Tests performed (name of test and test clause):	**Testing location:**
Model W2-170P cl. 7 Marking test cl. 8 Protection against access to live parts cl. 10 Power input and current cl. 11 Heating cl. 13 Leakage current and electric strength at operating temperature cl. 15 Moisture resistance cl. 16 Leakage current and electric strength cl. 19 Abnormal operation cl. 20 Stability test cl. 21 Mechanical strength cl. 22 Construction cl. 23 Internal wiring cl. 24 Components cl. 25 Cord anchorage cl. 26 Terminals for external conductors cl. 27 Protective earth cl. 28 Screws and connections cl. 29 Clearances, creepage distances and solid insulation cl. 30 Resistance to heat and fire cl. 31 Resistance to rusting Model W2-170S cl. 7 Marking test cl. 8 Protection against access to live parts cl. 10 Power input and current cl. 11 Heating cl. 15 Moisture resistance cl. 16 Leakage current and electric strength cl. 20 Stability test cl. 29 Clearances, creepage distances and solid insulation	SGS Korea Co., Ltd. Gunpo Laboratory 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Repubilc of Korea

Summary of compliance with National Differences:
List of countries addressed: N/A

Copy of marking plate:

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



<W2-170P>

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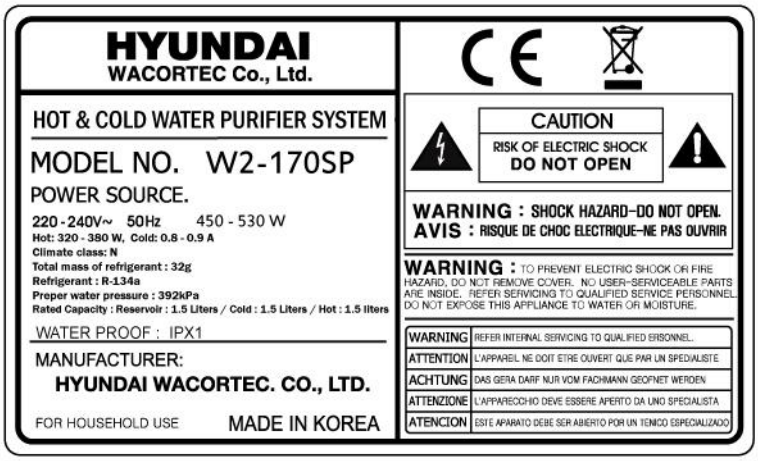

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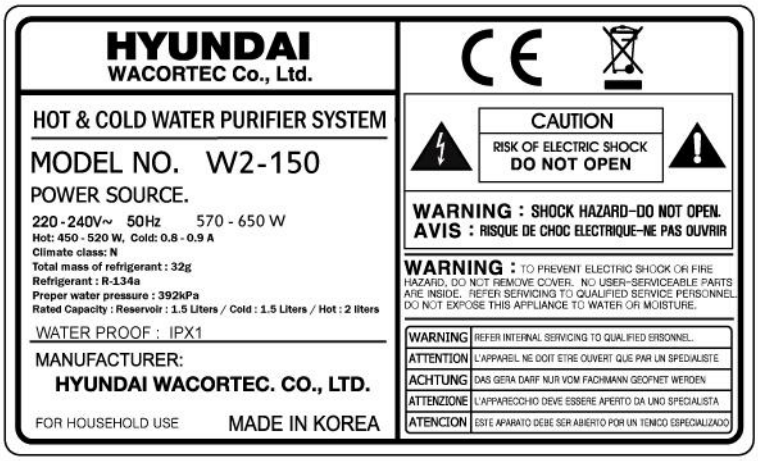

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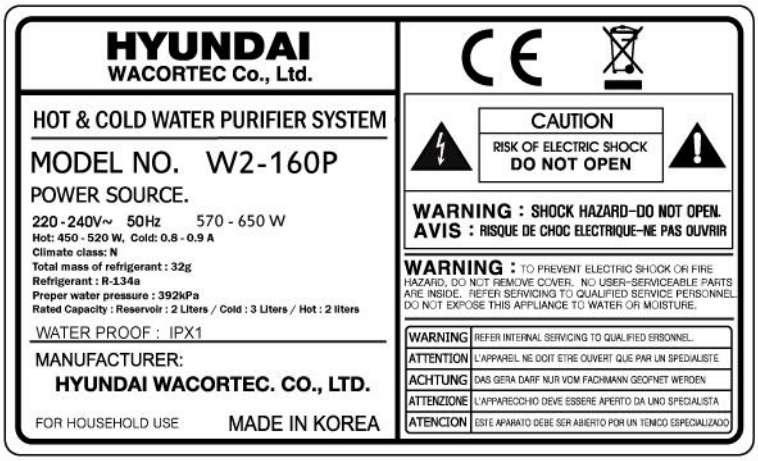

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Test item particulars ..... :	Hot and cold water dispenser with purifier system
Classification of installation and use ..... :	**Floor standing (model W2-170P, W2-150, W2-150P,W2-160, W2-160P, W2-170)** **Counter-top or table-top (model W2-170S, W2-170SP)**
Supply Connection ..... :	**Power supply cord with plug**
..... :	
Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Testing ..... :	
Date of receipt of test item ..... :	September 22, 2015
Date (s) of performance of tests ..... :	September 24, 2015 to December 31, 2015

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

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

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

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

Name and address of factory (ies) .....: Same as applicant

General product information:

- Model W2-170P, W2-150, W2-150P, W2-160, W2-160P and W2-170 are floor standing type hot and cold water dispenser having a compressor and a cistern-type water heater.
- Model W2-170S and W2-170SP is counter-top or table-top type hot and cold water dispenser.
- All models are electrically identical except they have different length of heating element.

  450 – 520 W heater: approx. 400 mm length

  320 – 380 W heater: approx. 350 mm length
- The more detailed differences of each models are:

<table>
<tr><th>Model</th><th>Exterior size
(length x width x height)</th><th>Watt (Total)</th><th>Watt (Heater)</th></tr>
<tr><td>W2-170P</td><td>310 x 400 x 1135 mm</td><td rowspan="6">570 – 650 W</td><td rowspan="6">450 – 520 W</td></tr>
<tr><td>W2-150</td><td>310 x 300 x 970 mm</td></tr>
<tr><td>W2-150P</td><td>310 x 400 x 970 mm</td></tr>
<tr><td>W2-160</td><td rowspan="2">340 x 335 x 1000 mm</td></tr>
<tr><td>W2-160P</td></tr>
<tr><td>W2-170</td><td>310 x 300 x 1135 mm</td></tr>
<tr><td>W2-170S</td><td>310 x 300 x 562 mm</td><td rowspan="2">450 – 530 W</td><td rowspan="2">320 – 380 W</td></tr>
<tr><td>W2-170SP</td><td>310 x 400 x 532 mm</td></tr>
</table>

"S" indicate short height
"P" indicate long width
W2-160 and W2-160P has no difference with their design but only have difference with their model name (for marketing purpose).

- Four stages water filter: Sediment -> Pre-Carbon -> UF or RO -> Post-Carbon Black
  UF: Ultra Filtration filter (up to 392 kPa)
  RO: Reverse Osmosis filter (up to 687 kPa)

IEC 60335-2-24			
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 60335-2-24:2010):		—
	- 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 60335-2-24:2010)		N/A
5.7	Tests according to sub-clause 10, 11,13 and subcl. 19.103 at ambient temperature of (IEC 60335-2-24:2010)		—
	(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 60335-2-24:2010)		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 60335-2-24:2010)		—
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

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Rated power input (W):	570 – 650 W (Total), 450 – 520 W (Hot): W2-170P, W2-150, W2-150P, W2-160, W2-160P, W2-170 450 – 530 W (Total), 320 – 380 W (Hot): W2-170S, W2-170SP	P
	Rated current (A):	0.8 – 0.9 A (Cold)	P
	Manufacturer's or responsible vendor's name, trademark or identification mark:	HYUNDAI WACORTEC Co., Ltd.	P
	Model or type reference:	W2-170P, W2-150, W2-150P, W2-160, W2-160P, W2-170, W2-170S, W2-170SP	P
	Symbol 5172 of IEC 60417, for Class II appliances	Class I	N/A
	IP number, other than IPX0:	IPX1	P
	Symbol IEC 60417-5180, for class III appliances, unless	Class I	N/A
	the appliance is operated by batteries only		N/A
	Symbol IEC 60417-5036, for the enclosure of electrically-operated water valves in external hose-sets for connection of an appliance to the water mains, if the working voltage exceeds extra-low voltage	No such valves	N/A
	Power input of heating systems, if greater than 100 W, (W) (IEC 60335-2-24:2010)	450 – 520 W 320 – 380 W	P
	Defrosting input, in W, if greater than the rated power input, (W) (IEC 60335-2-24:2010)	No defrosting circuit	N/A
	Rated power input in Watts (IEC 60335-2-24:2010)	450 – 520 W (Hot): W2-170P, W2-150, W2-150P,W2-160, W2-160P, W2-170 320 – 380 W (Hot):W2-170S, W2-170SP	P
	Rated current in Amperes for compression-type appliances (IEC 60335-2-24:2010)	0.8 – 0.9 A (Cold)	P
	Climatic class of the appliance (SN, N, ST or T) (IEC 60335-2-24:2010)	N	P
	Maximum rated input of lamps in Watts (IEC 60335-2-24:2010) Not applicable if the lamps can only be replaced by the manufacturer, together with a part of the appliance ((IEC 60335-2-24:2010 + A1:2012)	No lamp	N/A
	Total mass of the refrigerant (IEC 60335-2-24:2010)	32 g	P

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	For a single component refrigerant, at least one of the following (IEC 60335-2-24:2010):		—
	- the chemical name		N/A
	- the chemical formula		N/A
	- the refrigerant number		N/A
	For a blended refrigerant, at least one of the following (IEC 60335-2-24:2010):		—
	- 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	R-134a	P
	The chemical name or refrigerant number of the insulation blowing gas (IEC 60335-2-24:2010)		N/A
	Battery voltage for appliances which can be mains and battery operated (IEC 60335-2-24:2010)		N/A
	Max. power input for incorporated ice-maker, if greater than 100 W (IEC 60335-2-24:2010)		N/A
	Ice-makers shall be marked with the maximum permissible water level (IEC 60335-2-24:2010)		N/A
	Compression-type refrigerating systems appliance shall be marked with mass of the refrigerant for each separate refrigerant circuit (IEC 60335-2-24:2010)		N/A
	Compression-type appliances flammable which use refrigerants shall be marked the symbol Caution: risk of fire" (IEC 60335-2-24:2010)	No flammable gas	N/A
	Appliances employing R-744 in a transcritical refrigeration system shall be marked with the substance of the following: (IEC 60335-2-24:2010)		—
	Warning: System contains refrigerant under high pressure. Do not tamper with the system. It must be serviced by qualified persons only.		N/A
	Appliances employing R-744 in a transcritical refrigeration system shall be marked with symbol ISO 7000 – 1701 (2004-01). (IEC 60335-2-24:2010)	R-134a	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

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	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		P
	the power input is related to the arithmetic mean value of the rated voltage range		N/A
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		P
7.6	Correct symbols used		P
	Symbol IEC 60417-5005 (2002-10) Plus; positive polarity (IEC 60335-2-24:2010)		N/A
	Symbol IEC 60417-5006 (2002-10) Minus; negative polarity (IEC 60335-2-24:2010)		N/A
	Symbol ISO 7010 W021 Caution: risk of fire ((IEC 60335-2-24:2010 + A1:12)		N/A
	Symbol ISO 7000–1701 (2004-01) Pressure (IEC 60335-2-24:2010)		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	I/O mark on heater switch. Red/Blue coloured figure on Hot/Cold water dispensing tap	P
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		P
	See Note (IEC 60335-2-24:2010)		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
7.11	Indication for direction of adjustment of controls		N/A
7.12	Instructions for safe use provided		P
	This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.		P
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided		N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless		N/A
	it is a battery-operated appliance, the battery being charged outside the appliance		N/A
	Instructions for refrigerating appliances and ice-makers for camping or similar use include the substance of the following (IEC 60335-2-24:2010):		—
	- suitable for camping use	Not for outdoor 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 60335-2-24:2010)	No flammable refrigerants	N/A
	For compression-type appliances that use flammable refrigerants shall additionally include the substance of the warnings listed below: (IEC 60335-2-24:2010)		N/A
	- WARNING – Keep ventilation openings, in the appliance enclosure or in the built-in structure, clear of obstruction (IEC 60335-2-24:2010)		N/A
	- WARNING – Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer (IEC 60335-2-24:2010)		N/A
	- WARNING – Do not damage the refrigerant circuit (IEC 60335-2-24:2010)		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	- 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 60335-2-24:2010)		N/A
	Appliances which use flammable insulation blowing gases, instructions shall include information regarding disposal of the appliance (IEC 60335-2-24:2010)		N/A
	Instructions for ice-cream appliances shall include ingredients and max. quantity of mixtures that can be used in the appliance (IEC 60335-2-24:2010)		N/A
	The instructions shall state the substance of the following (IEC 60335-2-24:2010)		—
	Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.		N/A
	If symbol ISO 7000–1701 (2004-01) is used, its meaning shall be explained.		N/A
	The instructions shall include the substance of the following (IEC 60335-2-24:2010)		—
	This appliance is intended to be used in household and similar applications (list)		N/A
7.12.1	Sufficient details for installation supplied		P
	The method for replacing illuminating lamps included (IEC 60335-2-24:2010), if the lamps can be replaced by the user (A1:12)		N/A
	Appliances designed for incorporating ice-makers, the types of ice-makers (IEC 60335-2-24:2010)		N/A
	Information on the installation of incorporated ice-makers as optional accessories (IEC 60335-2-24:2010)		N/A
	Incorporated ice-makers installed only by the manufacturer or its service agent (IEC 60335-2-24:2010)		N/A
	Ice-makers intended to be connected to the water supply (IEC 60335-2-24:2010):		—
	WARNING: connect to potable water supply only (IEC 60335-2-24:2010)		N/A
	Instructions for fixed appliances shall include the following warning (IEC 60335-2-24:2010):		—
	WARNING: To avoid a hazard due to instability of the appliance, it must be fixed in accordance with the instructions (IEC 60335-2-24:2010)		N/A
	In appliances employing R-744 in a transcritical refrigeration system the instructions shall include the substance of the following (IEC 60335-2-24:2010) :		—

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	WARNING: The refrigeration system is under high pressure. Do not tamper with it. Contact qualified service personal before disposal.		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 and fixing		N/A
	- minimum distances between parts and surrounding structure		N/A
	- minimum dimensions of ventilating openings and arrangement		N/A
	- connection to supply mains and interconnection of separate components		N/A
	- necessity to allow disconnection of the appliance from the supply after installation, unless the appliance incorporates a switch complying with 24.3		N/A
	Also applicable to fixed appliances (IEC 60335-2-24:2010)		N/A
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N/A
	Replacement cord instructions, type Y attachment		P
	Replacement cord instructions, type Z attachment		N/A
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		N/A
7.12.7	The instructions for fixed appliances shall state how the appliance is to be fixed to its support		N/A
7.12.8	Instructions for appliances connected to the water mains:		—
	- max. inlet water pressure (Pa)..... .....:	392 kPa (when UF Filter System), 687 kPa (when RO Filter System)	P

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	- min. inlet water pressure, if necessary (Pa) .....:	Not required.	N/A
	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	English	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
	The height of the triangle in the symbol "Caution: risk of fire" shall be at least 15 mm (IEC 60335-2-24:2010)		N/A
	The height of the letters used for the marking of the type of flammable blowing insulation gas shall be at least 40 mm (A1:12)		N/A
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
	Max. rated input of lamps discernible (IEC 60335-2-24:2010 + A1:12)	No lamps	N/A
	Compression-type appliances the marking of the type of flammable refrigerant and of the flammable insulation blowing gas, as well as the symbol Caution: risk of fire, shall be visible when gaining access to the motor-compressors (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	The positive terminal shall be indicated by symbol IEC 60417-5005 (2002-10) and the negative terminal by symbol IEC 60417-5006 (2002-10). (IEC 60335-2-24:2010)		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 60335-2-24:2010)		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	Not visible	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
	- for voltages having a peak value over 15 kV, the energy in the discharge shall not exceed 350 mJ.		N/A
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		—

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Clause	Requirement – Test	Result – Remark	Verdict
	- built-in appliances		N/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 (IEC 60335-2-24:2010)		—
10	**POWER INPUT AND CURRENT**		
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in Table 1	(see appended table)	P
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless the rated power input is related to the arithmetic mean value		P
	Appliances being operated under normal operation, user adjustable temperature controls are set to give the lowest temperature (IEC 60335-2-24:2010)		N/A
	The power input stabilized, steady conditions established (IEC 60335-2-24:2010)		P
	A period between the making and the breaking of the temperature control, or highest and lowest values of power input measured excluding starting power input but including the power input of the incorporated ice-maker, if any (IEC 60335-2-24:2010)		N/A
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)	P
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless the rated current is related to the arithmetic mean value of the range		P
	The appliance being operated under normal operation, user adjustable temperature controls are set to give the lowest temperature (IEC 60335-2-24:2010)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	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 30 s. Starting after 1 min (IEC 60335-2-24:2010)		P
10.101	The power input of the defrosting system, deviation shown in Table 1 (IEC 60335-2-24:2010)		N/A
10.102	The power input of any heating system, deviation shown in Table 1 (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A
	The winding temperatures of motor-compressors conforming IEC 60335-2-34 (incl. Annex AA) are not measured (IEC 60335-2-24:2010)		P
11.2	Placing and mounting of appliance as described (IEC 60335-2-24:2010)		P
	- according to instructions for installation		N/A
	- in a test corner		P
	- test enclosure		N/A
11.3	Temperature rises, other than of windings, determined by thermocouples		P
	Temperature rises of windings determined by resistance method, unless		N/A
	the windings makes it difficult to make the necessary connections		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……..:	206.8 V and 254.4 V	P
11.7	The appliances is operated until steady conditions are established (IEC 60335-2-24:2010)	Until be steady condition	P
11.8	Temperature rises not exceeding values in Table 3	(see appended tables)	P
	During the test protective devices do not operate (IEC 60335-2-24:2010)		P

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Clause	Requirement – Test	Result – Remark	Verdict
	During the test sealing compound doesn't flow out (IEC 60335-2-24:2010)		P
	During the test temperatures are monitored continuously (IEC 60335-2-24:2010)		P
	For (SN) and (N) class, the temperature rises not exceeding values in Table 3 (IEC 60335-2-24:2010)		P
	For (ST) and (T) class, the temperature rises not exceeding values in Table 3 reduced by 7 K (IEC 60335-2-24:2010)		N/A
	For motor-compressors not conforming to IEC 60335-2-34 (incl. its Annex AA), the temperatures of (IEC 60335-2-24:2010)		—
	- housings of motor-compressors and		N/A
	- windings of motor-compressors		N/A
	shall not exceed the values given in Table 101		N/A
	For motor-compressors conforming to IEC 60335-2-34 (including its Annex AA), the temperatures are not measured (IEC 60335-2-24:2010)		N/A
	The temperature rise of the external enclosure of motor-operated appliances not applicable for: (IEC 60335-2-24:2010)		—
	- built-in appliances		N/A
	- other appliances (distance from a wall $\leq$ 75 mm)		N/A
	- max. temperature rises specified in Table 101		N/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 60335-2-24:2010)		N/A
11.101	If the temperatures exceed the limits, the test is carried out again (IEC 60335-2-24:2010):		—
	- winding temperatures at the end of a running cycle not higher than the limits given in Table 101		N/A
11.102	Any defrosting system, temperature rises don't exceed the values given in 11.8 (IEC 60335-2-24:2010)		N/A
	Manual defrosting (IEC 60335-2-24:2010)		N/A
	Automatic defrosting (IEC 60335-2-24:2010)		N/A
11.103	Heating systems, other than defrosting, temperature rises don't exceed the values given in 11.8 (IEC 60335-2-24:2010)		P

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Clause	Requirement – Test	Result – Remark	Verdict
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 (W) .....:		N/A
	Motor-operated appliances and combined appliances supplied at 1.06 times rated voltage (V) .....:	254.4 V	P
	Protective impedance and radio interference filters disconnected before carrying out the tests	No such parts	N/A
	The test of 13.2 does not apply to battery circuit (IEC 60335-2-24:2010)		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 60335-2-24:2010)	(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 60335-2-24:2010)		N/A
14	**TRANSIENT OVERVOLTAGES**		
	Appliances withstand the transient over-voltages to which they may be subjected		N/A
	Clearances having a value less than specified in Table 16 subjected to an impulse voltage test, the test voltage specified in Table 6		N/A
	No flashover during the test, unless		N/A
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
15	**MOISTURE RESISTANCE**		
15.1	Enclosure provides the degree of moisture protection according to classification of the appliance		P
	Compliance checked as specified in 15.1.1, taking into account 15.1.2, followed by the electric strength test of 16.3		P
	No trace of water on insulation which can result in a reduction of clearances and creepage distances below values specified in clause 29		P
15.1.1	Appliances, other than IPX0, subjected to tests as specified in IEC 60529:	IPX1	P
	Water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains are subjected to the test specified for IPX7 appliances.	No such part	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
	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 normally fixed to a ceiling are mounted underneath a horizontal unperforated support, the pivot axis of the oscillating tube located at the level of the underside of the support, and		N/A
	for IPX4 appliances, the movement of the tube is limited to two times 90° from the vertical for a period of 5 min		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Appliances with type X attachment fitted with a flexible cord as described		N/A
	Detachable parts subjected to the relevant treatment with the main part		P
	However, if a part has to be removed for user maintenance and a tool is needed, this part is not removed		P
15.2	Spillage of liquid does not affect the electrical insulation		P
	Appliances with type X attachment fitted with a flexible cord as described	Type Y	N/A
	Appliances incorporating an appliance inlet tested with or without an connector, whichever is most unfavourable	No appliance inlet	N/A
	Detachable parts removed		P
	Overfilling test with additional amount of water, over a period of 1 min (l):	0.75 (l) tested on water drip tray	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 60335-2-24:2010)		N/A
15.3	Appliances proof against humid conditions		P
	Humidity test for 48 h in a humidity cabinet	30 °C, 93% R.H.	P
	The appliance withstands the tests of clause 16		P
15.101	Spillage of liquid from inside does not affect their electrical insulation (IEC 60335-2-24:2010)		N/A
	The relevant tests of 15.102, 15.103 and 15.104. are carried out (IEC 60335-2-24:2010)		N/A
15.102	The apparatus shown in figure 101 is filled with water containing 1 % NaCl and 0.6 % of acid rinsing agent (IEC 60335-2-24:2010)		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 60335-2-24:2010)		P
	Test with 0.5 l water containing 1 % NaCl and 0.6 % of acid rinsing agent over the top of the appliance (IEC 60335-2-24:2010)		P

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Clause	Requirement – Test	Result – Remark	Verdict
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 60335-2-24:2010)		N/A
15.105	Operation of a defrosting system does not affect the electrical insulation of defrost heating elements (IEC 60335-2-24:2010)		N/A
	If the water is in contact with the defrost heating element or its insulation, test of 22.102 is carried out (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A
16.2	Single-phase appliances: test voltage 1.06 times rated voltage (V)	254.4 V	P
	Three-phase appliances: test voltage 1.06 times rated voltage divided by √3 (V)		N/A
	Leakage current measurements	(see appended table)	P
	Limits for class 0I appliances and the various types of class I appliances (IEC 60335-2-24:2010)	(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 60335-2-24:2010)		N/A
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	No such parts	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

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Clause	Requirement – Test	Result – Remark	Verdict
	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 (IEC 60335-2-24:2010)		—
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
	Appliances incorporating electronic circuits subjected to the tests of 19.11 and 19.12, as applicable		P
	Appliances incorporating contactors or relays subjected to the test of 19.14, being carried out before the tests of 19.11		N/A
	Appliances incorporating voltage selector switches subjected to the test of 19.15		N/A
	Subclauses 19.2 and 19.3 do not apply to heating systems (IEC 60335-2-24:2010)	See Attachment 1	P
	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 (IEC 60335-2-24:2010)		N/A
	Fan motors of ice-cream appliances are not subject to the locked-rotor test specified in Annex AA (IEC 60335-2-24:2010)		N/A
19.2	Test of appliances with heating elements with restricted heat dissipation, power input of 0.85 times rated power input	199.2 V, 382.5 W	P
19.3	Test of 19.2 repeated, power input of 1.24 times rated power input	265.2 V, 644.8 W	P
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
	The test repeated with reversed polarity and the other end of the heating element connected to the sheath		P

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Clause	Requirement – Test	Result – Remark	Verdict
	The test is not carried out on appliances intended to be permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during the test of 19.4		N/A
19.6	Appliances with PTC heating elements tested at rated voltage, establishing steady conditions	No PTC heating elements	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, capacitors open-circuited one at a time unless they are of class P2 of IEC 60252-1		N/A
	The test is repeated with the capacitors short-circuited one at a time, unless they are of class P2 of IEC 60252-1		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 60335-2-24:2010)		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 60335-2-24:2010)		N/A
19.9	Not applicable (IEC 60335-2-24:2010)		—
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

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Clause	Requirement – Test	Result – Remark	Verdict
	Appliances incorporating an electronic circuit that relies upon a programmable component to function correctly, subjected to the test of 19.11.4.8, unless restarting does not result in a hazard	No programmable components	N/A
	Appliances having a device 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		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		P
	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 microprocessors and integrated circuits		N/A
	g) failure of an electronic power switching device		N/A
	Low-power circuits are short circuited		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	No protective electronic circuit	N/A
19.11.4	Appliances having a device with an off position obtained by electronic disconnection, or a device that can be placed in the stand-by mode, are 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		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Surge protective devices disconnected, unless they incorporate spark gaps		N/A
19.11.4.1	The appliance is subjected to electrostatic discharges in accordance with IEC 61000-4-2, test level 4		N/A
19.11.4.2	The appliance is subjected to radiated fields in accordance with IEC 61000-4-3, test level 3		N/A
19.11.4.3	The appliance is subjected to fast transient bursts in accordance with IEC 61000-4-4, test level 3 or 4 as specified		N/A
19.11.4.4	The power supply terminals of the appliance subjected to voltage surges in accordance with IEC 61000-4-5, test level 3 or 4 as specified		N/A
19.11.4.5	The appliance is subjected to injected currents in accordance with IEC 61000-4-6, test level 3		N/A
19.11.4.6	Appliances having a rated current not exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-11		N/A
	Appliances having a rated current exceeding 16 A are subjected to the Class 3 voltage dips and interruptions in accordance with IEC 61000-4-34		N/A
19.11.4.7	The appliance is subjected to mains signals in accordance with IEC 61000-4-13, test level class 2		N/A
19.11.4.8	The appliance is supplied at rated voltage and operated under normal operation. After 60 s the power supply is reduced to a level such that the appliance ceases to respond or parts controlled by the programmable component cease to operate		N/A
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):	Measured: 25 A, Rated: 8 A	P
19.13	During the tests the appliance does not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts		P
	Temperature rises not exceeding the values shown in Table 9	(see appended table)	P
	After the tests, and when the appliance has cooled to approximately room temperature, compliance with clause 8 shall not be impaired and the appliance shall comply with 20.2 if it can still be operated		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	1000 V	P
	- supplementary insulation		N/A
	- reinforced insulation	3 000 V	P
	Temperature rises not exceeding the values shown in Table 7 or 150°C for housing of motor-compressors (IEC 60335-2-24:2010)		P
	The appliance does not undergo a dangerous malfunction, and no failure of protective electronic circuits, if the appliance is still operable		P
	Appliances tested with an electronic switch in the off position, or in the stand-by mode, not become operational, or if they become operational, not result in a dangerous malfunction during or after the tests of 19.11.4		N/A
	Conditions for interlocks of lids or doors		N/A
	The temperature of the housing of motor-compressors other than those which comply with IEC 60335-2-34 is determined at the end of the test period and shall not exceed 150°C (IEC 60335-2-24:2010)		N/A
19.14	Appliances operated under the conditions of clause 11, any contactor or relay contact operating under the conditions of clause 11 being short-circuited	No such parts	N/A
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied	No such parts	N/A
19.101	Heating systems dimensioned and located properly and comply with 19.13 during and after the test (IEC 60335-2-24:2010)		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 60335-2-24:2010)		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 60335-2-24:2010)		N/A
19.104	Illuminating equipment shall not cause a fire hazard under abnormal operating conditions (IEC 60335-2-24:2010)		N/A
	Test as specified (IEC 60335-2-24:2010)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	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 until temperature stabilisation of the measured parts (IEC 60335-2-24:2010)		N/A
	During and after the test, the appliance shall comply with 19.13 (IEC 60335-2-24:2010)		N/A
	The temperature of ballast windings and their associated wiring shall not exceed the values specified in 12.5 of IEC 60598-1 when measured under the conditions specified (IEC 60335-2-24:2010)		N/A
19.105	Appliances intended for battery operation properly constructed and comply with 19.13 during and after the test (IEC 60335-2-24:2010)		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°	Not overturned	P
	Possible heating test in overturned position; temperature rise does not exceed values shown in Table 9		N/A
	Ice-cream appliances shall have adequate stability (IEC 60335-2-24:2010)		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		P
	Protective enclosures, guards and similar parts are non-detachable		P
	Adequate mechanical strength and fixing of protective enclosures		P
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard, by unexpected reclosure		P
	Not possible to touch dangerous moving parts with test probe		P
20.101	Refrigeration appliances and ice-makers shall have adequate stability. Tests according to 20.102, 20.103 and 20.104 (IEC 60335-2-24:2010)	No doors, no drawers	P

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Clause	Requirement – Test	Result – Remark	Verdict
	This requirement does not apply to built-in appliances (IEC 60335-2-24:2010)		N/A
20.102	Tests with weights as described		N/A
	Test with door opened to 90° (IEC 60335-2-24:2010)		N/A
	Test with door opened to 180° or to the limit of door stop (IEC 60335-2-24:2010)		N/A
20.103	Test with one of the drawers is pulled to the most onerous out position (IEC 60335-2-24:2010)		N/A
	Test with two drawers are pulled to the most onerous out position (IEC 60335-2-24:2010)		N/A
20.104	Test with sliding drawers accessible without opening a door (IEC 60335-2-24:2010)		N/A
	Doors shelves are loaded as specified in 20.102 and opened 90° (IEC 60335-2-24:2010)		N/A
21	**MECHANICAL STRENGTH**		
21.1	Appliance has adequate mechanical strength and is constructed as to withstand rough handling		P
	Checked by applying 3 blows to every point of the enclosure like to be weak, in accordance with test Ehb of IEC 60068-2-75, spring hammer test, with an impact energy of 0.5 J		P
	The appliance shows no damage impairing compliance with this standard, and compliance with 8.1, 15.1 and clause 29 not impaired		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 60335-2-24:2010)		N/A
21.2	Accessible parts of solid insulation shall have sufficient strength to prevent Penetration by sharp implements		N/A
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
21.101	Appliances for camping or similar use tested against the effects of dropping and vibration as specified (IEC 60335-2-24:2010)		N/A
21.102	Lamps are protected against mechanical shocks (IEC 60335-2-24:2010)		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, or		P
	- a switch complying with 24.3, or		N/A
	- a statement in the instruction sheet that a disconnection incorporated in the fixed wiring is to be provided, or		N/A
	- an appliance inlet		N/A
	Single-pole switches and single-pole protective devices that disconnect heating elements from the supply mains in single-phase, permanently connected class 0I appliances and class I appliances shall be connected to the phase conductor		N/A
22.3	Appliance provided with pins: no undue strain on socket-outlets		N/A
	Applied torque not exceeding 0.25 Nm		N/A
	Pull force of 50 N 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 1 mm		N/A
	Each pin subjected to a torque of 0.4 Nm; 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		N/A
22.5	No risk of electric shock when touching the pins of the plug, for appliances having a capacitor with rated capacitance exceeding 0.1 μF, the appliance being disconnected from the supply at the instant of voltage peak		P
	Voltage not exceeding 34 V	Measured: max. 0.8 V	P

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Clause	Requirement – Test	Result – Remark	Verdict
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 60335-2-24:2010)		N/A
	Fluids don't flow along parts such as stems and tubes of thermostats (IEC 60335-2-24:2010)		N/A
22.7	Compression-type appliances, including protective enclosures of a protected cooling system, using flammable refrigerants shall withstand (IEC 60335-2-24:2010)		—
	- 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, unless the substance has adequate insulating properties		P
22.10	Not possible to reset voltage-maintained non-self-resetting thermal cut-outs by the operation of an automatic switching device incorporated within the appliance, if:		N/A
	- a non-self-resetting thermal cut-out is required by the standard, and		N/A
	- a voltage maintained non-self-resetting thermal cut-out is used to meet it		N/A
	Non-self-resetting thermal motor protectors have a trip-free action, unless		N/A
	they are voltage maintained		N/A
	Reset buttons of non-self-resetting controls so located or protected that accidental resetting is unlikely		N/A
22.11	Reliable fixing of non-detachable parts that provide the necessary degree of protection against electric shock, moisture or contact with moving parts		P
	Obvious locked position of snap-in devices used for fixing such parts		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	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		N/A
22.12	Handles, knobs etc. fixed in a reliable manner		P
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		P
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		P
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N/A
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		P
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 6’000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1’000 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
	Not applicable to refrigeration appliances and ice-makers (IEC 60335-2-24:2010)		—
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		P
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless impregnated	Not used	P

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Clause	Requirement – Test	Result – Remark	Verdict
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		N/A
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		P
22.32	Supplementary and reinforced insulation 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

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Clause	Requirement – Test	Result – Remark	Verdict
	Insulating material in which heating conductors are embedded is considered to be basic insulation and not reinforced insulation		P
	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		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, unless		P
	the reinforced insulation consists of at least 3 layers		N/A
	For class II constructions, conductive liquids which are in contact with live parts, not in direct contact with reinforced insulation		P
	the reinforced insulation consists of at least 3 layers		N/A
	Air layer not used as basic or supplementary insulation		P
	Heating conductors having only one layer of insulation are not in direct contact with water or ice during normal use (IEC 60335-2-24:2010)		P
	NOTE : Frozen water is regarded as a conducting liquid (IEC 60335-2-24:2010)		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	If these handles, levers and knobs are of metal and if their shafts or fixings are likely to become live in the event of a failure of basic insulation, they shall be adequately covered by insulating material or their accessible parts shall be 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

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Clause	Requirement – Test	Result – Remark	Verdict
22.37	Capacitors in Class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N/A
	the capacitors comply with 22.42		N/A
22.38	Capacitors not connected between the contacts of a thermal cut-out		P
22.39	Lamp holders used only for the connection of lamps		N/A
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N/A
	If the appliance cannot operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation being fitted with a switch for stopping the operation. The actuating member of the switch being easily visible and accessible		N/A
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		N/A
	Values specified in 8.1.4 not exceeded if any one of the components are short-circuited or open-circuited		N/A
	Resistors according 14.1 a) of IEC 60065; Y-Capacitors according IEC 60384-14		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 shall not have an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.4 due to deformation as a result of an external force applied to the enclosure		P
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in Table R.1		N/A
	Software that contains measures to control the fault/error conditions specified in Table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N/A
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use	1 374 kPa (687 kPa x 2)	P
	No leakage from any part, including any inlet water hose		P
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water		P
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless the appliance switches off automatically or can operate continuously without hazard		N/A
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		N/A
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode There is a visual indication showing that the appliance is adjusted for remote operation		N/A
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold		N/A
22.101	Lampholders properly fixed (IEC 60335-2-24:2010)		N/A
	NOTE: Normal use includes replacement of lamps (IEC 60335-2-24:2010)		N/A
	Test with torque of (IEC 60335-2-24:2010):		N/A
	Lampholders for a fluorescent lamp shall comply with the test of 4.4.4 i) in IEC 60598-1 (IEC 60335-2-24:2010)		N/A
22.102	Insulated wire heaters and their joints protected against entry of water (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
22.103	Appliances employing a transcritical refrigeration system shall in the high pressure side of the refrigeration system include a pressure relief device on the compressor or between the compressor and the gas cooler. There shall be no shut off devices or other components except piping between the compressor and the pressure relief device, which could introduce a pressure drop. (IEC 60335-2-24:2010)		N/A
	Pressure relief device installed as described (IEC 60335-2-24:2010)		N/A
	Test of pressure relief device as described (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A
	The test is carried out separately with each combination of control devices (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A
	It is not possible to touch live parts when making the connections to the battery (IEC 60335-2-24:2010)		N/A
	Specified for double insulation or reinforced insulation (IEC 60335-2-24:2010)		N/A
22.106	The mass of refrigerant (flammable refrigerant) shall not exceed 150 g (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A
22.107.1	A leakage is simulated at the most critical point of the cooling system (method as specified) (IEC 60335-2-24:2010)		N/A
	Measured as specified		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 60335-2-24:2010)		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
22.107.2	All accessible surfaces of protected cooling system components, are scratched using the tool whose tip is shown in figure 102 (IEC 60335-2-24:2010)		N/A
	The tool is applied using the following parameters (IEC 60335-2-24:2010):		—
	- 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 60335-2-24:2010)		N/A
22.107.3	If aluminium having a purity of less than 99.5 % according to ISO 209 is used in a protected cooling system that is embedded in thermal insulation, a sample of the cooling system is subjected to the salt mist test of IEC 60068-2-11 for a test duration of 48 h. (IEC 60335-2-24:2010)		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 (IEC 60335-2-24:2010)		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 (IEC 60335-2-24:2010)		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 60335-2-24:2010)		N/A
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 (IEC 60335-2-24:2010)		N/A
	Unless the electrical components comply least with the requirements in Annex CC for group IIA gases or the refrigerant used (IEC 60335-2-24:2010)		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Test: A quantity equal to 50 % ± 1.5 g of the refrigerant charge is injected into the considered area (IEC 60335-2-24:2010)		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 60335-2-24:2010)		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 60335-2-24:2010)		N/A
22.111	In compression-type appliances which use flammable refrigerant: Prevention from galvanic coupling in contact points between uncoated aluminium and copper pipes (or similar metals) by positive means such as the use of insulated sleeving or spacers. (IEC 60335-2-24:2010)		N/A
22.112	Doors and lids of compartments in appliances with a free space shall be capable of being opened from the inside (IEC 60335-2-24:2010)		N/A
	The door shall open before the force exceeds 70 N (IEC 60335-2-24:2010)		N/A
22.113	Drawers which are only accessible after openings a door or lid shall not contain a free space (IEC 60335-2-24:2010)		N/A
22.114	Drawers which are accessible without 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 60335-2-24:2010)		N/A
	The drawers shall open before the force exceeds 70 N (IEC 60335-2-24:2010)		N/A
22.115	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 60335-2-24:2010)		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 60335-2-24:2010)		N/A
22.116	Accessible glass panels with an area having any two orthogonal dimensions exceeding 75 mm shall be either made from glass that shatters into small pieces when broken or be made from glass that has enhanced mechanical strength. (IEC 60335-2-24:2010)		N/A
	Tested as described – small pieces (IEC 60335-2-24:2010)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Tested as described – glass don't brooks or cracks (IEC 60335-2-24:2010)		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		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, 1'000 V between live parts and accessible metal parts		N/A
	Open-coil springs not used. NOTE : It does not apply to external conductors (IEC 60335-2-24:2010)		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 2'000 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 clamping at both ends, or be such that it can only be removed by breaking or cutting		N/A
23.7	The colour combination green/yellow used only for earthing conductors		P

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Clause	Requirement – Test	Result – Remark	Verdict
23.8	Aluminium wires not used for internal wiring		P
23.9	No lead-tin soldering of stranded conductors where they are subject to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N/A
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		N/A
24	**COMPONENTS**		
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components	(see appendix components)	P
	If components have not been tested and found to comply with relevant IEC standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		N/A
	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
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard		N/A
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		P
	Motor-compressors are not required to be separately tested according to (IEC 60335-2-34) nor are they required to meet the requirements of (IEC 60335-2-34) if they meet the requirements of this standard (IEC 60335-2-24:2010)		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

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Clause	Requirement – Test	Result – Remark	Verdict
	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 60335-2-24:2010):		—
	- quick-freeze switches:		N/A
	- manual and semi-automatic defrost switches		N/A
	- door switches		N/A
	- on/off switches		N/A
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N/A
	If the switch only operates a motor staring relay complying with IEC 60730-2-10 with the number of cycles of a least 10’000 as specified, the complete switching system need not be tested		N/A
24.1.4	Automatic controls complying with IEC 60730-1 with relevant part 2		P
	The number of cycles of operation being:		—
	- thermostats:	10’000	N/A
	- temperature limiters:	1’000	N/A
	- self-resetting thermal cut-outs:	300	P
	- voltage maintained non-self-resetting thermal cut-outs:	1’000	N/A
	- other non-self-resetting thermal cut-outs:	30	P
	- timers:	3’000	N/A
	- energy regulators:	10’000	N/A
	- self-resetting thermal cut-outs which may influence the test results of 19.101 and which are not short-circuited during this test: (IEC 60335-2-24:2010)	100'000	N/A
	- thermostats which control the motor-compressor: (IEC 60335-2-24:2010)	100'000	P
	- motor-compressor starting relays: (IEC 60335-2-24:2010)	100'000	P
	- automatic thermal motor-protectors for motor-compressors of the hermetic and semi-hermetic type: (IEC 60335-2-24:2010)	the number of operations during the locked-rotor test (but minimum 2’000)	P
	- manual reset thermal motor-protectors for motor-compressors of the hermetic and semi-hermetic type: 50 (IEC 60335-2-24:2010)	50	N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	- other automatic thermal motor-protectors: except for fan-motors (IEC 60335-2-24:2010)	2'000	N/A
	- other manual test thermal motor protectors: (IEC 60335-2-24:2010)	30	N/A
	- for pressure relief devices of the bursting disc type, three separate samples of the appropriate parts of the refrigeration system are tested and the bursting disc shall operate in the same way for each sample tested (IEC 60335-2-24:2010)	1	N/A
	- electrical pressure relief devices for automatic operation: (IEC 60335-2-24:2010)	30'000	N/A
	- electrical pressure relief devices for manual reset: (IEC 60335-2-24:2010)	300	N/A
	Electrical pressure relief devices comply with IEC 60730-2-6 and with listed additional requirements (IEC 60335-2-24:2010)		N/A
	Requirement for mechanical pressure relief devices (IEC 60335-2-24:2010)		N/A
	Testing of pressure relief devices of the bursting disc type with the appliance if not certified (IEC 60335-2-24:2010). Marking of devices as mentioned (A1:12)		N/A
	The number of cycles for controls operating during clause 11 need not be declared, if the appliance meets the requirements of this standard when they are short-circuited		N/A
	Thermal motor protectors are tested in combination with their motor under the conditions specified in Annex D		N/A
	For water valves containing live parts and that are incorporated in external hoses for connection of an appliance to the water mains, the degree of protection declared for subclause 6.5.2 of IEC 60730-2-8 is IPX7		N/A
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
	The relevant standard for interconnection couplers is IEC 60320-2-2		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

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Clause	Requirement – Test	Result – Remark	Verdict
24.1.7	If the remote operation of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151		N/A
24.1.8	The relevant standard for thermal links is IEC 60691. Thermal links that do not comply with IEC 60691 are considered to be an intentionally weak part for the purposes of clause 19		N/A
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance They are also tested in accordance with clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance		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 60335-2-24:2010):		—
	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		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
	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 60335-2-24:2010)		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
24.6	Working voltage of motors connected to the supply mains and having basic insulation that is inadequate for the rated voltage of the appliance, not exceeding 42 V		N/A
	In addition, the motors are complying with the requirements of Annex I		N/A
24.7	Detachable hose-sets for connection of appliances to the water mains, complying with IEC 61770 and supplied with the appliance		P
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N/A
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure		N/A
	One or more of the following conditions are to be met:		—
	- class P2 according to IEC 60252-1		N/A
	- housed within a metallic or ceramic enclosure		N/A
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N/A
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of Annex E		N/A
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N/A
24.101	Lampholders shall be of the insulated type (IEC 60335-2-24:2010)		N/A
24.102	The discharge capacity of the pressure relief device shall be such that it is able to release an adequate amount of refrigerant so that the pressure during the release of the refrigerant does not increase beyond the pressure setting of the pressure relief device even if the compressor is operating (IEC 60335-2-24:2010)		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 60335-2-34 are not subjects to the following tests (IEC 60335-2-24:2010)		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

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	- 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 1'250 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 60335-2-24:2010)		N/A
	- the appliance consists of two or more completely independent units built together in one enclosure (IEC 60335-2-24:2010)		N/A
	- the relevant circuits are adequately insulated from each other (IEC 60335-2-24:2010)		N/A
	Appliances which can be both mains and battery operated shall be provided with a separate means for connection (IEC 60335-2-24:2010)		N/A
25.3	Appliance intended to be permanently connected to fixed wiring provided with one of the following means for connection to the supply mains:		—
	- a set of terminals allowing the connection of a flexible cord		N/A
	- a fitted supply cord		N/A
	- a set of supply leads accommodated in a suitable compartment		N/A
	- a set of terminals for the connection of cables of fixed wiring, cross-sectional areas specified in 26.6, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
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 clause 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
	For multi-phase appliances supplied with a supply cord and that are intended to be permanently connected to fixed wiring, the supply cord is assembled to the appliance by type Y attachment		N/A
25.6	Plugs fitted with only one flexible cord		P
25.7	Supply cord shall be one of the following types:		—
	- Rubber sheathed (60245 IEC 53)		N/A
	- Polychloroprene sheathed (60245 IEC 57)		N/A
	- Cross-linked polyvinyl chloride sheathed. (60245 IEC 88)		N/A
	Appliance supply cord other than SELV power supply not lighter than (IEC 60335-2-24:2010):		—
	- light polyvinyl chloride sheathed cord (60227 IEC 52)		N/A
	Supply cords for class III appliances adequately insulated (test as described)		N/A
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N/A
25.8	Nominal cross-sectional area of supply cords according to Table 11; rated current (A); cross-sectional area (mm^2) ..... :	3.2 A, 0.75 mm^2	P
25.9	Supply cord not in contact with sharp points or edges		P
25.10	Supply cord of class I appliances have a green/yellow core for earthing		P
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		P
25.13	Inlet openings so constructed as to prevent damage to the supply cord		P
	If the enclosure at the inlet opening is not of insulating 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 the appliance is		N/A
	class 0, or class III appliance not containing live parts		N/A
	Does not apply to flexible leads used to connected an appliance to a SELV power supply (IEC 60335-2-24:2010)		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
	- broken strands piercing the insulation and becoming accessible		N/A
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord, values shown in Table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm) .....:	20 kg, 100 N, 0.35 Nm	P

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Cord not damaged and max. 2 mm displacement of the cord		P
25.16	Cord anchorages for type X attachments constructed and located so that:		—
	- replacement of the cord is easily possible	Type Y	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
	so constructed that the cord can only be fitted with the aid of a tool		N/A
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

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Clause	Requirement – Test	Result – Remark	Verdict
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 (not applicable if complying with IEC 60320-1)		N/A
	- connector can be inserted without difficulty		N/A
	- the appliance is not supported by the connector		N/A
	- 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 60335-2-24:2010)		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/TR 60083		N/A
25.101	Appliances which can be battery operated shall have suitable means for connection of the battery (IEC 60335-2-24:2010)		N/A
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 60335-2-34 (IEC 60335-2-24:2010)		N/A
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts		N/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		N/A
26.2	Appliances with type X attachment and appliances for the connection of cables to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless 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, unless		N/A
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N/A
26.3	Terminals for type X attachment and for connection 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 fixed so that when the clamping means is tightened or loosened:		—
	- 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 is checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified.		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

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Clause	Requirement – Test	Result – Remark	Verdict
26.5	Terminals for type X attachment so located or shielded that if a wire of a stranded conductor escapes, no risk of accidental connection to other parts that result in a hazard		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 (mm^2)……..:		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
	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 60335-2-24:2010)		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
27	**PROVISION FOR EARTHING**		
	Compliance is not checked on parts related to motor-compressors if the motor-compressor complies with IEC 60335-2-34 (IEC 60335-2-24:2010)		N/A
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 mm^2, and		N/A
	do not provide earthing continuity between different parts of the appliance and		N/A
	conductors cannot be loosened without the aid of a tool		N/A
27.3	For a detachable part having an earth connection and being plugged into another part of the appliance, the earth connection is made before and separated after current-carrying connections when removing the part		N/A
	For appliances with supply cords, 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 parts of the earthing terminal and the copper of the earthing conductor or other metal		P
	Parts providing earthing continuity, other than parts of a metal frame or enclosure, have adequate resistance to corrosion		P
	If of steel, these parts provided with an electroplated coating with a thickness at least 5 µm		N/A
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		N/A
	In case of aluminium alloys precautions taken to avoid risk of corrosion		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
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	0.067 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
28	**SCREWS AND CONNECTIONS**		
	Compliance is not checked on parts related to motor-compressors if the motor-compressor complies with IEC 60335-2-34 (IEC 60335-2-24:2010)		N/A
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
	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

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		P
	This requirement does not apply to electrical connections in circuits of appliances for which:		—
	- 30.2.2 is applicable and that carry a current not exceeding 0.5 A		N/A
	- 30.2.3 is applicable and that carry a current not exceeding 0.2 A		N/A
28.3	Space-threaded (sheet metal) screws only used for electrical connections if they clamp the parts together		N/A
	Thread-cutting (self-tapping) screws and thread rolling screws shall only be used for electrical connections if they generate a full form standard machine screw thread. However, thread-cutting (self-tapping) screws shall not be used if they are likely to be operated by the user or installer		N/A
	Thread-cutting, thread rolling and space-threaded screws may be used in connections providing earthing continuity provided it is not necessary to disturb the connection		N/A
	At least two screws must be used for each connection providing earthing continuity unless the screw forms a thread having a length of at least half the diameter of the screw		P
28.4	Screws and nuts that make mechanical connection secured against loosening if they also make electrical connections or connections providing earthing continuity (except earthing screws if at least two)		P
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if subjected to torsion		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
29	**CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION**		
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on PCB to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), Annex J applies. Pollution degree 1 under type 1 protection. The spacing between the conductors is not less than the values specified in Table 1 of IEC 60664-3 for type 2 protection		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 for basic insulation and functional insulation they comply with the impulse voltage test of clause 14	(see appended table)	P
	However, if the construction is affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1’500 V and above are increased by 0.5 mm and the impulse voltage test is not applicable		P
	The impulse voltage test is not applicable when the microenvironment is pollution degree 3 or for basic insulation of class 0 appliances and class 0I appliances		N/A
	Appliances are in overvoltage category II		P
	Compliance is checked by inspection and measurements as specified		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	The values of Table 16, or the impulse voltage test of clause 14, are applicable		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		N/A
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in Table 16		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
29.1.4	Clearances for functional insulation are the largest values determined from:		—

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	- Table 16 based on the rated impulse voltage		P
	- Table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N/A
	If values of Table 16 are largest, the impulse voltage test of clause 14 may be applied instead, unless the microenvironment is pollution degree 3, or the distances can be affected by wear, distortion, movement of the parts or during assembly		N/A
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited	Between each terminals of LED indicator	P
	Lacquered conductors of windings considered to be bare conductors		N/A
	However, clearances at crossover points are not measured		N/A
	Clearance between surfaces of PTC heating elements may be reduced to 1 mm		N/A
29.1.5	Appliances having higher working voltages than rated voltage, clearances for basic insulation are the largest values determined from:		—
	- Table 16 based on the rated impulse voltage		N/A
	- Table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		N/A
	- clause 4 of IEC 60664-4, frequency exceeding 30 kHz		N/A
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1 or clause 4 of IEC 60664-4, the clearances of supplementary insulation are not less than those specified for basic insulation		N/A
	If clearances for basic insulation are selected from Table F.7a of IEC 60664-1, the clearances of reinforced insulation dimensioned as specified in Table F.7a are to withstand 160 % of the withstand voltage required for basic insulation		N/A
	If clearances for basic insulation are selected from clause 4 of IEC 60664-4, the clearances of reinforced insulation are twice the value required for basic insulation		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
	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		N/A
	Compliance is checked by inspection and measurements as specified		P
	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 60335-2-24:2010). N/A for functional insulation if working voltage< 50 V (IEC 60335-2-24:2010 + A1:12)	No condensation had been made during tests.	N/A
29.2.1	Creepage distances of basic insulation not less than specified in Table 17	(see appended table)	P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from Table 2 of IEC 60664-4, these values being used if exceeding the values in Table 17		N/A
	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, or		N/A
	Table 2 of IEC 60664-4, as applicable		N/A
29.2.3	Creepage distances of reinforced insulation at least double as specified for basic insulation in Table 17, or		P
	Table 2 of IEC 60664-4, as applicable		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
29.2.4	Creepage distances of functional insulation not less than specified in Table 18		P
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from Table 2 of IEC 60664-4, these values being used if exceeding the values in Table 18		N/A
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		P
29.3	Supplementary insulation and reinforced insulation shall have adequate thickness, or have a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked:		—
	- by measurement, in accordance with 29.3.1, or		P
	- by an electric strength test in accordance with 29.3.2, or		N/A
	- by an assessment of the thermal quality of the material combined with an electric strength test, in accordance with 29.3.3, and for accessible parts of reinforced insulation consisting of a single layer, by measurement in accordance with 29.3.4, or		N/A
	- as specified in subclause 6.3 of IEC 60664-4 for insulation that is subjected to any periodic voltage having a frequency exceeding 30 kHz		N/A
29.3.1	The thickness of the insulation shall be at least:		—
	- 1 mm for supplementary insulation; - 2 mm for reinforced insulation.	1 mm for the front of LED board (plastic enclosure)	P
29.3.2	Each layer of material shall withstand the electric strength test of 16.3 for supplementary insulation.		N/A
	2 layers minimum for supplementary insulation and 3 layers minimum for reinforced insulation		N/A
29.3.3	The insulation is subjected to the dry heat test Bb of IEC 60068-2-2, followed by		N/A
	the electric strength test of 16.3		N/A
	If the temperature rise during the tests of clause 19 does not exceed the value specified in Table 3, the test of IEC 60068-2-2 is not carried out		N/A
29.3.4	Thickness of accessible parts of reinforced insulation consisting of a single layer not less than specified in Table 19		N/A

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
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,		N/A
	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		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		P
	Parts of thermoplastic material providing supplementary or reinforced insulation, 25°C plus the maximum temperature rise determined during clause 19, if higher		N/A
	Not applied to parts of motor-compressor if complies with IEC 60335-2-34 (IEC 60335-2-24:2010)		N/A
	Accessible parts within the storage compartment 65°C (IEC 60335-2-24:2010)		N/A
30.2	Relevant parts of non-metallic material adequately resistant to ignition and spread of fire	(see appended table)	P
	Not applied to parts of motor-compressor if complies with IEC60335-2-34 with no ignition (IEC 60335-2-24:2010)		N/A
	parts having a mass not exceeding 0.5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		N/A
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		N/A
30.2.1	Glow-wire test of IEC 60695-2-11 at 550°C, unless		P
	the material is classified as having a GWFI according to IEC 60695-2-12 of at least 550°C, or		N/A
	the material is classified at least HB40 according to IEC 60695-11-10		N/A
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
30.2.2	Not applicable (IEC 60335-2-24:2010)		—
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 0.2 A during normal operation, and		P
	parts of insulating material within a distance of 3 mm,		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 non-metallic material, within a distance of 3 mm,		P
	subjected to glow-wire test of IEC 60695-2-11		P
	The test severity is:		—
	- 750°C, for connections carrying a current exceeding 0.2 A during normal operation		P
	- 650°C, for other connections		N/A
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	However, the glow-wire test of 750°C or 650°C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		—
	- a GWIT according to IEC 60695-2-13 of at least:		N/A
	• 775°C , for connections carrying a current exceeding 0.2 A during normal operation		N/A
	• 675°C, for other connections		N/A
	- a GWFI according to IEC 60695-2-12 of at least:		N/A
	• 750°C, for connections carrying a current exceeding 0.2 A during normal operation		N/A
	• 650°C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts are to:		—
	- comprise material having a glow-wire ignition temperature of at least 775°C or 675°C as appropriate, or		N/A
	- comprise material having a glow-wire flammability index of at least 750°C or 650°C as appropriate, or		N/A
	- comply with the needle-flame test of Annex E, or		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	- comprise material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
	The consequential needle-flame test of Annex E applied to non-metallic parts that encroach within the vertical cylinder placed above the centre of the connection zone and on top of the non-metallic parts supporting current-carrying connections, and parts of non-metallic material within a distance of 3 mm of such connections if these parts are those		—
	- parts that withstood the glow-wire test of IEC 60695-2-11 of 750°C or 650°C as appropriate, but produce a flame that persist longer than 2 s, or		P
	- parts that comprised material having a glow-wire flammability index of at least 750°C or 650°C as appropriate, or		N/A
	- small parts, that comprised material having a glow-wire flammability index of at least 750°C or 650°C as appropriate, or		N/A
	- small parts for which the needle-flame test of Annex E was applied, or		N/A
	- small parts for which a material classification of V-0 or V-1 was applied		N/A
	However, the consequential needle-flame test is not carried out on non-metallic parts, including small parts, within the cylinder that are:		—
	- parts having a glow-wire ignition temperature of at least 775°C or 675°C as appropriate, or		N/A
	- parts comprising material classified as V-0 or V-1 according to IEC 60695-11-10, or		N/A
	- parts shielded by a flame barrier that meets the needle-flame test of Annex E or that comprises material classified as V-0 or V-1 according to IEC 60695-11-10		N/A
30.2.4	Base material of printed circuit boards subjected to needle-flame test (NFT) 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 (IEC 60335-2-24:2010)		—

IEC 60335-2-24			
Clause	Requirement – Test	Result – Remark	Verdict
A	**ANNEX A (INFORMATIVE) ROUTINE TESTS**		
	Description of routine tests to be carried out by the manufacturer		N/A
AA	**ANNEX AA, (NORMATIVE) LOCKED-ROTOR TEST OF FAN MOTORS (IEC 60335-2-24:2010)**		
	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
	Tests as described		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	No battery	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

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Clause	Requirement – Test	Result – Remark	Verdict
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		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
19.10	Not applicable		N/A
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N/A
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N/A
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength, checked according to procedure 2 of IEC 60068-2-32		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

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Clause	Requirement – Test	Result – Remark	Verdict
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
BB	**ANNEX BB (NORMATIVE) METHOD FOR ACCUMULATION OF FROST**		
	Description of method for accumulation of frost		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 60335-2-24:2010)		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 60335-2-24:2010)		—
11	Supplementary requirements for non-sparking luminaires (A1:12)		—
	All of subclauses of clause 11 are applicable, except 11.2.4.1, 11.2.4.5, 11.2.5, 11.2.6, 11.2.7, 11.3.4, 11.3.5, 11.3.6 and 11.4 (A1:12)		N/A
16	General supplementary requirements for apparatus producing arcs, sparks or hot surfaces (A1:12)		N/A
17	Supplementary requirements for enclosed-break devices and non-incendive components producing arcs, sparks or hot surfaces (A1:12)		N/A
18	Supplementary requirements for hermetically sealed devices producing arcs, sparks or hot surfaces (A1:12)		N/A
19	Supplementary requirements for sealed devices producing arcs, sparks or hot surfaces (A1:12)		—
	All of the subclauses of clause 19 are applicable, except 19.1 and 19.6, which are replaced by the following (A1:12)		N/A
19.1	Non-metallic materials (A1:12)		—

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Clause	Requirement – Test	Result – Remark	Verdict
	Seals are tested using 22.5. However if the device is tested in the appliance, then 22.5.1 and 22.5.2 are not applicable (A1:12)		N/A
	After the tests of clause 19 in IEC 60335-2-24, by inspection, no damage that could impair the type of protection shall be evident (A1:12)		N/A
19.6	Type tests (A1:12)		—
	The type tests described in 22.5 shall be performed where relevant (A1:12)		N/A
20	Supplementary requirements for restricted-breathing enclosures protecting apparatus producing arcs, sparks or hot surfaces (A1:12)		N/A
D	**ANNEX D (NORMATIVE)** **THERMAL MOTOR PROTECTORS**		
	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 60335-2-24:2010)		P
	Test conditions as specified		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:		—
7	Severities		—
	The duration of application of the test flame is 30 s ± 1 s		P
9	Test procedure		—
9.1	The specimen so arranged that the flame can be applied to a vertical or horizontal edge as shown in the examples of figure 1		P
9.2	The first paragraph does not apply		N/A
	If possible, the flame is applied at least 10 mm from a corner		P
9.3	The test is carried out on one specimen		P
	If the specimen does not withstand the test, the test may be repeated on two further specimens, both withstanding the test		N/A
11	Evaluation of test results		—

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Clause	Requirement – Test	Result – Remark	Verdict
	The duration of burning not exceeding 30 s		P
	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:		N/A
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
	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

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Clause	Requirement – Test	Result – Remark	Verdict
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
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, 29.2 and 29.3	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

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Clause	Requirement – Test	Result – Remark	Verdict
	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
	Subclauses 17.2.2 and 17.2.5.2 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		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		—

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Clause	Requirement – Test	Result – Remark	Verdict
8.1	Metal parts of the motor are considered to be bare live parts		N/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.I.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.I.101	For class I appliances incorporating a motor supplied by a rectifier circuit, the d.c. circuit being insulated from accessible parts of the appliance by double or reinforced insulation		N/A
	Compliance checked by the tests specified for double and reinforced insulation		N/A
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
K	**ANNEX K (NORMATIVE)** **OVERVOLTAGE CATEGORIES**		
	The information on overvoltage categories is extracted from IEC 60664-1		P

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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
N	**ANNEX N (NORMATIVE)** **PROOF TRACKING TEST**		
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:	Plastic enclosure PCB Housing of overload protector for motor compressor	P
	Test apparatus		—
7.3	Test solutions		—
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		—
10.1	The proof voltage is 100 V, 175 V, 400 V or 600 V:	175 V	P
	The last paragraph of clause 3 applies		P
	The test is carried out on five specimens		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.		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		N/A
O	**ANNEX O (INFORMATIVE)** **SELECTION AND SEQUENCE OF THE TESTS OF CLAUSE 30**		
	Description of tests for determination of resistance to heat and fire		P

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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**		
	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		—
5.7	The ambient temperature of the tests of clause 10, 11 and 13 is 43°C ± 1°C. See subclause 5.7 (IEC 60335-2-24:2010)		N/A
7.1	The appliance marked with the letters WdaE		N/A
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.		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
11.8	The values of Table 3 are reduced by 15 K		N/A
13.2	The leakage current for class I appliances not exceeding 0.5 mA		N/A
15.3	The value of t is 37°C		N/A
16.2	The leakage current for class I appliances not exceeding 0.5 mA		N/A
19.13	The leakage current test of 16.2 is applied in addition to the electric strength test of 16.3		N/A
Q	**ANNEX Q (INFORMATIVE)** **SEQUENCE OF TESTS FOR THE EVALUATION OF ELECTRONIC CIRCUITS**		
	Description of tests for appliances incorporating electronic circuits		—
R	**ANNEX R (NORMATIVE)** **SOFTWARE EVALUATION**		
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or R.2 validated in accordance with the requirements of this annex	No such parts	N/A

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Clause	Requirement – Test	Result – Remark	Verdict
R.1	Programmable electronic circuits using software		—
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or R.2 constructed so that the software does not impair compliance with the requirements of this standard		N/A
R.2	Requirements for the architecture		—
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or R.2 use measures to control and avoid software-related faults/errors in safety-related data and safety-related segments of the software		N/A
R.2.1.1	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.2 have one of the following structures:		—
	- single channel with periodic self-test and monitoring		N/A
	- dual channel (homogenous) with comparison		N/A
	- dual channel (diverse) with comparison		N/A
	Programmable electronic circuits requiring software incorporating measures to control the fault/error conditions specified in Table R.1 have one of the following structures:		—
	- single channel with functional test		N/A
	- single channel with periodic self-test		N/A
	- dual channel without comparison		N/A
R.2.2	Measures to control faults/errors		—
R.2.2.1	When redundant memory with comparison is provided on two areas of the same component, the data in one area is stored in a different format from that in the other area		N/A
R.2.2.2	Programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.2 and that use dual channel structures with comparison, have additional fault/error detection means for any fault/errors not detected by the comparison		N/A
R.2.2.3	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or R.2, means are provided for the recognition and control of errors in transmissions to external safety-related data paths		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
R.2.2.4	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or R.2, the programmable electronic circuits incorporate measures to address the fault/errors in safety-related segments and data indicated in Table R.1 and R.2 as appropriate		N/A
R.2.2.5	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or R.2, detection of a fault/error occur before compliance with clause 19 is impaired		N/A
R.2.2.6	The software is referenced to relevant parts of the operating sequence and the associated hardware functions		N/A
R.2.2.7	Labels used for memory locations are unique		N/A
R.2.2.8	The software is protected from user alteration of safety-related segments and data		N/A
R.2.2.9	Software and safety-related hardware under its control is initialized and terminates before compliance with clause 19 is impaired		N/A
R.3	Measures to avoid errors		—
R.3.1	General		—
	For programmable electronic circuits with functions requiring software incorporating measures to control the fault/error conditions specified in Table R.1 or R.2, the following measures to avoid systematic fault in the software are applied		—
	Software that incorporates measures used to control the fault/error conditions specified in Table R.2 is inherently acceptable for software required to control the fault/error conditions specified in Table R.1		N/A
R.3.2	Specification		—
R.3.2.1	Software safety requirements:	Software Id:	N/A
	The specification of the software safety requirements includes the descriptions listed		N/A
R.3.2.2	Software architecture		—

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Clause	Requirement – Test	Result – Remark	Verdict
R.3.2.2.1	The specification of the software architecture includes the aspects listed - techniques and measures to control software faults/errors (refer to R.2.2); - interactions between hardware and software; - partitioning into modules and their allocation to the specified safety functions; - hierarchy and call structure of the modules (control flow); - interrupt handling; - data flow and restrictions on data access; - architecture and storage of data; - time-based dependencies of sequences and data	Document ref. No:	N/A
R.3.2.2.2	The architecture specification is validated against the specification of the software safety requirements by static analysis		N/A
R.3.2.3	Module design and coding		—
R.3.2.3.1	Based on the architecture design, software is suitably refined into modules		N/A
	Software module design and coding is implemented in a way that is traceable to the software architecture and requirements		N/A
R.3.2.3.2	Software code is structured		N/A
R.3.2.3.3	Coded software is validated against the module specification by static analysis		N/A
	The module specification is validated against the architecture specification by static analysis		N/A
R.3.3.3	Software validation		—
	The software is validated with reference to the requirements of the software safety requirements specification		N/A
	Compliance is checked by simulation of:		N/A
	- input signals present during normal operation		N/A
	- anticipated occurrences		N/A
	- undesired conditions requiring system action		N/A

TABLE R.1 – GENERAL FAULT/ERROR CONDITIONS						
Component [1)]	Fault/error	Acceptable measures [2) 3)]	Definitions	Document reference for applied measure	Document reference for applied test	Ver-dict
1 CPU 1.1 Registers	Stuck at	Functional test, or periodic self-test using either: - static memory test, or - word protection with single bit redundancy	H.2.16.5 H.2.16.6 H.2.19.6 H.2.19.8.2			N/A
1.2 VOID						N/A
1.3 Programme counter	Stuck at	Functional test, or Periodic self-test, or Independent time-slot monitoring, or Logical monitoring of the programme sequence	H.2.16.5 H.2.16.6 H.2.18.10.4 H.2.18.10.2			N/A
2 Interrupt handling and execution	No interrupt or too frequent interrupt	Functional test, or time-slot monitoring	H.2.16.5 H.2.18.10.4			N/A
3 Clock	Wrong frequency (for quartz synchronized clock: harmonics/ sub-harmonics only)	Frequency monitoring, or time slot monitoring	H.2.18.10.1 H.2.18.10.4			N/A
4. Memory 4.1 Invariable memory	All single bit faults	Periodic modified checksum, or multiple checksum, or word protection with single bit redundancy	H.2.19.3.1 H.2.19.3.2 H.2.19.8.2			N/A
4.2 Variable memory	DC fault	Periodic static memory test, or word protection with single bit redundancy	H.2.19.6 H.2.19.8.2			N/A
4.3 Addressing (relevant to variable and invariable memory)	Stuck at	Word protection with single bit redundancy including the address	H.2.19.8.2			N/A

TABLE R.1 – GENERAL FAULT/ERROR CONDITIONS						
Component [1)]	Fault/error	Acceptable measures [2) 3)]	Definitions	Document reference for applied measure	Document reference for applied test	Ver-dict
5 Internal data path	Stuck at DC fault	Word protection with single bit redundancy Comparison of redundant CPUs by either: - reciprocal comparison - independent hardware comparator	H.2.19.8.2 H.2.18.15 H.2.18.3			N/A
5.1 VOID						N/A
5.2 Addressing	Wrong address	Word protection with single bit redundancy including the address	H.2.19.8.2			N/A
6 External communication	Hamming distance 3	Word protection with multi-bit redundancy, or CRC – single work, or Transfer redundancy, or Protocol test	H.2.19.8.1 H.2.19.4.1 H.2.18.2.2 H.2.18.14			N/A
6.1 VOID						N/A
6.2 VOID						N/A
6.3 Timing	Wrong point in time Wrong sequence	Time-slot monitoring, or scheduled transmission Time-slot and logical monitoring, or Comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator Logical monitoring, or time-slot monitoring, or Scheduled transmission (same options as for wrong point in time)	H.2.18.10.4 H.2.18.18 H.2.18.10.3 H.2.18.15 H.2.18.3 H.2.18.10.2 H.2.18.10.4 H.2.18.18			N/A
7 Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check Comparison of redundant communication channels by either: - reciprocal comparison - independent hardware comparator	H.2.18.13 H.2.18.15 H.2.18.3			N/A

TABLE R.1 – GENERAL FAULT/ERROR CONDITIONS

Component [1)]	Fault/error	Acceptable measures [2) 3)]	Definitions	Document reference for applied measure	Document reference for applied test	Ver-dict
7.1 VOID						N/A
7.2 Analog I/O 7.2.1 A/D and D/A-converter	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N/A
7.2.2 Analog multiplexer	Wrong addressing	Plausibility check	H.2.18.13			N/A
8 VOID						N/A
9 Custom chips [4)] e.g. ASIC, GAL, Gate array	Any output outside the static and dynamic functional specification	Periodic self-test	H.2.16.6			N/A

NOTE A Stuck-at fault model denotes a fault model representing an open circuit or a non-varying signal level. A DC fault model denotes a stuck-at fault model incorporating short circuit between signal lines.

[1)] For fault/error assessment, some components are divided into their sub-functions.
[2)] For each sub-function in the table, the Table R.2 measure will cover the software fault/error.
[3)] Where more than one measure is given for a sub-function, these are alternatives.
[4)] To be divided as necessary by the manufacturer into sub-functions.

10.1	TABLE: Power input deviation				P
Input deviation of/at:	P rated (W)	P measured (W)	P	Required P	Remark
W2-170P					
220 V, 50 Hz	570	575	+ 0.9 %	+5 %, -10 %	Total
240 V, 50 Hz	650	642	- 1.24 %	+5 %, -10 %	Total
220 V, 50 Hz	450	449	- 0.23 %	+5 %, -10 %	Hot
240 V, 50 Hz	520	528	+ 1.54 %	+5 %, -10 %	Hot
W2-170S					
220 V, 50 Hz	450	455	+ 1.11 %	+5 %, -10 %	Total
240 V, 50 Hz	530	527	- 0.57 %	+5 %, -10 %	Total
220 V, 50 Hz	320	321	+ 0.32 %	+5 %, -10 %	Hot
240 V, 50 Hz	380	383	+ 0.79 %	+5 %, -10 %	Hot
Supplementary information: Hot: measured when only the heating circuit operated.					

10.2	TABLE: Current deviation				P
Current deviation of/at:	I rated (A)	I measured (A)	I	Required I	Remark
W2-170P					
220 V, 50 Hz	0.8	0.810	+ 1.25 %	+ 20 %	Cold
240 V, 50 Hz	0.9	0.898	- 0.23 %	+ 20 %	Cold
W2-170S					
220 V, 50 Hz	0.8	0.805	+ 0.63 %	+ 20 %	Cold
240 V, 50 Hz	0.9	0.921	+ 2.34 %	+ 20 %	Cold
Supplementary information: Measured when the cooling circuit operated only.					

11.8	TABLE: Heating test, thermocouple measurements			P
	Test voltage (V)..... :	206.8 V		—
	Ambient (°C) ..... :	31.8 °C, 32.5 °C (W2-170P) 32.2 °C, 32.4 °C (W2-170S)		—
Thermocouple locations		Max. temperature rise measured T (K)	Max.temperature rise limit T (K)	
Model: W2-170P				
Power cord sheath		3.8	35	
Cord bushing		5.1	35	
AC internal wire		4.0	50	

Current fuse holder	3.2	cl. 30.1
Motor compressor housing	37.6	150
AC connector (wire to wire)	3.4	cl. 30.1
OLP & Relay cover (WH)	16.3	cl. 30.1
OLP & Relay cover (BL)	22.5	cl. 30.1
Self resetting thermal cutout on water tank	51.0	Ref.
Non self resetting thermal cutout on water tank	48.7	Ref.
AC connector (CN1)	7.1	cl. 30.1
PCB near D2	16.8	120
Cold thermostat	5.4	30
Plastic enclosure (front)	7.0	60
Metal enclosure (Side)	2.2	35
On/Off switch of heater	17.2	30
Condensing tube	1.3	35
Wall of test corner	3.0	60
Band heater	Over 200	Ref.
Model: W2-170S		
Power cord sheath	5.6	35
Cord bushing	5.6	35
AC internal wire	19.6	50
Current fuse holder	21.6	cl. 30.1
Motor compressor housing	66.6	150
AC connector (wire to wire)	19.6	cl. 30.1
OLP & Relay cover (WH)	37.6	cl. 30.1
OLP & Relay cover (BL)	47.6	cl. 30.1
Self resetting thermal cutout on water tank	47.6	Ref.
Non self resetting thermal cutout on water tank	49.6	Ref.
AC connector (CN1)	12.6	cl. 30.1
PCB near D2	18.6	120
Cold thermostat	8.6	30
Plastic enclosure (front)	11.6	60
Metal enclosure (Side)	23.6	35
On/Off switch of heater	25.6	30
Condensing tube	5.6	35
Wall of test corner	17.6	60
Band heater	Over 200	Ref.

Supplementary information: Heating and cooling function operated simultaneously during test.
OLP: Overload protector for motor compressor
WH: white coloured
BK: black coloured

11.8	TABLE: Heating test, thermocouple measurements		P
	Test voltage (V)..... :	254.4 V	—
	Ambient (°C) ..... :	32.3 °C, 32.3 °C (W2-170P) 32.3 °C, 32.5 °C (W2-170S)	—

Thermocouple locations	Max. temperature rise measured T (K)	Max.temperature rise limit T (K)
Model: W2-170P		
Power cord sheath	3.7	35
Cord bushing	5.3	35
AC internal wire	3.6	50
Current fuse holder	3.2	cl. 30.1
Motor compressor housing	42.8	150
AC connector (wire to wire)	2.9	cl. 30.1
OLP & Relay cover (WH)	17.6	cl. 30.1
OLP & Relay cover (BL)	25.7	cl. 30.1
Self resetting thermal cutout on water tank	47.9	Ref.
Non self resetting thermal cutout on water tank	47.8	Ref.
AC connector (CN1)	10.9	cl. 30.1
PCB near D2	22.1	120
Cold thermostat	5.1	30
Plastic enclosure (front)	7.8	60
Metal enclosure (Side)	2.6	35
On/Off switch of heater	18.6	30
Condensing tube	1.0	35
Wall of test corner	2.6	60
Band heater	Over 200	Ref.
Model: W2-170S		
Power cord sheath	6.5	35
Cord bushing	6.5	35
AC internal wire	20.5	50
Current fuse holder	23.5	cl. 30.1
Motor compressor housing	73.5	150

AC connector (wire to wire)	21.5	cl. 30.1
OLP & Relay cover (WH)	41.5	cl. 30.1
OLP & Relay cover (BL)	52.5	cl. 30.1
Self resetting thermal cutout on water tank	47.5	Ref.
Non self resetting thermal cutout on water tank	49.5	Ref.
AC connector (CN1)	16.5	cl. 30.1
PCB near D2	31.5	120
Cold thermostat	8.5	30
Plastic enclosure (front)	12.5	60
Metal enclosure (Side)	26.5	35
On/Off switch of heater	26.5	30
Condensing tube	5.2	35
Wall of test corner	18.5	60
Band heater	Over 200	Ref.
Supplementary information: Heating and cooling function operated simultaneously during test. OLP: Overload protector for motor compressor WH: white coloured BK: black coloured		

11.8	**TABLE: Heating test, resistance method**					**N/A**
	Test voltage (V)..... :					—
	Ambient, T_1 (°C)..... :					—
	Ambient, T_2 (°C)..... :					—
Temperature rise of winding		R_1 (Ω)	R_2 (Ω)	T (K)	Max. T (K)	Insulation class
Supplementary information:						

13.2	**TABLE: Leakage current**		**P**
	Heating appliances: 1.15 x rated input (V)……:		—
	Motor-operated and combined appliances: 1.06 x rated voltage (V)……:	254.4 V	—
Leakage current between:		I (mA)	Max. allowed I (mA)
Live parts and accessible earthed metal parts		1.3	3.5
Live parts and accessible unearthed parts		0.01 (peak)	0.35 (peak)

Supplementary information:		

13.3	**TABLE: Electric strength**	**P**
Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
Live parts and accessible earthed metal parts	1 000	No
Live parts and accessible unearthed parts	3 000	No
Supplementary information:		

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

16.2	**TABLE: Leakage current**		**P**
	Single phase appliances: 1.06xrated voltage(V) .:	254.4	—
	Three phase appliances 1.06xrated voltage divided by √3 (V)……..:		—
Leakage current between:	I (mA)	Max. allowed I (mA)	
Live parts and accessible earthed metal parts	1.65	3.5	
Live parts and accessible unearthed parts	0.01	0.25	
Supplementary information:			

16.3	**TABLE: Electric strength**	**P**
Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)
Live parts and accessible earthed metal parts	1 250	No
Live parts and accessible unearthed parts	3 000	No

Supplementary information:		

17	**TABLE: Overload protection, thermocouple measurements**		**N/A**
Temperature rise of part/at:		T (K)	Max. T (K)
Supplementary information:			

17	**TABLE: Overload protection, resistance method**					**N/A**
	Test voltage (V)..... :					—
	Ambient, T_1 (°C)..... :					—
	Ambient, T_2 (°C)..... :					—
Temperature of winding		R_1 (Ω)	R_2 (Ω)	T (K)	T (°C)	Max. T (°C)
(Insulation class)						
(Insulation class)						
(Insulation class)						
Supplementary information:						

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)	T (K)	T (°C)	Max. T (°C)
Supplementary information:						

19.11.2	TABLE: Abnormal operation, fault simulations				N/A
	Test voltage (V) ..... :				—
	Ambient, T_1 (°C) ..... :				—
	Ambient, T_2 (°C) ..... :				—
Temperature of winding	R_1 (Ω)	R_2 (Ω)	T (°C)	T (°C)	Max. T (°C)
Supplementary information:					

19.11.3	Abnormal operation conditions	P

Operational characteristics	Yes/No	Operational conditions
Are there electronic circuits to control the appliance operation?	No	Electronic circuit only display operation mode
Are there “off” or “stand-by” position?	No	
The unintended operation of the appliance results in dangerous malfunction?	No	

Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	0.85 times of rated power input and restricted heat dissipation.	Self resetting thermal cutout operated at 84 °C, and resetted at 76 °C.	No PEC	N/A	N/A	N/A	Continuously operated without hazards. No damage, No hazards.
19.3	1.24 times of rated power input under normal operation	Self resetting thermal cutout operated at 86 °C, and resetted at 78 °C.	No PEC	N/A	N/A	N/A	Continuously operated without hazards. No damage, No hazards.
19.4	1.06 times of rated voltage and thermal control on hot water tank short-circuited.	Non self resetting thermal cut out operated.	No PEC	N/A	N/A	N/A	Continuously operated except heater. No damage, No hazards.
19.5	S/C between earthed metal sheath of band heater and end of its heating element.	Current fuse operated immediately	No PEC	N/A	N/A	N/A	No hazard.
	S/C between earthed metal sheath of band heater and the other end of its heating element.	Current fuse operated immediately					
19.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A

19.11.3	Abnormal operation conditions						P
19.11.2	S/C of D1 of W2-170P	No changes had been made.	No PEC	N/A	N/A	N/A	Continuously operated without hazards. No damage, No hazards.
	S/C of D2 of W2-170P	No changes had been made.	No PEC	N/A	N/A	N/A	Continuously operated without hazards. No damage, No hazards.
	S/C of D1 of W2-170S	No changes had been made.	No PEC	N/A	N/A	N/A	Continuously operated without hazards. No damage, No hazards.
	S/C of D2 of W2-170S	No changes had been made.	No PEC	N/A	N/A	N/A	Continuously operated without hazards. No damage, No hazards.
19.11.4.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supplementary information: O/C: open circuit S/C: short circuit							

19.13	TABLE: Abnormal operation, temperature rises			P
Thermocouple locations	Max. temperature rise measured, dT (K)			Max.temperature rise limit, dT (K)
	cl. 19.2	cl. 19.3	cl. 19.4	
Power cord sheath	3.9	3.6	0.5	150
Current fuse Holder	15.6	18.7	5.7	cl. 30.1
AC connector (wire to wire)	14.6	17.3	5.7	cl. 30.1
OLP & Relay cover (WH)	24.9	29.1	20.2	cl. 30.1
OLP & Relay base (BL)	38.0	47.7	31.1	cl. 30.1
Plastic enclosure (front)	12.4	13.6	4.4	cl. 30.1
Wall of test corner	1.9	1.8	0.4	150
AC connector (CN1)	10.6	16.7	9.4	cl. 30.1
Supplementary information:				

24.1	TABLE: Components information				P
Object/ part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity[1])

Power plug	Shangyu Jintao Electron Co., Ltd.	JT003	250 V~, 16 A	IEC 60884-1 (ed.3);am1	VDE/ DE1-52192
(alt.)	KOREA KDK Co., Ltd.	KKP-4819R	250 V~, 16 A	IEC 60884-1 (ed.3);am1;am2	Fimko/ FI 29065
Power cord	Shangyu Jintao Electron Co., Ltd.	H05VV-F	300/500 V, 3 x 0.75 mm^2	IEC 60227-5 (ed.2);am1	KTL/ KR-3603A1
(alt.)	KOREA KDK Co., Ltd.	H05VV-F	300/500 V, 3 x 0.75 mm^2	IEC 60227-1 (ed.2);am1;am2 IEC 60227-2 (ed.2);am1 IEC 60227-5 (ed.2);am1;am2	VDE/ DE1-37483
Insulation tube	DAE CHANG ELECCOM CO LTD	DC-3	300V, 105 °C VW-1	UL 224	UL/ E120268
AC connector (wire to wire)	Zhejiang Hongxing Electrical Co., Ltd	HX62002	300 V, 15 A, V-2	UL 1977 IEC 60335-1 IEC 60335-2-21 IEC 603352-24	UL/ E228500 Tested in appliance
AC wire	SAM POONG ELECTRIC WIRE CO LTD	1015-18	300 V, 105 °C, 0.82 mm^2	UL 758 IEC 60335-1 IEC 60335-2-21 IEC 603352-24	UL/ E171097 Tested in appliance
Motor compressor	Daewoo Electronics Corp.	WX30LHS5W-K	220 - 240 V~, 50 Hz, R-134a, Class I	IEC 6035-1 (ed.4);am1;am2 IEC 60335-2-34 (ed.4);am1;am2	VDE/ DE1-48319
Starting relay (PTC) in motor compressor	Sensata Technology	11SP	250 V, 6 A, 100 000 cycles	IEC 60730-1 (ed.3);am1 IEC 60730-2-10 (ed.1);am1;am2 IEC 60730-2-4(ed.1);am1;am2	DEKRA/ NL-12910
Overload protector in motor compressor	Sensata Technology	4TM	250 V, 16 A, 10 000 cycles	IEC 60730-1 (ed.3.1) IEC 60730-2-4 (ed.1.2)	DEKRA/ NL-8658/A1

Heater (for model W2-170P, W2-150, W2-150P, W2-160, W2-160P, W2-170)	Hyundai Precision	HDH-02-02-01	220 V~, 500 W	IEC 60335-1 IEC 60335-2-21 IEC 603352-24	Tested in appliance
Heater (W2-170S, W2-170SP)	Hyundai Precision	HDH-01-05-06	220 V~, 330 W	IEC 60335-1 IEC 60335-2-21 IEC 603352-24	Tested in appliance
Current fuse	Shenzhen Lanson Electronics Co., Ltd	6D	T8AL 250V~	IEC 60335-1 IEC 60335-2-21 IEC 603352-24	Tested in appliance
Fuse holder	Changzhou Haojia Electric Appliances Co.,Ltd	6 x 30 mm	250 V~	IEC 60335-1 IEC 60335-2-21 IEC 603352-24	Tested in appliance
Cold thermostat	Pacific Control Co., Ltd	PF	250 V~, 6 A, 100 000 cycles	IEC 60730-1 (ed.4) IEC 60730-2-9 (ed.3);am1	CQC/ CN34883
Self resetting thermal cut out for heater	Pacific Control Co., Ltd	PW-2	250 V~, 7.5 A, 100 000 cycles, 85 °C	IEC 60730-1 (ed.3) IEC 60730-2-9 (ed.2);am1	VDE/ DE1 31310
(alt.)	Pacific Control Co., Ltd	PTS-12H	250 V~, 10 A, 100 000 cycles, 95 °C	EN 60730-1/ A2:2008 EN 60730-2-9: 2010	TUV SUD/ B13084902 8036
Non self resetting thermal cut out for heater	Pacific Control Co., Ltd	PBR380	250 V~, 7.5 A, 6 000 cycles, 95 °C	EN 60730-1/ A2:2008 EN 60730-2-9/ A2:2005	TUV SUD/ B13124902 8042
AC connector (CN1)	Yeon Ho Electronics Co., Ltd.	YAW-396	250 V~, 7.5 A, 85 °C	UL 1977 IEC 60335-1 IEC 60335-2-21 IEC 603352-24	UL/ E108706 Tested in appliance
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB-3151C	V-0, 130 °C	UL 94 IEC 60335-1 IEC 60335-2-21 IEC 603352-24	UL/ E123995 Tested in appliance
Hot switch	Ningbo Yinzhou Lihe Switch Factory	RL3	250 V~, 6 A, 85 °C, 10 000 cycles	IEC 61058-1 (ed.1);am1;am2	VDE/ DE1 29352

Single check valve	Storm tec	ST-900H	1/4”	IEC 60335-1 IEC 60335-2-21 IEC 603352-24 IEC 61770	Tested in appliance
Plastic enclosure	STYROLUTION GROUP GMBH	GP-35	HB	UL 94 IEC 60335-1 IEC 60335-2-21 IEC 603352-24	UL/ E108538 Tested in appliance
[1]) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

28.1	**TABLE: Threaded part torque test**		**P**
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Protective fixed screw	3.93	II	1.2
Supplementary information: Fixed metal screw on enclosure			

29.1	**TABLE: Clearances**					**P**
	Overvoltage category…… :		II			—
		Type of insulation:				
Rated impulse voltage (V):	Min. cl (mm)	Basic (mm)	Supplementary (mm)	Reinforced (mm)	Functional (mm)	Verdict/ Remark
330	0.2* / 0.5 / 0.8**					
500	0.2* / 0.5 / 0.8**					
800	0.2* / 0.5 / 0.8**					
1’500	0.5 / 0.8** / 1.0***					
2’500	1.5 / 2.0***	2.2			2.2	P
4’000	3.0 / 3.5***			4.8		P
6’000	5.5 / 6.0***					
8’000	8.0 / 8.5***					
10’000	11.0 / 11.5***					
*) For tracks on printed circuit boards if pollution degree 1 and 2 **) For pollution degree 3 ***) If the construction is affected by wear, distortion, movement of the parts or during assembly the value is increased by 0.5 mm Basic: between earthed enclosure and pins of AC internal connector Reinforced: between external enclosure on the front of LED status board and LED status board. Functional: between each pins of AC connector						

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	0.18	0.60	0.85	1.2	1.5	1.7	1.9		—	—	N/A
≤ 50	0.18	0.60	0.85	1.2	1.5	1.7	1.9	—		—	N/A
≤ 50	0.36	1.20	1.70	2.4	3.0	3.4	3.8	—	—		N/A
125	0.28	0.75	1.05	1.5	1.9	2.1	2.4		—	—	N/A
125	0.28	0.75	1.05	1.5	1.9	2.1	2.4	—		—	N/A
125	0.56	1.50	2.1	3.0	3.8	4.2	4.8	—	—		N/A
250	0.56	1.25	1.8	2.5	3.2	3.6	4.0	3.0	—	—	P
250	0.56	1.25	1.8	2.5	3.2	3.6	4.0	—		—	N/A
250	1.12	2.5	3.6	5.0	6.4	7.2	8.0	—	—	7.0	P
400	1.0	2.0	2.8	4.0	5.0	5.6	6.3		—	—	N/A
400	1.0	2.0	2.8	4.0	5.0	5.6	6.3	—		—	N/A
400	2.0	4.0	5.6	8.0	10.0	11.2	12.6	—	—		N/A
500	1.3	2.5	3.6	5.0	6.3	7.1	8.0		—	—	N/A
500	1.3	2.5	3.6	5.0	6.3	7.1	8.0	—		—	N/A
500	2.6	5.0	7.2	10.0	12.6	14.2	16.0	—	—		N/A
> 630 and ≤ 800	1.8	3.2	4.5	6.3	8.0	9.0	10.0		—	—	N/A
> 630 and ≤ 800	1.8	3.2	4.5	6.3	8.0	9.0	10.0	—		—	N/A
> 630 and ≤ 800	3.6	6.4	9.0	12.6	16.0	18.0	20.0	—	—		N/A
> 800 and ≤ 1’000	2.4	4.0	5.6	8.0	10.0	11.0	12.5		—	—	N/A
> 800 and ≤ 1’000	2.4	4.0	5.6	8.0	10.0	11.0	12.5	—		—	N/A
> 800 and ≤ 1’000	4.8	8.0	11.2	16.0	20.0	22.0	25.0	—	—		N/A
> 1’000 and ≤ 1’250	3.2	5.0	7.1	10.0	12.5	14.0	16.0		—	—	N/A
> 1’000 and ≤ 1’250	3.2	5.0	7.1	10.0	12.5	14.0	16.0	—		—	N/A
> 1’000 and ≤ 1’250	6.4	10.0	14.2	20.0	25.0	28.0	32.0	—	—		N/A
> 1’250 and ≤ 1’600	4.2	6.3	9.0	12.5	16.0	18.0	20.0		—	—	N/A
> 1’250 and ≤ 1’600	4.2	6.3	9.0	12.5	16.0	18.0	20.0	—		—	N/A
> 1’250 and ≤ 1’600	8.4	12.6	18.0	25.0	32.0	36.0	40.0	—	—		N/A
> 1’600 and ≤ 2’000	5.6	8.0	11.0	16.0	20.0	22.0	25.0		—	—	N/A

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
> 1'600 and ≤ 2'000	5.6	8.0	11.0	16.0	20.0	22.0	25.0	—		—	N/A
> 1'600 and ≤ 2'000	11.2	16.0	22.0	32.0	40.0	44.0	50.0	—	—		N/A
> 2'000 and ≤ 2'500	7.5	10.0	14.0	20.0	25.0	28.0	32.0		—	—	N/A
> 2'000 and ≤ 2'500	7.5	10.0	14.0	20.0	25.0	28.0	32.0	—		—	N/A
> 2'000 and ≤ 2'500	15.0	20.0	28.0	40.0	50.0	56.0	64.0	—	—		N/A
> 2'500 and ≤ 3'200	10.0	12.5	18.0	25.0	32.0	36.0	40.0		—	—	N/A
> 2'500 and ≤ 3'200	10.0	12.5	18.0	25.0	32.0	36.0	40.0	—		—	N/A
> 2'500 and ≤ 3'200	20.0	25.0	36.0	50.0	64.0	72.0	80.0	—	—		N/A
> 3'200 and ≤ 4'000	12.5	16.0	22.0	32.0	40.0	45.0	50.0		—	—	N/A
> 3'200 and ≤ 4'000	12.5	16.0	22.0	32.0	40.0	45.0	50.0	—		—	N/A
> 3'200 and ≤ 4'000	25.0	32.0	44.0	64.0	80.0	90.0	100.0	—	—		N/A
> 4'000 and ≤ 5'000	16.0	20.0	28.0	40.0	50.0	56.0	63.0		—	—	N/A
> 4'000 and ≤ 5'000	16.0	20.0	28.0	40.0	50.0	56.0	63.0	—		—	N/A
> 4'000 and ≤ 5'000	32.0	40.0	56.0	80.0	100.0	112.0	126.0	—	—		N/A
> 5'000 and ≤ 6'300	20.0	25.0	36.0	50.0	63.0	71.0	80.0		—	—	N/A
> 5'000 and ≤ 6'300	20.0	25.0	36.0	50.0	63.0	71.0	80.0	—		—	N/A
> 5'000 and ≤ 6'300	40.0	50.0	72.0	100.0	126.0	142.0	160.0	—	—		N/A
> 6'300 and ≤ 8'000	25.0	32.0	45.0	63.0	80.0	90.0	100.0		—	—	N/A
> 6'300 and ≤ 8'000	25.0	32.0	45.0	63.0	80.0	90.0	100.0	—		—	N/A
> 6'300 and ≤ 8'000	50.0	64.0	90.0	126.0	160.0	180.0	200.0	—	—		N/A
> 8'000 and ≤ 10'000	32.0	40.0	56.0	80.0	100.0	110.0	125.0		—	—	N/A
> 8'000 and ≤ 10'000	32.0	40.0	56.0	80.0	100.0	110.0	125.0	—		—	N/A
> 8'000 and ≤ 10'000	64.0	80.0	112.0	160.0	200.0	220.0	250.0	—	—		N/A
> 10'000 and ≤ 12'500	40.0	50.0	71.0	100.0	125.0	140.0	160.0		—	—	N/A
> 10'000 and ≤ 12'500	40.0	50.0	71.0	100.0	125.0	140.0	160.0	—		—	N/A
> 10'000 and ≤ 12'500	80.0	100.0	142.0	200.0	250.0	280.0	320.0	—	—		N/A

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

* Material group IIIb is allowed if the working voltage does not exceed 50 V
** B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation
B: between earthed enclosure and pins of AC internal connector
R: between external enclosure on the front of LED status board and LED status board.

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
≤ 10	0.08	0.40	0.4	0.4	1.0	1.0	1.0	N/A
50	0.16	0.56	0.8	1.1	1.4	1.6	1.8	N/A
125	0.25	0.71	1.0	1.4	1.8	2.0	2.2	N/A
250	0.42	1.00	1.4	2.0	2.5	2.8	3.2	P
400	0.75	1.60	2.2	3.2	4.0	4.5	5.0	N/A
500	1.0	2.0	2.8	4.0	5.0	5.6	6.3	N/A
> 630 and ≤ 800	1.8	3.2	4.5	6.3	8.0	9.0	10.0	N/A
> 800 and ≤1’000	2.4	4.0	5.6	8.0	10.0	11.0	12.5	N/A
> 1’000 and ≤ 1’250	3.2	5.0	7.1	10.0	12.5	14.0	16.0	N/A
> 1’250 and ≤ 1’600	4.2	6.3	9.0	12.5	16.0	18.0	20.0	N/A
> 1’600 and ≤ 2’000	5.6	8.0	11.0	16.0	20.0	22.0	25.0	N/A
> 2’000 and ≤ 2’500	7.5	10.0	14.0	20.0	25.0	28.0	32.0	N/A
> 2’500 and ≤ 3’200	10.0	12.5	18.0	25.0	32.0	36.0	40.0	N/A
> 3’200 and ≤ 4’000	12.5	16.0	22.0	32.0	40.0	45.0	50.0	N/A
> 4’000 and ≤ 5’000	16.0	20.0	28.0	40.0	50.0	56.0	63.0	N/A
> 5’000 and ≤ 6’300	20.0	25.0	36.0	50.0	63.0	71.0	80.0	N/A
> 6’300 and ≤ 8’000	25.0	32.0	45.0	63.0	80.0	90.0	100.0	N/A
> 8’000 and ≤ 10’000	32.0	40.0	56.0	80.0	100.0	110.0	125.0	N/A
> 10’000 and ≤ 12’500	40.0	50.0	71.0	100.0	125.0	140.0	160.0	N/A
* Material group IIIb is allowed if the working voltage does not exceed 50 V Measured between each pins of AC connector								

30	TABLE: Resistance to heat and fire																			P
Part No./ Object	Manufacturer/ Trademark	Type/ Model	Ball pressure test °C				Glow wire test (GWT) °C						Glow-wire flammability index (GWFI) °C				Glow-wire ignition temp. (GWIT) °C		Needle flame test (NFT)	Verdict
			75	125	cl. 11 +40	cl. 19 +25	550	650		750		850	550	650	750	850	675	775		
								te	ti	te	ti									
Plastic enclosure	STYROLUTION GROUP GMBH	GP-35	P				P													P
Fuse holder	Changzhou Haojia Electric Appliances Co., Ltd.	6 x 30 mm		P						33.5 sec	25.0 sec	P							P	P
AC connector (wire to wire)	Zhejiang Hongxing Electrical Co., Ltd.	HX62002		P						0 s	0 s									P
AC connector (CN1)	Yeon Ho Electronics Co., Ltd.	YAW-396		P						0 s	0 s									P
OLP & Relay cover (WH)	E I DUPONT	FR530		P						0 s	0 s									P
OLP & Relay base (BL)	E I DUPONT	FR530		P						0 s	0 s									P
PCB	Hyunjin Electronic Co., Ltd.	W2-310																	P	P

[1] Parts of material classified at least HB40 or if relevant HBF

[2] Parts of material classified as V-0 or V-1

[3] Flame persisting longer than 2 s (= $t_e - t_i$) need only be reported for unattended appliances

30	TABLE: Resistance to heat and fire																		P
Part No./ Object	Manufacturer/ Trademark	Type/ Model	Ball pressure test °C				Glow wire test (GWT) °C					Glow-wire flammability index (GWFI) °C				Glow-wire ignition temp. (GWIT) °C		Needle flame test (NFT)	Verdict
			75	125	cl. 11 +40	cl. 19 +25	550	650		750		850	550	650	750	850	675	775		
								te	ti	te	ti									

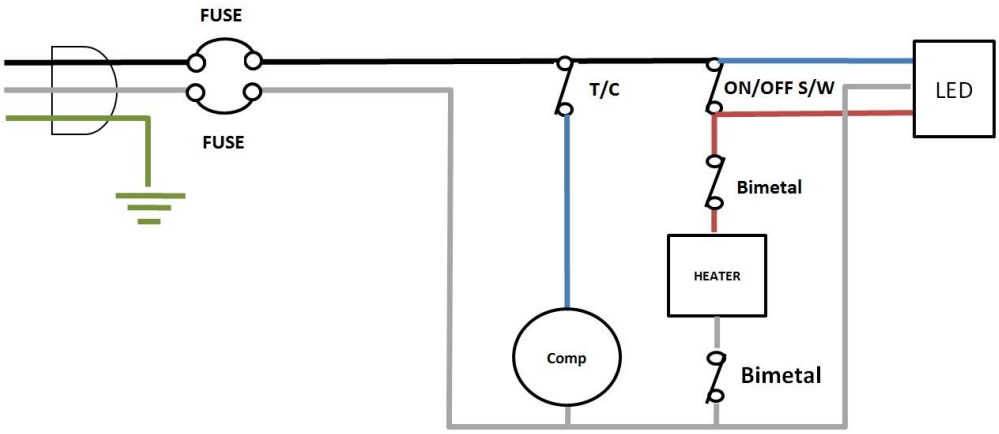
[4] Surrounding parts subjected to the needle-flame test of annex E
[5] Base material classified as V-0 or if relevant VTM-0
[6] The GWIT pre-selection option, the 850°C GWFI pre-selection option, and the 850°C GWT are not applicable for attended appliances

IEC 60335-2-24						
AA	**TABLE: locked-rotor test of fan motors, windings temperature limit measurements**					**N/A**
	Test voltage (V).....:					—
	Ambient, T_1 (°C) .....:					—
	Ambient, T_2 (°C) .....:					—
Temperature limit T of winding:		R_1 (Ω)	R_2 (Ω)	T °C)	T (°C)	Max. T (°C)
(Insulation class)						
(Insulation class)						
(Insulation class)						
Supplementary information:						

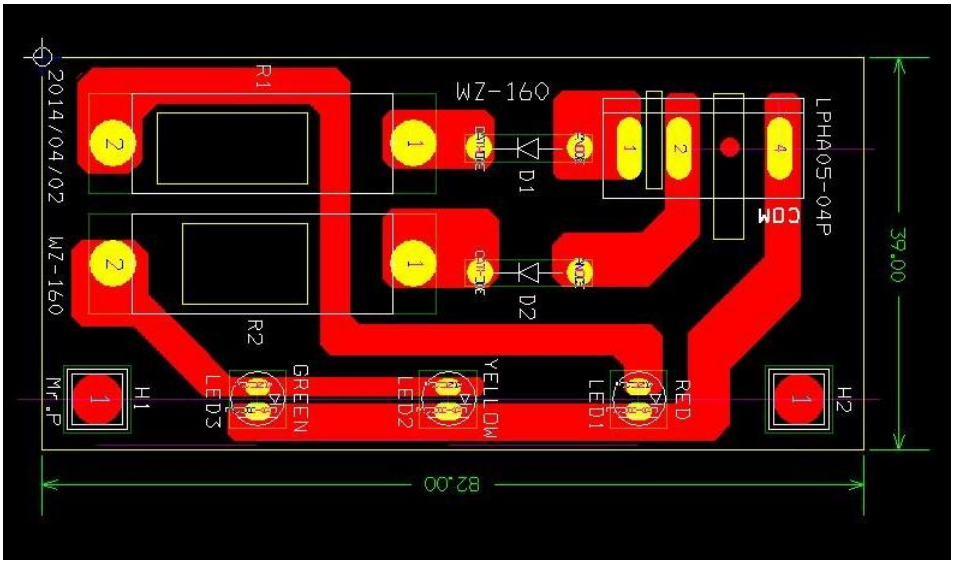
	TABLE: electric strength measurements		N/A
Test voltage applied between:		Test voltage (V)	Breakdown (Yes/No)
Supplementary information:			

	TABLE: leakage current measurements		N/A
	A voltage equal to twice the rated voltage (V).....:		—
Leakage current I between :		I (mA)	Required I (mA)
Supplementary information:			

Circuit diagram (system)



Circuit diagram (status PCB)



Photograph (model W2-170P)

<Front view>

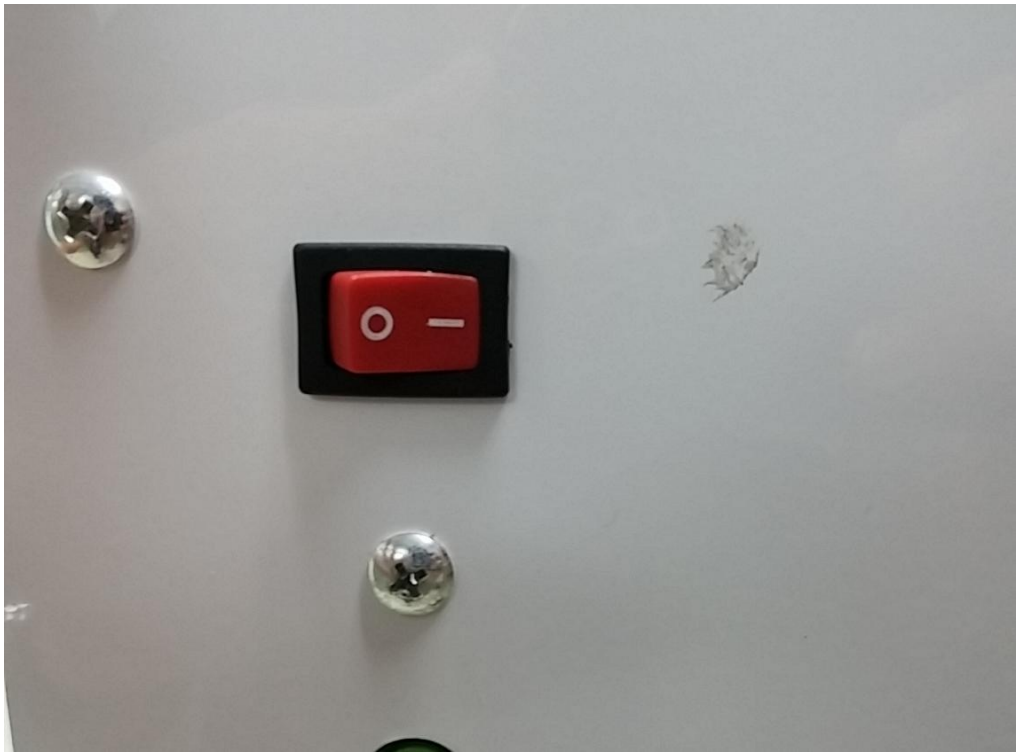
<Rear view>

Photograph (model W2-170P)

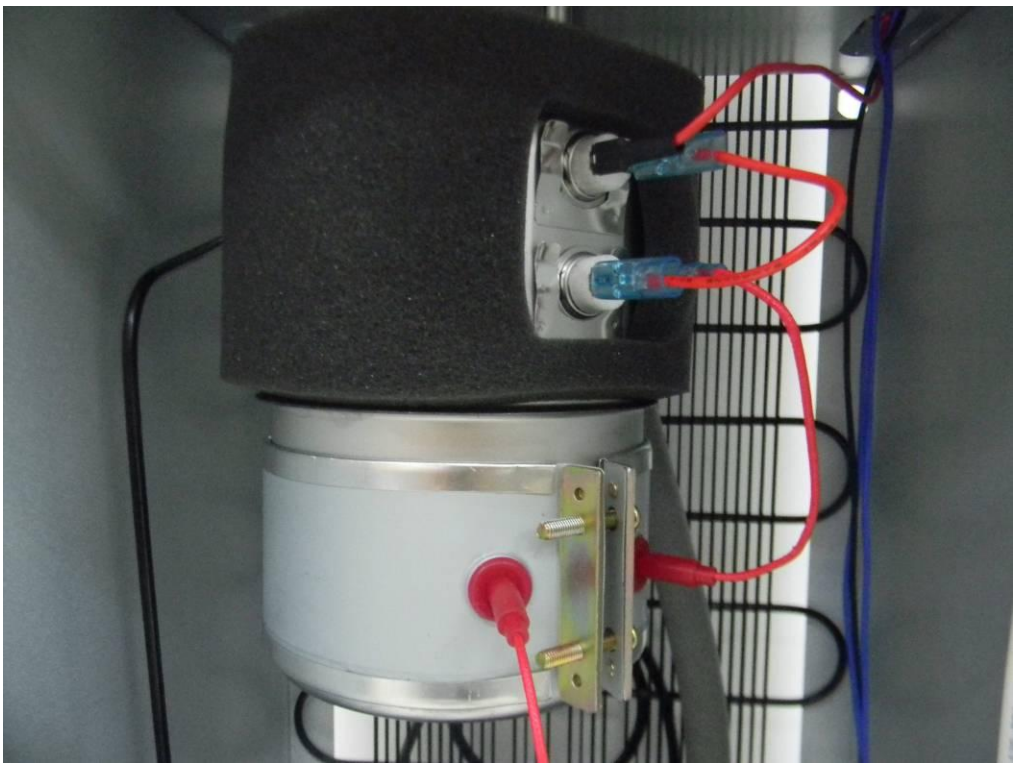
<LED indicator, symbol on dispensing tap>

<Cord anchorage>

Photograph (model W2-170P)



<Heater On/Off switch>



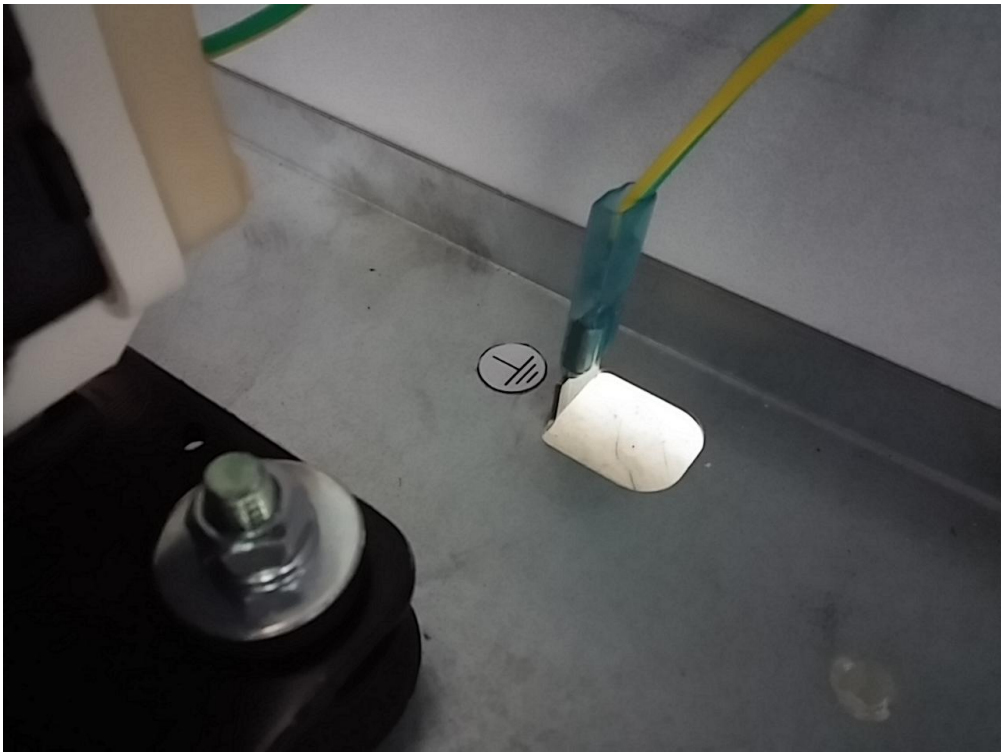
<Hot water tank>

Photograph (model W2-170P)

<Cistern>

<Motor compressor and supply connection>

Photograph (model W2-170P)



<Protective earth connection>

Photograph (model W2-170S)

<Front view>

<Rear view>

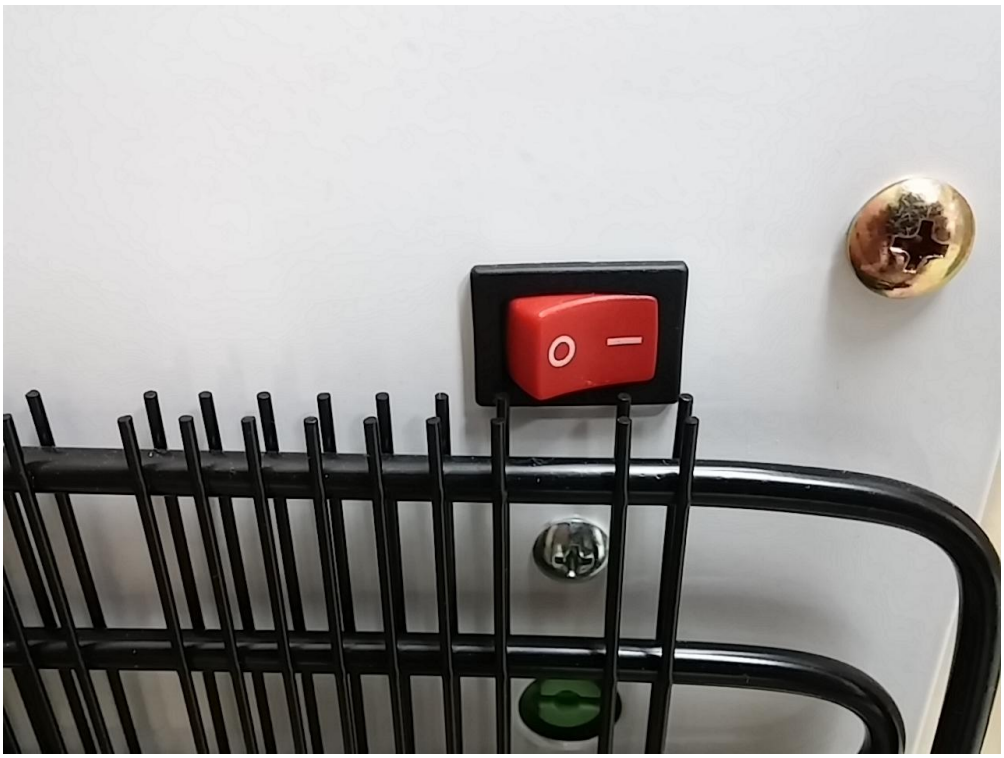
Photograph (model W2-170S)

<LED indicator, symbol on dispensing tap>

<Internal view – right>

Photograph (model W2-170S)

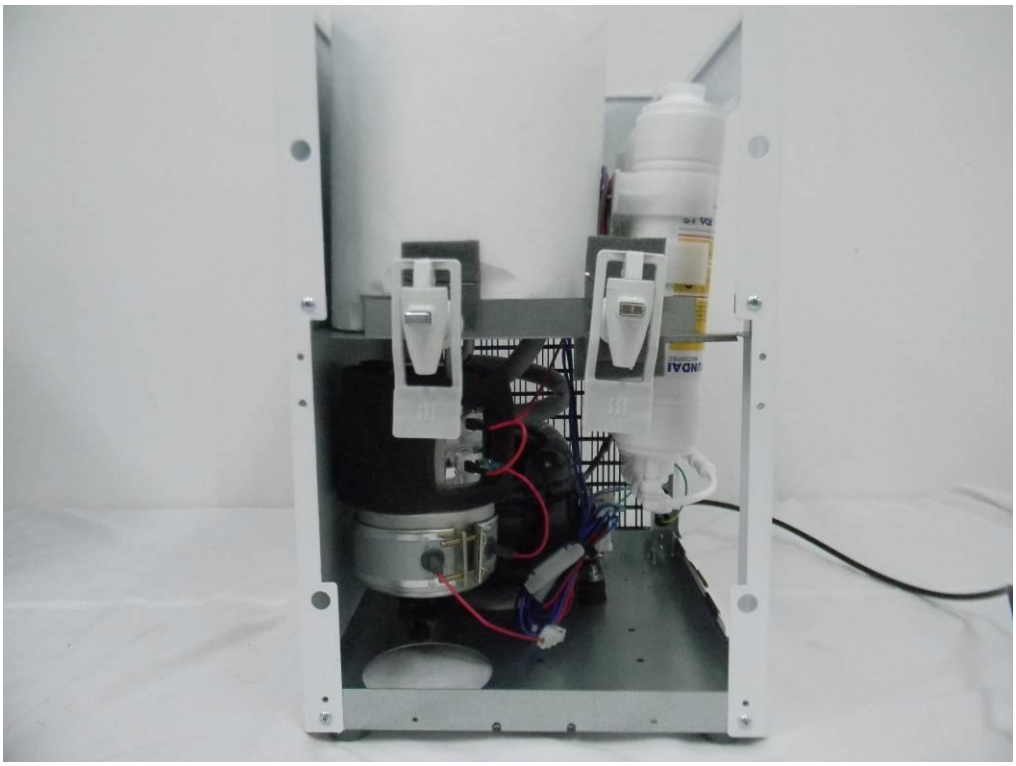
<Cord anchorage>



<Heater On/Off switch>

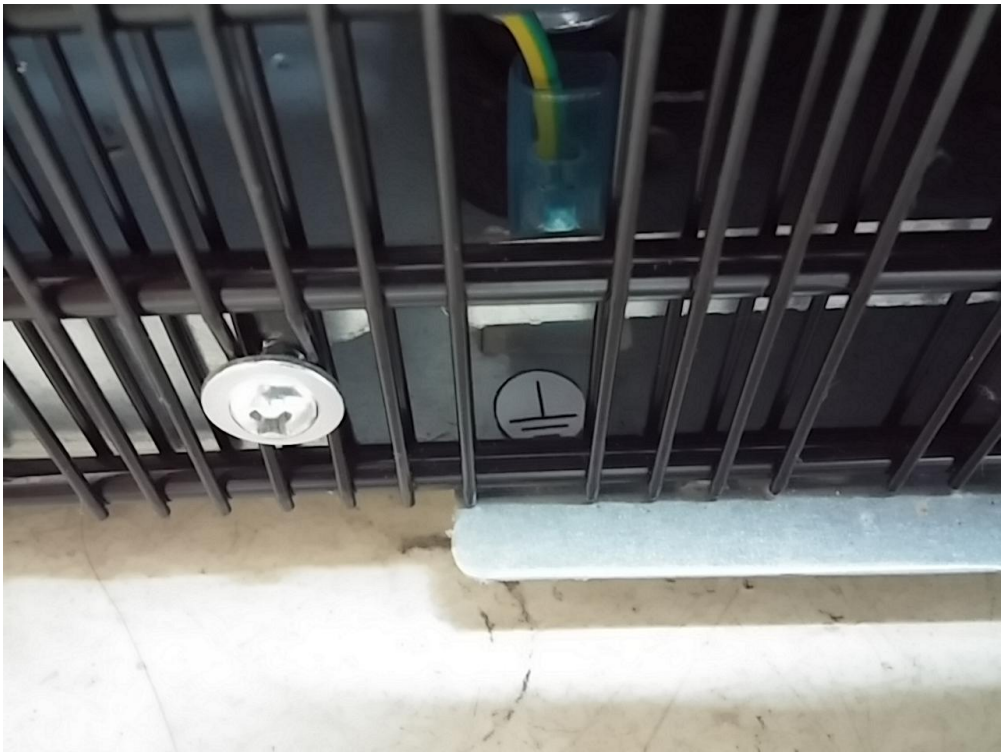
Photograph (model W2-170S)

<Cistern>



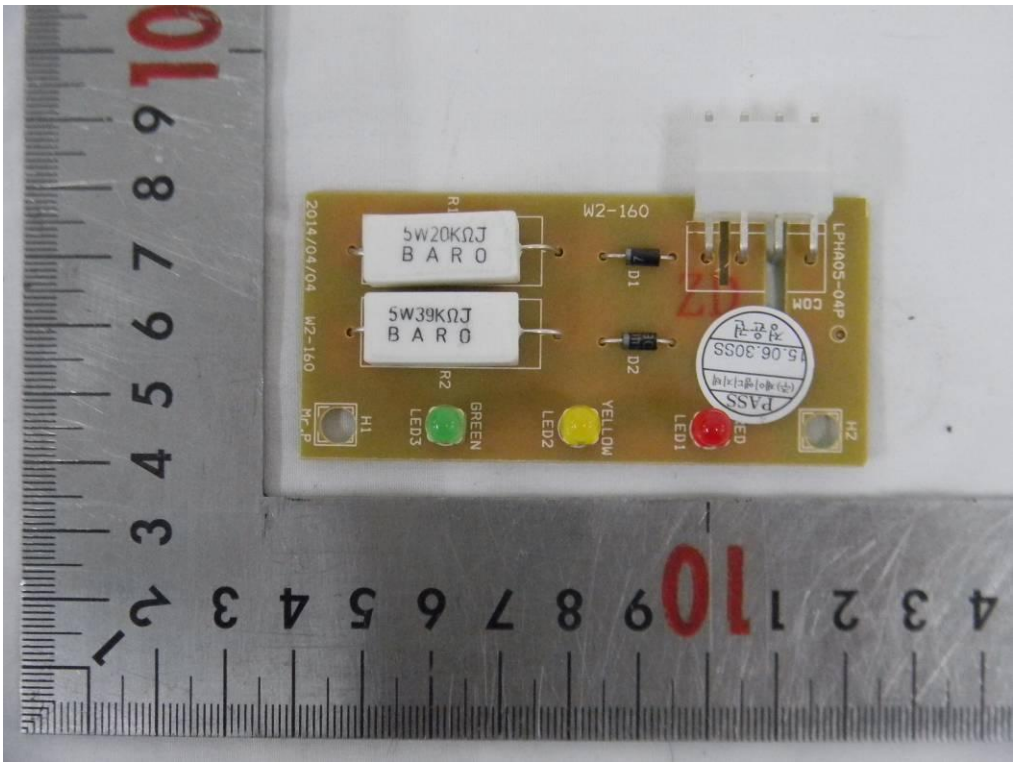
<Internal view – front>

Photograph (model W2-170S)



<Protective earth connection>

Photograph (status board for all models)



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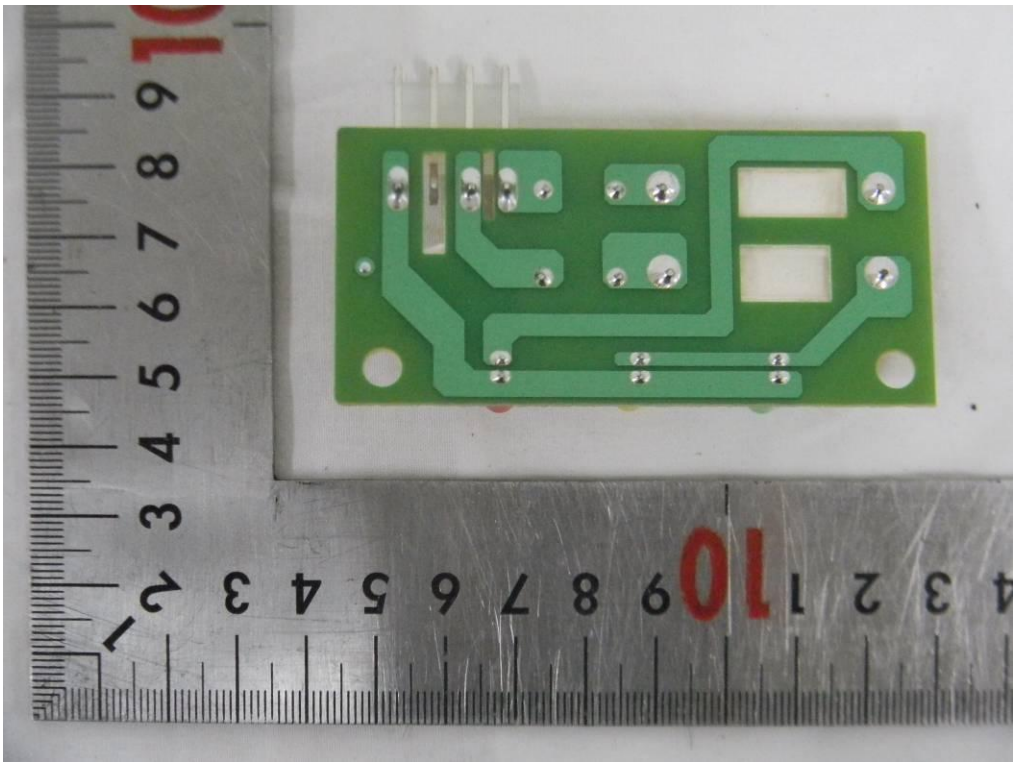
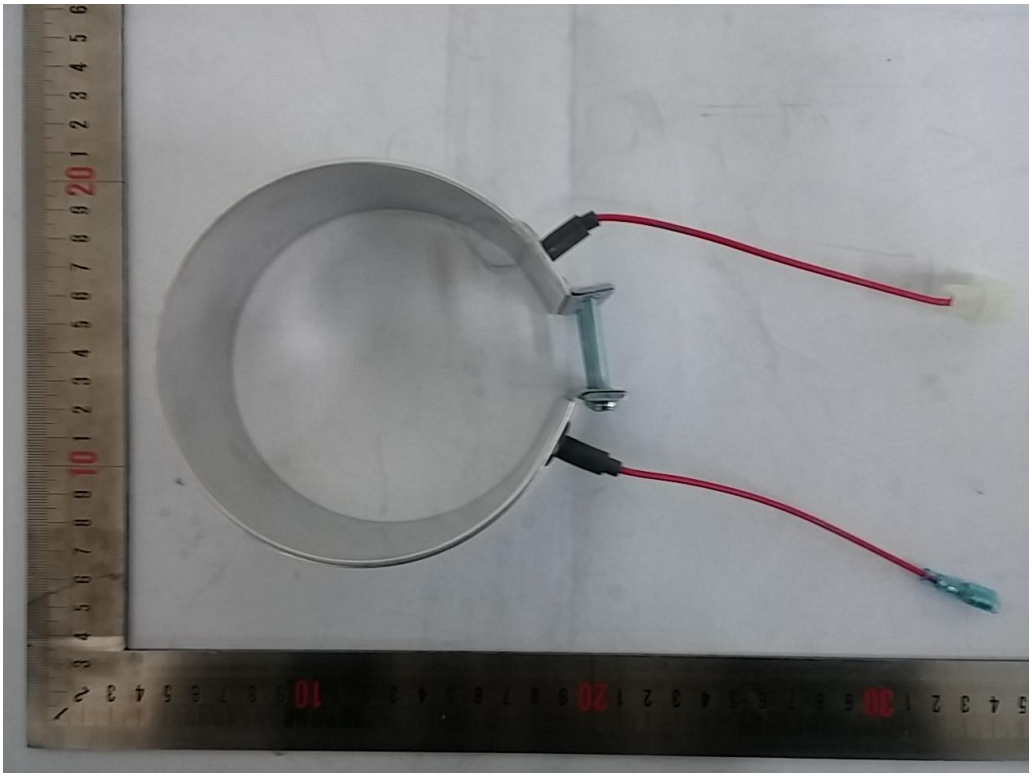


<Bottom>

Photograph (Band heater)



<Top>

<Band heater difference between model W2-170S and W2-170P>

Test Report issued under the responsibility of:

SGS Fimko Ltd.

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

Report Number. ..... :	**F690501/RF-SAF007903 Attachment 1**
Date of issue ..... :	July 06, 2016
Total number of pages ..... :	**10 pages**
Name of Testing Laboratory preparing the Report ..... :	SGS Korea Co., Ltd. Gunpo Laboratory 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Repubilc of Korea
Applicant's name ..... :	HYUNDAI Wacortec Co., Ltd.
Address ..... :	A-301, Hagye Technotown, 10, Nowon-ro15-gil, Nowon-gu, Seoul, 01788, Republic of Korea
Test specification:	
Standard ..... :	IEC 60335-2-21: 2012 (Sixth Edition) used in conjunction with IEC 60335-1:2010 (Fifth Edition) incl. Corr. 1:2010 and Corr. 2:2011 + A1:2013
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60335_2_21H
Test Report Form(s) Originator .... :	LCIE
Master TRF ..... :	Dated 2015-11

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description ..... :	Hot and cold water dispenser with purifier system
Trade Mark ..... :	HYUNDAI WACORTEC Co., Ltd.
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	W2-170P, W2-150, W2-150P, W2-160, W2-160P, W2-170, W2-170S, W2-170SP
Ratings ..... :	For model W2-170P, W2-150, W2-150P, W2-160, W2-160P, W2-170 220 – 240 V~, 50 Hz, 570 – 650 W, 450 – 520 W (Hot), 0.8 – 0.9 A (Cold) For model W2-170S, W2-170SP 220 – 240 V~, 50 Hz, 450 – 530 W, 320 – 380 W (Hot), 0.8 – 0.9 A (Cold)

6	CLASSIFICATION		
6.1	Protection against electric shock: Class 0, 0I, I, II, III..... ..... :	Class I	P
	Water heaters shall be class I, class II or class III (IEC 60335-2-21)	Class I	P
6.2	Protection against harmful ingress of water		P
	Water heaters for installation outdoors shall be at least IPX4. Other water heaters shall be at least IPX1; (IEC 60335-2-21)	IPX1	P
7	MARKING AND INSTRUCTIONS		
7.1	Appliances, other than cistern-type water heaters, shall be marked with the rated pressure in pascals (bars)..... (IEC 60335-2-21)	Cistern-type 392 kPa (when UF Filter System), 687 kPa (when RO Filter System)	N/A
	Rated capacity in litres (IEC 60335-2-21)	Marked	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)		N/A
	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)		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)		N/A
7.12	Instructions for safe use provided		P
	The instructions for close water heaters shall state the substance of the following (IEC 60335-2-21):		
	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
	The installation instructions shall state the substance of the following (IEC 60335-2-21):		
	-the type or characteristics of the pressure relief device, how to connect it, unless it is incorporated in the appliance		N/A

	-a discharge pipe connected to the pressure relief device installed downwards direction and in a frost-free environment		N/A
	-the type or characteristics of a pressure reducing valve and the installation details (for appliances having a rated pressure less than 0,6 MPa)		N/A
	The instructions for close water heaters incorporating heat exchanger shall give details on the installation of control devices and the temperature settings that are necessary to prevent operation of the thermal cut-out caused by the heat from the exchanger (IEC 60335-2-21)		N/A
	The instructions for cistern-fed water heaters and low-pressure water heaters shall contain the substance of the following (IEC 60335-2-21): Warning : Do not connect any pressure-relief device to the vent pipe of this water heater		N/A
7.101	The water inlet and the water outlet shall be identified. (IEC 60335-2-21)	Water supply inlet: "Inlet" sticker on the backside.	P
	This identification shall not be on detachable parts.		P
	If colours are used, blue shall be used for the inlet and red for the outlet.		N/A
	An alternative means of identification may be by means of arrows showing the direction of the water flow.		N/A
11	HEATING		
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)	Until steady conditions	P
15	MOISTURE RESISTANCE		
15.2	Spillage of liquid does not affect the electrical insulation		P
	Spillage solution comprising water containing approximately 1 % NaCl and 0,6 % rinsing agent		P
	The test is only applicable to cistern-type water heaters. (IEC 60335-2-21)		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 are removed		N/A

	Overfilling test with additional amount of the solution over a period of 1 min (l) ..... :	0.75 (l), tested on the water drip tray	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 or creepage distances below values specified in clause 29		P
19	ABNORMAL OPERATION		
19.1	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)	Cistern-type	N/A
	Or - 19.101 applies for appliances not liable to be emptied in normal use and having all following features: (IEC 60335-2-21) - an outer enclosure of metal *or a water container of metal and an outer enclosure of non-metallic material;* (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)		N/A
19.2	Test of appliances with heating elements with restricted heat dissipation; test voltage (V), power input of 0.85 times rated power input (W) ..... :	199.2 V, 382.5 W	P
	Appliance operated empty with thermal control operating in clause 11 short-circuited (see note) ..... (IEC 60335-2-21)	Non self resetting thermal cut out operated	P
19.3	Test of 19.2 repeated; test voltage (V), power input of 1.24 times rated power input (W) ..... :	265.2 V, 644.8 W	P
19.4	Open-outlet water heaters: ..... (IEC 60335-2-21) -19.2 repeated with container filled with water min. 10mm above heater -1.15 times rated power input		N/A
19.13	There shall be no leakage from the container during the test ..... (IEC 60335-2-21)		P
19.101	Appliance tested for 24h as specified in clause 11 but with empty container ..... (IEC 60335-2-21)		P
22	CONSTRUCTION		
22.6	Electrical insulation not affected by condensing water or leaking liquid		P

	Drain hole correct positioned to prevent water from impairing electrical insulation (IEC 60335-2-21)		P
	Dimension of drain hole: min. ∅=5mm or 20 mm2 with width min. 3mm (IEC 60335-2-21)		P
22.20	Thermal insulation not used for basic insulation of internal wiring (IEC 60335-2-21)		P
22.47	Appliances shall withstand the water pressure occurring in normal use. (IEC 60335-2-21)		
	-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
	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.	1 374 kPa (687 kPa x 2)	P

22.101	The rated pressure of (IEC 60335-2-21)		
	- 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		N/A
22.102	Closed water heaters shall be constructed so that repeated drawing off does not cause the water to boil. (IEC 60335-2-21)		N/A
	Temperature of the water, measured by means of a thermocouple at the outlet, shall not exceed 98 °C		N/A
22.103	Closed water heaters: pressure relief devise prevent pressure from exceeding rated pressure by more than 0.1 MPa (IEC 60335-2-21)		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)		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)		P
22.106	Closed water heaters: thermal cut-out providing all-pole disconnection, independent from the thermostat (IEC 60335-2-21)		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)		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)		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)		N/A
22.110	Open-outlet water heaters with plastic enclosure instructions ensure correct installation (see NOTE) (IEC 60335-2-21)		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)		N/A
24	COMPONENTS		
24.1.4	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)		N/A
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)		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 that the thermal cut out operate before its temperature exceeds 110 °C (IEC 60335-2-21)		N/A
24.102.1	Tested as specified (IEC 60335-2-21) Water temperature not exceeding 99°C		N/A
	If compliance relies on the operation of an electronic circuit, the test is repeated under the following conditions applied separately: – the fault conditions in a) to g) of 19.11.2 applied one at a time to the electronic circuit; – the electromagnetic phenomena tests of 19.11.4.1 to 19.11.4.7 applied to the appliance. The temperature of the water at the outlet shall not exceed 99 °C during or after each of the tests		N/A
	If the electronic circuit is programmable, the software shall contain measures to control the fault/error conditions specified in Table R.1 and is evaluated in accordance with the relevant requirements of Annex R.		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. (IEC 60335-2-21)		N/A
	If compliance relies on the operation of an electronic circuit, the test is repeated under the following conditions applied separately: – the fault conditions in a) to g) of 19.11.2 applied one at a time to the electronic circuit; – the electromagnetic phenomena tests of 19.11.4.2 and 19.11.4.5 applied to the appliance. The temperature of the water at the outlet shall not exceed 110 °C during or after each of the tests.		N/A

25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
25.1	appliance inlet not allowed (IEC 60335-2-21)		N/A
27	PROVISION FOR EARTHING		
27.1	Class I water heaters, sheath of heating element permanently and reliably connected to earthing terminal, unless (IEC 60335-2-21)		P
	-provided with inlet and outlet pipes of metal permanently and reliably connected to earthing terminal (IEC 60335-2-21)		P
	-other accessible metal parts in contact with the water permanently and reliably connected to earthing terminal (IEC 60335-2-21)		N/A
30	RESISTANCE TO HEAT AND FIRE		
30.1	The temperature rises occurring during the tests of 19.2, 19.3 and 19.101 are not taken into account ..... (IEC 60335-2-21)		P

19	**Abnormal operation conditions**	**P**

Operational characteristics	YES/NO	Operational conditions
Are there electronic circuits to control the appliance operation?	Yes	Operating modes can be selected by electronic control.
Are there “off” or “stand-by” position?	No	-
The unintended operation of the appliance results in dangerous malfunction?	No	-

Sub-clause	Operating conditions description	Test results description	PEC description	EMP 19.11.4	Software type required	19.11.3 PEC	Final result
19.2	0,85 times of rated power input and operated empty with thermal control on hot water tank short-circuited.	Non self resetting thermal cut out operated.	No PEC	N/A	N/A	N/A	No damage No hazards
19.3	1,24 times of rated power input and operated empty, thermal control on hot water tank short-circuited.	Non self resetting thermal cut out operated.	No PEC	N/A	N/A	N/A	No damage No hazards
19.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.11.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.11.4.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19.101	24h operated under condition of cl.11 with the container empty.	After few minute, non self resetting thermal cut out operated.	No PEC	N/A	N/A	N/A	No damage No hazards

Supplementary information: -