



<b>TEST REPORT</b> <b>IEC 60335-2-40</b> <b>Safety of household and similar electrical appliances</b> <b>Part 2-40: Particular requirements for electrical heat pumps, air conditioners and dehumidifiers</b>	
<b>Report Number</b> .....	64.111.14.00105.07 Rev.00
<b>Date of issue</b> .....	2018-08-06
<b>Total number of pages</b> .....	102
<b>Applicant's name</b> .....	GD Midea Heating & Ventilating Equipment Co., Ltd.
<b>Address</b> .....	Penglai Industry Road, Beijiao, Shunde, 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA.
<b>Test specification:</b>	
<b>Standard</b> .....	IEC 60335-2-40:2002 (Fourth Edition) + A1:2005 (incl. Corr.1:2006) + A2:2005 in conjunction with IEC 60335-1:2010 (Fifth Edition)
<b>Test procedure</b> .....	CE_LVD and CE_MD
<b>Non-standard test method</b> .....	N/A
<b>Test Report Form No.</b> .....	IEC60335_2_40J
<b>Test Report Form(s) Originator</b> .....	VDE
<b>Master TRF</b> .....	Dated 2014-06
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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.	
<b>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.</b>	
<b>General disclaimer:</b>	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

<b>Test item description</b> .....	Split type Air Conditioner (High-static pressure air conditioner)
<b>Trade Mark</b> .....	Midea, MDV
<b>Manufacturer</b> .....	GD Midea Heating & Ventilating Equipment Co., Ltd. Penglai Industry Road, Beijiao, Shunde, 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA.
<b>Model/Type reference</b> .....	MHC-96HWD1N1/MOVG-96HD1N1-R, MHC-96CWD1N1/MOVG-96CD1N1-R, MHC-76HWD1N1/MOVG-76HD1N1-R, MHC-76CWD1N1/MOVG-76CD1N1-R, MHC-96HWD1N1(A)/MOUA-96HD1N1-R, MHC-96CWD1N1(A)/MOUA-96CD1N1-R, MHC1-76HWD1N1/MOVG1-76HD1N1-R, MHC1-76CWD1N1/MOVG1-76CD1N1-R
<b>Ratings</b> .....	Indoor unit: 220-240V~, 50Hz; outdoor unit: 380-415V 3N~, 50Hz; R410A; IPX0 for indoor unit, IPX4 for outdoor unit; for other ratings can refer to model list on page 9.

**Testing procedure and testing location:**

<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch	
	<b>Testing location/ address</b> .....	Location 1: 5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West Guangzhou 510656 P. R. China  Location 2: B1 Floor, No. 3 Chuangqi Building, TusPark, 63 Chuangqi Road, Shilou Town, Panyu District, Guangzhou 511447, P.R. China	
<input type="checkbox"/>	<b>Associated CB Testing Laboratory:</b>	N/	
	<b>Testing location/ address</b> .....	N/A	
	<b>Tested by (name + signature)</b> .....	Ress Cai	
	<b>Approved by (name + signature)</b> .....	Sam Yang	
<input type="checkbox"/>	<b>Testing procedure: TMP/CTF Stage 1:</b>	N/A	
	<b>Testing location/ address</b> .....	N/A	
	<b>Tested by (name + signature)</b> .....	N/A	
	<b>Approved by (name + signature)</b> .....	N/A	
<input type="checkbox"/>	<b>Testing procedure: WMT/CTF Stage 2:</b>	N/A	
	<b>Testing location/ address</b> .....	N/A	
	<b>Tested by (name + signature)</b> .....	N/A	
	<b>Witnessed by (name + signature) ...:</b>	N/A	
	<b>Approved by (name + signature)</b> .....	N/A	

<input type="checkbox"/>	<b>Testing procedure: SMT/CTF Stage 3 or 4:</b>	N/A
<b>Testing location/ address .....</b> :		N/A
<b>Tested by (name + signature).....</b> :		N/A
<b>Witnessed by (name + signature) .....</b> :		N/A
<b>Approved by (name + signature).....</b> :		N/A
<b>Supervised by (name + signature).....</b> :		N/A

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

- a) Attachment No. 1: 17 pages of report DIFFERENCES for EN 60335-2-40:2003 (incl. Corr.:2006) + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012 and EN 60335-1:2012.
- b) Attachment No. 2: 2 pages of report for EN 60335-1:2012/A11:2014.
- c) Attachment No. 3: 2 pages of report for EN 60335-1:2012/A13:2017.
- d) Attachment No. 4: 61 pages of report EN 378-2:2016

**Summary of testing:**

**Tests performed (name of test and test clause):**

1. EN 60335-1:2012 + A11:2014 + A13:2017  
EN 60335-2-40:2003 + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012,  
EN 62233: 2008 and EN 378-2:2016.
2. For the report 64.111.14.00105.01 Rev.00, full tests were carried out on MHC96HWD1N1/MOVG-96HD1N1-R as representative.
3. For the report 64.111.14.00105.03 Rev.00, full tests were carried out on MHC-96HWD1N1(A)/MOUA-96HD1N1-R as representative.
4. For the report 64.111.14.00105.05 Rev.00, the tests of clauses 10, 11, 13, 19.5, 19.7, 27.5, Annex EE and EMF were re-evaluated on model MHC1-76HWD1N1/MOVG1-76HD1N1-R.
5. For the report 64.111.14.00105.05 Rev.01, after evaluation, additional test of clause 30 were carried on PCB, relay and varistor samples.
6. For the report 64.111.14.00105.06 Rev.00. Full tests were conducted according to EN 378-2 for all models.
6. For the report 64.111.14.00105.07 Rev.00. Tests of clause 30 were conducted on alternative terminal T5312-3-6P and AC contactor AX25, XMC0-258 and NC1-2501.

**Testing location:**

TÜV SÜD Certification and Testing (China) Co., Ltd.  
Guangzhou Branch  
For clauses 10, 11, 13, 19.2, 19.5, 19.7, 19.10, 19.14:  
B1 Floor, No. 3 Chuangqi Building, TusPark, 63 Chuangqi Road, Shilou Town, Panyu District, Guangzhou 511447, P.R. China  
Other clauses:  
5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou 510656, P. R. China

**Summary of compliance with National Differences:**

**List of countries addressed:**

**The product fulfils the requirements of EN 60335-1:2012 + A11:2014 + A13:2017, EN 60335-2-40:2003 + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012, EN 62233:2008 & EN 378-2:2016**

**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.

<b>HIGH-STATIC PRESSURE AIR CONDITIONER INDOOR UNIT</b>		
MODEL	MHC-96HWD1N1	
COOLING CAPACITY	26.5kW	
HEATING CAPACITY	26.5kW	
POWER SUPPLY	220-240V ~ 50Hz	
RATED INPUT	850W	
NET WEIGHT	83kg	
REFRIGERANT	R410A	
PS	HIGH	4.4MPa
	LOW	2.6MPa













<b>HIGH-STATIC PRESSURE AIR CONDITIONER OUTDOOR UNIT</b>		
MODEL	MOVG-96HD1N1-R	
COOLING CAPACITY	26.5kW	
HEATING CAPACITY	26.5kW	
POWER SUPPLY	380-415V 3N~ 50Hz	
RATED INPUT	9250W	
NET WEIGHT	231kg	
REFRIGERANT	R410A/10000g	
PS	HIGH	4.4MPa
	LOW	2.6MPa
OUTDOOR RESISTANCE CLASS	IP X4	
<small>GD Midea Heating &amp; Ventilating Equipment Co.,Ltd. (Penglai Industry Road,Beijiao,Shunde, Foshan, Guangdong,528311,P.R.China)</small>		

<b>HIGH-STATIC PRESSURE AIR CONDITIONER INDOOR UNIT</b>		
MODEL	MHC-96CWD1N1	
COOLING CAPACITY	26.5kW	
HEATING CAPACITY	————	
POWER SUPPLY	220-240V ~ 50Hz	
RATED INPUT	850W	
NET WEIGHT	83kg	
REFRIGERANT	R410A	
PS	HIGH	4.4MPa
	LOW	2.6MPa

<b>HIGH-STATIC PRESSURE AIR CONDITIONER OUTDOOR UNIT</b>		
MODEL	MOVG-96CD1N1-R	
COOLING CAPACITY	26.5kW	
HEATING CAPACITY	————	
POWER SUPPLY	380-415V 3N~ 50Hz	
RATED INPUT	9250W	
NET WEIGHT	231kg	
REFRIGERANT	R410A/10000g	
PS	HIGH	4.4MPa
	LOW	2.6MPa
OUTDOOR RESISTANCE CLASS	IP X4	
<small>GD Midea Heating &amp; Ventilating Equipment Co.,Ltd. (Penglai Industry Road,Beijiao,Shunde, Foshan, Guangdong,528311,P.R.China)</small>		

<b>HIGH-STATIC PRESSURE AIR CONDITIONER INDOOR UNIT</b>		
MODEL	MHC-76CWD1N1	
COOLING CAPACITY	23.5kW	
HEATING CAPACITY	————	
POWER SUPPLY	220-240V ~ 50Hz	
RATED INPUT	850W	
NET WEIGHT	83kg	
REFRIGERANT	R410A	
PS	HIGH	4.4MPa
	LOW	2.6MPa

<b>HIGH-STATIC PRESSURE AIR CONDITIONER OUTDOOR UNIT</b>		
MODEL	MOVG-76CD1N1-R	
COOLING CAPACITY	23.5kW	
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POWER SUPPLY	380-415V 3N~ 50Hz	
RATED INPUT	9250W	
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<b>HIGH-STATIC PRESSURE AIR CONDITIONER INDOOR UNIT</b>		
MODEL	MHC1-76HWD1N1	
COOLING CAPACITY	20kW	
HEATING CAPACITY	20kW	
POWER SUPPLY	220-240~ 50Hz	
RATED INPUT	650W	
NET WEIGHT	83kg	
REFRIGERANT	R410A	
PS	HIGH	4.4MPa
	LOW	2.6MPa

<b>HIGH-STATIC PRESSURE AIR CONDITIONER OUTDOOR UNIT</b>		
MODEL	MOVG1-76HD1N1-R	
COOLING CAPACITY	20kW	
HEATING CAPACITY	20kW	
POWER SUPPLY	380-415V 3N~ 50Hz	
RATED INPUT	8000W	
NET WEIGHT	231kg	
REFRIGERANT	R410A/9000g	
PS	HIGH	4.4MPa
	LOW	2.6MPa
OUTDOOR RESISTANCE CLASS	IPX4	
<small>GD Midea Heating &amp; Ventilating Equipment Co.,Ltd. (Penglai Industry Road,Beijiao,Shunde, Foshan, Guangdong,528311,P.R.China)</small>		

<b>HIGH-STATIC PRESSURE AIR CONDITIONER INDOOR UNIT</b>		
MODEL	MHC1-76CWD1N1	
COOLING CAPACITY	20kW	
HEATING CAPACITY	20kW	
POWER SUPPLY	220-240~ 50Hz	
RATED INPUT	650W	
NET WEIGHT	83kg	
REFRIGERANT	R410A	
PS	HIGH	4.4MPa
	LOW	2.6MPa

<b>HIGH-STATIC PRESSURE AIR CONDITIONER OUTDOOR UNIT</b>		
MODEL	MOVG1-76CD1N1-R	
COOLING CAPACITY	20kW	
HEATING CAPACITY	20kW	
POWER SUPPLY	380-415V 3N~ 50Hz	
RATED INPUT	8000W	
NET WEIGHT	231kg	
REFRIGERANT	R410A/9000g	
PS	HIGH	4.4MPa
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OUTDOOR RESISTANCE CLASS	IPX4	
<small>GD Midea Heating &amp; Ventilating Equipment Co.,Ltd. (Penglai Industry Road,Beijiao,Shunde, Foshan, Guangdong,528311,P.R.China)</small>		

Remark:

1. The height of CE marking shall be higher than 5mm and the height of WEEE marking shall be higher than 7mm.
2. The rating labels with trademark MDV is the same as above rating labels with trademark Midea except for the trademark is different.
3. According to the EU directives which have been aligned with EU NLF (new legislative framework), both of manufacturer and importer's name and address shall be affixed on the product or, where that is not possible, on its packaging or in a document accompanying the product before the product is placed on the EU market.

<b>Test item particulars</b> ..... : -	
<b>Classification of installation and use</b> .....	Fixed appliances
<b>Supply Connection</b> .....	Fixed wiring
..... :	
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing</b> .....	
<b>Date of receipt of test item</b> .....	2014-01-20; 2014-09-04; 2014-12-20; 2015-01-27; 2015-05-18; 2016-10-15; 2018-06-08
<b>Date (s) of performance of tests</b> .....	2014-02-10~2014-03-05; 2014-09-12; 2018-06-08 2014-12-22~2015-01-25; 2015-01-28~2015-02-08; 2015-06-01~2015-06-25; 2016-10-15~2016-12-01; 2018-06-08~2018-08-06.
<b>General remarks:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.          "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p> <p>This TRF includes an appendix EMF containing the IEC/EN 62233 requirements (see below).          IEC 62233:2005 (1. Edition)          EN 62233:2008 (incl. Corr.1:2008)</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC60335-1:</b>	
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 .....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies)</b> .....	GD Midea Heating & Ventilating Equipment Co., Ltd. Penglai Industry Road, Beijiao, Shunde, 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA.

**General product information:**

1. The appliances are split type air conditioner (High-static pressure air conditioner);
2. This report 64.111.14.00105.05 Rev.01 bases on the report 64.111.14.00105.05 Rev.00, issued for changing address of compressor E705DHD-72D2YG and adding alternative PCB, relay, fuse and varistor.
3. The models MHC-96HWD1N1/MOVB-96HD1N1-R, MHC-76HWD1N1/MOVB-76HD1N1-R, MHC-96HWD1N1(A)/MOUA-96HD1N1-R are the same as models MHC-96CWD1N1/MOVB-96CD1N1-R, MHC-76CWD1N1/MOVB-76CD1N1-R, MHC-96CWD1N1(A)/MOUA-96CD1N1-R except for the models MHC-96HWD1N1/MOVB-96HD1N1-R, MHC-76HWD1N1/MOVB-76HD1N1-R, MHC-96HWD1N1(A)/MOUA-96HD1N1-R employed a 4-way valve.
4. The models MHC-76HWD1N1/ MOVB-76HD1N1-R and MHC-76CWD1N1/MOVB-76CD1N1-R are the same as issued models MHC-96HWD1N1/MOVB-96HD1N1-R and MHC-96CWD1N1/MOVB-96CD1N1-R respectively except for the model name and capacity code setting are different.
5. The indoor unit MHC-96HWD1N1(A), MHC-96CWD1N1(A) are the same as MHC-96HWD1N1, MHC-96CWD1N1, MHC-76HWD1N1, MHC-76CWD1N1 except that MHC-96HWD1N1(A), MHC-96CWD1N1(A) have no throttling element.
6. The new model MHC1-76HWD1N1/MOVB1-76HD1N1-R is the same as issued model MHC-96HWD1N1/MOVB-96HD1N1-R except the models name, capacity code setting, compressor, oil separator and mass of refrigerant.
7. The model MHC1-76HWD1N1/MOVB1-76HD1N1-R is the same as model MHC1-76CWD1N1/ MOVB1-76CD1N1-R except the model MHC1-76HWD1N1/MOVB1-76HD1N1-R employed a 4-way valve.
8. The fan module board DCFAN(W750\_R50m).D.13.MKSP.2.1-1 is the same as issued fan module board DC-FAN-15A (PS21964).D.13.MP1-1 except for the layout.
9. The indoor main power is supplied by a 3-pole supply cable which not supply by manufactory; the outdoor main power is supplied by a 5-pole supply cable which not supply by manufactory; indoor unit and outdoor unit are connected by interconnection cables which not supplied by manufactory.
10. This test report 64.111.14.00105.06 Rev.00 supersedes original test report 64.111.14.00105.05 Rev.01 dated 2016-12-23, modified on 2017-12-25, issued for following changes and/or additions, which were considered technical modifications:
  - a) Upgrading standards  
from:  
EN 60335-1:2012 + A11:2014  
EN 60335-2-40:2003 + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012,  
EN 62233: 2008 and EN 378-2:2008 + A1:2009 + A2:2012  
To:  
EN 60335-1:2012+A11:2014  
EN 60335-2-40:2003 + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012,  
EN 62233:2008 and EN 378-2:2016
  - b) Changing permissible excessive operating pressure of refrigerant circuit for suction side from 2,6MPa to 3,4MPa for models MOUA-96CD1N1-R and MOUA-96HD1N1-R.
11. This test report 64.111.14.00105.07 Rev.00 supersedes original test report 64.111.14.00105.06 Rev.00 dated 2017-12-25, modified on 2018-08-06, issued for following changes and/or additions, which were considered technical modifications:
  - a) Upgrading standards  
from: EN 60335-1:2012 + A11:2014  
EN 60335-2-40:2003 + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012,  
EN 62233: 2008  
EN 378-2:2016  
To: EN 60335-1:2012 + A11:2014 + A13:2017  
EN 60335-2-40:2003 + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012,  
EN 62233:2008  
EN 378-2:2016
  - b) Adding alternative PCB material manufacturers in table 24.1.  
Adding alternative outdoor fan motor model WZDK170-38G-1 (RD-380-170-8) in table 24.1 which is the same as model WZDK170-38G-1 (RD-310-170-8) except model name.  
Adding alternative terminal model T5312-3-6P in table 24.1.



Adding alternative AC contactor model AX25, XMC0-258 and NC1-2501 in table 24.1.  
 Adding outdoor unit's Electrolytic Capacitors, Electronic expansion valve and optocoupler information in table 24.1.  
 Adding alternative X2 capacitor model "HQX/ HCR/ HQXR" in table 24.1.  
 Adding alternative varistor model SIOV-S14K420 and E11681 in table 24.1.

12. Model list:

Unit	Issued models	Rated power input		Refrigerant/ Charge
		Cooling mode	Heating mode	
Indoor unit	MHC-96HWD1N1	850W	850W	-
Outdoor unit	MOVG-96HD1N1-R	9250W	9250W	R410A/10000g
Indoor unit	MHC-96CWD1N1	850W	-	-
Outdoor unit	MOVG-96CD1N1-R	9250W	-	R410A/10000g
Indoor unit	MHC-76HWD1N1	850W	850W	-
Outdoor unit	MOVG-76HD1N1-R	9250W	9250W	R410A/10000g
Indoor unit	MHC-76CWD1N1	850W	-	-
Outdoor unit	MOVG-76CD1N1-R	9250W	-	R410A/10000g
Indoor unit	MHC-96HWD1N1(A)	850W	850W	-
Outdoor unit	MOUA-96HD1N1-R	11700W	11700W	R410A/7200g
Indoor unit	MHC-96CWD1N1(A)	850W	-	-
Outdoor unit	MOUA-96CD1N1-R	11700W	-	R410A/7200g
Indoor unit	MHC1-76HWD1N1	650W	650W	-
Outdoor unit	MOVG1-76HD1N1-R	8000W	8000W	R410A/9000g
Indoor unit	MHC1-76CWD1N1	650W	-	-
Outdoor unit	MOVG1-76CD1N1-R	8000W	-	R410A/9000g

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		-
	Tests performed according to clause 5, e.g. nature of supply, sequence of testing, etc.		P
5.2	Tests of clause 21 carried out on separate samples. Tests of clauses 11, 19 and 21 require pressure measurements made at various points in refrigerating system (IEC 60335-2-40/A1)		P
	At least one additional specially prepared sample required for tests of annex FF (Leak simulation tests) (IEC 60335-2-40/A1)		N/A
	Temperatures on refrigerant piping measured during test of clause 11 (IEC 60335-2-40/A1)		P
5.6	Appropriate controls rendered inoperative during test (IEC 60335-2-40)		P
5.7	Tests of clauses 10 and 11 carried out under most severe operating conditions within operating temperature range specified by manufacturer. Annex AA provide examples of such temperature conditions (IEC 60335-2-40)		P
5.10	For split-package units, refrigerant lines installed in accordance with installation instructions (IEC 60335-2-40)		P
	Refrigerant line length is maximum length stated in installation instructions or (IEC 60335-2-40)		P
	7,5 m, whichever is shorter (IEC 60335-2-40)		N/A
	Thermal insulation of refrigerant lines applied in accordance with installation instructions (IEC 60335-2-40)		P
5.101	Motor-compressor subjected to relevant test of clause 19 of IEC 60335-2-34, unless (IEC 60335-2-40)	For compressor E705DHD-72D2YG	P
	motor-compressor comply with that standard (IEC 60335-2-40)	For compressor LNB53FCAMC	P
5.102	Motor-compressors tested and comply with IEC 60335-2-34 need not additionally tested for clause 21 (IEC 60335-2-40/A1)		P
6	CLASSIFICATION		
6.1	Protection against electric shock: Class I, II, III (IEC 60335-2-40).....:	Class I	P
6.2	Protection against harmful ingress of water, IP degree in accordance with IEC 60529 (IEC 60335-2-40)		-
	- appliances or parts intended for outdoor use be at least IPX4 (IEC 60335-2-40);	IPX4	P
	- appliances intended only for indoor use (excluding laundry rooms) be IPX0 (IEC 60335-2-40);	IPX0 for indoor unit (no marked)	P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	- appliances intended to be used in laundry rooms be at least IPX1 (IEC 60335-2-40).		N/A
6.101	Degree of accessibility (accessible/not accessible to the general public) (IEC 60335-2-40)	Accessible to the general public	P
7	MARKING AND INSTRUCTIONS		-
7.1	Rated voltage or voltage range (V).....:	Indoor unit: 220-240; Outdoor unit: 380-415.	P
	Symbol for nature of supply including number of phases, unless for single phase operation (IEC 60335-2-40).....:	Indoor unit: ~ Outdoor unit: 3N~	P
	Rated frequency (Hz) .....	50	P
	Rated power input (W), or .....	See rating labels	P
	Rated current (A) .....		N/A
	Manufacturer's or responsible vendor's name, trademark or identification mark.....:	Midea and MDV	P
	Model or type reference.....:	See rating labels	P
	Symbol IEC 60417-5172, for class II appliances		N/A
	IP number, other than IPX0.....:	Outdoor unit: IPX4	P
	Symbol IEC 60417-5180, for class III appliances, unless		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		N/A
	Mass of refrigerant or of each refrigerant in blend (except for azeotropic type) (IEC 60335-2-40) .....	See rating labels	P
	Refrigerant identification (IEC 60335-2-40).....:	R410A	P
	Permissible excessive operating pressure for sanitary hot water heat pumps (IEC 60335-2-40)..:		N/A
	Maximum operating pressure for heat exchanger for hydronic fan coil/air handling units (IEC 60335-2-40/A2) .....		N/A
	Permissible excessive operating pressure of refrigerant circuit for suction and discharge, if they differ (IEC 60335-2-40).....:	Discharge: 4,4MPa Suction: for model MOUA-96CD1N1-R and MOUA-96HD1N1-R: 3,4MPa; for other models: 2,6MPa	P
	Symbol for degree of protection against ingress of water, other than IPX0 (IEC 60335-2-40) .....	Outdoor unit: IPX4	P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Separate marking of appliances with all rated characteristics of supplementary heaters (IEC 60335-2-40).....:		N/A
	Marking of direction of fluid flow (IEC 60335-2-40)		N/A
	Flame symbol and instruction manual symbol of 7.6 visible when flammable refrigerant employed and following conditions exist (IEC 60335-2-40/A1):		-
	- accessing parts expected to be subjected to maintenance or repair (IEC 60335-2-40/A1);		N/A
	- observing appliance under sale or installed conditions (IEC 60335-2-40/A1);		N/A
	- observing appliance packaging, if appliance charged with refrigerant (IEC 60335-2-40/A1).		N/A
	If flammable refrigerant used, symbols for “read operator’s manual”, “operator’s manual; operating instructions” and “service indicator; read technical manual” (symbols 0790, 1641 and 1659 of ISO 7000) placed on appliance in location visible to persons required to know information. Perpendicular height be at least 10 mm (IEC 60335-2-40/A1 corr.1)		N/A
	Additional warning symbol (flame symbol: B.3.2 of ISO 3864) placed on nameplate of unit near declaration of refrigerant type and charge information. Perpendicular height be at least 10 mm, and symbol need not be in colour (IEC 60335-2-40/A1)		N/A
	Following warning also applied to appliance when flammable refrigerant employed.  WARNING Appliance shall be installed, operated and stored in a room with a floor area larger than ‘X’ m <sup>2</sup> (only applies to appliances that are not fixed appliances) (IEC 60335-2-40/A1)		N/A
	Not fixed appliances, minimum room size X specified on appliance. X in marking determined in m <sup>2</sup> by procedure described in paragraph 2 of annex GG for unventilated areas and X in marking be 4 if refrigerant charge of appliance is less than m1 (see annex GG, paragraph 1.1) (IEC 60335-2-40/A1)		N/A
	Maximum allowable pressure for low-pressure side and high-pressure side marked on product (IEC 60335-2-40/A1)		N/A
	If not already visible when accessing service port and if service port provided, service port marked to identify type of refrigerant. If refrigerant is flammable, symbol B.3.2 of ISO 3864, be included, without specifying the colour (IEC 60335-2-40/A1)		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	Warning for stationary appliances for multiple supply		P
	Warning placed in vicinity of terminal cover		P
7.3	Range of rated values marked with the lower and upper limits separated by a hyphen		P
	Different rated values marked with the values separated by an oblique stroke		N/A
7.4	Appliances adjustable for different rated voltages, the voltage setting is clearly discernible		N/A
	Requirement met if frequent changes are not required and the rated voltage to which the appliance is to be adjusted is determined from a wiring diagram		N/A
7.5	Appliances with more than one rated voltage or one or more rated voltage ranges, marked with rated input or rated current for each rated voltage or range, unless		N/A
	the power input is related to the arithmetic mean value of the rated voltage range		P
	Relation between marking for upper and lower limits of rated power input or rated current and voltage is clear		N/A
7.6	Correct symbols used		P
	Flammable refrigerant, warning symbol B.3.2 of ISO 3864, including colour and format, permanently placed on appliance. Perpendicular height of triangle containing "Caution, risk of fire" symbol be at least 30 mm (IEC 60335-2-40/A1)		N/A
	Flammable refrigerant, symbol requiring reference to manual [0790 of ISO 7000], including colour and format, permanently placed on appliance (IEC 60335-2-40/A1 corr.1)		N/A
	Symbol for nature of supply placed next to rated voltage		P
	Symbol for class II appliances placed unlikely to be confused with other marking		N/A
	Units of physical quantities and their symbols according to international standardized system		P
7.7	Connection diagram fixed to appliances to be connected to more than two supply conductors and appliances for multiple supply, unless		P
	correct mode of connection is obvious		N/A
7.8	Except for type Z attachment, terminals for connection to the supply mains indicated as follows:		-

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	- marking of terminals exclusively for the neutral conductor (letter N)		P
	- marking of protective earthing terminals (symbol IEC 60417-5019)		P
	- marking not placed on removable parts		P
7.9	Marking or placing of switches which may cause a hazard		N/A
7.10	Indications of switches on stationary appliances and controls on all appliances by use of figures, letters or other visual means .....	"ON/OFF"	P
	This applies also to switches which are part of a control		N/A
	If figures are used, the off position indicated by the figure 0		N/A
	The figure 0 indicates only OFF position, unless no confusion with the OFF position		N/A
7.11	Indication for direction of adjustment of controls		P
7.12	Instructions for safe use provided		P
	Details concerning precautions during user maintenance		P
	Appliances not accessible to general public, classification of clause 6.101 included (IEC 60335-2-40)		N/A
	Appliances using flammable refrigerants, an installation, service and operation manual, either separate or combined manuals, provided and include information given in annex DD (IEC 60335-2-40/A1)		N/A
	The instructions state that:		-
	- the appliance is not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction	Replaced by EN 60335-1:2012	N/A
	- children being supervised not to play with the appliance	Replaced by EN 60335-1:2012	N/A
	For a part of class III construction supplied from a detachable power supply unit, the instructions state that the appliance is only to be used with the unit provided		N/A
	Instructions for class III appliances state that it must only be supplied at SELV, unless		N/A
	it is a battery-operated appliance, the battery being charged outside the appliance		N/A
7.12.1	Sufficient details for installation supplied		P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	For an appliance intended to be permanently connected to the water mains and not connected by a hose-set, this is stated		N/A
	Sufficient details for installation or maintenance supplied (IEC 60335-2-40):		-
	- that the appliance shall be installed in accordance with national wiring regulations (IEC 60335-2-40);		P
	- the dimensions of the space necessary for correct installation of the appliance including the minimum permissible distance to adjacent structures (IEC 60335-2-40);		P
	- for appliances with supplementary heaters, the minimum clearance from the appliance to combustible surfaces (IEC 60335-2-40);	No supplementary heater used	N/A
	- a wiring diagram with a clear indication of the connections and wiring to external control devices and supply cord (IEC 60335-2-40);		P
	- the range of external static pressures at which the appliance was tested (add-on heat pumps and appliances with supplementary heaters only) (IEC 60335-2-40);		N/A
	- the method of connection to the appliance to the electrical supply and interconnection of separate components (IEC 60335-2-40);		P
	- indication of which parts of the appliance are suitable for outdoor use, if applicable (IEC 60335-2-40);	For outdoor unit	P
	- details of type and rating of fuses (IEC 60335-2-40);		P
	- details of supplementary heating elements that may be used in conjunction with the appliance, including fitting instructions either with the appliance or with the supplementary heater (IEC 60335-2-40);		N/A
	- maximum and minimum water or brine operating temperatures (IEC 60335-2-40);		N/A
	- maximum and minimum water or brine operating pressures (IEC 60335-2-40).		N/A
	Open storage tanks of heat pumps for water heating, accompanied by an instruction sheet which state that the vent shall not be obstructed (IEC 60335-2-40)		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	Stated in the manual	P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
7.12.3	Insulation of the fixed wiring in contact with parts exceeding 50 K during clause 11; instructions state that the fixed wiring must be protected		N/A
7.12.4	Instructions for built-in appliances:		-
	- 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
	- allow disconnection of the appliance after installation, by accessible plug or a switch in the fixed wiring, unless		N/A
	a switch complying with 24.3		N/A
7.12.5	Replacement cord instructions, type X attachment with a specially prepared cord		N/A
	Replacement cord instructions, type Y attachment		P
	Replacement cord instructions, type Z attachment		N/A
7.12.6	Caution in the instructions for appliances incorporating a non-self-resetting thermal cut-out that is reset by disconnection of the supply mains, if this cut-out is required to comply with the standard		N/A
7.12.7	Instructions for fixed appliances stating how the appliance is to be fixed		P
7.12.8	Instructions for appliances connected to the water mains:		-
	- max. inlet water pressure (Pa) .....		N/A
	- min. inlet water pressure, if necessary (Pa) .....		N/A
	Instructions concerning new and old hose-sets for appliances connected to the water mains by detachable hose-sets		N/A
7.13	Instructions and other texts in an official language	English	P
7.14	Marking clearly legible and durable, rubbing test as specified		P
7.15	Markings on a main part		P
	Marking clearly discernible from the outside, if necessary after removal of a cover		P
	For portable appliances, cover can be removed or opened without a tool		N/A
	For stationary appliances, name, trademark or identification mark and model or type reference visible after installation		N/A



IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	For fixed appliances, name, trademark or identification mark and model or type reference visible after installation according to the instructions		P
	Indications for switches and controls placed on or near the components. Marking not on parts which can be positioned or repositioned in such a way that the marking is misleading		N/A
	Marking on panel allowed, provided panel in place for intended operation of appliance (IEC 60335-2-40)		P
7.16	Marking of a possible replaceable thermal link or fuse link clearly visible with regard to replacing the link		P
7.101	Marking of fuses and overload protective devices, if replaceable (IEC 60335-2-40):		-
	- fuse rated current in amperes, type and rated voltage or (IEC 60335-2-40)		P
	- manufacturer and model of overload protective device (IEC 60335-2-40)		N/A
7.102	Marking for connection with aluminium wire, if necessary (IEC 60335-2-40)		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
	Lamps behind a detachable cover not removed, if conditions met		N/A
	Insertion or removal of lamps, protection against contact with live parts of the lamp cap		N/A
	Use of test probe B of IEC 61032, with a force not exceeding 1 N: no contact with live parts		P
	Use of test probe B of IEC 61032 through openings, with a force of 20 N: no contact with live parts		P
8.1.2	Use of test probe 13 of IEC 61032, with a force not exceeding 1 N, through openings in class 0 appliances and class II appliances/constructions: no contact with live parts		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, with a force not exceeding 1 N: no contact with live parts of visible glowing heating elements	No visible glowing heating elements used.	N/A
8.1.4	Accessible part not considered live if:		-

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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 $\mu$ F		N/A
	- for peak values over 450 V up to and including 15 kV, discharge not exceeding 45 $\mu$ C		N/A
	- for peak values over 15kV, the energy in the discharge not exceeding 350 mJ		N/A
8.1.5	Live parts protected at least by basic insulation before installation or assembly:		-
	- built-in appliances		N/A
	- fixed appliances		P
	- appliances delivered in separate units		P
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	Class II construction	P
	Only possible to touch parts separated from live parts by double or reinforced insulation		P
9	STARTING OF MOTOR-OPERATED APPLIANCES		-
	Requirements and tests are specified in part 2 when necessary		N/A
10	POWER INPUT AND CURRENT		-
10.1	Power input at normal operating temperature, rated voltage and normal operation not deviating from rated power input by more than shown in table 1 ...:	(see appended table)	P
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A
	the rated power input is related to the arithmetic mean value		P
10.2	Current at normal operating temperature, rated voltage and normal operation not deviating from rated current by more than shown in table 2 .....		N/A
	Test carried out at upper and lower limits of the ranges for appliances with one or more rated voltage ranges, unless		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	the rated current is related to the arithmetic mean value of the range		N/A
11	HEATING		-
11.1	No excessive temperatures in normal use (IEC 60335-2-40)		P
	Compliance is checked by the tests of annex C, if (IEC 60335-2-40):		-
	- temperature of motor winding exceeds values shown in table 3 (IEC 60335-2-40)		N/A
	- there is doubt about classification of insulation system of the motor (IEC 60335-2-40)		N/A
11.2	Placing and mounting of appliance (IEC/EN 60335-2-40):		-
	- clearances to adjacent surfaces (IEC 60335-2-40);		P
	- flow rates for liquid source or sink equipment be minimum, except for fan coils where flow rates and liquid temperatures be maximum (IEC 60335-2-40/A2);		N/A
	- static pressures (IEC 60335-2-40);		P
	- means of adjusting the flow, flow for tests be minimum obtainable (IEC 60335-2-40);		N/A
	- adjustable limit controls set at maximum cut-out setting and minimum differential (IEC 60335-2-40).		P
	Appliances with supplementary heaters, use test casing of clause 11.9 (IEC 60335-2-40)		N/A
11.2.1	Appliances with supplementary heaters, inlet duct connected to inlet air opening (IEC 60335-2-40)		N/A
11.2.2	Appliance without supplementary heaters, air outlet used (IEC 60335-2-40)		N/A
11.3	Temperature rise determine by thermocouples or resistance method (IEC 60335-2-40)	Resistance method: 4-way valve, transformer and compressor Thermocouples method: other parts	P
11.4	Test performed at supply voltage between 0,94 and 1,06 times the rated voltage (IEC 60335-2-40)	Indoor unit: 254,4V and 206,8V; Outdoor unit: 357,2V 3N~ and 439,9V 3N~	P
	Heating elements energized at voltage which gives an electrical input of 1,15 times maximum rated power input (IEC 60335-2-40)		N/A
11.5	Test conducted in heating mode and cooling mode, if both exist (IEC 60335-2-40)		P
	All supplementary heating elements operative simultaneously (IEC 60335-2-40)		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
11.6	Defrost test in most unfavourable conditions, if needed (IEC/EN 60335-2-40)		P
11.7	Appliances operated continuously until steady conditions except for defrost tests (IEC 60335-2-40)		P
11.8	Temperatures not exceeding values of table 3 (IEC 60335-2-40/A2)	(See appended tables)	P
	Protective devices do not operate (IEC 60335-2-40)		P
	Sealing compound not flowing out (IEC 60335-2-40)		P
	Temperature of air in outlet duct not exceed 90 °C (IEC 60335-2-40)		P
11.9	Test casing and installation of appliances in accordance with manufacturer's instructions (IEC 60335-2-40)		P
	Glass fibre insulation for appliances without indication of minimum clearances according to manufacturer; thermocouple in contact with enclosure (IEC 60335-2-40)		N/A
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 the rated power input (W) .....		N/A
	Motor-operated appliances and combined appliances supplied at 1,06 times the rated voltage (V) .....	Indoor unit: 254,4V~ Outdoor unit: 439,9V 3N~	P
	Protective impedance and radio interference filters disconnected before carrying out the tests		P
13.2	For class 0, class II and class III appliances, leakage current measured by means of the circuit described in figure 4 of IEC 60990	class II construction	P
	For other appliances, a low impedance ammeter may be used		P
	Leakage current measurements .....	(see appended table)	P
13.3	The appliance is disconnected from the supply		P
	Electric strength tests according to table 4.....	(see appended table)	P
	No breakdown during the tests		P
14	TRANSIENT OVERVOLTAGES		-
	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

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	No flashover during the test, unless		N/A
	of functional insulation if the appliance complies with clause 19 with the clearance short-circuited		N/A
15	MOISTURE RESISTANCE		-
15.1	Enclosure provides degree of moisture protection against ingress of water (rain, overflow from drain pan or defrosting), tests of clause 15.2, 15.3, 11.6 and 16) (IEC 60335-2-40)		P
	Motor-compressor not operated and detachable parts removed during tests of clause 15.2 and 15.3 (IEC 60335-2-40/A2)		P
15.2	Tests in accordance with IEC 60529 in appliances other than IPX0, as specified (IEC 60335-2-40).....:	Outdoor unit: IPX4	P
15.3	Drain pan filled to brim and subjected to continuous overflow and fan(s) switched on (IEC 60335-2-40)		P
15.101	Spillage test as specified (IEC 60335-2-40/A2)		N/A
	After spillage completed, appliance withstand test of clause 16 (IEC 60335-2-40/A2)		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		P
	Tests carried out at room temperature and not connected to the supply		P
16.2	Single-phase appliances: test voltage 1,06 times rated voltage (V) .....	254,4 V for indoor unit	P
	Three-phase appliances: test voltage 1,06 times rated voltage divided by $\sqrt{3}$ (V) .....	254,4 V for outdoor unit	P
	Leakage current measurements .....	(see appended table)	P
	(IEC 60335-2-40)		
	Limit values doubled if:		-
	- all controls have an off position in all poles, or		N/A
	- the appliance has no control other than a thermal cut-out, or		N/A
	- all thermostats, temperature limiters and energy regulators do not have an off position, or		N/A
	- the appliance has radio interference filters		N/A
	With the radio interference filters disconnected, the leakage current do not exceed limits specified .....	(see appended table)	P
16.3	Electric strength tests according to table 7.....:	(see appended table)	P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Test voltage applied between the supply cord and inlet bushing and cord guard and cord anchorage as specified .....	(see appended table)	P
	No breakdown during the tests		P
17	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		-
	No excessive temperatures in transformer or associated circuits in event of short-circuits likely to occur in normal use .....	(see appended table)	P
	Appliance supplied with 1,06 or 0,94 times rated voltage under the most unfavourable short-circuit or overload likely to occur in normal use (V) .....	254,4 V~	P
	Basic insulation is not short-circuited		P
	Temperature rise of insulation of the conductors of safety extra-low voltage circuits not exceeding the relevant value specified in table 3 by more than 15 K		N/A
	Temperature of the winding not exceeding the value specified in table 8		P
	However, limits do not apply to fail-safe transformers complying with sub-clause 15.5 of IEC 61558-1		N/A
18	ENDURANCE		-
	Requirements and tests are specified in part 2 when necessary		N/A
19	ABNORMAL OPERATION		-
19.1	The risk of fire or mechanical damage under abnormal or careless operation obviated (tests 19.2-19.14) (IEC 60335-2-40)		P
	Failure of transfer medium flow or of any control device not result in a hazard (IEC 60335-2-40)		P
	Electronic circuits so designed and applied that a fault will not render the appliance unsafe (electric shock, fire or mechanical hazard, dangerous malfunction) (test 19.11 and 19.12) (IEC 60335-2-40)		P
19.2	Test of appliance with motor rotors, other than motor-compressors, operated for 15 days (360 h) or until protection device opens circuit (IEC 60335-2-40)		P
	Insulation of motor windings (IEC 60335-2-40) .....	(See appended table)	P
	Temperature of enclosure does not exceed (°C) (IEC 60335-2-40) .....	(See appended table)	P
	Temperature of the windings does not exceed the values shown in the table ; temperature (°C) (IEC 60335-2-40) .....	(See appended table)	P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test as specified in 16.3, 72 h after the beginning of the test (IEC 60335-2-40)		P
	30 mA residual current device does not open (IEC 60335-2-40)		P
	At the end, leakage current between windings and enclosure does not exceed 2 mA (IEC 60335-2-40)		P
19.3	Motor-compressor complies with IEC 60335-2-34 (IEC 60335-2-40)	LNB53FCAMC	P
	Test of motor-compressor with rotor locked as specified in clause 19.101 of IEC 60335-2-34 and comply with 19.104 of that standard (IEC 60335-2-40)	E705DHD-72D2YG	P
19.4	Test of three-phase motors operated under conditions of clause 11 with one phase disconnected until steady conditions or protective device operates (IEC 60335-2-40)	The protector of the appliance operated when one phase has been disconnected during test and no hazard occur.	P
19.5	Test of appliance with heat transfer medium flow of the outdoor heat exchanger restricted or shut off when reaching steady conditions (IEC 60335-2-40)	(See appended table)	P
	Test of appliance with heat transfer flow of the indoor heat exchanger restricted or shut off when reaching steady conditions (IEC 60335-2-40)		P
	Disconnection of motor common to both the outdoor and the indoor heat exchangers when reaching steady conditions (IEC 60335-2-40)		N/A
19.6	Test of appliances using water as heat transfer medium (IEC 60335-2-40)		N/A
19.7	Test of air to air appliances at rated voltage or at the upper limit of the rated voltage range. Dry-bulb temperature is 5 K below values specified by manufacturer (IEC 60335-2-40)		P
	Test with the dry-bulb temperature 10 K over the values specified by manufacturer (IEC 60335-2-40)		P
19.8	Test of appliances with supplementary heaters (IEC 60335-2-40)		N/A
19.9	Test at temperature permitting continuous operation of the motor-compressor and electric heating elements at same time (IEC 60335-2-40)		N/A
19.10	Test of appliance with any defect which expected during normal use (IEC 60335-2-40)	(see appended table)	P
19.10.101	Test of clause 19.10 repeated on class 0I appliances and class I appliances incorporating tubular sheathed or embedded heating elements (IEC 60335-2-40/A2)		N/A
	However, controls not short-circuited but one end of element connected to sheath of heating element (IEC 60335-2-40/A2)		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Test repeated with polarity of supply to appliance reversed and with other end of element connected to sheath (IEC 60335-2-40/A2)		N/A
	Test not carried out on appliances intended to permanently connected to fixed wiring and on appliances where an all-pole disconnection occurs during test of clause 19.10 (IEC 60335-2-40/A2)		N/A
19.11	Electronic circuits, compliance checked by evaluation of the fault conditions specified in clause 19.11.2 for all circuits or parts of circuits (IEC 60335-2-40), unless		P
	they comply with conditions specified in clause 19.11.1 (IEC 60335-2-40)		N/A
	Windings temperature not exceeding values shown in table 8 (IEC 60335-2-40)		P
	Appliance comply with conditions of clause 19.14 (IEC 60335-2-40)		P
	Appliance withstands test: a conductor becomes open circuited and three conditions are met (IEC 60335-2-40)		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 following conditions (IEC 60335-2-40):		-
	- electronic circuit is low-power circuit, that is, maximum power at low-power points not exceed 15 W according to tests specified (IEC 60335-2-40)		N/A
	- protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction in other parts of appliance does not rely on correct functioning of electronic circuit (IEC 60335-2-40)		P
19.11.2	Fault conditions applied one at a time, appliance operated under conditions specified in clause 11, but supplied at rated voltage, duration of tests as specified (IEC 60335-2-40):		-
	a) short circuit of creepage distances and clearances between live parts of different potential, if these distances less than values specified in clause 29.1, unless relevant part is adequately encapsulated (IEC 60335-2-40)		N/A
	b) open circuit at terminals of any component (IEC 60335-2-40)	(see appended table)	P
	c) short circuit if capacitors, unless they comply with IEC 60384-14 (IEC 60335-2-40)	(see appended table)	P
	d) short circuit of any two terminals of an electronic component, other than integrated circuits. This fault condition not applied between circuits of an optocoupler (IEC 60335-2-40)	(see appended table)	P
	e) failure of triacs in diode mode (IEC 60335-2-40)	(see appended table)	P



IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	f) failure of an integrated circuit. Possible hazardous situations of appliance assessed to ensure that safety not rely on correct functioning of such component (IEC 60335-2-40)	(see appended table)	P
	Short-circuit of low-power circuits (IEC 60335-2-40)		N/A
	Duration of tests (IEC 60335-2-40):		-
	- as specified in clause 11.7 but only for one operating cycle, if fault cannot recognised by user (IEC 60335-2-40);		P
	- as specified in clause 19.2, if fault can recognised by user (IEC 60335-2-40);		P
	- until steady conditions established (IEC 60335-2-40).		P
	Test ended if interruption of supply occurs within the appliance (IEC 60335-2-40)		P
	If electronic circuit operates to ensure compliance with clause 19, relevant test repeated with single fault a) to f) simulated (IEC 60335-2-40)		N/A
	Fault condition f) applied to encapsulated or similar components (IEC 60335-2-40)		N/A
	PTC's, NTC's and VDR's resistors not short-circuited if used as specified by manufacturer (IEC 60335-2-40)		P
19.12	If safety of appliance for any of fault conditions specified in clause 19.11.2 depends on operation of miniature fuse-link complying with IEC 60127, test repeated with fuse-link replaced by an ammeter (IEC 60335-2-40)		P
	Current $\leq 2,1$ times rated current of fuse-link, circuit not adequately protected (fuse-link short-circuited) (IEC 60335-2-40)		N/A
	Current $\geq 2,75$ times rated current of fuse-link, circuit adequately protected (IEC 60335-2-40)		P
	Current $\geq 2,1$ and $\leq 2,75$ times rated current, fuse-link short-circuited and test carried out during specified time (IEC 60335-2-40)		N/A
19.13	Appliances with PTC heating elements test as specified (IEC 60335-2-40)		N/A
19.14	During tests of clause 19.2 to 19.10.101 and 19.11, 19.12 and 19.13 if appropriate, appliances not emit flames, molten metal, poisonous or ignitable gas in hazardous amounts (IEC 60335-2-40/A2)		P
	Enclosures not deform (IEC 60335-2-40)		P
	Temperature rise not exceed values shown in table 9 (IEC 60335-2-40)	(See appended table)	P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test, test voltage as specified in table 4 (IEC 60335-2-40)		P
19.15	For appliances with a mains voltage selector switch, the switch is set to the lowest rated voltage position and the highest value of rated voltage is applied		N/A
19.101	All appliances provided with supplementary heaters and free air discharge subjected to specified test in each mode of operation (IEC 60335-2-40/A2)		N/A
	During test temperature not exceed 150 °C but an overshoot of 25 °C is permitted during first hour (IEC 60335-2-40/A2)		N/A
20	STABILITY AND MECHANICAL HAZARDS		-
20.1	Appliances having adequate stability	Fixed appliance	N/A
	Tilting test through an angle of 10°, appliance placed on an inclined plane/horizontal support, not connected to the supply mains; appliance does not overturn		N/A
	Tilting test repeated on appliances with heating elements, angle of inclination increased to 15°		N/A
	Possible heating test in overturned position; temperature rise does not exceed values shown in table 9		N/A
20.2	Moving parts adequately arranged or enclosed as to provide protection against personal injury		P
	Protective enclosures, guards and similar parts are non-detachable, and		P
	have adequate mechanical strength		P
	Enclosures that can be opened by overriding an interlock are considered to be detachable parts		P
	Self-resetting thermal cut-outs and overcurrent protective devices not causing a hazard by unexpected closure	Used for motor-compressor and fan motor	P
	Not possible to touch dangerous moving parts with the test probe described		P
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	(see appended table)	P
	The appliance shows no damage impairing compliance with this standard, and		P
	compliance with 8.1, 15.1 and clause 29 not impaired		P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	If doubt, supplementary or reinforced insulation subjected to the electric strength test of 16.3		N/A
	If necessary, repetition of groups of three blows on a new sample		N/A
	Safety requirements specified in annex EE applied. Pressure test in annex EE applies to parts other than pressure vessels (IEC 60335-2-40/A1)		P
	Safety requirements of ISO 5149 applied (IEC 60335-2-40/A2)		P
21.2	Accessible parts of solid insulation having strength to prevent penetration by sharp implements		P
	Test not applicable if the thickness of supplementary insulation is at least 1 mm and reinforced insulation at least 2 mm		P
	The insulation is tested as specified, and does withstand the electric strength test of 16.3		N/A
22	CONSTRUCTION		-
22.1	Appliance marked with the first numeral of the IP system, relevant requirements of IEC 60529 are fulfilled		P
22.2	Stationary appliance: means to ensure all-pole disconnection from the supply being provided:		-
	- a supply cord fitted with a plug, or		N/A
	- 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		P
	- an appliance inlet		N/A
	Single-pole switches and single-pole protective devices for the disconnection of heating elements in single-phase, permanently connected class 01 and class I appliances, connected to the phase conductor		N/A
22.3	Appliance provided with pins: no undue strain on socket-outlets		N/A
	Applied torque not exceeding 0,25 Nm		N/A
	Pull force of 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		N/A
	rotating does not impair compliance with this standard		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	Voltage not exceeding 34 V (V).....:		N/A
22.6	Electrical insulation not affected by condensing water or leaking liquid		P
	Electrical insulation of class II appliances not affected if a hose ruptures or seal leaks	class II construction	P
	In case of doubt, test as described		P
	Electrical insulation not affected by snow penetration to appliance enclosure (IEC 60335-2-40)		P
22.7	Adequate safeguards against the risk of excessive pressure in appliances containing liquid or gases or having steam-producing devices		N/A
22.8	Electrical connections not subject to pulling during cleaning of compartments to which access can be gained without the aid of a tool, and that are likely to be cleaned in normal use		P
22.9	Insulation, internal wiring, windings, commutators and slip rings not exposed to oil, grease or similar substances, unless		N/A
	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

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Obvious locked position of snap-in devices used for fixing such parts		P
	No deterioration of the fixing properties of snap-in devices used in parts that are likely to be removed during installation or servicing		P
	Tests as described		P
22.12	Handles, knobs etc. fixed in a reliable manner		N/A
	Fixing in wrong position of handles, knobs etc. indicating position of switches or similar components not possible		N/A
	Axial force 15 N applied to parts, the shape being so that an axial pull is unlikely to be applied		N/A
	Axial force 30 N applied to parts, the shape being so that an axial pull is likely to be applied		N/A
22.13	Unlikely that handles, when gripped as in normal use, make the operator's hand touch parts having a temperature rise exceeding the value specified for handles which are held for short periods only		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 or other fasteners, likely to be touched by the user in normal use or during user maintenance		P
22.15	Storage hooks and the like for flexible cords smooth and well rounded		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 and no undue wear of contacts		N/A
	Cord reel tested with 6000 operations, as specified		N/A
	Electric strength test of 16.3, voltage of 1000 V applied		N/A
22.17	Spacers not removable from the outside by hand or by means of a screwdriver or a spanner		N/A
22.18	Current-carrying parts and other metal parts resistant to corrosion		P
22.19	Driving belts not relied upon to provide the required level of insulation, unless		N/A
	constructed to prevent inappropriate replacement		N/A
22.20	Direct contact between live parts and thermal insulation effectively prevented, unless		N/A
	material used is non-corrosive, non-hygroscopic and non-combustible		P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
22.21	Wood, cotton, silk, ordinary paper and fibrous or hygroscopic material not used as insulation, unless		P
	impregnated		N/A
	This requirement does not apply to magnesium oxide and mineral ceramic fibres used for the electrical insulation of heating elements		N/A
22.22	Appliances not containing asbestos		P
22.23	Oils containing polychlorinated biphenyl (PCB) not used		P
22.24	Bare heating elements adequately supported to prevent contact with accessible metal parts in case of rupture or sagging (IEC 60335-2-40)		N/A
	Bare heating elements only used with metal enclosures (wood or composite enclosures not allowed) (IEC 60335-2-40)		N/A
22.25	Sagging heating conductors, except in class III appliances or class III constructions that do not contain live parts, cannot come into contact with accessible metal parts		N/A
22.26	For class III constructions the insulation between parts operating at safety extra-low voltage and other live parts complies with the requirements for double or reinforced insulation		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	Class I appliance	N/A
22.30	Parts serving as supplementary or reinforced insulation fixed so that they cannot be removed without being seriously damaged, or		P
	so constructed that they cannot be replaced in an incorrect position, and so that if they are omitted, the appliance is rendered inoperable or manifestly incomplete		P
22.31	Neither clearances nor creepage distances over supplementary and reinforced insulation reduced below values specified in clause 29 as a result of wear		P
	Neither clearances nor creepage distances between live parts and accessible parts reduced below values for supplementary insulation if wires, screws etc. become loose		P

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
22.32	Supplementary and reinforced insulation constructed or protected against pollution so that clearances or creepage distances are not reduced below the values in clause 29		P
	Supplementary insulation of natural or synthetic rubber resistant to ageing, or arranged and dimensioned so that creepage distances are not reduced below values specified in 29.2		N/A
	Ceramic material not tightly sintered, similar materials or beads alone not used as supplementary or reinforced insulation		N/A
	Insulating material in which heating conductors are embedded is considered to be basic insulation, not reinforced insulation		N/A
	Oxygen bomb test at 70 °C for 96 h and 16 h at room temperature		N/A
22.33	Conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts are not in direct contact with live parts		P
	Electrodes not used for heating liquids		N/A
	For class II constructions, conductive liquids that are or may become accessible in normal use and conductive liquids that are in contact with unearthed accessible metal parts, not in direct contact with basic or reinforced insulation, unless		N/A
	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, unless		N/A
	the reinforced insulation consists of at least 3 layers		N/A
	An air layer not used as basic or supplementary insulation in a double insulation system if likely to be bridged by leaking liquid		N/A
22.34	Shafts of operating knobs, handles, levers etc. not live, unless		N/A
	the shaft is not accessible when the part is removed		N/A
22.35	For other than class III constructions, handles, levers and knobs, held or actuated in normal use, not becoming live in the event of a failure of basic insulation		N/A
	Such parts being of metal, and their shafts or fixings are likely to become live in the event of a failure of basic insulation, are either adequately covered by insulation material or their accessible parts are separated from their shafts or fixings by supplementary insulation		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	This requirement does not apply to handles, levers and knobs on stationary appliances, other than those of electrical components, provided they are reliably connected to an earthing terminal or earthing contact, or separated from live parts by earthed metal		N/A
	Insulating material covering metal handles, levers and knobs withstand the electric strength test of 16.3 for supplementary insulation		N/A
22.36	For appliances other than class III, handles continuously held in the hand in normal use so constructed that when gripped as in normal use, the operators hand is not likely to touch metal parts, unless		N/A
	they are separated from live parts by double or reinforced insulation		N/A
22.37	Capacitors in class II appliances not connected to accessible metal parts and their casings, if of metal, separated from accessible metal parts by supplementary insulation, unless		N/A
	the capacitors comply with 22.42		N/A
22.38	Capacitors not connected between the contacts of a thermal cut-out		P
22.39	Lamp holders used only for the connection of lamps		N/A
22.40	Motor-operated appliances and combined appliances intended to be moved while in operation, or having accessible moving parts, fitted with a switch to control the motor. The actuating member of the switch being easily visible and accessible		N/A
	If the appliance cannot operate continuously, automatically or remotely without giving rise to a hazard, appliances for remote operation being fitted with a switch for stopping the operation. The actuating member of the switch being easily visible and accessible		N/A
22.41	No components, other than lamps, containing mercury		P
22.42	Protective impedance consisting of at least two separate components		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 checked by the test of 14.1 a) in IEC 60065		N/A
	Capacitors checked by the tests for class Y capacitors in IEC 60384-14		N/A



IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
22.43	Appliances adjustable for different voltages, accidental changing of the setting of the voltage unlikely to occur		N/A
22.44	Appliances not having an enclosure that is shaped or decorated like a toy		P
22.45	When air is used as reinforced insulation, clearances not reduced below the values specified in 29.1.3 due to deformation as a result of an external force applied to the enclosure		P
22.46	For programmable protective electronic circuits used to ensure compliance with the standard, the software contains measures to control the fault/error conditions in table R.1		N/A
	Software that contains measures to control the fault/error conditions specified in table R.2 is to be specified in parts 2 for particular constructions or to address specific hazards		N/A
	These requirements are not applicable to software used for functional purpose or compliance with clause 11		N/A
22.47	Appliances connected to the water mains withstand the water pressure expected in normal use		N/A
	No leakage from any part, including any inlet water hose		N/A
22.48	Appliances connected to the water mains constructed to prevent backsiphonage of non-potable water		N/A
22.49	For remote operation, the duration of operation is to be set before the appliance can be started, unless		N/A
	the appliance switches off automatically or can operate continuously without hazard		N/A
22.50	Controls incorporated in the appliance take priority over controls actuated by remote operation		N/A
22.51	There is a control on the appliance manually adjusted to the setting for remote operation before the appliance can be operated in this mode		N/A
	There is a visual indication showing that the appliance is adjusted for remote operation		N/A
	These requirements not necessary on appliances that can operate as follows, without giving rise to a hazard:		-
	- continuously, or		N/A
	- automatically, or		N/A
	- remotely		N/A
22.52	Socket-outlets on appliances accessible to the user in accordance with the socket-outlet system used in the country in which the appliance is sold		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
22.101	Appliances intended to be fixed, securely fixed (IEC 60335-2-40)		P
22.102.1	At least two thermal cut-outs in appliances with supplementary heating elements for air (first one be self-resetting and other non-self-resetting thermal cut-out) (IEC 60335-2-40/A2)		N/A
22.102.2	Appliances provided with supplementary heaters for water incorporate non-self-resetting thermal cut-out, providing all-pole disconnection that operates separately from water thermostats (IEC 60335-2-40/A2)		N/A
	However, for appliances intended to be connected to fixed wiring, the neutral conductor need not be disconnected (IEC 60335-2-40/A2)		N/A
22.102.3	Thermal cut-outs of capillary type open in event of leakage from capillary tube (IEC 60335-2-40/A2)		N/A
22.103	Non-self-resetting cut-outs independent of other control devices (IEC 60335-2-40)		P
22.104	Containers of sanitary hot water heat pumps withstand twice permissible operating pressure in closed containers (IEC 60335-2-40) or		N/A
	0,15 MPa in open containers (IEC 60335-2-40)		N/A
	without leakage or rupture (IEC 60335-2-40)		N/A
22.105	Air or vapour cushion in closed containers not exceeding 10 % (IEC 60335-2-40)		N/A
22.106	Pressure relief devices operating at 0,1 Mpa over permissible operating pressure (IEC 60335-2-40)		N/A
22.107	Water outlet systems of open containers free from obstruction causing over-pressure (IEC 60335-2-40)		N/A
	Vented containers of sanitary hot water heat pumps always open to the atmosphere through appropriate aperture (IEC 60335-2-40)		N/A
22.108	Not vented open containers subjected to test in accordance with clause 22.104 to vacuum of 33 kPa for 15 min (IEC 60335-2-40)		N/A
	Container show no deformation which result in a hazard (IEC 60335-2-40)		N/A
22.109	Replacement of non-self-resetting thermal cut-outs does not damage other connections (IEC 60335-2-40)	Not for replacement	N/A
22.110	Non-self-resetting thermal cut-outs operate without short-circuiting live parts of different potential and without causing contact between live parts and enclosure (IEC 60335-2-40)		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Test repeated five times without blowing 3 A fuse which connects appliance to earth (IEC 60335-2-40)		N/A
	Electric strength test as specified in clause 16.3 for supplementary heating elements (IEC 60335-2-40)		N/A
22.111	Manual resetting of thermostats not necessary after power supply interruption (IEC 60335-2-40)		N/A
22.112	Construction of refrigerating system comply with requirements of Section 3 of ISO 5149 (IEC 60335-2-40/A1)		P
22.113	Flammable refrigerant used, refrigerant tubing protected or enclosed to avoid mechanical damage (IEC 60335-2-40/A1)		N/A
	Tubing protected to extent that it will not be handled or used for carrying during moving of product (IEC 60335-2-40/A1)		N/A
	Tubing located within confines of cabinet considered to be protected from mechanical damage (IEC 60335-2-40/A1)		N/A
22.114	Flammable refrigerant used, low temperature solder alloys, such as lead/tin alloys, not acceptable for pipe connections (IEC 60335-2-40/A1)		N/A
22.115	Total refrigerant mass (M) of all refrigerating systems within appliance employing flammable refrigerants, not exceed m3 defined in annex GG (IEC 60335-2-40/A1)		N/A
22.116	Appliances using flammable refrigerants constructed that any leaked refrigerant not flow or stagnate so as to cause fire or explosion hazard in areas within appliance where electrical components, which could be a source of ignition and which could function under normal conditions or in event of leak, fitted (IEC 60335-2-40/A1)		N/A
	Separate components, such as thermostats, which charged with less than 0,5 g of flammable gas not considered to cause fire or explosion hazard in event of leakage of gas within component itself (IEC 60335-2-40/A1)		N/A
	All electrical components that could be a source of ignition and which could function under normal conditions or in the event of a leak, comply with one of the following (IEC 60335-2-40/A1):		-
	- IEC 60079-15:2001, Cl. 9 to 26, for group IIA gases or the refrigerant used or an applicable standard that makes electrical components suitable for use in Zone 2, 1 or 0 as defined in IEC 60079-14 (IEC 60335-2-40/A1)		N/A
	- Not be located in an area where a potentially flammable gas mixture will accumulate as demonstrated by the test of annex FF (IEC 60335-2-40/A1)		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	- Be located in an enclosure. The enclosure containing the electrical components comply with IEC 60079-15:2001 for enclosures suitable for use with group IIA gases or the refrigerant used (IEC 60335-2-40/A1)		N/A
22.117	Temperatures on surfaces that exposed to leakage of flammable refrigerants not exceed auto-ignition temperature of refrigerant reduced by 100 K; some typical values given in annex BB (IEC 60335-2-40/A1)		N/A
22.118	Flammable refrigerant used, all appliances charged with refrigerant at manufacturing location or charged on site as recommended by manufacturer (IEC 60335-2-40/A1)		N/A
	Part of appliance that charged on site, which requires brazing or welding in installation not shipped with flammable refrigerant charge. Joints made in installation between parts of refrigerating system, with at least one part charged, made in accordance with following (IEC 60335-2-40/A1):		-
	- A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe and/or any uncharged refrigerating system part (IEC 60335-2-40/A1)		N/A
	- Reusable mechanical connectors and flared joints are not allowed indoors (IEC 60335-2-40/A1)		N/A
	- Refrigerant tubing shall be protected or enclosed to avoid damage (IEC 60335-2-40/A1)		N/A
	Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operations shall be protected against mechanical damage (IEC 60335-2-40/A1)		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		P
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

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
23.3	Electrical connections and internal conductors movable relatively to each other not exposed to undue stress		P
	Flexible metallic tubes not causing damage to insulation of conductors		N/A
	Open-coil springs not used		N/A
	Adequate insulating lining provided inside a coiled spring, the turns of which touch one another		N/A
	No damage after 10 000 flexings for conductors flexed during normal use, or		N/A
	100 flexings for conductors flexed during user maintenance		N/A
	Electric strength test of 16.3, 1000 V between live parts and accessible metal parts		N/A
	Not more than 10 % of the strands of any conductor broken, and		N/A
	not more than 30 % for wiring supplying circuits that consume no more than 15 W		N/A
23.4	Bare internal wiring sufficiently rigid and fixed		P
23.5	The insulation of internal wiring subjected to the supply mains voltage withstanding the electrical stress likely to occur in normal use		P
	Basic insulation electrically equivalent to the basic insulation of cords complying with IEC 60227 or IEC 60245, or		P
	no breakdown when a voltage of 2000 V is applied for 15 min between the conductor and metal foil wrapped around the insulation		P
23.6	Sleeving used as supplementary insulation on internal wiring retained in position by clamping at both ends, or		P
	be such that it can only be removed by breaking or cutting		P
23.7	The colour combination green/yellow only used for earthing conductors		P
23.8	Aluminium wires not used for internal wiring		P
23.9	Stranded conductors not consolidated by soldering where they are subjected to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N/A
23.10	The insulation and sheath of internal wiring, incorporated in external hoses for the connection of an appliance to the water mains, at least equivalent to that of light polyvinyl chloride sheathed flexible cord (60227 IEC 52)		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
24	COMPONENTS		-
24.1	Components comply with safety requirements in relevant IEC standards		P
	List of components .....:	(see appended table)	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
	For components mentioned in 24.1.1 to 24.1.9 no additional tests specified in the relevant component standard are necessary other than those specified in 24.1.1 to 24.1.9		N/A
	Components not tested and found to comply with relevant IEC standard and components not marked or not used in accordance with its marking, tested under the conditions occurring in the appliance		P
	Lampholders and starterholders that have not being tested and found to comply with the relevant IEC standard, tested as a part of the appliance and additionally according to the gauging and interchangeability requirements of the relevant IEC standard		N/A
	No additional tests specified for nationally standardized plugs such as those detailed in IEC/TR 60083 or connectors complying with the standard sheets of IEC 60320-1 and IEC 60309		N/A
	Motor-compressors not tested according to IEC 60335-2-34 (not necessary to meet all requirements of IEC 60335-2-34) (IEC 60335-2-40)	Unapproved compressor	N/A
24.1.1	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, complying with IEC 60384-14		P
	If the capacitors have to be tested, they are tested according to annex F		N/A
24.1.2	Safety isolating transformers complying with IEC 61558-2-6		N/A
	If they have to be tested, they are 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		N/A
	If they have to be tested, they are tested according to annex H		N/A
	If the switch operates a relay or contactor, the complete switching system is subjected to the test		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	If the switch only operates a motor starting relay complying with IEC 60730-2-10 with the number of cycles of a least 10 000 as specified, the complete switching system need not be tested		N/A
24.1.4	Automatic controls complying with IEC 60730-1 with the relevant part 2. The number of cycles of operation being at least:		-
	- thermostats:.....10 000		N/A
	- temperature limiters:.....1 000		N/A
	- self-resetting thermal cut-outs: .....300		N/A
	- voltage maintained non-self-resetting thermal cut-outs:.....1 000		N/A
	- other non-self-resetting thermal cut-outs:.....30		N/A
	- timers:.....3 000		N/A
	- energy regulators:.....10 000		N/A
	- thermostats which control motor-compressor (IEC/EN 60335-2-40):.....100 000		N/A
	- motor-compressor starting relays (IEC/EN 60335-2-40):.....100 000		N/A
	- automatic thermal motor-protectors for hermetic and semi-hermetic type motor-compressors (not less than number of operations during locked rotor test) (IEC/EN 60335-2-40):.....min 2000	Approved	P
	- manual reset thermal motor-protectors for hermetic and semi-hermetic type motor-compressors (IEC/EN 60335-2-40): .....50		N/A
	- other automatic thermal motor-protectors (IEC/EN 60335-2-40):.....2000	Approved	P
	- other manual reset thermal motor-protectors (IEC/EN 60335-2-40):.....30		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, for appliances classified higher than IPX0, the appliance couplers complying with IEC 60320-2-3		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Interconnection couplers complying with 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
24.1.7	For remote operation of the appliance via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is IEC 62151		N/A
24.1.8	The relevant standard for thermal links is IEC 60691		P
	Thermal links not complying with IEC 60691 are considered to be an intentionally weak part for the purposes of clause 19		N/A
24.1.9	Contactors and relays, other than motor starting relays, tested as part of the appliance		P
	They are also tested in accordance with clause 17 of IEC 60730-1, the number of cycles of operations in 24.1.4 selected according to the contactor or relay function in the appliance .....		N/A
24.2	Appliances not fitted with:		-
	- switches or automatic controls in flexible cords		P
	- devices causing the protective device in the fixed wiring to operate in the event of a fault in the appliance		P
	- thermal cut-outs that can be reset by soldering, unless		N/A
	the solder has a melting point of at least 230 °C		N/A
24.3	Switches intended for all-pole disconnection of stationary appliances are directly connected to the supply terminals and have a contact separation in all poles, providing full disconnection under overvoltage category III conditions		P
24.4	Plugs and socket-outlets for extra-low voltage circuits and heating elements, not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1 or with connectors and appliance inlets complying with the standard sheets of IEC 60320-1		N/A
24.5	Capacitors in auxiliary windings of motors marked with their rated voltage and capacitance, and used accordingly		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



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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 comply with the requirements of annex I		N/A
24.7	Detachable hose-sets for connection of appliances to the water mains comply with IEC 61770		N/A
	They are supplied with the appliance		N/A
	Appliances intended to be permanently connected to the water mains not connected by a detachable hose-set		N/A
24.8	Motor running capacitors in appliances for which 30.2.3 is applicable and that are permanently connected in series with a motor winding, not causing a hazard in event of a failure		N/A
	One or more of the following conditions are to be met:		-
	- the capacitors are of class P2 according to IEC 60252-1		N/A
	- the capacitors are housed within a metallic or ceramic enclosure		N/A
	- the distance of separation of the outer surface to adjacent non-metallic parts exceeds 50 mm		N/A
	- adjacent non-metallic parts within 50 mm withstand the needle-flame test of annex E		N/A
	- adjacent non-metallic parts within 50 mm classified as at least V-1 according to IEC 60695-11-10		N/A
24.101	Replaceable parts of thermal control devices identified by marking (IEC 60335-2-40)		N/A
25	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		-
25.1	Appliance not intended for permanent connection to fixed wiring, means for connection to the supply:		-
	- supply cord fitted with a plug,	Fixed wiring	N/A
	- an appliance inlet having at least the same degree of protection against moisture as required for the appliance, or		N/A
	- pins for insertion into socket-outlets		N/A
	Supply cord fitted with plug provided, if (IEC 60335-2-40):		-
	- appliance only for indoor use (IEC 60335-2-40),		N/A
	- marked with rating of 25 A or less and (IEC 60335-2-40)		N/A
	- complies with code requirements of country where it will be used (IEC 60335-2-40).		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	Appliance inlet not allowed (IEC 60335-2-40)		N/A
25.2	Appliance not provided with more than one means of connection to the supply mains		P
	Stationary appliance for multiple supply may be provided with more than one means of connection, provided electric strength test of 1250 V for 1 min between each means of connection causes no breakdown		P
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		P
	- 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		P
	- a set of terminals and cable entries, conduit entries, knock-outs or glands, allowing connection of appropriate types of cable or conduit, and the appliance allows the connection of the supply conductors after the appliance has been fixed to its support		N/A
	For a fixed appliance constructed so that parts can be removed to facilitate easy installation, this requirement is met if it is possible to connect the fixed wiring without difficulty after a part of the appliance has been fixed to its support		N/A
25.4	Cable and conduit entries, rated current of appliance not exceeding 16 A, dimension according to table 10 (mm) .....		N/A
	Introduction of conduit or cable does not reduce clearances or creepage distances below values specified in clause 29		N/A
25.5	Method for assembling the supply cord to the appliance:		-
	- type X attachment		N/A
	- type Y attachment		P
	- type Z attachment, if allowed in relevant part 2		N/A
	Type X attachment, other than those with a specially prepared cord, not used for flat twin tinsel cords		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	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	For outdoor unit	P
25.6	Plugs fitted with only one flexible cord		N/A
25.7	Supply cords, other than for class III appliances, being one of the following types:		-
	- rubber sheathed (at least 60245 IEC 53)		N/A
	- polychloroprene sheathed (at least 60245 IEC 57)		P
	- cross-linked polyvinyl chloride sheathed (at least 60245 IEC 88)		N/A
	- polyvinyl chloride sheathed. Not used if they are likely to touch metal parts having a temperature rise exceeding 75 K during the test of clause 11		-
	- light polyvinyl chloride sheathed cord (60227 IEC 52), for appliances not exceeding 3 kg		N/A
	- ordinary polyvinyl chloride sheathed cord (60227 IEC 53), for other appliances		N/A
	- heat resistant polyvinyl chloride sheathed. Not used for type X attachment other than specially prepared cords		-
	- heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56), for appliances not exceeding 3 kg		N/A
	- heat-resistant polyvinyl chloride sheathed cord (60227 IEC 57), for other appliances		N/A
	Supply cords for class III appliances adequately insulated		N/A
	Test with 500 V for 2 min for supply cords of class III appliances that contain live parts		N/A
	Supply cords for outdoor use not lighter than polychloroprene sheathed flexible cord (60245 IEC 57) (IEC 60335-2-40)	Stated in the user manual	P
25.8	Nominal cross-sectional area of supply cords not less than table 11; rated current (A); cross-sectional area (mm <sup>2</sup> ).....:	Stated in the user manual	P
25.9	Supply cords not in contact with sharp points or edges		P
25.10	Supply cord of class I appliances have a green/yellow core for earthing		P
25.11	Conductors of supply cords not consolidated by soldering where they are subject to contact pressure, unless		P
	the contact pressure is provided by spring terminals		N/A
25.12	Insulation of the supply cord not damaged when moulding the cord to part of the enclosure		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	If unsheathed supply cord, a similar additional bushing or lining is required, unless the appliance is		N/A
	class 0, or		N/A
	a class III appliance not containing live parts		N/A
25.14	Supply cords moved while in operation adequately protected against excessive flexing		N/A
	Flexing test, as described:		-
	- applied force (N).....:		N/A
	- number of flexings.....:		N/A
	The test does not result in:		-
	- short-circuit between the conductors, such that the current exceeds a value of twice the rated current		N/A
	- breakage of more than 10 % of the strands of any conductor		N/A
	- separation of the conductor from its terminal		N/A
	- loosening of any cord guard		N/A
	- damage to the cord or the cord guard		N/A
	- broken strands piercing the insulation and becoming accessible		N/A
25.15	For appliances with supply cord and appliances to be permanently connected to fixed wiring by a flexible cord, conductors of the supply cord relieved from strain, twisting and abrasion by use of cord anchorage		P
	The cord cannot be pushed into the appliance to such an extent that the cord or internal parts of the appliance can be damaged		P
	Pull and torque test of supply cord, values shown in table 12: mass (kg); pull (N); torque (not on automatic cord reel) (Nm) .....	100N; 0,35Nm	P
	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		N/A
	- it is clear how the relief from strain and the prevention of twisting are obtained		N/A
	- they are suitable for different types of supply cord		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict
	- cord cannot touch the clamping screws of cord anchorage if these screws are accessible, unless		N/A
	they are separated from accessible metal parts by supplementary insulation		N/A
	- the cord is not clamped by a metal screw which bears directly on the cord		N/A
	- at least one part of the cord anchorage securely fixed to the appliance, unless		N/A
	it is part of a specially prepared cord		N/A
	- screws which have to be operated when replacing the cord do not fix any other component, unless		N/A
	the appliance becomes inoperative or incomplete or the parts cannot be removed without a tool		N/A
	- if labyrinths can be bypassed the test of 25.15 is nevertheless withstood		N/A
	- for class 0, 0I and I appliances they are of insulating material or are provided with an insulating lining, unless		N/A
	failure of the insulation of the cord does not make accessible metal parts live		N/A
	- for class II appliances they are of insulating material, or		N/A
	if of metal, they are insulated from accessible metal parts by supplementary insulation		N/A
	After the test of 25.15, under the conditions specified, the conductors have not moved by more than 1 mm in the terminals		N/A
25.17	Adequate cord anchorages for type Y and Z attachment, test with the cord supplied with the appliance		P
25.18	Cord anchorages only accessible with the aid of a tool, or		P
	Constructed so that the cord can only be fitted with the aid of a tool		P
25.19	Type X attachment, glands not used as cord anchorage in portable appliances		N/A
	Tying the cord into a knot or tying the cord with string not used		N/A
25.20	The insulated conductors of the supply cord for type Y and Z attachment additionally insulated from accessible metal parts		P
25.21	Space for supply cord for type X attachment or for connection of fixed wiring constructed:		-

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Clause	Requirement + Test	Result - Remark	Verdict
	- to permit checking of conductors with respect to correct positioning and connection before fitting any cover		P
	- so there is no risk of damage to the conductors or their insulation when fitting the cover		P
	- for portable appliances, so that the uninsulated end of a conductor, if it becomes free from the terminal, prevented from contact with accessible metal parts		N/A
	2 N test to the conductor for portable appliances; no contact with accessible metal parts		N/A
25.22	Appliance inlets:		-
	- live parts not accessible during insertion or removal		N/A
	Requirement not applicable to appliance inlets complying with IEC 60320-1		N/A
	- connector can be inserted without difficulty		N/A
	- the appliance is not supported by the connector		N/A
	- not for cold conditions if temp. rise of external metal parts exceeds 75 K during clause 11, unless		N/A
	the supply cord is unlikely to touch such metal parts		N/A
25.23	Interconnection cords comply with the requirements for the supply cord, except that:		P
	- the cross-sectional area of the conductors is determined on the basis of the maximum current during clause 11		P
	- the thickness of the insulation may be reduced		N/A
	If necessary, electric strength test of 16.3		N/A
25.24	Interconnection cords not detachable without the aid of a tool if compliance with this standard is impaired when they are disconnected		P
25.25	Dimensions of pins that are inserted into socket-outlets compatible with the dimensions of the relevant socket-outlet.		N/A
	Dimensions of pins and engagement face in accordance with the dimensions of the relevant plug in IEC/TR 60083		N/A
26	TERMINALS FOR EXTERNAL CONDUCTORS		-
26.1	Appliances provided with terminals or equally effective devices for connection of external conductors		P
	Terminals only accessible after removal of a non-detachable cover, except		P
	for class III appliances that do not contain live parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
26.2	Appliances with type X attachment and appliances for the connection of cables to fixed wiring provided with terminals in which connections are made by means of screws, nuts or similar devices, unless		N/A
	the connections are soldered		N/A
	Screws and nuts not used to fix any other component, except		N/A
	internal conductors, if so arranged that they are unlikely to be displaced when fitting the supply conductors		N/A
	If soldered connections used, the conductor so positioned or fixed that reliance is not placed on soldering alone, unless		N/A
	barriers provided so that neither clearances nor creepage distances between live parts and other metal parts reduced below the values for supplementary insulation if the conductor becomes free at the soldered joint		N/A
26.3	Terminals for type X attachment and for connection of cables of fixed wiring so constructed that the conductor is clamped between metal surfaces with sufficient contact pressure but without damaging the conductor		P
	Terminals fixed so that when the clamping means is tightened or loosened:		-
	- the terminal does not become loose		P
	- internal wiring is not subjected to stress		P
	- neither clearances nor creepage distances are reduced below the values in clause 29		P
	Compliance checked by inspection and by the test of subclause 9.6 of IEC 60999-1, the torque applied being equal to two-thirds of the torque specified (Nm) .....	Nominal diameter of thread: 3,9mm; Screw category: II ; Torque: 0,8Nm	P
	No deep or sharp indentations of the conductors		P
26.4	Terminals for type X attachment, except those having a specially prepared cord and those for the connection of cables of fixed wiring, no special preparation of conductors such as by soldering, use of cable lugs, eyelets or similar, and		N/A
	so constructed or placed that conductors prevented from slipping out when clamping screws or nuts are tightened		N/A

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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,		N/A
	for class II constructions, between live parts and metal parts separated from accessible metal parts by supplementary insulation only		N/A
26.6	Terminals for type X attachment and for connection of cables of fixed wiring suitable for connection of conductors with cross-sectional area according to table 13; rated current (A); nominal cross-sectional area (mm <sup>2</sup> ).....:	Stated in the user manual	P
	If a specially prepared cord is used, terminals need only be suitable for that cord		N/A
26.7	Terminals for type X attachment, except in class III appliances not containing live parts, accessible after removal of a cover or part of the enclosure		N/A
26.8	Terminals for the connection of fixed wiring, including the earthing terminal, located close to each other		P
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		P
	conductors ends fitted with means 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 or similar connections may be used		P
	For class II appliances, the conductor so positioned or fixed that reliance is not placed on soldering, welding or crimping alone		N/A
	If soldering, welding or crimping alone used, barriers provided so that clearances and creepage distances between live parts and other metal parts are not reduced below the values for supplementary insulation if the conductor becomes free		N/A
27	PROVISION FOR EARTHING		-
27.1	Accessible metal parts of class 0I and I appliances permanently and reliably connected to an earthing terminal or earthing contact of the appliance inlet		P
	Earthing terminals and earthing contacts not connected to the neutral terminal		P



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Clause	Requirement + Test	Result - Remark	Verdict
	Class 0, II and III appliances have no provision for earthing		N/A
	Safety extra-low voltage circuits not earthed, unless		N/A
	protective extra-low voltage circuits		N/A
27.2	Clamping means of earthing terminals adequately secured against accidental loosening		P
	Terminals for the connection of external equipotential bonding conductors allow connection of conductors of 2,5 to 6 mm <sup>2</sup> , and		P
	do not provide earthing continuity between different parts of the appliance, and		P
	conductors cannot be loosened without the aid of a tool		P
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		P
	Adequate protection against rusting of parts of coated or uncoated steel, only intended to provide or transmit contact pressure		P
	In the body of the earthing terminal is a part of a frame or enclosure of aluminium or aluminium alloys, precautions taken to avoid risk of corrosion		P
27.5	Low resistance of connection between earthing terminal and earthed metal parts		P
	This requirement does not apply to connections providing earthing continuity in the protective extra-low voltage circuit, provided the clearances of basic insulation are based on the rated voltage of the appliance		N/A
	Resistance not exceeding 0,1 at the specified low-resistance test ( ).....:	0,02Ω	P

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Clause	Requirement + Test	Result - Remark	Verdict
27.6	The printed conductors of printed circuit boards not used to provide earthing continuity in hand-held appliances.		N/A
	They may be used to provide earthing continuity in other appliances if at least two tracks are used with independent soldering points and the appliance complies with 27.5 for each circuit		N/A
28	<b>SCREWS AND CONNECTIONS</b>		-
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 connections or connections providing earthing continuity		P
	Screws used for electrical connections or connections providing earthing continuity screwed into metal		P
	Screws not of insulating material if their replacement by a metal screw can impair supplementary or reinforced insulation		P
	For type X attachment, screws to be removed for replacement of supply cord or for user maintenance, not of insulating material if their replacement by a metal screw impairs basic insulation		N/A
	For screws and nuts; torque-test as specified in table 14.....:	(see appended table)	P
28.2	Electrical connections and connections providing earthing continuity constructed so that contact pressure is not transmitted through non-ceramic insulating material liable to shrink or distort, unless		P
	there is resiliency in the metallic parts to compensate for shrinkage or distortion of the insulating material		N/A
	This requirement does not apply to electrical connections in circuits of appliances for which:		-
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict
	Thread-cutting (self-tapping) screws and thread rolling screws only used for electrical connections if they generate a full form standard machine screw thread		P
	Thread-cutting (self-tapping) screws not used if they are likely to be operated by the user or installer		P
	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:		-
	- in normal use,		P
	- during user maintenance,		P
	- when replacing a supply cord having a type X attachment, or		N/A
	- during installation		P
	At least two screws being used for each connection providing earthing continuity, unless		P
	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		P
	This requirement does not apply to screws in the earthing circuit if at least two screws are used, or		P
	if an alternative earthing circuit is provided		N/A
	Rivets for electrical connections or connections providing earthing continuity secured against loosening if the connections are subjected to torsion		N/A
29	CLEARANCES, CREEPAGE DISTANCES AND SOLID INSULATION		-
	Clearances, creepage distances and solid insulation withstand electrical stress		P
	For coatings used on printed circuits boards to protect the microenvironment (Type 1) or to provide basic insulation (Type 2), annex J applies.....:		N/A
	The microenvironment is pollution degree 1 under type 1 protection		N/A
	For type 2 protection, the spacing between the conductors before the protection is applied is not less than the values specified in Table 1 of IEC 60664-3		N/A
	These values apply to functional, basic, supplementary and reinforced insulation.....:		N/A
	For motor-compressor not complying with IEC 60335-2-34, additions and modifications as specified (IEC 60335-2-40)		P

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Clause	Requirement + Test	Result - Remark	Verdict
29.1	Clearances not less than the values specified in table 16, taking into account the rated impulse voltage for the overvoltage categories of table 15, unless .....	(see appended table)	P
	for basic insulation and functional insulation they comply with the impulse voltage test of clause 14		N/A
	However, if the distances are affected by wear, distortion, movement of the parts or during assembly, the clearances for rated impulse voltages of 1500 V and above are increased by 0,5 mm and the impulse voltage test is not applicable		N/A
	Impulse voltage test is not applicable:		-
	- when the microenvironment is pollution degree 3, or		P
	- for basic insulation of class 0 and class 01 appliances		N/A
	Appliances are in overvoltage category II		P
	A force of 2 N is applied to bare conductors, other than heating elements		P
	A force of 30 N is applied to accessible surfaces		P
29.1.1	Clearances of basic insulation withstand the overvoltages, taking into account the rated impulse voltage		P
	The values of table 16 or the impulse voltage test of clause 14 are applicable.....	(see appended table)	P
	Clearance at the terminals of tubular sheathed heating elements may be reduced to 1,0 mm if the microenvironment is pollution degree 1		N/A
	Lacquered conductors of windings considered to be bare conductors		P
29.1.2	Clearances of supplementary insulation not less than those specified for basic insulation in table 16 .....	(see appended table)	P
29.1.3	Clearances of reinforced insulation not less than those specified for basic insulation in table 16, using the next higher step for rated impulse voltage .....	(see appended table)	P
	For double insulation, with no intermediate conductive part between basic and supplementary insulation, clearances are measured between live parts and the accessible surface, and the insulation system is treated as reinforced insulation		N/A
29.1.4	Clearances for functional insulation are the largest values determined from:		-
	- table 16 based on the rated impulse voltage.....	(see appended table)	P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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		N/A
	the microenvironment is pollution degree 3, or		P
	the distances can be affected by wear, distortion, movement of the parts or during assembly		N/A
	However, clearances are not specified if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
	Lacquered conductors of windings considered to be bare conductors		P
	However, clearances at crossover points are not measured		P
	Clearance between surfaces of PTC heating elements may be reduced to 1mm		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.....:		P
	- table F.7a in IEC 60664-1, frequency not exceeding 30 kHz		P
	- 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
	If the secondary winding of a step-down transformer is earthed, or if there is an earthed screen between the primary and secondary windings, clearances of basic insulation on the secondary side not less than those specified in table 16, but using the next lower step for rated impulse voltage		N/A
	Circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage used as the rated voltage in table 15		P

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Clause	Requirement + Test	Result - Remark	Verdict
29.2	Creepage distances not less than those appropriate for the working voltage, taking into account the material group and the pollution degree .....	(see appended table)	P
	Pollution degree 2 applies, unless		N/A
	- precautions taken to protect the insulation; pollution degree 1		N/A
	- insulation subjected to conductive pollution; pollution degree 3		P
	A force of 2 N is applied to bare conductors, other than heating elements		P
	A force of 30 N is applied to accessible surfaces		P
	In a double insulation system, the working voltage for both the basic and supplementary insulation is taken as the working voltage across the complete double insulation system		P
	Insulation located in airflow, pollution degree 3 unless (IEC 60335-2-40)		P
	insulation enclosed or located so that unlikely to be exposed to pollution due to normal use (IEC 60335-2-40)		P
29.2.1	Creepage distances of basic insulation not less than specified in table 17 .....		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
	Except for pollution degree 1, corresponding creepage distance not less than the minimum specified for the clearance in table 16, if the clearance has been checked according to the test of clause 14 .....		N/A
29.2.2	Creepage distances of supplementary insulation at least those specified for basic insulation in table 17, or .....	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable .....		N/A
29.2.3	Creepage distances of reinforced insulation at least double those specified for basic insulation in table 17, or .....	(see appended table)	P
	Table 2 of IEC 60664-4, as applicable .....		N/A
29.2.4	Creepage distances of functional insulation not less than specified in table 18 .....	(see appended table)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	However, if the working voltage is periodic and has a frequency exceeding 30 kHz, the creepage distances are also determined from table 2 of IEC 60664-4, these values being used if exceeding the values in table 18.....:		N/A
	Creepage distances may be reduced if the appliance complies with clause 19 with the functional insulation short-circuited		N/A
29.3	Supplementary and reinforced insulation have adequate thickness, or a sufficient number of layers, to withstand the electrical stresses		P
	Compliance checked:		-
	- 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		N/A
	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	Supplementary insulation have a thickness of at least 1 mm		P
	Reinforced insulation have a thickness of at least 2 mm		P
29.3.2	Each layer of material withstand the electric strength test of 16.3 for supplementary insulation		N/A
	Supplementary insulation consist of at least 2 layers		N/A
	Reinforced insulation consist of at least 3 layers		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
30	RESISTANCE TO HEAT AND FIRE		-
30.1	External parts of non-metallic material,		P
	parts supporting live parts, and		P

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Clause	Requirement + Test	Result - Remark	Verdict
	parts of thermoplastic material providing supplementary or reinforced insulation		P
	sufficiently resistant to heat		P
	Ball-pressure test according to IEC 60695-10-2		P
	External parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 75 °C, whichever is the higher; temperature (°C).....:	(see appended table)	P
	Parts supporting live parts tested at 40 °C plus the maximum temperature rise determined during the test of clause 11, or at 125 °C, whichever is the higher; temperature (°C).....:	(see appended table)	P
	Parts of thermoplastic material providing supplementary or reinforced insulation tested at 25 °C plus the maximum temperature rise determined during clause 19, if higher; temperature (°C) .....	(see appended table)	P
30.2	Parts of non-metallic material resistant to ignition and spread of fire		P
	This requirement does not apply to:		-
	parts having a mass not exceeding 0,5 g, provided the cumulative effect is unlikely to propagate flames that originate inside the appliance by propagating flames from one part to another, or		N/A
	decorative trims, knobs and other parts unlikely to be ignited or to propagate flames that originate inside the appliance		N/A
	Compliance checked by the test of 30.2.1, and in addition:		P
	- for attended appliances, 30.2.2 applies		N/A
	- for unattended appliances, 30.2.3 applies		P
	For appliances for remote operation, 30.2.3 applies		N/A
	For base material of printed circuit boards, 30.2.4 applies		P
30.2.1	Parts of non-metallic material subjected to the glow-wire test of IEC 60695-2-11 at 550 °C		P
	However, test not carried out if the material is classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 550 °C, or		N/A
	the material is classified at least HB40 according to IEC 60695-11-10		N/A
	Parts for which the glow-wire test cannot be carried out need to meet the requirements in ISO 9772 for material classified HBF		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
30.2.3	Appliances operated while unattended, tested as specified in 30.2.3.1 and 30.2.3.2		P
	The tests are not applicable to conditions as specified .....		N/A
30.2.3.1	Parts of non-metallic material supporting connections carrying a current exceeding 0,2 A during normal operation, and		P
	parts of non-metallic material, other than small parts, within a distance of 3 mm,		P
	subjected to the glow-wire test of IEC 60695-2-11 with a test severity of 850 °C		P
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	The glow-wire test is not carried out on parts of material classified as having a glow-wire flammability index according to IEC 60695-2-12 of at least 850 °C		N/A
30.2.3.2	Parts of non-metallic material supporting 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		P
	Glow-wire applied to an interposed shielding material, if relevant		N/A
	However, the glow-wire test of 750 °C or 650 °C as appropriate, is not carried out on parts of material fulfilling both or either of the following classifications:		-
	- a glow-wire ignition temperature according to IEC 60695-2-13 of at least:		N/A
	- 775 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 675 °C, for other connections		N/A
	- a glow-wire flammability index according to IEC 60695-2-12 of at least:		N/A
	- 750 °C, for connections carrying a current exceeding 0,2 A during normal operation		N/A
	- 650 °C, for other connections		N/A
	The glow-wire test is also not carried out on small parts. These parts are to:		-

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	- 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 the needle-flame test of annex E		P
	Test not applicable to conditions as specified .....		N/A
31	RESISTANCE TO RUSTING		-
	Relevant ferrous parts adequately protected against rusting		P
	Tests specified in part 2 when necessary		P
	Salt mist test of IEC 60068-2-52, severity 2 (IEC 60335-2-40)		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Before test, coatings are scratched by means of a harden steel pin as specified (IEC 60335-2-40)		P
	Five scratches made at least 5 mm apart and at least 5 mm from the edges (IEC 60335-2-40)		P
	Appliance not deteriorated to such an extent that compliance with clause 8 and 27 is impaired (IEC 60335-2-40)		P
	Coating not be broken and not loosened from the metal surface (IEC 60335-2-40)		P
A	ANNEX A (INFORMATIVE) ROUTINE TESTS		-
	Description of routine tests to be carried out by the manufacturer		P
B	ANNEX B (NORMATIVE) APPLIANCES POWERED BY RECHARGEABLE BATTERIES		-
	The following modifications to this standard are applicable for appliances powered by batteries that are recharged in the appliance		N/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.B.101	Appliances supplied from the supply mains tested as specified for motor-operated appliances		N/A
7.1	Battery compartment for batteries intended to be replaced by the user, marked with battery voltage and polarity of the terminals		N/A
	The positive terminal indicated by symbol IEC 60417-5005 and the negative terminal by symbol IEC 60417-5006		N/A
7.6	Symbols 60417-5005 and IEC 60417-5006		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.12	The instructions give information regarding charging		N/A
	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 stated in the instructions or 24 h .....		N/A
19.1	Appliances subjected to tests of 19.B.101, 19.B.102 and 19.B.103		N/A
19.10	Not applicable		N/A
19.B.101	Appliances supplied at rated voltage for 168 h, the battery being continually charged		N/A
19.B.102	For appliances having batteries that can be removed without the aid of a tool, short-circuit of the terminals of the battery, the battery being fully charged,		N/A
19.B.103	Appliances having batteries replaceable by the user supplied at rated voltage under normal operation with the battery removed or in any position allowed by the construction		N/A
21.B.101	Appliances having pins for insertion into socket-outlets have adequate mechanical strength		N/A
	Part of the appliance incorporating the pins subjected to the free fall test, procedure 2, of IEC 60068-2-31, the number of falls being:		-
	- 100, if the mass of the part does not exceed 250 g (g) .....		N/A
	- 50, if the mass of the part exceeds 250 g .....		N/A
	After the test, the requirements of 8.1, 15.1.1, 16.3 and clause 29 are met		N/A
22.3	Appliances having pins for insertion into socket-outlets tested as fully assembled as possible		N/A
25.13	An additional lining or bushing not required for interconnection cords in class III appliances or class III constructions operating at safety extra-low voltage not containing live parts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
30.2	For parts of the appliance connected to the supply mains during the charging period, 30.2.3 applies		N/A
	For other parts, 30.2.2 applies		N/A
C	ANNEX C (NORMATIVE) AGEING TEST ON MOTORS		-
	Tests, as described, carried out when doubt with regard to the temperature classification of the insulation of a motor winding		N/A
	Test conditions as specified		N/A
E	ANNEX E (NORMATIVE) NEEDLE-FLAME TEST		-
	Needle-flame test carried out in accordance with IEC 60695-11-5, with the following modifications:		-
7	Severities		-
	The duration of application of the test flame is 30 s $\pm$ 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		P
	If possible, the flame is applied at least 10 mm from a corner		P
9.3	The test is carried out on one specimen		P
	If the specimen does not withstand the test, the test may be repeated on two additional specimens, both withstanding the test		N/A
11	Evaluation of test results		-
	The duration of burning not exceeding 30 s		N/A
	However, for printed circuit boards, the duration of burning not exceeding 15 s		P
F	ANNEX F (NORMATIVE) CAPACITORS		-
	Capacitors likely to be permanently subjected to the supply voltage, and used for radio interference suppression or voltage dividing, comply with the following clauses of IEC 60384-14, with the following modifications:		-
1.5	Terms and definitions		-
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

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Clause	Requirement + Test	Result - Remark	Verdict
3.4	Approval testing		-
3.4.3.2	Table 3 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 11 is applicable		N/A
	Values for test A apply		N/A
	However, for capacitors in heating appliances the values for test B or C apply		N/A
4.12	Damp heat, steady state		-
	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 are applicable		N/A
4.14.7	Only insulation resistance and voltage proof are checked		N/A
	No visible damage		N/A
4.17	Passive flammability test		-
	This subclause is applicable		N/A
4.18	Active flammability test		-
	This subclause is applicable		N/A
G	ANNEX G (NORMATIVE) SAFETY ISOLATING TRANSFORMERS		-
	The following modifications to this standard are applicable for safety isolating transformers:		-
7	Marking and instructions		-
7.1	Transformers for specific use marked with:		-
	- name, trademark or identification mark of the manufacturer or responsible vendor.....:		N/A
	- model or type reference .....		N/A
17	Overload protection of transformers and associated circuits		-

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Clause	Requirement + Test	Result - Remark	Verdict
	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, 29.3	The distances specified in items 2a, 2c and 3 in table 13 of IEC 61558-1 apply		N/A
	For insulated winding wires complying with subclause 19.12.3 of IEC 61558-1 there are no requirements for clearances or creepage distances		N/A
	For windings providing reinforced insulation, the distance specified in item 2c of table 13 of IEC 61558-1 is not assessed		N/A
	For safety isolating transformers subjected to periodic voltages with a frequency exceeding 30 kHz, the clearances, creepage distances and solid insulation values specified in IEC 60664-4 are applicable, if greater than the values specified in items 2a, 2c and 3 in table 13 of IEC 61558-1		N/A
H	ANNEX H (NORMATIVE) SWITCHES		-
	Switches comply with the following clauses of IEC 61058-1, as modified below:		-
	The tests of IEC 61058-1 carried out under the conditions occurring in the appliance		N/A
	Before being tested, switches are operated 20 times without load		N/A
8	Marking and documentation		-
	Switches are not required to be marked		N/A
	However, a switch that can be tested separately from the appliance marked with the manufacturer's name or trade mark and the type reference		N/A
13	Mechanism		-
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	For 17.2.4.4, the number of cycles declared according to 7.1.4 is 10 000, unless		N/A
	otherwise specified in 24.1.3 of the relevant part 2 of IEC 60335.....:		N/A
	Switches for operation under no load and which can be operated only by a tool, and		N/A
	switches operated by hand that are interlocked so that they cannot be operated under load,		N/A
	are not subjected to the tests		N/A
	However, switches without this interlock are subjected to the test of 17.2.4.4 for 100 cycles of operation		N/A
	Subclauses 17.2.2 and 17.2.5.2 not applicable		N/A
	The ambient temperature during the test is that occurring in the appliance during the test of clause 11 in IEC 60335-1		N/A
	The temperature rise of the terminals not more than 30 K above the temperature rise measured in clause 11 of IEC 60335-1 (K) .....		N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		-
	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
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
5.7	Conditioning of the test specimens		-
	When production samples are used, three samples of the printed circuit board are tested		N/A
5.7.1	Cold		-
	The test is carried out at -25 °C		N/A
5.7.3	Rapid change of temperature		-
	Severity 1 is specified		N/A
5.9	Additional tests		-
	This subclause is not applicable		N/A
K	ANNEX K (NORMATIVE) OVERVOLTAGE CATEGORIES		-
	The information on overvoltage categories is extracted from IEC 60664-1		P



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Clause	Requirement + Test	Result - Remark	Verdict
	Overvoltage category is a numeral defining a transient overvoltage condition		P
	Equipment of overvoltage category IV is for use at the origin of the installation		N/A
	Equipment of overvoltage category III is equipment in fixed installations and for cases where the reliability and the availability of the equipment is subject to special requirements		N/A
	Equipment of overvoltage category II is energy consuming equipment to be supplied from the fixed installation		P
	If such equipment is subjected to special requirements with regard to reliability and availability, overvoltage category III applies		N/A
	Equipment of overvoltage category I is equipment for connection to circuits in which measures are taken to limit transient overvoltages to an appropriate low level		N/A
L	ANNEX L (INFORMATIVE) GUIDANCE FOR THE MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES		-
	Information for the determination of clearances and creepage distances		P
M	ANNEX M (NORMATIVE) POLLUTION DEGREE		-
	The information on pollution degrees is extracted from IEC 60664-1		P
	Pollution		-
	The microenvironment determines the effect of pollution on the insulation, taking into account the macroenvironment		P
	Means may be provided to reduce pollution at the insulation by effective enclosures or similar		P
	Minimum clearances specified where pollution may be present in the microenvironment		P
	Degrees of pollution in the microenvironment		-
	For evaluating creepage distances, the following degrees of pollution in the microenvironment are established:		-
	- pollution degree 1: no pollution or only dry, non-conductive pollution occurs. The pollution has no influence		N/A
	- pollution degree 2: only non-conductive pollution occurs, except that occasionally a temporary conductivity caused by condensation is to be expected		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- pollution degree 3: conductive pollution occurs or dry non-conductive pollution occurs that becomes conductive due to condensation that is to be expected		P
	- pollution degree 4: the pollution generates persistent conductivity caused by conductive dust or by rain or snow		N/A
N	ANNEX N (NORMATIVE) PROOF TRACKING TEST		-
	The proof tracking test is carried out in accordance with IEC 60112 with the following modifications:		-
7	Test apparatus		-
7.3	Test solutions		-
	Test solution A is used		P
10	Determination of proof tracking index (PTI)		-
10.1	Procedure		-
	The proof voltage is 100 V, 175 V, 400 V or 600 V .....:	175V	P
	The test is carried out on five specimens		P
	In case of doubt, additional test with proof voltage reduced by 25 V, the number of drops increased to 100		N/A
10.2	Report		-
	The report states if the PTI value was based on a test using 100 drops with a test voltage of (PTI-25) V		N/A
O	ANNEX O (INFORMATIVE) SELECTION AND SEQUENCE OF THE TESTS OF clause 30		-
	Description of tests for determination of resistance to heat and fire		P
P	ANNEX P (INFORMATIVE) GUIDANCE FOR THE APPLICATION OF THIS STANDARD TO APPLIANCES USED IN WARM DAMP EQUABLE CLIMATES		-
	Modifications applicable for class 0 and 01 appliances having a rated voltage exceeding 150 V, 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 150 V, 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 for the tests of clauses 11 and 13 is 40 +3/0 °C		N/A
7.1	The appliance marked with the letters WdaE		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.12	The instructions state that the appliance is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA		N/A
	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 (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		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
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		-

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Clause	Requirement + Test	Result - Remark	Verdict
	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		-
R.3.2.2.1	The specification of the software architecture includes the aspects listed <ul style="list-style-type: none"> <li>- techniques and measures to control software faults/errors (refer to R.2.2);</li> <li>- interactions between hardware and software;</li> <li>- partitioning into modules and their allocation to the specified safety functions;</li> <li>- hierarchy and call structure of the modules (control flow);</li> <li>- interrupt handling;</li> <li>- data flow and restrictions on data access;</li> <li>- architecture and storage of data;</li> <li>- time-based dependencies of sequences and data</li> </ul>	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		-

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Clause	Requirement + Test	Result - Remark	Verdict
	The software is validated with reference to the requirements of the software safety requirements specification		N/A
	Compliance is checked by simulation of:		-
	- input signals present during normal operation		N/A
	- anticipated occurrences		N/A
	- undesired conditions requiring system action		N/A

TABLE R.1 e – GENERAL FAULT/ERROR CONDITIONS						
Component a	Fault/error	Acceptable measures b, c	Definitions	Document reference for applied measure	Document reference for applied test	Verdict
1 CPU						N/A
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

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Clause	Requirement + Test		Result - Remark			Verdict
4. Memory						N/A
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
5 Internal data path	Stuck at	Word protection with single bit redundancy	H.2.19.8.2			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	Time-slot monitoring, or scheduled transmission  Time-slot and logical monitoring, or  comparison of redundant communication channels by either:  - reciprocal comparison  - independent hardware comparator	H.2.18.10.4 H.2.18.18 H.2.18.10.3  H.2.18.15 H.2.18.3			N/A
	Wrong sequence	Logical monitoring, or time-slot monitoring, or Scheduled transmission	H.2.18.10.2 H.2.18.10.4 H.2.18.18			

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Clause	Requirement + Test	Result - Remark	Verdict

7	Input/output periphery	Fault conditions specified in 19.11.2	Plausibility check	H.2.18.13			N/A
7.1	VOID						N/A
7.2	Analog I/O						N/A
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 d 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.

- a) For fault/error assessment, some components are divided into their sub-functions.
- b) For each sub-function in the table, the Table R.2 measure will cover the software fault/error.
- c) Where more than one measure is given for a sub-function, these are alternatives.
- d) To be divided as necessary by the manufacturer into sub-functions.
- e) Table R.1 is applied according to the requirements of R.1 to R.2.2.9 inclusive.

AA	ANNEX AA (INFORMATIVE) (IEC 60335-2-40) Examples for operating temperatures of the appliance	-
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BB	ANNEX BB (NORMATIVE) (IEC 60335-2-40) Selected information about refrigerants	-
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CC	ANNEX CC (INFORMATIVE) (IEC/EN 60335-2-40/A1) Transportation, marking and storage for units that employ flammable refrigerants	-
CC.1	Transport of equipment containing flammable refrigerants (IEC 60335-2-40/A1)	N/A
CC.2	Marking of equipment using signs (IEC 60335-2-40/A1)	N/A
CC.3	Disposal of equipment using flammable refrigerants (IEC 60335-2-40/A1)	N/A
CC.4	Storage of equipment/appliances (IEC 60335-2-40/A1)	N/A



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Clause	Requirement + Test	Result - Remark	Verdict

CC.5	Storage of packed (unsold) equipment (IEC 60335-2-40/A1)		N/A
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DD	ANNEX DD (NORMATIVE) (IEC/EN 60335-2-40/A1) Service operations		-
DD.1	Generals (IEC 60335-2-40/A1)		N/A
DD.2	Symbols (IEC 60335-2-40/A1)		N/A
DD.3	Information in manual (IEC 60335-2-40/A1 corr.1)		N/A
DD.4	Information on servicing (IEC 60335-2-40/A1)		N/A
DD.5	Repairs to sealed components (IEC 60335-2-40/A1)		N/A
DD.6	Repair to intrinsically safe components (IEC 60335-2-40/A1)		N/A
DD.7	Cabling (IEC 60335-2-40/A1)		N/A
DD.8	Detection of flammable refrigerants (IEC 60335-2-40/A1)		N/A
DD.9	Leak detection methods (IEC 60335-2-40/A1)		N/A
DD.10	Removal and evacuation (IEC 60335-2-40/A1)		N/A
DD.11	Charging procedures (IEC 60335-2-40/A1)		N/A
DD.12	Decommissioning (IEC 60335-2-40/A1)		N/A
DD.13	Labelling (IEC 60335-2-40/A1)		N/A
DD.14	Recovery (IEC 60335-2-40/A1)		N/A

EE	ANNEX EE (NORMATIVE) (IEC/EN 60335-2-40/A1) Pressure Tests		-
EE.1	General (IEC 60335-2-40/A1)		P
EE.2	Pressure test value determined under testing carried out in clause 11 (IEC 60335-2-40/A1)		P
EE.3	Pressure test value determined under testing carried out in clause 19 (IEC 60335-2-40/A1)		P
EE.4	Pressure test value determined under testing carried out under standstill conditions (IEC 60335-2-40/A1)		P
EE.5	Fatigue test option for Clauses EE.1 and EE.4.1 (IEC 60335-2-40/A1)		N/A

FF	ANNEX FF (NORMATIVE) (IEC/EN 60335-2-40/A1) Leak simulation tests		-
FF.1	General (IEC 60335-2-40/A1)		N/A
FF.2	Test methods (IEC 60335-2-40/A1 corr.1)		N/A

IEC 60335-2-40			
Clause	Requirement + Test	Result - Remark	Verdict

GG	ANNEX GG (NORMATIVE) (IEC/EN 60335-2-40/A1) Charge limits, ventilation requirements and requirements for secondary circuits		-
GG.1	Requirements for charge limits in ventilated areas (IEC 60335-2-40/A1 Corr.1)		N/A
GG.2	Requirements for charge limits in unventilated areas (IEC 60335-2-40/A1 Corr.1)		N/A
GG.3	Requirements for charge limits in areas with mechanical ventilation (IEC 60335-2-40/A1)		N/A
GG.4	Requirements for mechanical ventilation within the appliance enclosure (IEC 60335-2-40/A1)		N/A
GG.5	Requirements for mechanical ventilation for rooms complying with ISO 5149 (IEC 60335-2-40/A1)		N/A
GG.6	Requirements for refrigeration systems employing secondary heat exchangers (IEC 60335-2-40/A1 Corr.1)		N/A
GG.7	The appliance shall then be tested with a maximum water flow under the conditions described in g) (IEC 60335-2-40/A1)		N/A

10.1	TABLE: Power input deviation				P
Input deviation of/at:	P rated (W)	P measured (W)	$\Delta P$	Required $\Delta P$	Remark (measured current)
Indoor unit MHC-96HWD1N1 (cooling and heating mode)	850	791	-6,9%	+15%	4,6
Outdoor unit MOVG-96HD1N1-R (cooling mode)	9250	9245	-0,1%	+15%	14,3
Outdoor unit MOVG-96HD1N1-R (heating mode)	9250	8347	-9,8%	+15%	13,0
Indoor unit MHC-96HWD1N1(A) (cooling and heating mode)	850	450	-47,1%	+15%	3,1
Outdoor unit MOUA-96HD1N1-R (cooling mode)	11700	11845	+1,24%	+15%	18,1
Outdoor unit MOUA-96HD1N1-R (heating mode)	11700	9197	-21,4%	+15%	14,2
Indoor unit MHC1-76HWD1N1 (cooling and heating mode)	650	460	-29,2%	+15%	2,7
Outdoor unit MOVG1-76HD1N1-R (cooling mode)	8000	7286	-8,9%	+15%	11,2
Outdoor unit MOVG1-76HD1N1-R (heating mode)	8000	6833	-14,6%	+15%	10,5

Supplementary information: The test was carried out on samples respectively with all alternate components at voltage 230V 50Hz for indoor unit and 397,5V 3N~ 50Hz for outdoor unit, Only the highest value is listed.

10.2	TABLE: Current deviation				N/A
Current deviation of/at:	I rated (A)	I measured (A)	$\Delta I$	Required $\Delta I$	Remark
-	-	-	-	-	-

Supplementary information:

11.8	TABLE: Heating test, thermocouples (Cooling mode)		P
	Test voltage (V) .....	Indoor unit: 254,4V~ and 206,8V~ Outdoor unit: 357,2 V 3N~ and 439,9V 3N~	—
	Ambient (°C) .....	32/23(DB/WB indoor) 50/24(DB/WB outdoor)	—
Thermocouple locations		Max. temperature measured, T (°C)	Max. temperature limit, T (°C)
Indoor unit of model MHC-96HWD1N1/MOVB-96HD1N1-R			
Fan motor (Panasonic) winding		45,6	105
(Alternative) Fan motor (SHIBAURA) winding		42,3	105
(Alternative) Fan motor (Welling) winding		41,8	105
Electrolytic capacitor		48,1	T105

Fan motor relay (ambient)	38,0	T70
PCB	50,0	130
Winding of transformer	42,0	110
X2 capacitor	36,8	T100
Varistor	32,5	T85
Terminal block I	33,9	85
Terminal block II	35,9	85
Display board enclosure	32,7	For cl.30
Display PCB	34,4	130
Reactive	74,6	165
Power cord	35,6	75
Air let-out	28,4	90
Test corner	32,0	90
Outdoor unit of model MHC-96HWD1N1/MOVB-96HD1N1-R		
Fan motor (Panasonic) winding	69,0	105
(Alternative) Fan motor (SHIBAURA) winding	68,4	105
(Alternative) Fan motor (Welling) winding	68,0	105
Fan motor relay (ambient)	65,2	T70
X2 capacitor for Filter board	63,3	T100
Compressor surface (top)	65,1	For reference
Compressor surface (side)	62,3	For reference
Internal wiring near compressor	65,6	80
4-way valve solenoid	50,2	110
4-way valve relay (ambient)	52,9	T70
AC contactor (ambient)	60,0	T70
Electrolytic capacitor	80,1	T105
Reactor	63,0	165
Winding of transformer I	62,8	110
Winding of transformer II	64,9	110
Three-phase protector	56,0	For reference
PCB	53,2	130
X2 capacitor	60,5	T100
Varistor	59,4	T85
Enclosure	49,9	85
Terminal block	52,7	85
Power cord	51,8	75
Indoor unit of model MHC-96HWD1N1(A)/ MOUA-96HD1N1-R		
Fan motor (Panasonic) winding	40,4	105
(Alternative) Fan motor (SHIBAURA) winding	43,7	105

(Alternative) Fan motor (Welling) winding	42,1	105
Ambient of relay	46,2	T70
PCB	40,1	130
Transformer	43,5	110
X2 capacitor	35,9	T100
Varistor	30,9	T85
Terminal block	36,8	85
Display board enclosure	32,1	For cl.30
Display PCB	49,5	130
Reactive	46,7	165
Power cord	36,3	75
Air let-out	16,7	90
Test corner	32,0	90
Outdoor unit of model MHC-96HWD1N1(A)/ MOUA-96HD1N1-R		
Fan motor (Panasonic) winding	86,8	105
(Alternative) Fan motor (SHIBAURA) winding	76,5	105
(Alternative) Fan motor (Welling) winding	74,2	105
Ambient of relay	70,1	T85
X2 capacitor	61,8	T100
Compressor surface (top)	73,8	For reference
Compressor surface (side)	76,7	For reference
Internal wiring near compressor	51,2	T80
4-way valve solenoid	52,6	110
AC contactor (ambient)	50,9	T70
Capacitor on main PCB	59,9	T70
Capacitor for fan motor	51,3	T70
Reactor	79,1	165
Surface of transformer 1	67,1	110
Surface of transformer 2	54,6	110
Three-phase protector	56,0	For reference
PCB	58,7	130
X2 capacitor	61,8	T100
Varistor	55,5	T85
Enclosure	47,5	85
Terminal block	48,9	85
Power cord	63,2	75
Indoor unit of model MHC1-76HWD1N1/ MOVG1-76HD1N1-R		
Fan motor winding	35,2	105
Power cord	37,4	75

Terminal I	36,9	85
Terminal II	37,6	85
Terminal III	37,0	85
Reactor	43,9	165
Transformer	47,9	110
PCB	36,2	130
Relay	51,1	T70
X2 capacitor I	50,6	T100
X2 capacitor II	39,7	T100
Varistor	38,7	T85
Inductance	43,8	For reference
Electrolytic capacitor	42,9	T105
Outdoor unit of model MHC1-76HWD1N1/MOVG1-76HD1N1-R		
X2 capacitor I (for filter board)	55,0	T100
X2 capacitor II (for filter board)	54,2	T100
PCB (for filter board)	51,6	130
Ambient of relay (for filter board)	57,0	T70
Varistor (for filter board)	50,2	T85
Inductance (for filter board)	59,8	For reference
PCB (for fan module board)	57,5	130
Transformer (for fan module board)	57,5	105
X2 capacitor (for fan module board)	57,0	T100
Appliance enclosure	51,8	85
Power cord	49,7	75
PCB (for main control board)	61,2	130
Transformer (for main control board)	55,7	105
Ambient of relay I (for main control board)	55,1	T70
Ambient of relay II (for main control board)	51,5	T70
X2 capacitor (for main control board)	53,6	T100
Varistor (for main control board)	50,6	T85
IPM (for IPM module board)	61,1	For reference
PCB (for IPM module board)	56,9	130
Transformer (for IPM module board)	60,9	105
X2 capacitor (for IPM module board)	64,4	T100
Fan motor winding	63,0	105
Compressor enclosure (top)	64,5	For reference
Compressor enclosure (side)	63,2	For reference
4-way valve	48,7	105
Terminal	48,9	85

Transformer	57,2	110
Reactor	56,6	165
Internal wire	56,7	T105
AC contactor (ambient)	51,9	T70
Supplementary information: The tests were carried out at both 254,4V~ and 206,8V~ (for indoor unit); 439,9V 3N~ and 357,2V 3N~ (for outdoor unit) respectively with all alternate components, the highest temperature result is listed.		

11.8	TABLE: Heating test, resistance method (cooling mode)					P
	Test voltage (V) .....	Indoor unit: 254,4V~ and 206,8V~ Outdoor unit: 357,2 V 3N~ and 439,9V 3N~				—
	Ambient, t <sub>1</sub> (°C) .....	32/23(DB/WB indoor) 50/24(DB/WB outdoor)				—
	Ambient, t <sub>2</sub> (°C) .....	32/23(DB/WB indoor) 50/24 (DB/WB outdoor)				—
Temperature of winding		R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	T (°C)	Max, T (°C)	Insulation class
Model: MHC-96HWD1N1/MOVB-96HD1N1-R						
Winding of outdoor transformer 1		148,2(18,8°C)	176,7	67,5	120	Class B
Winding of outdoor transformer 2		274,5(18,8°C)	328,1	68,3	120	Class B
4-way valve solenoid		1457(18,8°C)	1663	54,6	120	Class B
Winding of compressor		0,79(18,8°C)	0,97	76,5	130	Other insulation
Model: MHC-96HWD1N1(A)/ MOUA-96HD1N1-R						
Winding of outdoor transformer 1		149,3(25,4°C)	179,7	78,4	120	Class B
Winding of outdoor transformer 2		1,162(25,4°C)	1,349	67,2	120	Class B
4-way valve solenoid		2135,0(25,4°C)	2461,9	65,2	120	Class B
Model: MHC1-76HWD1N1/MOVB1-76HD1N1-R						
Winding of compressor		0,78(33,9°C)	0,92	82,1	130	Other insulation
Supplementary information: The tests were carried respectively out at both 439,9V 3N~ and 357,2V 3N~, only the highest temperature result is listed.						

11.8	TABLE: Heating test, thermocouples (heating mode)					P
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	Test voltage (V)..... .....	Indoor unit: 254,4V~ and 206,8V~ Outdoor unit: 357,2 V 3N~ and 439,9V 3N~	—
	Ambient (°C) .....	30/19(DB/WB indoor) 24/18(DB/WB outdoor)	—
Thermocouple locations		T (°C)	Max, T (°C)
Indoor unit of model MHC-96HWD1N1/MOVB-96HD1N1-R			
Fan motor (Panasonic) winding		60,2	105
(Alternative) Fan motor (SHIBAURA) winding		57,8	105
(Alternative) Fan motor (Welling) winding		51,6	105
Electrolytic capacitor		47,3	T105
Fan motor relay (ambient)		37,8	T70
PCB		49,5	130
Winding of transformer		41,8	110
X2 capacitor		36,1	T100
Varistor		29,7	T85
Terminal block I		33,0	85
Terminal block II		35,3	85
Display board enclosure		32,4	For cl.30
Display PCB		35,1	130
Reactive		73,3	165
Power cord		34,6	75
Air let-out		43,0	90
Test corner		30,8	90
Outdoor unit of model MHC-96HWD1N1/MOVB-96HD1N1-R			
Fan motor (Panasonic) winding		21,2	105
(Alternative) Fan motor (SHIBAURA) winding		23,5	105
(Alternative) Fan motor (Welling) winding		22,3	105
Fan motor relay (ambient)		30,9	T70
X2 capacitor for Filter board		35,5	T100
Compressor surface (top)		59,1	For reference
Compressor surface (side)		56,3	For reference
Internal wiring near compressor		54,4	T80
4-way valve solenoid		59,7	110
4-way valve relay (ambient)		30,0	T70



AC contactor (ambient)	33,7	T70
Electrolytic capacitor	65,8	T105
Reactive	39,4	165
Winding of transformer I	40,0	110
Winding of transformer II	41,5	110
Three-phase protector	32,8	For reference
PCB	31,8	130
X2 capacitor	36,6	T100
Varistor	35,8	T85
Enclosure	24,8	85
Terminal block	28,4	85
Power cord	26,7	75
Indoor unit of model MHC-96HWD1N1(A)/ MOUA-96HD1N1-R		
Fan motor (Panasonic) winding	57,6	105
(Alternative) Fan motor (SHIBAURA) winding	59,2	105
(Alternative) Fan motor (Welling) winding	56,9	105
Ambient of relay	44,0	T70
PCB	40,1	130
Transformer	43,4	110
X2 capacitor	35,5	T100
Varistor	32,2	T85
Terminal block	36,7	85
Display board enclosure	30,3	For cl.30
Display PCB	52,2	130
Reactive	47,6	165
Power cord	36,0	75
Air let-out	42,7	90
Test corner	30,8	90
Outdoor unit of MHC-96HWD1N1(A)/ MOUA-96HD1N1-R		
Fan motor (Panasonic) winding	40,2	105
(Alternative) Fan motor (SHIBAURA) winding	33,6	105
(Alternative) Fan motor (Welling) winding	32,3	105
Ambient of relay	38,4	T85
X2 capacitor	58,7	T100

Compressor surface (top)	68,8	For reference
Compressor surface (side)	60,5	For reference
Internal wiring near compressor	31,3	T80
4-way valve solenoid	32,8	110
AC contactor (ambient)	31,6	T70
Capacitor on main PCB	36,5	T70
Capacitor for fan motor	29,5	T70
Reactive	42,0	165
Surface of transformer 1	36,6	110
Surface of transformer 2	29,4	110
Three-phase protector	32,8	For reference
PCB	37,1	130
X2 capacitor	58,7	T100
Varistor	34,5	T85
Enclosure	24,9	85
Terminal block	29,2	85
Power cord	43,1	75
Indoor unit of model MHC1-76HWD1N1/ MOVG1-76HD1N1-R		
Fan motor winding	50,7	105
Power cord	37,7	75
Terminal I	37,7	85
Terminal II	38,9	85
Terminal III	39,7	85
Reactor	44,9	165
Transformer	48,0	110
PCB	37,1	130
X2 capacitor I	51,3	T100
X2 capacitor II	40,2	T100
Relay (ambient)	44,3	T70
Varistor	39,3	T85
Inductance	46,7	For reference
Electrolytic capacitor	43,2	T105
Outdoor unit of model MHC1-76HWD1N1/ MOVG1-76HD1N1-R		
X2 capacitor I (for filter board)	31,6	T100

X2 capacitor II (for filter board)	28,7	T100
PCB (for filter board)	29,1	130
Ambient of relay (for filter board)	31,9	T70
Varistor (for filter board)	27,9	T85
Inductance (for filter board)	38,1	For reference
PCB (for fan module board)	33,1	130
Transformer (for fan module board)	34,6	105
X2 capacitor (for fan module board)	33,8	T100
Appliance enclosure	28,5	85
Power cord	27,9	75
PCB (for main control board)	40,5	130
Transformer (for main control board)	36,3	105
Ambient of relay I (for main control board)	33,6	T70
Ambient of relay II (for main control board)	30,2	T70
X2 capacitor (for main control board)	33,6	T100
Varistor (for main control board)	30,0	T85
IPM (for IPM module board)	39,7	For reference
PCB (for IPM module board)	36,6	130
Transformer (for IPM module board)	40,6	105
X2 capacitor (for IPM module board)	42,0	T100
Fan motor winding	62,4	105
Compressor enclosure (top)	61,3	For reference
Compressor enclosure (side)	61,1	For reference
4-way valve	48,5	105
Terminal	26,9	85
Transformer	37,2	110
Reactor	38,7	165
Internal wire	35,8	T105
AC contactor (ambient)	28,8	T70

Remark: The tests were carried out at both 254,4V~ and 206,8V~ (for indoor unit); 439,9V 3N~ and 357,2V 3N~ (for outdoor unit) respectively with all alternate components, the highest temperature result is listed.

11.8	TABLE: Heating test, resistance method (heating mode)		P
	Test voltage (V) .....	Indoor unit: 254,4V~ and 206,8V~ Outdoor unit: 357,2 V 3N~ and 439,9V 3N~	—

Ambient, t <sub>1</sub> (°C).....:		30/19(DB/WB indoor)		—	
		24/18(DB/WB outdoor)			
Ambient, t <sub>2</sub> (°C).....:		30/19(DB/WB indoor)		—	
		24/18(DB/WB outdoor)			
Temperature of winding	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	T (°C)	Max, T (°C)	Insulation class
Model: MHC-96HWD1N1/MOVG-96HD1N1-R					
Winding of outdoor transformer 1	148,2(18,8°C)	163,2	44,4	120	Class B
Winding of outdoor transformer 2	274,5(18,8°C)	302,7	44,8	120	Class B
4-way valve solenoid	1457(18,8°C)	1674,2	56,6	120	Class B
Winding of compressor	0,79(18,8°C)	0,94	66,9	130	Other insulation
Model: MHC-96HWD1N1(A)/ MOUA-96HD1N1-R					
Winding of outdoor transformer 1	149,3(25,4°C)	162,2	47,8	120	Class B
Winding of outdoor transformer 2	1,162(25,4°C)	1,275	50,6	120	Class B
4-way valve solenoid	2135,0(25,4°C)	2484,1	67,9	120	Class B
Model: MHC1-76HWD1N1/ MOVG1-76HD1N1-R					
Winding of compressor	0,78(33,9°C)	0,90	75,2	130	Other insulation
Remark: The tests were carried respectively out at both 439,9V 3N~ and 357,2V 3N~, only the highest temperature result is listed.					

<b>13.2</b>	<b>TABLE: Leakage current</b>		P
	Heating appliances: 1.15 x rated input (W).....:	-	—
	Motor-operated and combined appliances: 1.06 x rated voltage (V).....:	Indoor unit: 254,4V~ Outdoor unit:439,9V 3N~	—
Leakage current between		I (mA)	Max. allowed I (mA)
L/N, A/B/C/N– earthing metal enclosure		0,61	2,0/kW
L/N, A/B/C/N– plastic cover		0,06	0,25
Supplementary information: the test was performed with all alternative components and the high value is listed.			

<b>13.3</b>	<b>TABLE: Electric strength</b>		P
Test voltage applied between:		Voltage (V)	Breakdown (Yes/No)
L/N, A/B/C/N– earthing metal enclosure (cooling and heating mode)		1000	No

Supplementary insulation	1750	No
L/N, A/B/C/N– plastic cover (cooling and heating mode)	3000	No
Supplementary information: the test was performed with all alternative components and the severe result is listed.		

<b>14</b>	<b>TABLE: Transient overvoltages</b>					N/A
Clearance between:	CI (mm)	Required CI (mm)	Rated impulse voltage (V)	Impulse test voltage (V)	Flashover (Yes/No)	
-	-	-	-	-	-	

<b>16.2</b>	<b>TABLE: Leakage current</b>			P
	Single phase appliances: 1.06 x rated voltage (V) .....	254,4	—	—
	Three phase appliances 1.06 x rated voltage divided by $\sqrt{3}$ (V) .....	254,4	—	—
Leakage current between		I (mA)	Max. allowed I (mA)	
L/N, A/B/C/N– earthing metal enclosure		0,97	2,0/kW	
L/N, A/B/C/N– plastic cover		0,09	0,25	
Supplementary information: the test was performed with all alternative components and the high value is listed.				

<b>16.3</b>	<b>TABLE: Electric strength</b>		P
Test voltage applied between:	Voltage (V)	Breakdown (Yes/No)	
L/N, A/B/C/N– earthing metal enclosure (cooling and heating mode)	1250	No	
Supplementary insulation	1750	No	
L/N, A/B/C/N– plastic cover (cooling and heating mode)	3000	No	
Supplementary information: the test was performed with all alternative components and the severe result is listed.			

<b>17</b>	<b>TABLE: Overload protection, thermocouple measurements</b>		P
Temperature rise of part/at:	T (°C)	Max. T (°C)	
Winding of transformer (TT2-B35+D15-1F:Zhanliang)	143,2	225	
Winding of transformer (TT2-B35+D90-8F:Zhanliang)	142,5	225	
Winding of transformer (TT2-B35+D90-8F, Zhanliang)	157,7	225	
Winding of transformer (TT2-B35+D90-8F, Wanxin)	143,6	225	
Winding of transformer (TT2-B35+D90-8F, Yingju)	148,9	225	
Winding of transformer (TT2-B35+D90-8F, Yinli)	157,7	225	

Winding of transformer (E16116: MAANSHAN COINER)	80,7	225
Winding of transformer (E28116: ZHONGSHAN COIN)	85,6	225
Winding of transformer (E16108: MAANSHAN COINER)	96,8	225
Winding of transformer (E16108: ZHONGSHAN COIN)	96,8	225
Winding of transformer (E28131: JIA YANG)	90,2	225
Winding of transformer (E28069: JIA YANG)	87,4	225
Winding of transformer (TD-0.5-1: Quanzhou Coiner)	84,4	225
Winding of transformer (TD-0.5-1: Zhanliang)	80,1	225
Winding of transformer (TD-0.5-1: Zhongshan Coin)	82,5	225
Winding of transformer (TD-0.5-1: Maanshan Coiner)	79,3	225
Winding of transformer (E28093: CNT)	106,7	225
Winding of transformer (E28093: NEW-TEC)	112,3	225
Winding of transformer (E28093: Zhongshan Coiner)	93,2	225
Winding of transformer (E28093: Maanshan Coiner)	98,7	225
Winding of transformer (BCK2804: CNT)	80,4	225
Winding of transformer (BCK2804: NEW-TEC)	85,4	225
Winding of transformer (BCK2804: ZhongShan Coin)	87,2	225
Winding of transformer (E19055: zhizhuo)	90,3	225
Winding of transformer (Quanzhou Coiner: BCK-2801-187)	95,4	225
Winding of transformer (BCK2804: Maanshan Coiner)	89,7	225
Winding of transformer (E28069: NEW-TEC)	80,2	225
Winding of transformer (E28069: Ma'anshan Coin)	83,4	225
Winding of transformer (E28131: NEW-TEC)	85,1	225

<b>17</b>	<b>TABLE: Overload protection, resistance method</b>					N/A
	Test voltage (V) .....					—
	Ambient, t1 (°C) .....					—
	Ambient, t2 (°C) .....					—
Temperature of winding	R1 (Ω)	R2 (Ω)	Δ T (K)	T (°C)	Max. T (°C)	
-	-	-	-	-	-	
Supplementary information:						

19		Abnormal operation conditions						P
Operational characteristics		YES/NO	Operational conditions					
Are there electronic circuits to control the appliance operation?		Yes	-					
Are there "off" or "stand-by" position?		Yes	-					
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	P	P	N/A	N.A	N/A	N/A	P	
19.3	P	P	N/A	N.A	N/A	N/A	P	
19.4	P	P	N/A	N.A	N/A	N/A	P	
19.5	P	P	N/A	N.A	N/A	N/A	P	
19.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
19.7	P	P	N/A	N.A	N/A	N/A	P	
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	P	P	N/A	N.A	N/A	N/A	P	
19.11.2	P	P	N/A	N.A	N/A	N/A	P	
19.11.4.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
19.101	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Supplementary information:								

19.2	Abnormal operation conditions – locked rotor test other than motor-compressors					P	
	Ambient, t1 (°C):		23,0°C		—		
	Ambient, t2 (°C):		23,0°C		—		
	Test voltage (V) :		240V		—		
Temperature limit T of winding:			R1 (Ω)	R2 (Ω)	Measured T (°C)	Limit T (°C)	Insulation class
Winding(Panasonic: WZDK750-38G-7 (DMSBN8PKB))			-	-	121,6	215	E
Enclosure (Panasonic: WZDK750-38G-7(DMSBN8PKB))			-	-	106,5	150	-
Winding(SHIBAURA: WZDK750-38G-7)			-	-	122,3	215	E
Enclosure (SHIBAURA: WZDK750-38G-7)			-	-	106,2	150	-
Winding(WELLING: WZDK750-38G-7 (RD-310-750-8B))			-	-	125,4	215	E

Enclosure (WELLING: WZDK750-38G-7 (RD-310-750-8B))	-	-	112,2	150	-
Winding(Panasonic: WZDK750-38GS-W (DMUD8C1KB))	-	-	125,3	215	E
Enclosure (Panasonic: WZDK750-38GS-W (DMUD8C1KB))	-	-	108,5	150	-
Winding(SHIBAURA: WZDK750-38GS-W)	-	-	126,3	215	E
Enclosure (SHIBAURA: WZDK750-38GS-W)	-	-	112,5	150	-
Winding(WELLING: WZDK750-38GS-W (RDN-310-750-8))	-	-	127,2	215	E
Enclosure (WELLING:WZDK750-38GS-W (RDN-310-750-8))	-	-	116,8	150	-
Winding of outdoor fan motor (WZDK170-38G-1: Panasonic)	-	-	125,4	215	E
Enclosure of outdoor fan motor (WZDK170-38G-1: Panasonic)	-	-	108,4	150	-
Winding of outdoor fan motor (WZDK170-38G-1 (SIC-81FW-F1170-1) :SHIBAURA)	-	-	119,5	215	E
Enclosure of outdoor fan motor (WZDK170-38G-1 (SIC-81FW-F1170-1) :SHIBAURA)	-	-	102,3	150	-
Winding of outdoor fan motor (WZDK170-38G-1 (SIC-81FW-F1170-1) : Welling)	-	-	118,1	215	E
Enclosure of outdoor fan motor (WZDK170-38G-1 (SIC-81FW-F1170-1) : Welling)	-	-	98,3	150	-
Remark: only the thermocouples method is used in this test.					

<b>19.2</b>	<b>TABLE: electric strength measurements after 72 hours</b>		P
Test voltage applied between:		Test voltage (V)	Breakdown Yes / No
For all fan motors			
L/N-metal enclosure of fan motor		1250	No

<b>19.2</b>	<b>TABLE: leakage current measurements after 72 hours</b>		P
	A voltage equal to twice the rated voltage (V) :	480V	—
Leakage current I between:		I (mA)	Required I (mA)
Panasonic: WZDK750-38G-7 (DMSBN8PKB)		0,27	2,0
SHIBAURA: WZDK750-38G-7		0,18	2,0
WELLING: WZDK750-38G-7 (RD-310-750-8B)		0,23	2,0
Panasonic: WZDK750-38GS-W(DMUD8C1KB)		0,25	2,0
SHIBAURA: WZDK750-38GS-W)		0,28	2,0
WELLING: WZDK750-38GS-W (RDN-310-750-8)		0,23	2,0
Panasonic :WZDK170-38G-1		0,01	2,0



Welling : WZDK170-38G-1 (RD-310-170-8)	0,12	2,0
Shibaura : WZDK170-38G-1 (SIC-81FW-F1170-1)	0,12	2,0

19.3	Abnormal operation conditions – Locked rotor test motor-compressor			P
	Motor-compressor .....	E705DHD-72D2YG		
	Start device .....	--		
	Protector .....	35HM Series		
	Start capacitor .....	--		
	Run capacitor .....	--		
	Cooling; (static); (fan-m3/h); (oil); .....	Static		
	Thermal motor-protection system .....	Self-resetting reset		
		Self-resetting		Manually reset
Rated voltage	Vn max (V)			Vn min (V)
	After 72 h	After 288 h	After 360 h	After 363 h
High-voltage test (see 16.3)	P	-	-	-
Leakage current (mA) (see 16.2)	-	-	0,28	0,28
Electric strength (see 13.3)	-	-	P	P
Room temperature (°C) (20 ± 5°C)	23,0	23,0	23,0	23,0
Number of cycles (≥ 2000 or 50)	2321	10240	13537	13753
Housing temperature (°C) (≤ 150°C)	119,4	120,6	120,2	120,0
Supplementary information: --				

<b>19.5-19.9</b>	<b>Abnormal operation conditions</b>	P
Subclause	Effect	Verdict
19.5	Refer to table 19,5	P
19.6	-	N/A
19.7	Refer to table 19,7	P
19.8	-	N/A
19.9	-	N/A
Supplementary information:		

19.5	TABLE: RESTRICT HEAT EXCHANGERS TEST	P
	t1 (°C) .....	23,0
	t2 (°C) .....	23,0

Procedure	Supplied at indoor unit: 240V~, outdoor unit: 415V 3N~		
Duration	Until steady conditions are obtained or the protective device operates		
Restrict heat exchanger		phenomenon	hazard
Restrict outdoor air flow at cooling mode	Protector occurred, compressor stopped.		No
Restrict indoor air flow at heating mode	Protector occurred, compressor stopped.		No
Remark: the test was carried out with all alternative components respectively and the severe result is listed.			

<b>19.7</b>	<b>TABLE: low and high temperature test</b>		<b>P</b>
Low temperature	t (°C) .....	5/--(DB/WB indoor), -20/--(DB/WB outdoor)	
High temperature	t (°C) .....	42/--(DB/WB indoor) 60/--(DB/WB outdoor)	
Procedure	indoor unit: 240V~, outdoor unit: 415V 3N~		
Duration	Until steady conditions are obtained or the protective device operates		
		phenomenon	hazard
Dry-bulb temperature reduced a value 5 K below the minimum value	Operated normally, defrost occurred.		No
Dry-bulb temperature increased a value 10 K above the maximum value	Protector occurred, compressor stopped.		No
Remark: the test was carried out on all models respectively and the severe result is listed.			

<b>19.10</b>	<b>Abnormal operation conditions</b>		<b>P</b>
Failure description	Effect		Verdict
The programmed controller, if any, stopping in any position	Normal operation.		P
Disconnection and reconnection of one or more phases of the supply	Protection occurred, compressor stopped		P
Open-circuiting or short-circuiting of components	Protection occurred, compressor stopped		P
Supplementary information: all temp. sensor have been evaluated and the unfavourable result is listed			

19.11.2		Abnormal Operation			P
Fault condition	Short circuit	Open circuit	Effect	Verdict	
Outdoor fan module board DCINV-FAN-15A (PS219A4)(RIVER).D.3.1-1 for MHC-96HWD1N1/MOVG-96HD1N1-R					
C14	Yes	No	The appliance stops running, the component C4 damaged, the test repeated, the C4 damaged again.	P	
C14	No	Yes	The appliance running normally	P	
D14	Yes	No	The appliance stops running	P	
D14	No	Yes	The appliance stops running	P	
T1	Yes	No	The appliance stops running	P	
PC817	Yes	No	The appliance stops running	P	
PC817	No	Yes	The appliance stops running	P	
U1	Yes	No	The appliance stops running	P	
Outdoor main Control Board MDV-850W/DSN1-950.D.1.1.1-1 for MHC-96HWD1N1/MOVG-96HD1N1-R					
TLP 781	Yes	No	The appliance stops running	P	
TLP 781	No	Yes	The appliance stops running	P	
Trans 1	Yes	No	The appliance stops running	P	
IC48	Yes	No	The appliance stops running	P	
IC31	Yes	No	The appliance stops running	P	
IC25	Yes	No	The appliance stops running	P	
IC32	Yes	No	The appliance stops running	P	
Outdoor IPM Module Board ME-POWER-50A(PS22A79).D.1.1.1-1 for MHC-96HWD1N1/MOVG-96HD1N1-R					
C1	Yes	No	The appliance stops running	P	
C1	No	Yes	The appliance stops running	P	
T1	Yes	No	The appliance stops running	P	
PC817	Yes	No	The appliance stops running	P	
PC817	No	Yes	The appliance stops running	P	
IC1	Yes	No	The appliance stops running	P	
IPM1	Yes	No	The appliance stops running	P	
Outdoor filter Broad V-EOK220.S.1.1.1-1 for MHC-96HWD1N1/MOVG-96HD1N1-R					
C20	Yes	No	The appliance stops running	P	
C20	No	Yes	The appliance stops running	P	
C21	Yes	No	The appliance stops running	P	

C21	No	Yes	The appliance stops running	P
ZR1	Yes	No	The appliance stops running	P
ZR1	No	Yes	The appliance running normally	P
ZR2	Yes	No	The appliance stops running	P
ZR2	No	Yes	The appliance running normally	P
ZR3	Yes	No	The appliance stops running	P
ZR3	No	Yes	The appliance running normally	P
BR1	Yes	No	The appliance stops running, The fuse operated (the measured current:29A)	P
Indoor Fan module board DC-FAN-15A (PS21964).D.13.MP1-1				
IC1	Yes	No	The appliance stops running	P
IC2	Yes	No	The appliance stops running	P
Indoor Main Control Board V-EIK280-D-A[0547A].1.1.1-1				
C62	Yes	No	The appliance stops running	P
C62	No	Yes	The appliance stops running	P
T1	Yes	No	The appliance stops running	P
PC817	Yes	No	The appliance stops running	P
PC817	Yes	No	The appliance stops running	P
IC12	Yes	No	The appliance stops running	P
IC1	Yes	No	The appliance stops running	P
C70	Yes	No	The appliance stops running	P
C70	No	Yes	The appliance running normally	P
C42	Yes	No	The appliance stops running	P
C42	No	Yes	The appliance running normally	P
Main controller PCB for outdoor unit of MHC-96HWD1N1(A)/ MOUA-96HD1N1-R				
KC10	Yes	No	The appliance stops running.	P
KC10	No	Yes	The appliance stops running.	P
KC39	Yes	No	The appliance stops running.	P
KC39	No	Yes	The appliance stops running.	P
KC4	Yes	No	The appliance stops running.	P
KC4	No	Yes	The appliance stops running.	P
KC5	Yes	No	The appliance stops running.	P
KC5	No	Yes	The appliance stops running.	P

BR1	Yes	No	The appliance stops running. The fuse operated, the measured current :30A	P
BR1	No	Yes	The appliance stops running.	P
E4	Yes	No	The appliance stops running. The fuse operated, the measured current :31A	P
E4	No	Yes	The appliance stops running.	P
D6	Yes	No	The appliance running normally.	P
D6	No	Yes	The appliance stops running.	P
Transformer	Yes	No	The appliance stops running.	P
PC817	Yes	No	The appliance stops running.	P
PC817	No	Yes	The appliance stops running.	P
IC7	Yes	No	The appliance stops running.	P
IC7	No	Yes	The appliance stops running.	P

<b>19.14</b>	<b>TABLE: Abnormal operation, temperature rises</b>			P
Thermocouple locations		T (°C)	Max. T (°C)	
Insulation of supply cord		65,7	175	
Walls, ceiling and floor of the test casing		62,3	175	
Supplementary information: only the highest value is listed on this table according to the test result of clause 19.				

<b>21.1</b>	<b>TABLE: Impact resistance</b>			P
Impacts per surface	Surface tested	Impact energy (Nm)	Comments	
3	Enclosure of indoor unit	0,5J	No damaged	
3	Enclosure of outdoor unit	0,5J	No damaged	
Supplementary information:				

<b>24.1</b>	<b>TABLE: Critical components information (see CDF)</b>					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity1)	
-	-	-	-	-	-	
Supplementary information:						
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)	
Fixed screw for enclosure	4,0	II	1,2	
Fixed screw for anchorage for supply cord	4,0	II	1,2	
Screw fixing earthing continuity connections	4,0	II	1,2	
Screws for electrical connections	4,0	II	1,2	
Supplementary information:				

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**	--	--	--	--	N/A
500	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
800	0,2* / 0,5 / 0,8**	--	--	--	--	N/A
1 500	0,5 / 0,8** / 1,0***	--	--	--	--	N/A
2 500	1,5 / 2,0***	2,8	4,5	--	4,3	P
4 000	3,0 / 3,5***	--	--	10,0	--	P
6 000	5,5 / 6,0***	--	--	--	--	N/A
8 000	8,0 / 8,5***	--	--	--	--	N/A
10 000	11,0 / 11,5***	--	--	--	--	N/A

Supplementary information:

\*) 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

1. The clearance for basic insulation between winding and metal enclosure of fan motor is 2,8mm.
2. The clearance for basic insulation between winding and metal enclosure of compressor is 4,0mm.
3. The clearance for basic insulation on PCB is 4,3 mm.
4. The clearance for function insulation on PCB is 4,3 mm.
5. The clearance for function insulation on terminal block is 4,5 mm.
6. The clearance for supplementary insulation between internal wire and the test probe is 4,5 mm.
7. The clearance for reinforce insulation between inner live part and accessible surface is 10,0 mm.

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree							Type of insulation			Verdict
	1	2			3						
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*	B**	S**	R**	
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9		—	—	N/A
≤50	0,18	0,6	0,85	1,2	1,5	1,7	1,9	—		—	N/A
≤50	0,36	1,2	1,7	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	1,5	2,1	3,0	3,8	4,2	4,8	—	—		N/A
<b>250</b>	0,56	1,25	1,8	2,5	3,2	3,6	<b>4,0</b>	4,3	—	—	P
<b>250</b>	0,56	1,25	1,8	2,5	3,2	3,6	<b>4,0</b>	—	4,7	—	P
<b>250</b>	1,12	2,5	3,6	5,0	6,4	7,2	<b>8,0</b>	—	—	10,0	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 ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5		—	—	N/A
>800 and ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	—		—	N/A
>800 and ≤1000	4,8	8,0	11,2	16,0	20,0	22,0	25,0	—	—		N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0		—	—	N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	—		—	N/A
>1000 and ≤1250	6,4	10,0	14,2	20,0	25,0	28,0	32,0	—	—		N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0		—	—	N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	—		—	N/A
>1250 and ≤1600	8,4	12,6	18,0	25,0	32,0	36,0	40,0	—	—		N/A
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0		—	—	N/A

29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree							Type of insulation			Verdict
	1	2			3						
		Material group			Material group						
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*	B**	S**	R**	
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	—	—	—	N/A
>1600 and ≤2000	11,2	16,0	22,0	32,0	40,0	44,0	50,0	—	—	—	N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—	—	—	N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	—	—	—	N/A
>2000 and ≤2500	15,0	20,0	28,0	40,0	50,0	56,0	64,0	—	—	—	N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—	—	—	N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	—	—	—	N/A
>2500 and ≤3200	20,0	25,0	36,0	50,0	64,0	72,0	80,0	—	—	—	N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—	—	—	N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	—	—	—	N/A
>3200 and ≤4000	25,0	32,0	44,0	64,0	80,0	90,0	100,0	—	—	—	N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—	—	—	N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	—	—	—	N/A
>4000 and ≤5000	32,0	40,0	56,0	80,0	100,0	112,0	126,0	—	—	—	N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—	—	—	N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	—	—	—	N/A
>5000 and ≤6300	40,0	50,0	72,0	100,0	126,0	142,0	160,0	—	—	—	N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—	—	—	N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	—	—	—	N/A
>6300 and ≤8000	50,0	64,0	90,0	126,0	160,0	180,0	200,0	—	—	—	N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—	—	—	N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	—	—	—	N/A
>8000 and ≤10000	64,0	80,0	112,0	160,0	200,0	220,0	250,0	—	—	—	N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—	—	—	N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	—	—	—	N/A
>10000 and ≤12500	80,0	100,0	142,0	200,0	250,0	280,0	320,0	—	—	—	N/A



29.2	TABLE: Creepage distances, basic, supplementary and reinforced insulation										P
Working voltage (V)	Creepage distance (mm) Pollution degree										Verdict
	1	2			3			Type of insulation			
	Material group			Material group							
	I	II	IIIa/IIIb	I	II	IIIa/IIIb*	B**	S**	R**		
<p>Supplementary information:</p> <p>*) Material group IIIb is allowed if the working voltage does not exceed 50 V.</p> <p>**) B = Basic insulation, S = Supplementary insulation, R = Reinforced insulation.</p> <ol style="list-style-type: none"> <li>1. The creepage distance for basic insulation between winding and metal enclosure of fan motor is 4,5mm.</li> <li>2. The creepage distance for basic insulation between winding and metal enclosure of compressor is 4,6mm.</li> <li>3. The creepage distance for basic insulation on PCB is 4,3mm.</li> <li>4. The creepage distance for supplementary insulation between showing PCB and accessible surface is 4,7 mm.</li> <li>5. The creepage distance for reinforce insulation between inner live part and accessible surface is 10,0 mm.</li> </ol>											

29.2	TABLE: Creepage distances, functional insulation							P
Working voltage (V)	Creepage distance (mm) Pollution degree							Verdict / Remark
	1	2			3			
		Material group			Material group			
		I	II	IIIa/IIIb	I	II	IIIa/IIIb*	
≤10	0,08	0,4	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	1,0	1,4	2,0	2,5	2,8	<b>3,2</b>	P
400	0,75	1,6	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 ≤1000	2,4	4,0	5,6	8,0	10,0	11,0	12,5	N/A
>1000 and ≤1250	3,2	5,0	7,1	10,0	12,5	14,0	16,0	N/A
>1250 and ≤1600	4,2	6,3	9,0	12,5	16,0	18,0	20,0	N/A
>1600 and ≤2000	5,6	8,0	11,0	16,0	20,0	22,0	25,0	N/A
>2000 and ≤2500	7,5	10,0	14,0	20,0	25,0	28,0	32,0	N/A
>2500 and ≤3200	10,0	12,5	18,0	25,0	32,0	36,0	40,0	N/A
>3200 and ≤4000	12,5	16,0	22,0	32,0	40,0	45,0	50,0	N/A
>4000 and ≤5000	16,0	20,0	28,0	40,0	50,0	56,0	63,0	N/A
>5000 and ≤6300	20,0	25,0	36,0	50,0	63,0	71,0	80,0	N/A
>6300 and ≤8000	25,0	32,0	45,0	63,0	80,0	90,0	100,0	N/A
>8000 and ≤10000	32,0	40,0	56,0	80,0	100,0	110,0	125,0	N/A
>10000 and ≤12500	40,0	50,0	71,0	100,0	125,0	140,0	160,0	N/A

Supplementary information:

\*) Material group IIIb is allowed if the working voltage does not exceed 50 V

1. The creepage distance for function insulation on PCB is 4,3 mm.
2. The creepage distance for function insulation on terminal block is 10,0 mm.

30																				
TABLE: Resistance to heat and fire																				
Object/ part No.	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									
Bobbin of transformer	-	-	-	1,3mm	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P
Terminal block	-	-	-	1,2mm	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P
Terminal block	HOPPY			<1,5mm	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P
Anchorage	-	-	0,8mm	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-	P
Groove of internal wire	-	-	1,1mm	-	-	-	√	-	-	-	-	-	-	-	-	-	-	-	-	P
Relay enclosure	-	-	-	-	-	-	-	-	-	7)	7)	-	-	-	-	-	-	-	-	P
Bobbin of fan motor	-	-	-	1,2mm	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P
Three-phase protector enclosure	-	-	-	0,8mm	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P
AC contactor enclosure	-	-	-	1,4mm	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P
X2 capacitor	-	-	-	-	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P
Varistor	-	-	-	1,3mm	-	-	-	-	-	7)	7)	√	-	-	-	-	-	-	-	P



PCB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	√	P
Supplementary information:																				
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 <sub>e</sub> – t <sub>i</sub> ) need only be reported for unattended appliances																				
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 flame																			7) No	

Appendix EMF	TEST: Evaluation of the magnetic fields			P
Applied standards:	IEC 62233:2005, EN 62233:2008 (incl. Corr.1:2008)			-
Method	Used method: 5.5.2 Time domain evaluation			—
Applied Limit	ICNIRP Guidelines			—
Identification of the appliance	Type of apparatus	All models		
	Rated Voltage	Indoor unit: 220-240V~ Outdoor unit: 380-415 V 3N~		
	Rated Frequency	50Hz		
Parameters required prior to the test	Laboratory Ambient Temperature	25 °C ± 10 °C		
	Supply Voltage	(Rated Voltage ± 2 %) V		
	Supply Frequency	(Rated Frequency ± 2 %) Hz		
Parameters recorded during the test	Laboratory Ambient Temperature	23 °C		
	Supply Voltage	Indoor unit: 230V~ Outdoor unit: 400 V 3N~		
	Supply Frequency	50 Hz		
Operating Mode	Cooling and heating			
Method 5.5.2				
Measuring Positions	Measuring Distance	Coupling Factor	Measurement Uncertainty	
Around of appliance	30 cm	0,18	N/A, see information	
Frequency (kHz)	Limit (%)		Measured Maximum Value (%)	
0,01 to 400	100		5,32%	
Supplementary information:				
The measured maximum value in this table may be weighted with the coupling factor if applicable, and the measurement uncertainty is applied if the measured result is more than 75 % of the limit.				



IEC60335_2_40J - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict

<b>ATTACHMENT TO TEST REPORT IEC 60335-2-40</b> <b>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b> Part-2-40: Particular requirements for electrical heat pumps, air conditioners and dehumidifiers	
<b>Differences according to :</b>	EN 60335-2-40:2003 (incl. Corr.:2006) + A11:2004 + A12:2005 + A1:2006 + A2:2009 + A13:2012 (incl. Corr.:2013) EN 60335-1:2012 (incl. Corr.:2014)
<b>Attachment Form No. :</b>	EU_GD_IEC60335_2_40J
<b>Attachment Originator :</b>	VDE
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IEC60335_2_40J - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict

<b>CENELEC COMMON MODIFICATIONS</b>			
6.1	Delete "class 0" and "class 01"		N/A
7.1	Single-phase appliances to be connected to the supply mains: 230 V covered	220-240 for indoor unit	P
	Multi-phase appliances to be connected to the supply mains: 400 V covered	380-415V, 3N~ for outdoor unit	P
7.10	Devices used to start/stop operational functions of the appliance distinguished from other manual devices by means of shape, size, surface texture, position, etc.		P
	An indication that the device has been operated is given by:		-
	- a tactile feedback, or		P
	- an audible and visual feedback		P
7.12	The instructions include the substance of the following:		-
	- this appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved		P
	- children shall not play with the appliance		P
	- cleaning and user maintenance shall not be made by children without supervision		P
7.12.1	Installation instructions for appliances intended to be permanently connected to fixed wiring, and have leakage current exceed 10 mA, state that installation of residual current device (RCD) having rated residual operating current not exceeding 30 mA is advisable (EN 60335-2-40)		N/A
	For appliances not accessible to the general public and which are intended to be permanently connected to fixed wiring and which may have leakage currents exceeding 10 mA, the installation instructions shall specify the rating of the residual current device (RCD) to be installed (EN 60335-2-40/A12)		N/A
7.12.Z1	The specific instructions related to the safe operation of this appliance is collated together in the front section of the user instructions		P
	The height of the characters, measured on the capital letters, is at least 3 mm		P
	These instructions are also available in an alternative format, e.g. on a website		P
8.1.1	Also test probe 18 of EN 61032 is applied		P

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Clause	Requirement - Test	Result - Remark	Verdict
	The appliance being in every possible position, except that appliances normally used on the floor and having a mass exceeding 40 kg are not tilted. (EN 60335-1:2012/AC:2014)		P
	The force on the probe in the straight position is increased to 10 N when probe 18 is used		P
	When using test probe 18 the appliance is fully assembled as in normal use without any parts removed, and		P
	parts intended to be removed for user maintenance are also not removed		P
8.2	Compliance is checked by applying the test probes of EN 61032		P
	For built-in appliances and fixed appliances, the test probe B and probe 18 of EN 61032 are applied only after installation		P
11.8	Footnotes to "External enclosure of motor-operated appliances" to be taken into account		P
13.2	Leakage current measurements (EN 60335-2-40)	(See appended table)	P
15.1.2	Appliances with an automatic cord reel tested with the cord in the most unfavourable position so that the reeling of the wet cord may affect electrical insulation during operation, the cord not being dried before reeling		N/A
15.2	Drain pan filled to brim and subjected to continuous overflow and fan(s) switched on (EN 60335-2-40)		N/A
16.2	Leakage current measurements (EN 60335-2-40)	(See appended table)	P
20.2	When using the test probe similar to test probe B with a circular stop face, the accessories and detachable covers are removed		P
	Test probe 18 applied with a force of 2,5 N on the appliance fully assembled		P
24.1	Components comply with the safety requirements specified in the relevant standards as far as they reasonably apply		P
	The requirements of clause 29 of this standard apply between live parts of components and accessible parts of the appliance.		P
	The requirements of 30.2 of this standard apply to parts of non-metallic material in components including parts of non-metallic material supporting current-carrying connections inside components		P
	Components that have not been previously tested or do not comply with the standard for the relevant component are tested according to the requirements of 30.2		N/A



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Clause	Requirement - Test	Result - Remark	Verdict
	Components that have been previously tested and shown to comply with the resistance to fire requirements in the standard for the relevant component need not be retested provided that:		-
	- the severity specified in the component standard is not less than the severity specified in 30.2, and		P
	- the test report for the component states whether it complied with the standard for the relevant component with or without flame, flames not exceeding 2 s during the test are ignored		P
	Unless components have been previously tested and found to comply with the relevant standard for the number of cycles specified, they are tested in accordance with 24.1.1 to 24.1.9		N/A
	For components mentioned in 24.1.1 to 24.1.9, no additional tests specified in the relevant standard for the component are necessary other than those specified in 24.1.1 to 24.1.9		N/A
	Components that have not been separately tested and found to comply with the relevant standard, and		P
	components that are not marked or not used in accordance with their marking,		P
	are tested in accordance with the conditions occurring in the appliance, the number of samples being that required by the relevant standard		P
	Lamp holders and starter holders that have not been previously tested and found to comply with the relevant standard are tested as a part of the appliance and additionally comply with the gauging and interchangeability requirements of the relevant standard under the conditions occurring in the appliance		N/A
	Where the relevant standard specifies these gauging and interchangeability requirements at elevated temperatures, the temperatures measured during the tests of clause 11 are used		N/A
	Plugs and socket-outlets and other connecting devices of interconnection cords are not interchangeable with plugs and socket-outlets listed in IEC/TR 60083 or IEC 60906-1, or		N/A
	with connectors and appliance inlets complying with the standard sheets of IEC 60320-1,		N/A
	if direct supply to these parts from the supply mains gives rise to a hazard		N/A
24.1.7	If the remote operation of the appliance is via a telecommunication network, the relevant standard for the telecommunication interface circuitry in the appliance is EN 41003		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	Compliance with clause 8 of this standard is not impaired by connecting the appliance to a device covered by EN 41003		N/A
24.Z1	For motor running capacitors (IEC 60252-1 type P2) with a metallic enclosure having an overpressure fuse the flame testing of internal plastic parts supporting current carrying connections as required in 30.2.2 and 30.2.3.1 is not necessary		N/A
25.6	Supply cords of single-phase portable appliances having a rated current not exceeding 16 A, fitted with a plug complying with the following standard sheets of IEC/TR 60083:		-
	- for class I appliances: standard sheet C2b, C3b or C4.....:		N/A
	- for class II appliances: standard sheet C5 or C6 .....		N/A
25.7	Rubber sheathed cords (60245 IEC 53) are not suitable for appliances intended to be used outdoors or when they are liable to be exposed to significant amount of ultraviolet radiation		N/A
	Halogen-free thermoplastic compound sheathed supply cords have properties at least those of:		-
	- halogen-free thermoplastic compound sheathed cords (H03Z1Z1H2-F or H03Z1Z1-F), for appliances having a mass not exceeding 3 kg		N/A
	- halogen-free thermoplastic compound sheathed cords (H05Z1Z1H2-F or H05Z1Z1-F), for other appliances		N/A
	Cross-linked halogen-free compound sheathed supply cords have properties at least those of cross-linked halogen-free compound sheathed cords (H07ZZ-F)		N/A
26.11	Conductors connected by soldering are not considered to be positioned or fixed so that reliance is not placed upon the soldering alone to maintain them in position unless they are held in place near the terminals independently of the solder		N/A
29.3.Z1	Appliance constructed so that if there is a possibility of damaging the insulation during installation, the insulation withstands the scratch and penetration test of 21.2		N/A
32	Compliance regarding electromagnetic fields is checked according to EN 62233		P
GG.2	Requirements for charge limits in unventilated areas (EN 60335-2-40/A1)		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
GG.Z1	Non-fixed factory sealed single package units with a charge amount of $m_1 < M \leq 2 \times m_1$ (EN 60335-2-40/A1)		N/A
Annex I, 19.I.101	The appliance is supplied at rated voltage and operated under normal operation with each of the fault conditions specified		N/A
	The duration of the test is as specified in 19.7		N/A
<b>ZA</b>	<b>ANNEX ZA (NORMATIVE) SPECIAL NATIONAL CONDITIONS</b>		-
	<b>Norway</b>		-
19.5	The test is also applicable to appliances intended to be permanently connected to fixed wiring		N/A
	<b>Norway</b>		-
22.2	The second paragraph of this subclause, dealing with single-phase, permanently connected class I appliances having heating elements, is not applicable due to the supply system		N/A
	<b>All CENELEC countries</b>		-
25.6 and 25.25	Information concerning National plug and socket-outlets is available from the CENELEC website. Normative national requirements concerning plug and socket-outlets are shown in the relevant National standard		N/A
	<b>Ireland and United Kingdom</b>		-
25.8	In the table, the lines for 10 A and 16 A are replaced by:		-
	> 10 and $\leq 13$ 1,25 (1,0) <sup>b</sup> (EN 60335-1:2012/AC:2014)		N/A
	> 13 and $\leq 16$ 1,5 (1,0) <sup>b</sup> (EN 60335-1:2012/AC:2014)		N/A
<b>ZB</b>	<b>ANNEX ZB (INFORMATIVE) A-DEVIATIONS</b>		-
	<b>Ireland</b>		-

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Clause	Requirement - Test	Result - Remark	Verdict
25.6	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs complying with I.S. 401:1997, or equivalent, to be fitted to domestic appliances		N/A
	<b>United Kingdom</b>		-
25.6	These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in general allow only plugs to BS 1363 to be fitted to domestic appliances. It also allows plugs to BS 4573 and EN 50075 to be fitted to shavers and toothbrushes		N/A
<b>ZC</b>	<b>ANNEX ZC (NORMATIVE) NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</b>		-
	A list of referenced documents in this standard		N/A
<b>ZD</b>	<b>ANNEX ZD (INFORMATIVE) IEC and CENELEC CODE DESIGNATIONS FOR FLEXIBLE CORDS</b>		-
	A table with IEC and CENELEC code designations for flexible cords		N/A
<b>ZE</b>	<b>ANNEX ZE (NORMATIVE) SPECIFIC ADDITIONAL REQUIREMENTS FOR APPLIANCES AND MACHINES INTENDED FOR COMMERCIAL USE</b>		-
7.1	Business name and full address of the manufacturer and, where applicable, his authorized representative.....:	See rating labels	P
	Model or type reference.....:	See rating labels	P
	Serial number, if any.....:		N/A
	Production year		P
	Designation of the appliance .....	See rating labels	P
7.12	Instructions provided with the appliance so that the appliance can be used safely		P
	The instructions contain at least the following information:		-
	- the business name and full address of the manufacturer and, where applicable, his authorized representative		P
	- model or type reference of the appliance as marked on the appliance itself, except for the serial number		P

IEC60335_2_40J - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	- the designation of the appliance together with its explanation in case it is given by a combination of letters and/or numbers		P
	- the general description of the appliance, when needed due to the complexity of the appliance		P
	- specific precautions if required during installation, operation, adjusting, user maintenance, cleaning, repairing or moving		P
	- when needed drawings, diagrams, descriptions and explanations necessary for the safe use and user maintenance of the appliance		P
	- the possible reasonably foreseeable misuse and, whenever relevant, a warning against the effects it may have on the safe use of the appliance		P
	The words "Original instructions" appear on the language version(s) verified by the manufacturer or by the authorized representative		P
	When a translation of the original instructions has been provided by a person introducing the appliance on the market; the meaning of the sentence "Translation of the original instructions" appear in the relevant instructions delivered with the appliance		N/A
	The instructions for maintenance/service to be done by specialized personnel, mandated by the manufacturer or the authorized representative may be supplied in only one Community language which the specialized personnel understand		P
	The instructions indicate the type and frequency of inspections and maintenance required for safe operation including the preventive maintenance measures		P
	"This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons". (EN 60335-2-40/A13)		P
7.12.ZE1	If needed for specific appliances, the following information to be given:		-
	- on use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns, if these operations have consequences on stability of the appliance in order to avoid overturning, falling or uncontrolled movements of the appliance or of its component parts		N/A
	- on how to maintain adequate mechanical stability when in use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	- on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided		N/A
	- on the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur the operating method to safely unblock the appliance		N/A
	- on the specifications on the spare parts to be used, when these affect the health and safety of the operator		N/A
	- on airborne noise emissions, determined and declared in accordance with the Annex ZAB, which includes: (EN 60335-2-40/A13)		-
	- the A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A) .....; (EN 60335-2-40/A13)	Less than 70dB(A)	N/A
	- where this level does not exceed 70 dB(A), no value needs to be given, but the instructions shall state that the A-weighted sound pressure level is below 70 dB. (EN 60335-2-40/A13)		P
	- the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 µPa):		N/A
	- the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A) .....		N/A
7.12.ZE2	The instructions includes a warning to disconnect the appliance from its power source during service and when replacing parts		P
	If the removal of the plug is foreseen, it is clearly indicated that the removal of the plug has to be such that an operator can check from any of the points to which he has access that the plug remains removed		N/A
	If this is not possible, due to the construction of the appliance or its installation, a disconnection with a locking system in the isolated position is provided		N/A
19.11.4.8	The appliance continues to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage fluctuation occurred, or		P
	a manual operation is required to restart it		N/A
20.1	Appliances and their components and fittings have adequate mechanical stability during transportation, assembly, dismantling and any other action involving the appliance		P

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Clause	Requirement - Test	Result - Remark	Verdict
20.2	Dangerous moving transmission parts safeguarded either by design or guards		P
	When guards are used, they are fixed guards, interlocking movable guards or protective devices		P
	Moving parts directly involved in the function of the appliance which cannot be made completely inaccessible fitted with:		-
	- fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work, and		N/A
	- adjustable guards restricting access to those sections of the moving parts where access is necessary		N/A
	Interlocking movable guards used where frequent access is required		N/A
21.1	Appliances and their components and fittings have adequate mechanical strength and is constructed to withstand such rough handling that may be expected in normal use, during transportation, assembly, dismantling, scrapping and any other action involving the appliance		P
22.ZE.1	For appliances provided with a seat, the seat gives adequate stability		N/A
	The distance between the seat and the control devices capable of being adapted to the operator		N/A
22.ZE.2	For appliances provided with separate devices for the start and the stop functions, the stop function is unambiguously identifiable and does always override the start function		N/A
	For appliances provided with one device performing the start and the stop function, the stop function is unambiguously identifiable and does always override the start function		N/A
22.ZE.3	Appliances designed in such a way that incorrect mounting is avoided, if this can lead to an unsafe situation		N/A
	If this is not possible, information on the correct mounting is given directly on the part and/or the enclosure		N/A
22.ZE.4	Where the weight, size or shape prevents appliances from being moved manually, they are fitted with attachments for lifting gear, or		P
	so designed that they can be fitted with such attachments, or		N/A
	be shaped in such a way that standard lifting gear can easily be used		P

IEC60335_2_40J - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	Appliances to be moved manually are constructed or equipped so that they can be moved easily and safely		N/A
22.ZE.5	The fixing systems of fixed guards which prevent access to dangerous moving transmission parts only removable with the use of tools		P
	If such guards have to be removed by the user for routine cleaning or maintenance their fixing systems remain attached to the fixed guards or to the machine after removal		N/A
	Where possible, guards are incapable of remaining in place without their fixings		P
	This does not apply if, after removal of the screws, or if the component is incorrectly repositioned, the appliance becomes inoperative		N/A
	Movable guards are interlocked		N/A
	The interlocking devices prevent the start of hazardous appliance functions until the guards are fixed in their position, and give a stop command whenever they are no longer closed		N/A
	Where it is possible for an operator to reach the danger zone before the risk due to hazardous appliance functions has ceased, movable guards associated with a guard locking device in addition to an interlocking device that:		-
	- prevents the start of hazardous appliance functions until the guard is closed and locked, and		N/A
	- keeps the guard closed and locked until the risk of injury from the hazardous appliance functions has ceased		N/A
	Interlocking movable guards remain attached to the appliance when open, and		N/A
	they are designed and constructed in such a way that they can be adjusted only by means of an intentional action		N/A
22.ZE.6	Interlocking movable guards designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous appliance functions		N/A
	The guard is opened at the extent needed to cause the interlocking to operate and is then closed. This operation is carried out for 5 000 cycles at a rate of 5 cycles per min. (EN 60335-2-40/A13/AC)		N/A
	After this test any defect that may be expected in normal use is applied to the interlock system, including interruption of the supply, only one defect being simulated at a time		N/A



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Clause	Requirement - Test	Result - Remark	Verdict
	After these tests the interlock system is fit for further use		N/A
22.ZE.7	Adjustable guards restricting access to areas of the moving parts strictly necessary for the work are:		-
	- adjustable manually or automatically, depending on the type of work involved, and		N/A
	- readily adjustable without the use of tools		N/A
22.ZE.8	In case of interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply, the appliance does not restart		P
	However, automatic restarting of the operation is allowed if the appliance may continue to operate, without causing any hazard to the user, from the same point in its operating cycle at which the voltage interruption or fluctuation occurred		N/A
22.ZE.9	Appliances fitted with means to isolate them from all energy sources		N/A
	Such isolators are clearly identified, and		N/A
	they are capable of being locked if reconnection endanger persons		N/A
	After the energy source is disconnected, it is possible to dissipate any energy remaining or stored in the circuits of the appliance without risk to persons		N/A
<b>ZF</b>	<b>ANNEX ZF (INFORMATIVE) CRITERIA APPLIED FOR THE ALLOCATION OF PRODUCTS COVERED BY STANDARDS IN THE EN 60335 SERIES UNDER LVD OR MD</b>		-
	List of standards under CENELEC/TC61 with the allocation under the LVD (Low Voltage Directive) or the MD (Machinery Directive) .....	LVD and MD	P
<b>ZG</b>	<b>ANNEX ZG (NORMATIVE) UV APPLIANCES</b>		-
	The following modifications to this standard apply to appliances having UV emitters		N/A
	This annex is not applicable to appliances covered by the scopes of IEC 60335-2-27, IEC 60335-2-59 or IEC 60335-2-109		N/A
7.12.ZG	The instructions for appliances incorporating UVC emitters include the substance of the following: WARNING — This appliance contains a UV emitter. Do not stare at the light source		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
32	For appliances incorporating UV emitters the manufacturer delivers a declaration providing evidence that the plastic material exposed to the radiation is UV resistant		N/A
<b>ZZ</b>	<b>ANNEX ZZ (INFORMATIVE) COVERAGE OF ESSENTIAL REQUIREMENTS OF EC DIRECTIVES</b>		-
	Description of the relation between this European standard and the LVD (Low Voltage Directive, 2006/95/EC) and the MD (Machinery Directive, 2006/42/EC)	LVD and MD	P
<b>ZAA</b>	<b>ANNEX ZAA (INFORMATIVE) (EN 60335-2-40/A11) THE RELEVENCE OF THE PRESSURE EQUIPMENT DIRECTIVE</b>		--
	Refrigerating systems having a pressure greater than 0,05 MPa are considered to be assemblies falling within the scope of the Pressure Equipment Directive, 97/23/EC. However, according to Article 1, item 3.6 of the directive, equipment classified no higher than category I and covered by the low voltage directive is excluded from its scope. (EN 60335-2-40/A11)		P
	According to guideline 1/39 of the directive, this exclusion applies to both components and assemblies (refrigerant circuits). This applies to appliances containing vessels (e.g. compressors, receivers) or piping with limits in accordance with the following (EN 60335-2-40/A11):		P
	Vessels (EN 60335-2-40/A11)		-
	- dangerous refrigerants (Annex II, Table 1) (EN 60335-2-40/A11):		-
	- volume not exceeding 1 l, or (EN 60335-2-40/A11)		N/A
	- pressure x volume not exceeding 5 MPa l (EN 60335-2-40/A11)		N/A
	- non-dangerous refrigerants (Annex II, Table 2) (EN 60335-2-40/A11):		-
	- volume not exceeding 1 l, or (EN 60335-2-40/A11)		N/A
	- pressure x volume not exceeding 20 MPa l (EN 60335-2-40/A11)		N/A
	Piping (EN 60335-2-40/A11)		-
	- dangerous refrigerants (Annex II, Table 6) (EN 60335-2-40/A11):		-
	- numerical designation not exceeding 25, or (EN 60335-2-40/A11)		N/A
	- pressure not exceeding 1 MPa and numerical designation not exceeding 100, or (EN 60335-2-40/A11)		N/A

IEC60335_2_40J - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	- pressure exceeding 1 MPa and pressure x numerical designation not exceeding 100 MPa (EN 60335-2-40/A11).		N/A
	- non-dangerous refrigerants (Annex II, Table 7) (EN 60335-2-40/A11):		-
	- numerical designation not exceeding 100, or (EN 60335-2-40/A11)		N/A
	- pressure x numerical designation not exceeding 350 MPa (EN 60335-2-40/A11).		P
	For other components, the most onerous limit of the two applies (EN 60335-2-40/A11)		N/A
	The volume is the internal volume of the vessel and includes the volume of pipework up to the first connection. It excludes the volume of fixed internal parts (EN 60335-2-40/A11)		N/A
	The pressure is the maximum pressure the vessel or piping system is exposed to, as specified by the manufacturer of the appliance (EN 60335-2-40/A11)		N/A
	The numerical designation designates the size common to all components in the piping system (EN 60335-2-40/A11)		P
	If any component exceeds the limits given above, the appliance has to comply with the directive. The technical requirements are given in Annex I and the conformity assessment tables and procedures in Annexes II and III of the directive (EN 60335-2-40/A11)		P
	Commonly used dangerous refrigerants, identified as Group 1 in the directive, are listed in table ZAA.1 (EN 60335-2-40/A11)		N/A
	Commonly used non-dangerous refrigerants, identified as Group 2 in the directive, are listed in table ZAA.2 (EN 60335-2-40/A11)		P
<b>ZAB</b>	<b>ANNEX ZAA (NORMATIVE) (EN 60335-2-40/A13) EMISSION OF ACOUSTICAL NOISE FROM APPLIANCES COVERED BY ANNEX ZE</b>		-
ZAB.1	Noise reduction is an integral part of the design process and achieved by particularly applying measures at source to control noise, see for example EN ISO 11688-1. (EN 60335-2-40/A13)		N/A
	Success of the applied noise reduction measures is assessed on the basis of the actual noise emission values in relation to other machines of the same type with comparable non-acoustical technical data. (EN 60335-2-40/A13)		N/A

IEC60335_2_40J - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
ZAB.2.1	A-weighted emission sound pressure level determined in accordance with EN 11203:2009, 6.2.3 d) with the surface S being the measurement surface used for the sound power level determination. (EN 60335-2-40/A13)		N/A
	If the sound power level determination is based on a measurement method requiring a reverberant sound field, the surface S to define Q, shall be a parallelepiped measurement surface at a distance of 1 m from the reference box enclosing the source and assuming only one reflecting surface. (EN 60335-2-40/A13)		N/A
ZAB.2.2	A-weighted sound power level determined in accordance with EN 12102 applying a measurement method of at least grade 2. (EN 60335-2-40/A13)		N/A
	If a grade 3 measurement method used for determining the A-weighted sound power level, the reasons are explicitly mentioned (EN 60335-2-40/A13)		N/A
ZAB.2.3	Total measurement uncertainty is depending on the standard deviation of reproducibility $\sigma_{R0}$ of the measurement method and the standard deviation $\sigma_{omc}$ representing the instability of the operating and mounting conditions. (EN 60335-2-40/A13)		N/A
	$\sigma_{R0}$ has an upper value for a grade 2 measurement method of about 1,5 dB, whereas $\sigma_{omc}$ may have values between 0,5 dB for small variations of the sound power due on the mounting and operating conditions or 4 dB for very instable sources (EN 60335-2-40/A13)		N/A
	Total measurement uncertainty for the A-weighted emission sound pressure level is of the same order as the one for the respective sound power level measurement. (EN 60335-2-40/A13)		N/A
ZAB.2.4	Information to be recorded covers all the technical requirements of this noise test code. (EN 60335-2-40/A13)		N/A
	Any deviations from this noise test code or from the basic standards upon which it is based are to be recorded together with the technical justification for such deviations. (EN 60335-2-40/A13)		N/A
ZAB.2.5	Information to be given in the test report includes.: (EN 60335-2-40/A13)		N/A
	- he data required by the manufacturer for inclusion in the noise declaration,. (EN 60335-2-40/A13)		N/A
	- the data required by the user to verify the declared values. (EN 60335-2-40/A13)		N/A

IEC60335_2_40J - ATTACHMENT			
Clause	Requirement - Test	Result - Remark	Verdict
	Thus the following information shall be included ...: (EN 60335-2-40/A13)		N/A
	- reference to the noise test code and the basic noise emission standards used; (EN 60335-2-40/A13)		N/A
	- description of the installation and operation conditions used; (EN 60335-2-40/A13)		N/A
	- location of the work station(s) and other specified positions; (EN 60335-2-40/A13)		N/A
	- the noise emission values obtained (EN 60335-2-40/A13)		N/A
	Test report states that all requirements of the noise test code have been fulfilled, or, if this is not the case, it shall identify any unfulfilled requirements. (EN 60335-2-40/A13)		N/A
	Deviations from the requirements stated and a technical justification for these deviations shall be given. (EN 60335-2-40/A13)		N/A
ZAB.2.6	Noise emission declaration is made according to EN ISO 4871 (EN 60335-2-40/A13)		N/A
	Emission sound pressure level $L_{pA}$ is made as a dual number noise emission declaration, thus declaring the determined value for $L_{pA}$ and the respective uncertainty $K_{pA}$ . (EN 60335-2-40/A13)		N/A
	Sound power level $L_{WA}$ is declared as single number noise emission declaration declaring the sum of the measured sound power level and its uncertainty $K_{WA}$ . (EN 60335-2-40/A13)		N/A
	Noise declaration states that the noise emission values have been obtained according to this noise test code. (EN 60335-2-40/A13)		N/A
	Any deviations from this noise test code or from the basic standards upon which it is based are clearly indicated. (EN 60335-2-40/A13)		N/A
	Additional noise emission values are given in the declaration. (EN 60335-2-40/A13)		N/A
	If undertaken, verification of the noise emission values shall be conducted according to EN ISO 4871, using the same mounting and operating conditions as those used for the initial determination. (EN 60335-2-40/A13)		N/A



# Attachment No.2

**EN 60335-1:2012/A11:2014**

**Household and similar electrical appliances - Safety  
Part 1: General requirements**

**Attachment contains**

Cover page:	1 page
Requirements:	1 page
<b>Total:</b>	<b>2 pages</b>

Explanation for Abbreviations:

Possible Verdicts: **P** = Pass, **F**= Fail, **N/A** = Not Applicable

Remarks:

Throughout this report, a comma is used as the decimal separator.



Clause	Requirement – Test	Result – Remark	Verdict			
<b>EN 60335-1:2012/A11:2014</b>						
Clause	Requirement –Test	Result - Remark	Verdict			
<b>7.14</b>	In NOTE Z1, replace "IEC 82079-1" by "EN 82079-1".		P			
<b>Annex ZF</b>	In Table ZF.1 – List of standards under CLC/TC 61, replace line of EN 60335-2-38 by the following: <table border="1"><tr><td>EN 60335-2-38, Commercial electric griddles and griddle grills</td><td style="text-align: center;"><input checked="" type="checkbox"/></td><td style="text-align: center;"><input checked="" type="checkbox"/> With moving parts</td></tr></table>	EN 60335-2-38, Commercial electric griddles and griddle grills	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> With moving parts		N/A
EN 60335-2-38, Commercial electric griddles and griddle grills	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> With moving parts				



# Attachment No.3

**EN 60335-1:2012/A13:2017**

**Household and similar electrical appliances - Safety  
Part 1: General requirements**

**Attachment contains**

Cover page:	1 page
Requirements:	1 page
<b>Total:</b>	<b>2 pages</b>

Explanation for Abbreviations:

Possible Verdicts: **P** = Pass, **F**= Fail, **N/A** = Not Applicable

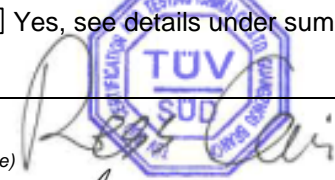

Remarks:

Throughout this report, a comma is used as the decimal separator.



Clause	Requirement – Test	Result – Remark	Verdict
<b>EN 60335-1:2012/A13:2017</b>			
<b>ZC</b>	<b>Annex ZC(normative) Normative references to international publications with their corresponding European publications</b>		--
	The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.		P
<b>ZZA</b>	<b>ANNEX ZZA (INFORMATIVE) Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered</b>		--
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the safety objectives.		P
<b>ZZB</b>	<b>Annex ZZB (informative) Relationship between this European standard and the essential requirements of Directive 2006/42/EC aimed to be covered</b>		--
	Compliance with this Part 1 when used together with the relevant Part 2 provides one means of conformity with the relevant essential health and safety requirements.		P



<b>TEST REPORT</b> <b>Standard EN 378-2:2016</b> <b>TÜV SÜD Test Report for</b> <b>Refrigerating systems and heat pumps - Safety and environmental requirements</b> <b>- Part 2: Design, construction, testing, marking and documentation</b>	
Report No.:	64.111.14.00105.07 Rev.00
Date of issue:	2018-08-06
Project handler:	Ress Cai
Testing laboratory:	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
Address:	Location 1: 5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West Guangzhou 510656 P. R. China Location 2: B1 Floor, No. 3 Chuangqi Building, TusPark, 63 Chuangqi Road, Shilou Town, Panyu District, Guangzhou 511447, P.R. China
Testing location:	as above
Client:	GD Midea Heating & Ventilating Equipment Co., Ltd.
Client number:	72433
Address:	Penglai Industry Road, Beijiao, Shunde, 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA
Contact person:	Roy Li
Standard:	This TÜV SÜD test report form is based on the following requirements: N 378-2: 2016
TRF originated by:	TÜV SÜD Product Service, Mr./Mrs. Gary Sun ( <i>product specialist</i> )
Copyright blank test report:	This test report is based on the content of the standard (see above). The test report considered selected clauses of the a.m. standard(s) and experience gained with product testing. It was prepared by TÜV SÜD Product Service.  TÜV SÜD Group takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.
General disclaimer:	This technical report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.
Scheme:	<input type="checkbox"/> GS Mark <input type="checkbox"/> NRTL Mark <input type="checkbox"/> TÜV Mark <input checked="" type="checkbox"/> EU-Directive <input type="checkbox"/> without certification
Non-standard test method:	<input type="checkbox"/> No <input type="checkbox"/> Yes, see details under summary
National deviations:	N/A
Compiled by:	Ress Cai <i>(Printed Name and Signature)</i> 
Approved by:	Gary Sun <i>(Printed Name and Signature)</i> 

Test sample:	Multi-split type air conditioner (outdoor unit)
Type of test object:	Referred to main report page 7
Trademark:	Midea, MDV
Model and/or type reference:	MHC-96HWD1N1/MOVG-96HD1N1-R; MHC-96CWD1N1/MOVG-96CD1N1-R; MHC-76HWD1N1/MOVG-76HD1N1-R; MHC-76CWD1N1/MOVG-76CD1N1-R; MHC-96HWD1N1(A)/MOUA-96HD1N1-R; MHC-96CWD1N1(A)/MOUA-96CD1N1-R; MHC1-76HWD1N1/MOVG1-76HD1N1-R; MHC1-76CWD1N1/MOVG1-76CD1N1-R
Rating(s):	Indoor unit: 220-240V~, 50Hz; outdoor unit: 380-415V 3N~, 50Hz; R410A; IPX0 for indoor unit, IPX4 for outdoor unit; for other ratings can refer to main report
Manufacturer:	GD Midea Heating & Ventilating Equipment Co., Ltd.
Manufacturer number:	72433
Address:	Penglai Industry Road, Beijiao, Shunde, 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA
Sub-contractors/ tests (clause):	N/A
Name:	N/A
Order description:	<input checked="" type="checkbox"/> Complete test according to TRF
	<input type="checkbox"/> Partial test according to manufacturer's specifications
	<input type="checkbox"/> Preliminary test
	<input type="checkbox"/> Spot check
Date of order:	2017-12-11; 2018-06-08
Date of receipt of test item:	N/A; 2018-06-08
Date(s) of performance of test:	N/A; 2018-06-08 to 2018-08-06
Test item particulars:	
Classification of installation and use:	Fixed appliances
Supply Connection:	Fixed wiring
Attachments:	N/A
<b>General remarks:</b>	
	<i>Throughout this report a comma is used as the decimal separator. The test results presented in this report relate only to the object tested. This report shall not be reproduced except in full without the written approval of the testing laboratory.</i>
	Refer to main report.

**Summary of testing:**

1. All tests were carried out according to EN 378-2:2016.
2. All test and construction checking were performed on all models.

**Additional information on Non-standard test method(s)**

Sub clause: N/A

Page:	N/A
Rational:	N/A

- deviation(s) found  
 no deviations found

**If additional information is necessary, please provide**

N/A

**Copy of marking plate:**

The rated marking plates see test report.

F-Gas marking sample:

**R410A GWP:2088**

① Factory charge  
11.00 kg  
22.97 tonnes CO<sub>2</sub> equivalent

② Additional charge  


---

 kg  


---

 tonnes CO<sub>2</sub> equivalent

① + ② Total charge  


---

 kg  


---

 tonnes CO<sub>2</sub> equivalent

Contains fluorinated greenhouse gases

**Remark:**

- The height of CE marking shall be higher than 5mm and the height of WEEE marking shall be higher than 7mm.
- The rating labels with trademark MDV is the same as above rating labels with trademark Midea except for the trademark is different.
- According to the EU directives which have been aligned with EU NLF (new legislative framework), both of manufacturer and importer's name and address shall be affixed on the product or, where that is not possible, on its packaging or in a document accompanying the product before the product is placed on the EU market.
- All models' F-Gas marking are the same except the value.

**Picture of the product:**

refer to photo documents

**Characteristic data** *(not shown on the marking plate):*

N/A

**Characteristic data Factory** *(only if certification is provided):*



GD Midea Heating & Ventilating Equipment Co., Ltd. Penglai Industry Road, Beijiao, Shunde, 528311 Foshan, Guangdong, PEOPLE'S REPUBLIC OF CHINA.	
<b>Purpose of the product</b> (Description of intended use):	
The appliances are air conditioner outdoor unit which can be matched with some certain indoor units that total capacity shall be within 50%-130% of that of outdoor unit.	
<b>Possible test case verdicts:</b>	
test case does not apply to the test object:	N/A (not applicable / not included in the order)
test object does meet the requirement:	P (Pass)
test object does not meet the requirement:	F (Fail)
<b>Possible suffixes to the verdicts:</b>	
suffix for detailed information for the client:	C (Comment)
suffix for important information for factory inspection:	M (Manufacturing)

Clause	Requirement + Test	result – Remark	Verdict
<b>5.</b>	<b>Safety requirements</b>		--
<b>5.1</b>	<b>General safety and environmental requirements</b>		--
<b>5.1.1</b>	<b>General</b>		--
	Safety and environmental requirements are specified in 5.2 and Clause 6.		P
	Refrigerating appliances complying with the product standards such as		--
	- EN 60335-2-40 for electrical heat pumps, air-conditioners and dehumidifiers,		P
	- EN 60335-2-24 for refrigerating appliances, ice-cream appliances and ice-makers		N/A
	- EN 60335-2-89 for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor		N/A
	are in compliance with this European Standard up to and including category I as determined in Annex B, provided they are also compliant with the applicable safety requirements for machinery or low voltage.		N/A
	For refrigerating appliances of category II and higher, as determined in Annex B, the relevant requirements for pressure safety in 5 and 6 apply.		P
<b>5.1.2</b>	<b>Hazards to persons, property and environment</b>		--
	Refrigerating systems and components shall be designed and constructed with the intention to eliminate possible hazards to persons, property and the environment. Deliberate discharge of refrigerants shall only be permitted in a manner which is not harmful to persons, property and the environment and in accordance with national laws.		P
<b>5.2</b>	<b>Safety requirements for components and piping</b>		--
<b>5.2.1</b>	<b>General requirements</b>		--
	Components and piping shall comply with the related standards or requirements as indicated in Table 1.		P
	Requirements for components not included in Table 1 and which are below category II as defined in B.5 are indicated in 5.3.		P
	Components that are declared to comply with the relevant directives using an alternative method also comply with the requirements of this standard.		P
	Where the product standards for components or piping are not harmonized for the EC provisions in relation to pressure or if the essential requirements of such provisions are not covered, then the relevant requirements for pressure shall be confirmed by risk assessment.		P

Clause	Requirement + Test	result – Remark	Verdict																																																															
	<p><b>Table 1 — Components and piping requirements</b></p> <table border="1"> <thead> <tr> <th>COMPONENT</th> <th>related standard AND requirements</th> </tr> </thead> <tbody> <tr> <td>Heat exchangers: — pipe coil without air (tube in tube) — multi-tubular (shell and tubes)</td> <td>EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard</td> </tr> <tr> <td>Plate heat exchangers</td> <td>EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard</td> </tr> <tr> <td>Headers, coils and grids with air as secondary fluid</td> <td>EN 14276-2 or EN 14276-1 if applicable combined with 5.2.2.2 of this standard</td> </tr> <tr> <td>Receiver/accumulator/economizer</td> <td>EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard</td> </tr> <tr> <td>Oil separator</td> <td>EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard</td> </tr> <tr> <td>Drier</td> <td>EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard</td> </tr> <tr> <td>Filter</td> <td>EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard</td> </tr> <tr> <td>Muffler</td> <td>EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard</td> </tr> <tr> <td>Hermetic positive displacement motor-compressor</td> <td>EN 14276-1, EN 60335-2-34 or EN 12693</td> </tr> <tr> <td>Semi-hermetic positive displacement motor-compressor</td> <td>EN 60335-2-34 or EN 12693</td> </tr> <tr> <td>Open positive displacement compressor</td> <td>EN 12693</td> </tr> <tr> <td>Non positive displacement compressor</td> <td>EN 14276-1, EN 1012-3 or EN 13445 if applicable combined with EN 60204-1</td> </tr> <tr> <td rowspan="2">Pump</td> <td>general requirements</td> <td>EN 809 combined with EN 60204-1, and combined with 5.2.2.2 and 5.2.2.4 of this standard</td> </tr> <tr> <td>additional requirements for pumps in refrigerating systems and heat pumps with R-717</td> <td>Annex A</td> </tr> <tr> <td>Piping</td> <td>EN 14276-2 or EN 13480</td> </tr> <tr> <td>Piping joints: permanent joints</td> <td>EN 14276-2</td> </tr> <tr> <td>Piping joints: detachable joints</td> <td>5.2.2.2 and 5.2.2.3 of this standard</td> </tr> <tr> <td>Flexible piping</td> <td>EN 1736</td> </tr> <tr> <td rowspan="4">Valves</td> <td>general</td> <td>EN 12284</td> </tr> <tr> <td>isolating valves</td> <td>EN 12284</td> </tr> <tr> <td>hand operated valves</td> <td>EN 12284</td> </tr> <tr> <td>valves with seal cap</td> <td>EN 12284</td> </tr> <tr> <td></td> <td>pressure relief valve</td> <td>EN 13136 and EN ISO 4126-1 combined with 5.2.2 of this standard</td> </tr> <tr> <td>Safety switching devices for limiting the pressure</td> <td>EN 12263 combined with 5.2.2.2 of this standard</td> </tr> <tr> <td>Bursting disc</td> <td>EN ISO 4126-2 and EN 13136 combined with 5.2.2.2 of this standard</td> </tr> <tr> <td>Liquid level indicators</td> <td>EN 12178 combined with 5.2.2.2 of this standard</td> </tr> <tr> <td>Gauges</td> <td>EN 837-1, EN 837-2 and EN 837-3 combined with 5.2.2.2 of this standard</td> </tr> <tr> <td>Brazing and soldering materials</td> <td>5.3.1.3 e), f) of this standard</td> </tr> <tr> <td>Welding materials</td> <td>EN 14276-2</td> </tr> </tbody> </table>	COMPONENT	related standard AND requirements	Heat exchangers: — pipe coil without air (tube in tube) — multi-tubular (shell and tubes)	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard	Plate heat exchangers	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard	Headers, coils and grids with air as secondary fluid	EN 14276-2 or EN 14276-1 if applicable combined with 5.2.2.2 of this standard	Receiver/accumulator/economizer	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard	Oil separator	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard	Drier	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard	Filter	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard	Muffler	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard	Hermetic positive displacement motor-compressor	EN 14276-1, EN 60335-2-34 or EN 12693	Semi-hermetic positive displacement motor-compressor	EN 60335-2-34 or EN 12693	Open positive displacement compressor	EN 12693	Non positive displacement compressor	EN 14276-1, EN 1012-3 or EN 13445 if applicable combined with EN 60204-1	Pump	general requirements	EN 809 combined with EN 60204-1, and combined with 5.2.2.2 and 5.2.2.4 of this standard	additional requirements for pumps in refrigerating systems and heat pumps with R-717	Annex A	Piping	EN 14276-2 or EN 13480	Piping joints: permanent joints	EN 14276-2	Piping joints: detachable joints	5.2.2.2 and 5.2.2.3 of this standard	Flexible piping	EN 1736	Valves	general	EN 12284	isolating valves	EN 12284	hand operated valves	EN 12284	valves with seal cap	EN 12284		pressure relief valve	EN 13136 and EN ISO 4126-1 combined with 5.2.2 of this standard	Safety switching devices for limiting the pressure	EN 12263 combined with 5.2.2.2 of this standard	Bursting disc	EN ISO 4126-2 and EN 13136 combined with 5.2.2.2 of this standard	Liquid level indicators	EN 12178 combined with 5.2.2.2 of this standard	Gauges	EN 837-1, EN 837-2 and EN 837-3 combined with 5.2.2.2 of this standard	Brazing and soldering materials	5.3.1.3 e), f) of this standard	Welding materials	EN 14276-2		P
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Muffler	EN 14276-1 or EN 13445 if applicable combined with 5.2.2 of this standard																																																																	
Hermetic positive displacement motor-compressor	EN 14276-1, EN 60335-2-34 or EN 12693																																																																	
Semi-hermetic positive displacement motor-compressor	EN 60335-2-34 or EN 12693																																																																	
Open positive displacement compressor	EN 12693																																																																	
Non positive displacement compressor	EN 14276-1, EN 1012-3 or EN 13445 if applicable combined with EN 60204-1																																																																	
Pump	general requirements	EN 809 combined with EN 60204-1, and combined with 5.2.2.2 and 5.2.2.4 of this standard																																																																
	additional requirements for pumps in refrigerating systems and heat pumps with R-717	Annex A																																																																
Piping	EN 14276-2 or EN 13480																																																																	
Piping joints: permanent joints	EN 14276-2																																																																	
Piping joints: detachable joints	5.2.2.2 and 5.2.2.3 of this standard																																																																	
Flexible piping	EN 1736																																																																	
Valves	general	EN 12284																																																																
	isolating valves	EN 12284																																																																
	hand operated valves	EN 12284																																																																
	valves with seal cap	EN 12284																																																																
	pressure relief valve	EN 13136 and EN ISO 4126-1 combined with 5.2.2 of this standard																																																																
Safety switching devices for limiting the pressure	EN 12263 combined with 5.2.2.2 of this standard																																																																	
Bursting disc	EN ISO 4126-2 and EN 13136 combined with 5.2.2.2 of this standard																																																																	
Liquid level indicators	EN 12178 combined with 5.2.2.2 of this standard																																																																	
Gauges	EN 837-1, EN 837-2 and EN 837-3 combined with 5.2.2.2 of this standard																																																																	
Brazing and soldering materials	5.3.1.3 e), f) of this standard																																																																	
Welding materials	EN 14276-2																																																																	
	If the component contains electrical components, and if the component standard does not cover electrical safety, then the component shall fulfill the electrical requirements of EN 60335-2-40, EN 60335-2-24, EN 60335-2-89 or EN 60204-1 as relevant.	Comply with EN 60335-2-40	P																																																															
<b>5.2.2</b>	<b>Specific requirements</b>		--																																																															
<b>5.2.2.1</b>	General		P																																																															
	In addition to the requirements of 5.2.1, the following requirements are applicable for incorporation of specific components and piping into the refrigerating system.		P																																																															
<b>5.2.2.2</b>	Tightness		P																																																															
	A tightness test shall be performed according to the type approval procedure as specified in EN 16084.		P																																																															

Clause	Requirement + Test	result – Remark	Verdict
	Unless otherwise agreed with the manufacturer of the assembly, components, not covered by the scope of EN 16084, shall be tested with detection equipment having a sensitivity equivalent to 3 g/year of refrigerant leakage or better, under a pressure of at least 0,25 x PS. The acceptance criterion is that no leak shall be detected.		P
	NOTE: This method may be specified in the components standard (see Table 1).		P
	Clause 6 may require components incorporated in assemblies to conform to specified tightness control levels according to EN 16084.		P
	When agreed by the manufacturer of the assembly, some or all component tests may be included in the assembly tests (refer to 6.3).		P
	Tightness tests shall be conducted only after the component has passed a strength pressure test or has been verified by a type test for strength pressure.		P
	For environmental and safety reasons, nitrogen, helium, carbon dioxide or mixtures of low level hydrogen are preferred test gases.		P
	Radioactive tracers may be added to the test gases.		N/A
	Air and gas mixtures should be avoided as certain mixtures can be dangerous. Air may be used if the hazard of ignition is eliminated and worker safety is ensured. Oxygen shall not be used for tightness tests.		P
<b>5.2.2.3</b>	Piping joints		P
	Joints shall be designed so that they will not be damaged due to the freezing of water on the outside. They shall be suitable for the pipe, the piping material and the pressure, temperature and fluid.		P
	Coated (e.g. galvanized) pipes shall not be welded, unless all coating has been completely removed from the joint area. Welded joints shall be suitably protected.		P
<b>5.2.2.4</b>	Refrigerant liquid pumps		N/A
	Refrigerant liquid pumps shall be provided with the following information as a minimum, which shall be durable and permanently affixed:		N/A
	a) manufacturer;		N/A
	b) type designation;		N/A
	c) serial number;		N/A
	d) year of manufacture;		N/A
	e) maximum allowable pressure (PS).		N/A



Clause	Requirement + Test	result – Remark	Verdict
<b>5.3</b>	<b>Miscellaneous components</b>		--
<b>5.3.1</b>	<b>Materials</b>		--
<b>5.3.1.1</b>	<b>General</b>		--
	The material of the component shall be suitable for the intended temperature and pressure range and in combination with refrigerating systems.		P
	The material of the component shall conform to relevant standards.		P
	Restrictions for use of dangerous or hazardous substances and preparations shall be taken into account.		P
	NOTE For example as required in EC/1907/2006 (REACH) and 2011/65/EU (RoHS).		N/A
<b>5.3.1.2</b>	<b>Ferrous materials</b>		--
	a) Cast iron and malleable iron Cast iron and malleable iron shall only be used, when suitable for the particular application in accordance with the requirements of this standard.	Compressor enclosure	P
	NOTE 1 Since some grades of cast iron are brittle, their application is dependent on temperature, stress, design considerations.		P
	NOTE 2 Malleable iron has two general classifications with several different grades in each. These grades can have very different mechanical properties.		P
	b) Steel, cast steel, carbon steel and low alloy steel may be used for all parts carrying refrigerant and also for heat transfer medium circuits. Where there is a combination of low temperatures and high pressure and/or where corrosion risks and/or thermal stresses are present, steel with adequate impact strength shall be used paying regard to thickness, the lowest operating temperature and its welding properties.	filter	P
	NOTE 3 Guidance on stress corrosion cracking in carbon steel is given in H.3.		P
	c) High alloy steel High alloy steel may be required where there is a combination of low temperatures and high pressure and/or where corrosion risks and/or thermal stresses are present. The impact strength shall be adequate for the particular duty and the material suitable for welding, if required.		P
	d) Stainless steel When using stainless steel, care shall be taken to ensure that the grade of stainless steel is compatible with the process fluids and possible atmospheric impurities, e.g. sodium chloride (NaCl), sulphuric acid (H <sub>2</sub> SO <sub>4</sub> ).		P

Clause	Requirement + Test	result – Remark	Verdict
<b>5.3.1.3</b>	<b>Non-ferrous materials and their alloys (cast, forged, rolled and drawn)</b>		--
	a) Copper and copper alloys Copper in contact with refrigerants shall be oxygen-free or de-oxidized, for example Cu-DHP as specified in EN 12735-1 and EN 12735-2.	De-oxidized is used in the system.	P
	Copper and alloys with a high percentage of copper shall not be used for parts carrying R717 unless their compatibility has been proved by test or experience.	R410A used	P
	Note 1 Guidance on stress corrosion cracking in copper pipe is given in H.2.		P
	b) Aluminium and aluminium alloys Aluminium used for gaskets for use with R717 shall be of at least 99,5 % purity. Aluminium alloys containing more than 2 % magnesium shall not be used with halogenated refrigerants unless their compatibility has been proved by test or experience.	R410A refrigerant is used for system. There is no magnesium in aluminum alloys. (TBC) or There is no aluminum alloys served in combination with refrigeration system.	P
	Methyl chloride (CH <sub>3</sub> Cl) shall not be used in contact with aluminium and its alloys.	R410A	N/A
	NOTE 2 Aluminium and aluminium alloys may be used in any part of the refrigerant circuit provided that its strength is adequate and it is compatible with the refrigerants and the lubricants being used.	There is no aluminum or its alloys served in combination with refrigeration system, anyhow the clause is considered.	N/A
	c) Magnesium and magnesium alloys Magnesium and magnesium alloys shall not be used unless their compatibility with refrigerants has been proved by test or experience.	There is no magnesium or its alloys used in refrigerant system.	N/A
	d) Zinc and zinc alloys Zinc shall not be used in contact with R-717, except in electro zinc plated components. Methyl chloride (CH <sub>3</sub> Cl) shall not be used in contact with zinc.	There is no Zinc or its alloys used in refrigerant system.	N/A
	e) Soldering alloys Soldering alloys shall not be used for refrigerant containment purposes.		P
	f) Brazing alloys Brazing alloys shall not be used unless their compatibility with refrigerants and lubricants has been proved by test or experience.		P
	g) Tin and lead tin alloys Tin and lead tin alloys may be corroded by halogenated refrigerants and shall not be used unless their compatibility has been proved by test or experience.		P
	NOTE 3 Copper free lead antimony or lead tin alloys may be used for valve seats.		P
<b>5.3.1.4</b>	<b>Non-metallic materials</b>		--

Clause	Requirement + Test	result – Remark	Verdict
	a) Gasket and packing materials Gasket and packing materials for sealing joints and for sealing stuffing boxes on valves etc. shall be resistant to the refrigerants, oil and lubricants used and shall be suitable for the expected range of the pressures and temperatures.	Packing material is used for screw sealing joint of changeover valve, relief valve etc. It is resistant to refrigerants, oil and lubricants.	P
	NOTE See EN 16084		P
	b) Glass Glass may be used in refrigerant circuits and for electrical terminal insulators, indicators and sight glasses, but it shall be resistant to the pressures, temperatures and chemical actions which may occur.	Sight glass is resistant to pressure, temperature and chemical action.	P
	c) Asbestos Asbestos shall not be used.	There is no asbestos used.	N/A
	d) Plastics When plastics are used, they shall be suitable for the mechanical, electrical, thermal, chemical and long term creep conditions to which they are subjected.		P
	e) Elastomers When elastomers are used, they shall be suitable for the mechanical, electrical, thermal and chemical conditions occurring, chemically and physically compatible with refrigerant or refrigerant-oil mixtures with which they are in contact, and they shall not create fire hazards.		P
<b>5.3.2</b>	<b>Testing</b>		--
<b>5.3.2.1</b>	Tests All the components shall undergo the following tests:		P
	a) strength pressure test (refer to 5.3.2.2);		P
	b) tightness test (refer to 5.2.2.2);		P
	c) functional test.		P
	The results of these tests shall be recorded. When agreed by the manufacturer of the assembly, some or all tests may be conducted on the assembly (refer to 6.3).		P
<b>5.3.2.2</b>	<b>Strength pressure test for miscellaneous components</b>		--
<b>5.3.2.2.1</b>	<b>General</b>		--
	The strength pressure test shall be one of the following methods: — individual strength-pressure test according to 5.3.2.2.2, or		P
	— strength-pressure type test according to 5.3.2.2.3, or		N/A
	— fatigue test according to 5.3.2.2.4.		N/A
	The test criteria specified in 5.3.2.2.5 shall apply.		P

Clause	Requirement + Test	result – Remark	Verdict
<b>5.3.2.2.2</b>	<b>Individual strength pressure test</b>		--
	Components shall be designed with a thickness according to standards of similar components of Table 1 and each component shall be strength pressure tested individually at a pressure which is no less than 1,43 x PS.	1,43*PS performed individually.	P
	Preferably the strength pressure test shall be carried out by means of air or some other non-hazardous gas. Adequate precautions shall be taken to prevent danger to people and to minimize risk to property. A hydrostatic pressure test by means of water or some other liquid may be accepted under the condition that the refrigeration circuit shall not be contaminated when the test is complete.	Components of refrigerating system tested individually by hydrostatic pressure means.	P
<b>5.3.2.2.3</b>	<b>Strength pressure type test</b>		--
	Components shall be type tested at a test pressure value which is no less than 3 x PS.		N/A
	If the continuous operating temperature of the component is less than or equal to — 125 °C for copper or aluminium, or — 200 °C for steel the test temperature of the component part or assembly shall be at least 20 °C.		N/A
	If the continuous operating temperature of the component exceeds — 125 °C for copper or aluminium, or — 200 °C for steel, the test temperature of the parts or assemblies that are at these temperatures, and subjected to the pressure, shall be at least — 150 °C for copper or aluminium and — 260 °C for steel.		N/A
	For other materials or higher temperatures, the effects of temperature on the material fatigue characteristics shall be evaluated.		N/A
<b>5.3.2.2.4</b>	<b>Fatigue test</b>		--
	Three test samples shall be subjected to a strength pressure test at a test pressure value not less than 2 x PS.		N/A
	Three test samples, other than the samples used for the strength pressure test, shall be filled with fluid, and shall be connected to a pressure-driving source. The pressure shall be raised and lowered between the upper and lower cyclic values at a rate specified by the component manufacturer for a total number of 250 000 cycles. The entire specified pressure excursion shall occur during each cycle. Pressure cycles shall be between 20 cycles per minute and 60 cycles per minute.		N/A
	For safety purposes, it is suggested that a non-compressible fluid should be used.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	The following test pressures shall be applied: For components at the low pressure side, PS of the low pressure side shall be applied for the first cycle.		N/A
	For components at the high pressure side, PS of the high pressure side shall be applied for the first cycle.		N/A
	The pressure of the test cycles shall be as follows: — the upper pressure value shall not be less than $0,7 \times PS$ and the lower pressure value shall not be greater than $0,2 \times PS$ . The upper pressure value shall not be less than $0,9 \times PS$ for water heat exchangers in heat pumps, — for the final test cycle, the test pressure shall be increased to a pressure value not less than $1,4 \times PS$ (2 times $0,7 \times PS$ ). The pressure value shall not be less than $1,8 \times PS$ (2 times $0,9 \times PS$ ) for water heat exchangers in heat pumps		N/A
	If the continuous operating temperature is less than or equal to — $125 \text{ }^\circ\text{C}$ for copper or aluminium, or — $200 \text{ }^\circ\text{C}$ for steel, the test temperature of the component part or assembly shall be at least $20 \text{ }^\circ\text{C}$ .		N/A
	If the continuous operating temperature of the component exceeds — $125 \text{ }^\circ\text{C}$ for copper or aluminium, or — $200 \text{ }^\circ\text{C}$ for steel, the fatigue test temperature of the parts or assemblies that are at these temperatures, shall be at least 10 K above the continuous operating temperature.		N/A
	Static test pressure shall be increased by the ratio of allowable stress of material at room temperature to that at the highest continuous operating temperature.		N/A
	For other materials, the effects of temperature on the fatigue characteristics shall be evaluated to determine the test conditions.		N/A
<b>5.3.2.2.5</b>	<b>Acceptance criteria</b>		--
	In the case of individual strength pressure test at minimum $1,43 \times PS$ , permanent deformation shall not result from this test.		P
	In the case of strength pressure type test, the samples tested shall withstand a pressure not less than $3 \times PS$ without rupture.		P
	In the case of the fatigue test, the samples tested shall not rupture, burst, or leak after completion of this test.		P
<b>5.3.3</b>	<b>Marking</b>		--

Clause	Requirement + Test	result – Remark	Verdict
	For miscellaneous parts no special marking is required.		P
<b>5.3.4</b>	<b>Documentation</b>		--
	The following documents for components shall be provided:		P
	a) results of tests;		P
	b) material test certificates shall be provided by the manufacturer as required by the purchaser to enable him to ensure that the material used conforms with the required specification and that it is traceable from the final test through production up to receipt, preferably at the time of delivery and not later than the time of commissioning. Any required inspection certificate shall be prepared on behalf of and signed by the competent person who carried out the inspection, test, or checking;		P
	NOTE: material certificates type 2.1 or type 2.2 in accordance with EN 10204 will be provided.		P
	c) documentation shall include following specifications:		--
	— maximum allowable pressure;	Described.	P
	— maximum allowable temperature;	Described.	P
	— applicable refrigerant;	Described.	P
	— applicable oil.	Described.	P
<b>6</b>	<b>Requirements for assemblies</b>		--
<b>6.1</b>	<b>General</b>		--
	The design, construction, testing, installing, documentation and marking of the refrigeration system assembly shall comply with this clause.		P
	Refrigeration system assemblies using R717 as refrigerant shall also comply with the additional requirements as specified in Annex A.	The refrigerant of R410A is used.	N/A
	Determination of the category of the assembly shall be done in accordance with Annex B.	Considered by 2014/68/EU implementation	P
	Refrigeration systems shall be charged with refrigerant at the manufacturing location or charged on site as recommended by the manufacturer (see 6.4.3.2).	Charged by manufacturing, the instruction of recharging is clearly mentioned in operation instruction.	P
	Constructional, welding and brazing materials shall be suitable to withstand foreseeable mechanical, thermal and chemical stresses. They shall be compatible with the refrigerants, the refrigerant and oil mixtures with possible impurities and contaminants and the heat transfer media.	All the fluids used in refrigeration system is compatible.	P

Clause	Requirement + Test	result – Remark	Verdict
	Where components, joints or parts are described as hermetically sealed, they shall comply with the requirements “hermetically sealed” according to EN 16084.		P
	For hermetically sealed systems the use of non-metallic flexible hoses shall be limited to the following:		N/A
	— The hoses shall be of class 1 according to EN 1736		N/A
	<p>— The total maximum length of the non-metallic flexible hoses installed on the system shall fulfil the following formula:</p> $[\sum l_i \times d_i \times \pi \times 10 \text{ g/m}^2 \text{ year} + \sum l_j \times d_j \times \pi \times 200 \text{ g/m}^2 \text{ year}] < 1,5 \text{ g/year}$ <p>where</p> <p><math>l_i</math> is the length of the flexible hose in metres where the temperature of the refrigerant is lower than or equal to 32 °C;</p> <p><math>l_j</math> is the length of the flexible hose in metres where the temperature of the refrigerant is higher than 32 °C;</p> <p><math>d_i</math> is the internal diameter of the flexible hose in metres where the temperature of the refrigerant is lower than or equal to 32 °C;</p> <p><math>d_j</math> is the internal diameter of the flexible hose in metres where the temperature of the refrigerant is higher than 32 °C;</p> <p>10 g/m<sup>2</sup>year is the allowable permeability at 32 °C for class 1 flexible hoses;</p> <p>200 g/m<sup>2</sup>year is the allowable permeability at 100 °C for class 1 flexible hoses.</p>		N/A
<b>6.2</b>	<b>Design and construction</b>		--
<b>6.2.1</b>	<b>General</b>		--
	All components selected for the assembly of the refrigerant circuit shall comply with Clause 5.		P
	The supports and bases of refrigerating systems shall have sufficient strength to withstand external forces for example:		P
	<p>a) the mass of the vessels;</p> <p>b) the mass of the contents and equipment, including the mass of hydrostatic test fluid and the mass of ice which may form under foreseeable abnormal operating circumstances;</p> <p>c) the snow load;</p> <p>d) the wind load;</p> <p>e) the mass of stays, braces and interconnecting piping;</p> <p>f) the thermal movement of the piping and components;</p> <p>g) the forces arising from foreseeable misuse;</p>		P

Clause	Requirement + Test	result – Remark	Verdict
	The supports and bases of refrigerating systems installed in areas with possible risk of earthquakes shall have sufficient strength to withstand the expected acceleration due to earthquakes.		N/A
	The refrigerating system shall be equipped with sufficient service access ports as required for the application.		P
<b>6.2.2</b>	<b>Determination of the maximum allowable pressure</b>		--
<b>6.2.2.1</b>	<b>Maximum allowable pressure (PS)</b>		--
	The maximum allowable pressure shall be determined by taking into account factors such as:		P
	a) maximum ambient temperature;		P
	b) possible presence of non-condensable gases;		P
	c) setting of any pressure relief device;		P
	d) method of defrosting;		P
	e) application (e.g. cooling or heating application);		P
	f) solar radiation; (e.g. impact on ice rinks during standstill);		P
	g) fouling;		P
	h) transport conditions including those specified in 6.2.13		P
	Based on the relevant factors, the designer shall determine the maximum allowable pressures in the different parts of the refrigerating system taking into account a maximum ambient temperature as appropriate for the installation site.		P
	One of the following methods shall be used to determine the maximum allowable pressure (PS) of the different parts of the refrigerating system.		P
	— Method 1 The designer shall document the calculation or testing method used for the determination of the maximum allowable pressure. Where temperature differences between ambient temperature and condensing temperature are calculated, the method shall be verified by testing.	Designer determined the PS by calculation and also considered the table 2 of method 2.	P
	For the low temperature circuit of a cascade system, the maximum allowable pressure PS shall be determined by the designer. The designer shall make provision for standstill under all reasonably foreseeable conditions.		P



Clause	Requirement + Test	result – Remark	Verdict																														
	<p>— Method 2</p> <p>Table 2 is an alternative to Method 1. The minimum value of the maximum allowable pressure shall be determined by the minimum specified temperatures given in Table 2 to determine the saturated refrigerant pressure. When the evaporators can be subject to high pressure e.g. during hot gas defrosting or reverse cycle operation, the high pressure side specified temperature shall be used.</p>		P																														
	<p>The use of specified temperatures does not always result in saturated refrigerant pressure within the system. In the case of a limit charged system at standstill condition the isochoric behaviour shall be regarded (refrigerant charge compared to free inner volume of the system). In case of pressure stages operating above the critical point Method 1 shall be used.</p>		N/A																														
	<p><b>Table 2 — Specified design temperatures</b></p> <table border="1"> <thead> <tr> <th>Ambient conditions</th> <th>≤ 32 °C</th> <th>≤ 38 °C</th> <th>≤ 43 °C</th> <th>≤ 55 °C</th> </tr> </thead> <tbody> <tr> <td>High pressure side with air cooled condenser</td> <td>55 °C</td> <td>59 °C</td> <td>63 °C</td> <td>67 °C</td> </tr> <tr> <td>High pressure side with water cooled condenser or water heat pump</td> <td colspan="4" style="text-align: center;">Maximum leaving water temperature + 8 K but not less than the design temperature at low pressure side</td> </tr> <tr> <td>High pressure side with evaporative condenser</td> <td>43 °C</td> <td>43 °C</td> <td>43 °C</td> <td>55 °C</td> </tr> <tr> <td>Low pressure side with heat exchanger exposed to the outdoor ambient temperature</td> <td>32 °C</td> <td>38 °C</td> <td>43 °C</td> <td>55 °C</td> </tr> <tr> <td>Low pressure side with heat exchanger exposed to the indoor ambient temperature</td> <td>27 °C</td> <td>33 °C</td> <td>38 °C</td> <td>38 °C</td> </tr> </tbody> </table> <p>NOTE 1 For the high pressure side, the specified temperatures are considered the maximum that will occur during operation. This temperature is higher than the temperature during compressor shut down (standstill). For the low pressure side and/or intermediate pressure side, it is sufficient to base the calculation of pressure on the expected temperature during compressor standstill period. These temperatures are minimum temperatures and thus determine that the system will not be designed for maximum allowable pressure lower than the saturated refrigerant pressure corresponding to these minimum temperatures.</p> <p>NOTE 2 For zeotropic blends the maximum allowable pressure (PS) is the pressure at the bubble point.</p>	Ambient conditions	≤ 32 °C	≤ 38 °C	≤ 43 °C	≤ 55 °C	High pressure side with air cooled condenser	55 °C	59 °C	63 °C	67 °C	High pressure side with water cooled condenser or water heat pump	Maximum leaving water temperature + 8 K but not less than the design temperature at low pressure side				High pressure side with evaporative condenser	43 °C	43 °C	43 °C	55 °C	Low pressure side with heat exchanger exposed to the outdoor ambient temperature	32 °C	38 °C	43 °C	55 °C	Low pressure side with heat exchanger exposed to the indoor ambient temperature	27 °C	33 °C	38 °C	38 °C	<p>Condition: R410A, ambient temp 48°C High pressure side: air cooled and low pressure side exposed to the outdoor ambient.            PSH: 4,4 MPa            PSL: for model MOUA-96CD1N1-R and MOUA-96HD1N1-R: 3,4MPa; for other models: 2,6MPa            (according to table 2, the minimum requirement is PSH:4,5MPa, PSL:3,4MPa)</p>	P
Ambient conditions	≤ 32 °C	≤ 38 °C	≤ 43 °C	≤ 55 °C																													
High pressure side with air cooled condenser	55 °C	59 °C	63 °C	67 °C																													
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Low pressure side with heat exchanger exposed to the outdoor ambient temperature	32 °C	38 °C	43 °C	55 °C																													
Low pressure side with heat exchanger exposed to the indoor ambient temperature	27 °C	33 °C	38 °C	38 °C																													
	<p>NOTE 1 The pressure at which the system or part of the system normally operates will be lower than the maximum allowable pressure PS.</p>		P																														
	<p>NOTE 2 Excessive stress can result from gas pulsations.</p>		P																														
	<p>NOTE 3 For determination of the ambient conditions IEC 60721-2-1 can be used.</p>		P																														
<b>6.2.2.2</b>	<b>Component maximum allowable pressure</b>		--																														
	<p>The maximum allowable pressure for each component shall not be less than the maximum allowable pressure of the system or part of the system.</p>		P																														
	<p>The selection of materials for components shall take into account the impact strength at all temperatures to which they may be exposed.</p>		P																														
	<p>NOTE The application of certain materials at low temperatures may request special consideration due to risk of brittle fracture.</p>		P																														
<b>6.2.2.3</b>	<b>Damage limitation requirements in the event of external fire</b>		--																														

Clause	Requirement + Test	result – Remark	Verdict								
	The pressure rise in case of external fire is not regarded as operational condition. However, the designer shall regard damage limitation requirements as appropriate for the refrigerating system. This may include measures as listed in Table 3. Other alternatives reaching the same level of safety may be applied.		P								
	<p><b>Table 3 —Examples for measures to meet damage limitation requirements</b></p> <p>Table 3 – Examples for measures to meet damage limitation requirements</p> <table border="1"> <thead> <tr> <th>Measures</th> <th>Additional information</th> </tr> </thead> <tbody> <tr> <td>Application of suitable pressure relief devices</td> <td>Calculation according to EN 13136</td> </tr> <tr> <td>Place the refrigerating system in a separate refrigeration machinery room which complies with EN 378-3</td> <td></td> </tr> <tr> <td>Allow migration of the refrigerant into other parts of the refrigerating system</td> <td>The worst case condition shall be considered.</td> </tr> </tbody> </table>	Measures	Additional information	Application of suitable pressure relief devices	Calculation according to EN 13136	Place the refrigerating system in a separate refrigeration machinery room which complies with EN 378-3		Allow migration of the refrigerant into other parts of the refrigerating system	The worst case condition shall be considered.		P
Measures	Additional information										
Application of suitable pressure relief devices	Calculation according to EN 13136										
Place the refrigerating system in a separate refrigeration machinery room which complies with EN 378-3											
Allow migration of the refrigerant into other parts of the refrigerating system	The worst case condition shall be considered.										
	In case of application of pressure relief devices, the designer may choose a higher setting than 1 x PS provided the respective part of the refrigerating system is designed to meet damage limitation requirement for this higher setting. This is achieved if the manufacturer can demonstrate adequate level of protection by calculation or testing.		N/A								
<b>6.2.3</b>	<b>Piping</b>		--								
<b>6.2.3.1</b>	<b>Foreseeable misuse of piping</b>		--								
	For piping where misuse can be foreseen e.g. climbing, storage, hanging of tools or similar misuse, adequate countermeasures shall be taken.	All piping is assembled in manufacturer before shipment. Misusing is impossible.	P								
	NOTE Examples of countermeasures are sufficient strength, protection or warning labels.		P								
<b>6.2.3.2</b>	<b>Piping joints and fittings.</b>		--								
<b>6.2.3.2.1</b>	<b>General</b>		--								
	Piping joints and fittings shall comply with the requirements of EN 14276-2.		P								
	Where joints are used on piping, damage caused by freezing or vibration shall be avoided.		P								
	NOTE: Painting, coating, ice grooves are examples of countermeasures to avoid damage by freezing.		P								

Clause	Requirement + Test	result – Remark	Verdict
	Joints other than brazed or welded shall be so made and located to minimize tension, compression, bending, or torsion of pipe. Pipe support shall be provided as necessary considering static and dynamic effects of the weight of the joint and joining components as well as possible displacement of the pipes due to flexible support of movable components. Operation, assembling, handling, transportation, and maintenance shall be taken into account.		P
<b>6.2.3.2.2</b>	<b>Permanent joints</b>		--
	For permanent joints welding or brazing shall be used in accordance with EN 14276-2. Other permanent joints shall comply with the requirements of EN 16084.		P
<b>6.2.3.2.3</b>	<b>Detachable joints</b>		--
<b>6.2.3.2.3.1</b>	<b>General</b>		--
	In general, detachable joints shall only be used where permanent joints are not appropriate for technical reasons.	Permanent connection used, except indoor/outdoor unit connection during the installation.	N/A
	It is recommended that in insulated piping the positions of detachable joints are permanently marked. At that position, it is recommended that insulation can be easily removed for inspection.		N/A
<b>6.2.3.2.3.2</b>	<b>Flanged joints</b>		--
	Flanged joints shall be arranged so that the connected parts can be dismantled with minimum distortion stress of the piping.		P
	It is preferable to use standardized flanges for steel piping according to EN 1092-1 and copper piping according to EN 1092-3.		P
	The joints should be solid and resistant enough to avoid any danger of the gasket being blown out. Flanges with a groove and tongue or projection and recess are preferred. Dismantling should be possible without forcing the jointed components. Care should be taken not to overstress bolts due to cold operation by applying a defined pre-stress.		P
<b>6.2.3.2.3.3</b>	<b>Flared joints</b>		--
	Flared joints shall be restricted to use with annealed pipe only, and to pipe sizes not exceeding a diameter of 20 mm outside diameter.	Annealed pipe for flared joints are used for pipe sizes less than 20 mm.	P
	When copper piping is used, the material shall comply with the requirements of EN 12735-1 or EN 12735-2.	Considered by 2014/68/EU implementation.	P
	The pipe ends shall be cut at a right angle to the axes (perpendicular) and checked to be free of burrs.		P

Clause	Requirement + Test	result – Remark	Verdict																																																															
	For flare connections of copper pipes, the appropriate torque and conditions shall apply as indicated in Table 4. The flares shall be tightened with the designated torque by means of a torque wrench and appropriate spanner.		P																																																															
	<p><b>Table 4 — Standard tightening torque</b></p> <p>Table 4 — Standard tightening torque</p> <table border="1"> <thead> <tr> <th rowspan="3">Metric series (mm)</th> <th colspan="2">Nominal outside diameter (according to EN 12735-1 and EN 12735-2)</th> <th rowspan="3">Minimum wall Thickness (mm)</th> <th rowspan="3">Tightening torque (Nm)</th> </tr> <tr> <th colspan="2">Imperial series</th> </tr> <tr> <th>(mm)</th> <th>(in)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">6</td> <td></td> <td></td> <td>0,80</td> <td>14 — 18</td> </tr> <tr> <td>6,35</td> <td>1/4</td> <td>0,80</td> <td>14 — 18</td> </tr> <tr> <td>7,94</td> <td>5/16</td> <td>0,80</td> <td>33 — 42</td> </tr> <tr> <td rowspan="2">8</td> <td></td> <td></td> <td>0,80</td> <td>33 — 42</td> </tr> <tr> <td>9,52</td> <td>3/8</td> <td>0,80</td> <td>33 — 42</td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>0,80</td> <td>33 — 42</td> </tr> <tr> <td rowspan="2">12</td> <td></td> <td></td> <td>0,80</td> <td>50 — 62</td> </tr> <tr> <td>12,7</td> <td>1/2</td> <td>0,80</td> <td>50 — 62</td> </tr> <tr> <td rowspan="2">15</td> <td></td> <td></td> <td>0,80</td> <td>63 — 77</td> </tr> <tr> <td>15,88</td> <td>5/8</td> <td>0,95</td> <td>63 — 77</td> </tr> <tr> <td rowspan="2">18</td> <td></td> <td></td> <td>1,00</td> <td>90 — 110</td> </tr> <tr> <td>19,06</td> <td>3/4</td> <td>1,00</td> <td>90 — 110</td> </tr> </tbody> </table>	Metric series (mm)	Nominal outside diameter (according to EN 12735-1 and EN 12735-2)		Minimum wall Thickness (mm)	Tightening torque (Nm)	Imperial series		(mm)	(in)	6			0,80	14 — 18	6,35	1/4	0,80	14 — 18	7,94	5/16	0,80	33 — 42	8			0,80	33 — 42	9,52	3/8	0,80	33 — 42	10			0,80	33 — 42	12			0,80	50 — 62	12,7	1/2	0,80	50 — 62	15			0,80	63 — 77	15,88	5/8	0,95	63 — 77	18			1,00	90 — 110	19,06	3/4	1,00	90 — 110	Required in production and instruction. (for maintenance)	P
Metric series (mm)	Nominal outside diameter (according to EN 12735-1 and EN 12735-2)		Minimum wall Thickness (mm)	Tightening torque (Nm)																																																														
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	A torque other than the value specified in Table 4 may be applied, provided it is recommended by the manufacturer.		P																																																															
	When making flared joints, care should be taken to ensure that the flare is of the correct size and that the torque used to tighten the nut is not excessive. Care should be taken not to flare piping that has been work hardened.		P																																																															
	Flared joints shall be subjected only to forces arising from the system pressure and those exerted by the flare nut in making the joint. Flexible section(s) in the connected pipe, support of it and associated components shall be provided as necessary to prevent extraneous tension, bending or torsion forces acting on the joint. Consider static (weight or tensile/compressive forces) and dynamic (mass x acceleration, including vibration) forces that may arise during assembly, handling, transport, operation or maintenance. Appropriate clamping of the flared pipe connections shall be used to avoid breaking caused by excessive vibrations.		N/A																																																															
<b>6.2.3.2.3.4</b>	<b>Taper pipe thread joints</b>		--																																																															
	Taper pipe thread joints that are part of the boundary of the refrigerating system shall be restricted to maximum DN 40 and only be used for connecting control-, safety- and indicating devices to components. Taper pipe fittings and sealing medium shall be type approved by the manufacturer with regard to tightness.		N/A																																																															

Clause	Requirement + Test	result – Remark	Verdict
<b>6.2.3.2.3.5</b>	<b>Compression joints</b>		--
	Compression joints shall be restricted to piping with maximum DN 32.		N/A
<b>6.2.3.3</b>	<b>Requirements for piping installed at site</b>		--
<b>6.2.3.3.1</b>	<b>General</b>		--
	For proper arrangement of piping the physical layout, in particular the position of each pipe, the flow conditions (two-phase flow, oil supply operation on partial load), condensation processes, thermal expansion, vibration and good accessibility shall be taken into account.		P
	NOTE Routing and supporting of piping have an important effect on the operational reliability and serviceability of a refrigerating system.		P
	As a general rule, piping shall be installed so as to avoid damage from any generally expected activity.		P
	The following considerations shall apply to the installation of piping for safety and environmental protection:		P
	a)there shall be no hazard for persons and free passage in escape and access routes shall not be restricted;		P
	b)No valves and detachable joints shall be located in areas accessible to the general public except when they comply with EN 16084;		P
	c) valves and detachable joints shall not be accessible to the general public unless protected against an unauthorized operation or disconnection;		P
	d) piping shall be protected against heat by segregation from hot pipes and heat sources;		P
	e) connecting pipes (e.g. in the case of split systems) shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A valve shall be provided to evacuate the interconnecting pipe and/or any uncharged refrigerating system part;		P
	f) refrigerant tubing shall be protected or enclosed to avoid damage;		P
	g) flexible refrigerant connectors such as connecting lines between the indoor and outdoor unit that may be displaced during normal operations shall be protected against mechanical damage.	There is no flexible refrigerant connecting between indoor and outdoor.	N/A
	h) during brazing or welding, refrigerant shall be removed from parts of the system affected by the heat from brazing or welding. It is recommended that such components are shipped without refrigerant charge;		N/A
	i)see 6.2.3.3.7 for requirements regarding accessibility of piping and joints.		P

Clause	Requirement + Test	result – Remark	Verdict														
<b>6.2.3.3.2</b>	<b>Specific requirements for installation of piping for equipment designed for A2, A3, B2 or B3 refrigerants.</b>	A1 refrierant used.	--														
	Piping and joints of a split system shall be made with permanent joints when inside an occupied space except joints directly connecting the piping to indoor units.		N/A														
<b>6.2.3.3.3</b>	<b>Spacing for pipe supports</b>		--														
	Piping shall be suitably supported according to its size and service weight. The recommended maximum spacing for pipe supports is shown in Table 5 and Table 6.	Table 5 requirements are met.	P														
	<b>Table 5 — Recommended maximum spacing for supports for copper pipe</b> <table border="1"> <thead> <tr> <th>Outside diameter (mm)</th> <th>Spacing (m)</th> </tr> </thead> <tbody> <tr> <td>15 to 22 soft</td> <td>2</td> </tr> <tr> <td>22 to &lt; 54 half hard</td> <td>3</td> </tr> <tr> <td>54 to 67 half hard</td> <td>4</td> </tr> </tbody> </table> <p>NOTE Information on soft and half hard is given in EN 12735-1 and EN 12735-2.</p>	Outside diameter (mm)	Spacing (m)	15 to 22 soft	2	22 to < 54 half hard	3	54 to 67 half hard	4		P						
Outside diameter (mm)	Spacing (m)																
15 to 22 soft	2																
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	<b>Table 6 — Recommended maximum spacing for supports for steel pipe</b> <table border="1"> <thead> <tr> <th>Nominal bore DN (according to EN ISO 6708)</th> <th>Spacing (m)</th> </tr> </thead> <tbody> <tr> <td>15 to 25</td> <td>2</td> </tr> <tr> <td>32 to 50</td> <td>3</td> </tr> <tr> <td>65 to 80</td> <td>4,5</td> </tr> <tr> <td>100 to 175</td> <td>5</td> </tr> <tr> <td>200 to 350</td> <td>6</td> </tr> <tr> <td>400 to 450</td> <td>7</td> </tr> </tbody> </table>	Nominal bore DN (according to EN ISO 6708)	Spacing (m)	15 to 25	2	32 to 50	3	65 to 80	4,5	100 to 175	5	200 to 350	6	400 to 450	7	Discharge pipe used steel, the maximum spacing considered.	P
Nominal bore DN (according to EN ISO 6708)	Spacing (m)																
15 to 25	2																
32 to 50	3																
65 to 80	4,5																
100 to 175	5																
200 to 350	6																
400 to 450	7																
<b>6.2.3.3.4</b>	<b>Protection of piping</b>		--														
	Precautions shall be taken to avoid excessive vibration or pulsation. Particular attention shall be paid to preventing direct transmission of noise or vibration to or through the supporting structure.	All piping is well protected.	P														
	The assessment of vibrations or pulsations should be carried out on the system in service, at conditions which give the worst effect on piping.		P														
	protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects. Adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris		P														
	provision shall be made for expansion and contraction of long runs of piping;		P														
	piping in refrigerating systems shall be so designed and installed that liquid hammer (hydraulic shock) cannot damage the system;		P														

Clause	Requirement + Test	result – Remark	Verdict
	steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation; Adhesive used for the insulation shall not react or dissolve the applied rustproof coating;		P
	NOTE Guidance on corrosion protection is given in EN ISO 12944-1 (steel piping).		P
	flexible pipe elements shall be protected against mechanical damage, excessive stress by torsion or other forces. Provisions for regularly checks (visual inspection) shall be made.		N/A
<b>6.2.3.3.5</b>	<b>Piping in ducts or shafts</b>		--
	Where refrigerant piping shares a duct with other services, provision shall be made to avoid damage due to interaction between them.		N/A
	There shall be no refrigerant pipes in ventilation or air conditioning ducts where these are also used as escape routes.		N/A
	Piping shall not be located in lift shafts.		N/A
<b>6.2.3.3.6</b>	<b>Location</b>		--
	Sufficient space for insulation of the piping shall be provided where it is required.		P
	Piping outside a machinery room or enclosure shall be protected against possible accidental damage.	All the piping located inside the frame of enclosure, damage by human activities is not expected.	P
	Piping with detachable joints not protected against disconnection shall not be located in public hallways, lobbies, stairways, stairway landings, entrances, exits or in any duct or shaft which has unprotected openings to these locations.		P
	Piping which has no detachable joints, valves or controls, and which is protected against accidental damage may be installed in public hallways, stairways or lobbies, provided it is not less than 2,2 m above the floor.		N/A
	Piping passing through fire resistant walls and ceilings shall be sealed in such a way as to be consistent with the fire rating of the partition.		P
<b>6.2.3.3.7</b>	<b>Accessibility of piping and joints</b>		--
	The clearance around the piping shall be sufficient to allow routine maintenance of insulation and components, checking of pipe joints and repairing of leaks.	Visual checked.	P
	All detachable joints shall be readily accessible for inspection.	Flared connection and flanged connection served as detachable joints. Are all readily accessible.	P

Clause	Requirement + Test	result – Remark	Verdict
<b>6.2.3.4</b>	<b>Piping for accessories and measurements</b>		--
	Piping, including flexible pipes as specified in EN 1736, for the connection of measuring, control and safety devices shall be of sufficient strength in relation to the maximum allowable pressure and shall be installed so as to minimize vibration and corrosion.		P
	Tubes for the connection of measuring, control and safety devices should be connected and routed so that the collection of liquid, oil or dirt is avoided as far as possible.		P
	A minimum nominal internal diameter of 4 mm is required for the connection pipes of safety switching devices, except for safety switching devices requiring a connection pipe with a smaller bore in order to damp pulsations. If this damping is required to ensure the correct function of the device, then the connection pipe shall be fitted as high as practical on the vessel or piping to prevent the entry of liquid phase or oil into the pipe.		P
<b>6.2.3.5</b>	<b>Drain</b>		--
<b>6.2.3.5.1</b>	<b>General</b>		--
	Shut-off devices in drains which should not be opened when the system is operating as intended shall be safeguarded against unauthorized actuation. Installation in a separate refrigeration machinery room provides sufficient protection against unauthorized actuation.	All shut-off devices is actuated by tools operated by service people, unauthorized actuation is not expected.	P
<b>6.2.3.5.2</b>	<b>Special requirements</b>		--
	Where service instructions require regular drain off of oil, the manufacturer shall provide instructions how to drain off oil with minimum emission to the environment.	Regular drain off of oil is not required by manufacturer.	N/A
	When a self closing valve is used in the oil drain line, a shut-off valve shall be installed on the inlet side of it, or a valve combining these two functions shall be fitted. NOTE The risk of dirt on the seat can be minimized by installing the valve with the spindle in the horizontal position.		N/A
	Refrigerating systems other than sealed systems shall have the necessary shut-off devices and/or connection facilities in order to enable the compressor of the system or external evacuation devices to transfer refrigerant and oil from the system to internal or external liquid receivers.		P
	Drain-off valves shall be provided to facilitate removal of the refrigerant from the system with minimum refrigerant emission.	Provided in each connection point.	P



Clause	Requirement + Test	result – Remark	Verdict
	Piping which is not used during normal operation shall be fitted with a permanent or removable cap or equivalent.		P
<b>6.2.4</b>	<b>Shut off devices</b>		--
<b>6.2.4.1</b>	<b>Isolating valves</b>		--
	Refrigerating systems shall be provided with sufficient isolating valves so as to minimize danger and loss of refrigerant particularly during repair and/or maintenance.	Isolating valves provided for each component replacement of refrigeration system.	P
<b>6.2.4.2</b>	<b>Hand operated valves</b>	No manual valves used.	--
	Hand operated valves required for use during essential operational conditions shall be fitted with a hand wheel or operating handle.	See above	N/A
<b>6.2.4.3</b>	<b>Change of gland packing/seal</b>		--
	If it is not possible to tighten or change the gland packing/seal(s) while the valve is exposed to system pressure, it shall be possible to isolate the valve from the system, or provisions shall be made to evacuate refrigerant from the part of the system where the valve is located.		P
<b>6.2.4.4</b>	<b>Oil drain that can be actuated during normal operation</b>		--
	Self closing valves shall be installed at oil draining points which are intended to be actuated during normal operation.	All the shut-off valves assembled into the system.	N/A
<b>6.2.4.5</b>	<b>Arrangement of shut-off devices</b>		--
	Shut-off devices shall not be mounted in crawl spaces or in piping shafts designed for human entry.		P
<b>6.2.5</b>	<b>Protective devices</b>		--
<b>6.2.5.1</b>	General		--
	In refrigerating systems the pressure during operation and standstill shall not exceed the maximum allowable pressure of any part of the refrigerating system, as determined by the designer according to 6.2.2.1.	Performed	P
	Excessive internal pressure from foreseeable causes shall be prevented or relieved with minimum practicable risk for persons, property and the environment. If a pressure relief device is discharging, the pressure in any part of the system shall not exceed the maximum allowable pressure of that part by more than 10 %. The restriction of 10 % does not apply for pressure rise caused by external fire.	Lower than 10%	P
<b>6.2.5.2</b>	<b>Safety switching devices for limiting the pressure</b>	See below	P
<b>6.2.5.2.1</b>	<b>Electro-mechanical safety switching devices for limiting the pressure</b>		--

Clause	Requirement + Test	result – Remark	Verdict
	Electro-mechanical switching devices shall be in accordance with EN 12263:1998. If used for protection of the refrigerating system against excessive pressure, they shall not be used for control purposes.		P
<b>6.2.5.2.2</b>	<b>Electronic safety switching devices for limiting the pressure</b>		--
	Electronic safety switching devices for limiting the pressure shall be type tested and shall fulfil the requirements for safety accessories, for example safety functions shall not be affected by control functions.	Electronic controls not used as safety switching devices.	P
	The devices shall comply with the requirements according to EN 12263, Clause 4.		P
	NOTE Some of these requirements may be not relevant for certain types of electronic safety switching devices limiting the pressure.		P
	Regarding the applicable requirements for included electronics, those devices shall comply with the relevant standard as appropriate for the application of the refrigerating system and as demanded by the legal provisions for pressure safety and machinery.		P
	EXAMPLE Examples for such standards are: — Harmonized product standards of EN 60335 series; — Annex H of standard EN 60730–2-6, with additional requirements; — control function shall be class C; and — deviation and drift shall not exceed +0 %. — EN 62061 for SIL class 2; — EN ISO 13849 for PL = d.		P
<b>6.2.6</b>	<b>Application of protection devices</b>		--
<b>6.2.6.1</b>	<b>General</b>		--
	Protection devices shall be provided for both the refrigerating system and the secondary heat transfer circuit.	Check by 6.2.6.2	P
	Wherever practicable, a safety switching device for limiting the pressure shall be used to stop the pressure source before any pressure relief device starts to operate. For relieving excessive pressure a pressure relief valve shall be used in accordance with 6.2.6.2.		P
	Wherever practicable, pressure relief valves venting to a lower pressure stage or to an expansion vessel are preferred instead of pressure relief devices relieving to atmosphere.		P
<b>6.2.6.2</b>	<b>Protection of the refrigerating system against excessive pressure except in the event of external fire</b>	Check by figure 1	--

Clause	Requirement + Test	result – Remark	Verdict
	For refrigerating systems protection devices shall be provided according to the flow chart as indicated in Figure 1 and the following text. The application of protection devices shall be considered for all parts of the refrigerating system, as they were determined by the designer according to 6.2.2.1, and only if the relevant pressure source may cause excessive internal pressure. This clause does not describe damage limitation requirements in the event of external fire, please refer to 6.2.2.3.		P
	Figure 1 consists of parts A, B, C, D, each of which has to be considered in relation to one another in order to determine the protective devices.	Considered	P
	All protection devices shall be type tested and certified according to the legal requirements, except the pressure relief device which protects only the compressor.		P
	Devices used for protection of parts of the refrigerating system shall be set according to the following rules:		P
	1) Where the pressure is limited by a safety switching device limiting the pressure: The safety switching device(s) for limiting the pressure shall be set at a pressure $\leq 1 \times PS$ .	1 x PS	P
	2) Where the pressure is limited by a pressure relief device: The pressure relief device(s) shall be set at a pressure $\leq 1 \times PS$ , The pressure relief device(s) shall be fully open at $\leq 1,1 \times PS$ .		N/A
	3) Where pressure relief device(s) and safety switching device(s) for limiting the pressure are used for protection of the same part of the refrigerating system, the setting of the safety switching device limiting the pressure shall be $\geq 0,9$ times the setting of the pressure relief device. If the manufacturer can ensure a sufficient precision of the setting, it is allowed to reduce the difference of 10 % between the setting of the safety switching device limiting the pressure and the pressure relieve device accordingly, provided that the intended response order is maintained.		N/A
<b>6.2.6.3</b>	<b>Overflow valves</b>		--
	Where pressure relief device(s), except compressor relief devices, discharge(s) from a higher to a lower pressure stage of the system a pressure relief valve(s) of a back-pressure compensating type shall be used.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	The back pressure compensation characteristics of the valve shall be such that the pressure created during relief is not higher than the pressure created by a pressure relief device relieving to the atmosphere.		N/A
	The relieving capacity of the pressure relief devices on the low-pressure side of the system shall protect all connected vessels, compressors and pumps which might be subjected to excess pressure simultaneously. Calculation shall be in accordance with EN 13136.		N/A
<b>6.2.6.4</b>	<b>Isolation of pressure relief devices.</b>		--
	There shall be no isolating valves in the inlet or outlet line of a pressure relief device except as specified in 6.2.6.6.	No isolating valve used in the inlet or outlet of the relief valve.	P
<b>6.2.6.5</b>	<b>Indication device for pressure relief devices</b>		--
	For systems with a charge of at least 300 kg of refrigerant, an indicating device shall be provided to check whether the relief valve has discharged to atmosphere.	Less than 300kg refrigerant used for applied type.	N/A
	EXAMPLE Examples of indication devices:		--
	— u-trap filled with oil;		N/A
	— maximum indicating pressure gauge between relief valve and bursting disc;		N/A
	— upstream installation of bursting discs with inter-space monitoring and pressure alarm device (pressure limiter). The actual relieving pressure of the type-tested pressure limiter monitoring the inter-space shall be set to a pressure of less than or equal to 0,5 bar (0,05 MPa);		N/A
	— gas sensor in the discharge line; or		N/A
	— use of safety valves with a soft seal, with pressure monitoring of the protected section and alarming at a permanently attended station when a level of 2 bar (0,2 MPa) below the actual relieving pressure of the safety valve is reached.		N/A
<b>6.2.6.6</b>	<b>Arrangement of pressure relief devices for refrigerating systems</b>		--
<b>6.2.6.6.1</b>	<b>General</b>		--
	Where this standard requires the provision of a pressure relief device then the pressure relief device shall be set not higher than the PS of the component it protects provided that other parts of the system are protected by another device. If other parts of the system are not protected by another device, then the pressure relief device shall not be set higher than the PS of any other component in the part of the system.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	Pressure relief devices shall be mounted on or in proximity to the pressure vessel or other part of the refrigerating system which they protect. Pressure relief devices shall be easily accessible and shall be connected above the level of liquid refrigerant, except for devices which protect against the effect of liquid expansion.		N/A
	When an externally mounted single pressure relief device is used to discharge to the low pressure side of the system, means shall be provided by which the device may be removed without losing a significant quantity of refrigerant.	No relief device discharge to the low pressure side of the system.	N/A
	NOTE Relief devices which are contained within a compressor package which can be isolated from the rest of the system are deemed to comply with this requirement.		N/A
	Overflow lines of overflow valves shall lead into the low pressure side of the system (e.g. the return line to the separator) via the shortest practical path and shall preferably lead into the gas phase (see Figures F.2 and F.3).		N/A
	Locked valves are permitted: — between the compressor and its relief device in open position; — between pressure relief devices and the pressure vessel or other part of the refrigerating system which they protect (see Figure F.1 and F.4), provided they are secured in the open position by means of a lead seal or equivalent; — upstream and downstream of an overflow valve, for systems containing more than 100 kg refrigerant, provided they are secured in the open position by means of a lead seal or equivalent.		N/A
	Where locked valves are required to be secured by means of a lead seal or equivalent, this seal shall be clearly marked with the identification of a competent person in accordance with EN 13313.		N/A
	Where a release to atmosphere would bring the refrigerant condition to or below the triple point, the refrigerant may solidify. The arrangement of pressure relief devices and associated pipes shall be designed to prevent any blockage of the refrigerant flow. The relief valve may be mounted remote from the vessel or other equipment which it is protecting to ensure that it can relieve to atmosphere without any risk of the outlet pipe blocking provided the inlet piping to the relief valve is adequately sized according to EN 13136.		N/A
	Pressure relief devices discharging into the atmosphere may be installed in parallel to the overflow pressure relief devices to protect the system against excessive pressure arising from external heat sources.		N/A

Clause	Requirement + Test	result – Remark	Verdict
<b>6.2.6.6.2</b>	<b>Calculations</b>		--
	Sizing of pressure relief devices, up and downstream piping and change over valves if any, shall be calculated according to EN 13136.		N/A
<b>6.2.6.6.3</b>	<b>Fusible plugs</b>		--
	Fusible plugs shall not be used.		N/A
<b>6.2.6.6.4</b>	<b>Bursting disc</b>		--
	A bursting disc relieving to the atmosphere shall only be used in series with a pressure relief valve and located on the inlet side of the pressure relief valve. In order to check that the bursting disc is intact, a sensor operating an indicator shall be located in the pipe between the bursting disc and the pressure relief valve. The bursting disc installed ahead of a pressure relief valve shall not be smaller than the inlet of the pressure relief valve. The bursting disc shall be constructed so that no piece of the broken disc obstructs the pressure relief valve or hinders the flow of refrigerant.		N/A
	NOTE: A pressure gauge connected between the bursting disc and the pressure relief device incorporating maximum pressure indication is considered to be a suitable indicator.		N/A
<b>6.2.6.6.5</b>	<b>Discharge piping from pressure relief devices</b>		P
	Discharge from pressure relief devices shall take place so that persons and property are not endangered by the released refrigerant.		P
	NOTE: The refrigerant can be diffused into the air by adequate means but away from any air intake to the building or discharged into an adequate quantity of a suitable absorbing substance.		P
	Adverse effects shall be considered e.g. the danger of water collecting and freezing in relief discharge pipes or the accumulation of dirt or debris, or, in the case of R-744 systems, blockage of the discharge by solid CO <sub>2</sub> .		N/A
	Discharge lines for pressure relief devices shall be calculated according to EN 13136.		P
	The connection of discharge lines to discharge devices shall be arranged so that individual tightness testing (e.g. access for leak refrigerant detection) of the discharge devices is possible.		P
<b>6.2.6.7</b>	<b>Arrangement of safety switching devices for limiting the pressure</b>		--
	No shut-off valve shall be positioned between the safety switching device for limiting the pressure and the pressure imposing element unless either:		P

Clause	Requirement + Test	result – Remark	Verdict
	— second safety switching device for limiting the pressure of equal type is fitted and the shut-off valve is a changeover valve, or		N/A
	— a pressure relief valve or bursting disc is fitted to the relevant part of the system.		N/A
	Examples of practical arrangement of safety devices can be found in Annex F.		P
	Safety switching devices for limiting the pressure mounted on the high pressure side shall be protected against the pulsations that may occur. This can be obtained by applying appropriate construction methods, by application of a damping device or by using reduced connection tubes. Refer also to 6.2.3.4 for installation of piping.		P
	NOTE Type approved safety pressure cut out, type approved pressure cut out and type approved pressure limiters are safety switching devices for limiting the pressure as defined in EN 378-1.		P
	One safety switching device for limiting the pressure may be used to stop more than one pressure imposing element if the safety switching device complies with above requirements.		P
	Safety switching devices for limiting the pressure shall be so arranged that change of setting can only be carried out by the use of a tool.	Stored in a cabinet and cannot be adjusted without aid of a tool	P
	In case of an automatic restart after failure of the power supply means shall be provided to prevent hazardous situations. Failure of electrical power to the safety switching devices for limiting the pressure or to the microprocessor/computer, if it is used in the safety circuit, shall stop the compressor. Refer also to 6.2.5.2.2 for the use of electronic safety switching devices for limiting the pressure.	The system will not be restarted after a failure of power supply. Electric circuit not used as safety switching device.	P
<b>6.2.6.8</b>	<b>Protection of the secondary cooling and heating system</b>		--
	If the heat exchanger between the refrigerating system and the secondary cooling and heating system can be shut off so that an increase in pressure could occur, then the heat exchanger shall be protected on the secondary side by means of a pressure relief device set at a pressure not higher than PS of the secondary side.	The build-up of pressure in heat exchanger is not expected.	N/A
	For a refrigerating system with a refrigerant charge of more than 500 kg, measures shall be taken to detect (e.g. by refrigerant detectors) and report (e.g. by a warning detector) the presence of refrigerant in any associated circuit containing water or other liquids.	Less than 500kg.	N/A

Clause	Requirement + Test	result – Remark	Verdict
	When B1, A2L, A2, B2, B2L, A3 or B3 refrigerant of more than 500 kg is used in an indirect system (refer to EN 378-1:2016, 5.4) the heat exchanger shall not allow the release of the refrigerant into the areas served by the secondary heat-transfer fluid due to a failure of the wall of the evaporator or condenser	A1 refrigerant is used for the system.	N/A
	The following examples comply with this requirement. EXAMPLE 1 An automatic air/refrigerant separator, mounted on the secondary circuit on the outlet pipe from the evaporator or the condenser and at a higher level than the heat exchanger. The air/refrigerant separator shall have a sufficient flow rating to discharge the refrigerant that can be released through the heat exchanger. The air separator shall discharge the refrigerant into the vented unit housing or the outside.	Secondary water cooling system is not supplied by these models, relevant requirement requirements are mentioned in instruction as recommendation.	P
	EXAMPLE 2 double wall heat exchanger, between the primary and the secondary circuit, in order to avoid, in case of leakage, that the refrigerant leaks into the secondary circuit, or		P
	EXAMPLE 3 pressure of the secondary circuit is always greater than the pressure of the primary circuit in the area of contact.		N/A
	Protection against freezing shall be in accordance with the principles given in 6.2.6.2.		N/A
<b>6.2.7</b>	<b>Indicating and measuring instruments (monitoring)</b>		--
<b>6.2.7.1</b>	<b>General</b>		--
	Refrigerating systems shall be equipped with the indicating and measuring instruments necessary for testing, operating and servicing as specified in this European Standard.		P
	"Monitoring devices" as described in this part of EN 378 are not considered to be protection devices.		P
<b>6.2.7.2</b>	<b>Arrangement of refrigerant pressure indicators</b>		--
	For systems containing more than 10,0 kg of refrigerant, pressure indicator connections for each pressure side or distinct pressure stage shall be provided (the fitting of permanent pressure indicators being optional).		N/A
	When a pressure gauge is permanently installed on the high side of a refrigerating system, its dial shall indicate the pressure to a range of at least $1,2 \times PS$ of the system.		N/A
	If a replaceable oil strainer is provided in the lubricating system of the open type compressor, an oil pressure indicator shall be provided to detect insufficient lubrication pressure.		N/A



Clause	Requirement + Test	result – Remark	Verdict
	Pressure vessels with an internal net volume of 100 l or larger, provided with shut-off devices on the inlet and outlet and which may contain liquid refrigerant, shall be provided with a pressure indicator connection.		N/A
	Refrigerant-containing components which are cleaned or defrosted in the warm or hot state and under manual control shall be equipped with one or more pressure indicators. When a pressure gauge is used, its dial shall indicate the pressure to a range of at least 1,2 times the saturation pressure of the refrigerant at the maximum temperature achieved during the cleaning or defrosting process.		N/A
<b>6.2.7.3</b>	<b>Liquid level indicators</b>		--
	Refrigerant receivers in systems containing more than:		--
	— 100 kg of group A1 refrigerant;		N/A
	— 25 kg of group A2L,B2L,A2,B1or B2 refrigerant;		N/A
	— 2,5 kg of group A3 or B3 refrigerant;		N/A
	and which may be isolated shall be provided with a liquid level indicator to show at least the maximum refrigerant level.		N/A
	Liquid level indicators constructed of glass tubes shall not be used (see EN 12178).		N/A
	Liquid level sight glasses comprising a flat or ridged glass disc sealed to a casing are not considered to be tubes.		N/A
	Liquid level indicators with long glass plates shall be fitted with a non-return safety mechanism in the lower and upper connection pipe.		N/A
<b>6.2.8</b>	<b>Liquid slugging in compressors</b>		--
	Refrigerating systems shall be so designed and installed that liquid refrigerant, oil or mixture of it cannot return to damage the compressor(s).		P
	To avoid damage of the compressors by slugging because of the charge of refrigerant and the volume of the vessel at the suction side, the vessel may be fitted with a maximum liquid level cut out, that stops the compressors before any damage occurs.		P
<b>6.2.9</b>	<b>Electrical requirements</b>		--
	The design of the electrical equipment shall comply with:		P
	a) product standard of the EN 60335 series, or	EN 60335-2-40 considered	P
	b) EN 60204-1 and for electronically controlled systems that are safety related with EN ISO 13849-1 requirements for PL = d or EN 62061 requirements for SIL2		N/A

Clause	Requirement + Test	result – Remark	Verdict
	as relevant.		P
<b>6.2.10</b>	<b>Protection against hot surfaces</b>		--
	Where the risk of contact with hot surfaces is possible equipment shall comply with the EN 60335 series where applicable or provisions shall be made for protection considering the criteria as defined in EN ISO 13732-1.	There is no other heat resource except for the outlet piping of compressor, which is covered by heat-resistant material and will not be touchable in normal condition.	P
	The temperature of surfaces that may be exposed to leakage of A2, A2L, B2L, A3, B2, or B3 refrigerants shall comply with the requirements in 6.2.14.	A1 refrigerant used.	N/A
<b>6.2.11</b>	<b>Protection against moving parts</b>		--
	Where the risk of contact with moving parts is possible (e.g. fans, rotors and shafts of open compressors), the equipment shall comply with EN ISO 13857, EN ISO 14120:2015, EN ISO 12100 or EN 60335 series when applicable.	EN 60335-2-40 considered	P
<b>6.2.12</b>	<b>Vibration and drop test</b>		--
<b>6.2.12.1</b>	<b>General</b>		--
	Factory sealed single package units (i.e. one functional unit in one enclosure) which are not fixed appliances, shall withstand the effects of dropping and vibration during transport and intended use without leaking refrigerant.	The machine is wholly assembled without any non-fixed factory sealed single package units.	P
	A sample shall be subjected to the tests of 6.2.12.2 to 6.2.12.6.		P
	There shall be no refrigerant leakage.		P
	Compliance is checked by the following: <ul style="list-style-type: none"> <li>— power input of the sample measured after at least 1 h shall not differ by more than 10 % from the value measured under the same conditions before the tests; or</li> </ul>		P
	<ul style="list-style-type: none"> <li>— use of detection equipment having an equivalent sensitivity of 3 g/year of refrigerant shall reveal no leaks.</li> </ul>		P
	The tests of 6.2.12.2, 6.2.12.3 and 6.2.12.4 may be carried out on the sample charged with a nonflammable refrigerant or a non-hazardous gas.		P
	During the test damage of parts other than the refrigerating circuit is allowed.		P
<b>6.2.12.2</b>	<b>Vibration test in the final transport packaging</b>		--
	The sample is tested in its final packaging for transport and shall withstand a random vibration test for 180 min according to ASTM D 4728 with the power spectral densities according to Table 7:		P

Clause	Requirement + Test	result – Remark	Verdict																
	<p><b>Table 7 — Power spectral densities</b></p> <table border="1"> <thead> <tr> <th>Frequency (Hz)</th> <th>Power spectral density level (g<sup>2</sup>/Hz)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0,000 05</td> </tr> <tr> <td>4</td> <td>0,01</td> </tr> <tr> <td>16</td> <td>0,01</td> </tr> <tr> <td>40</td> <td>0,001</td> </tr> <tr> <td>80</td> <td>0,001</td> </tr> <tr> <td>200</td> <td>0,000 01</td> </tr> <tr> <td>Overall, g rms</td> <td>0,52</td> </tr> </tbody> </table>	Frequency (Hz)	Power spectral density level (g <sup>2</sup> /Hz)	1	0,000 05	4	0,01	16	0,01	40	0,001	80	0,001	200	0,000 01	Overall, g rms	0,52		--
Frequency (Hz)	Power spectral density level (g <sup>2</sup> /Hz)																		
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Overall, g rms	0,52																		
<b>6.2.12.3</b>	<b>Drop test in the final transport packaging</b>		--																
	The sample is tested in its final packaging for transport and shall withstand the following number of drops on a horizontal hardwood board 20 mm thick placed on a concrete or similar hard surface:		P																
	— one with the sample held upright;		P																
	— one for each of the four edges of the bottom side, with the bottom side forming an angle of about 30° to the horizontal.		P																
	The drop height depends on the weight of the sample according to Table 8:		--																
	<p><b>Table 8 — Drop height</b></p> <table border="1"> <thead> <tr> <th>Appliance weight (kg)</th> <th>Drop height (mm)</th> </tr> </thead> <tbody> <tr> <td>&lt; 10</td> <td>800</td> </tr> <tr> <td>≥ 10 and &lt; 20</td> <td>600</td> </tr> <tr> <td>≥ 20 and &lt; 30</td> <td>500</td> </tr> <tr> <td>≥ 30 and &lt; 40</td> <td>400</td> </tr> <tr> <td>≥ 40 and &lt; 50</td> <td>300</td> </tr> <tr> <td>≥ 50</td> <td>200</td> </tr> </tbody> </table>	Appliance weight (kg)	Drop height (mm)	< 10	800	≥ 10 and < 20	600	≥ 20 and < 30	500	≥ 30 and < 40	400	≥ 40 and < 50	300	≥ 50	200		--		
Appliance weight (kg)	Drop height (mm)																		
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<b>6.2.12.4</b>	<b>Drop test without transport packaging</b>		--																
	The tests of 6.2.12.3 are repeated on the sample without its packaging and with the drop height according to Table 9:		--																
	<p><b>Table 9 — Drop height</b></p> <table border="1"> <thead> <tr> <th>Appliance weight (kg)</th> <th>Drop height (mm)</th> </tr> </thead> <tbody> <tr> <td>&lt; 10</td> <td>200</td> </tr> <tr> <td>≥ 10 and &lt; 20</td> <td>170</td> </tr> <tr> <td>≥ 20 and &lt; 30</td> <td>150</td> </tr> <tr> <td>≥ 30 and &lt; 40</td> <td>120</td> </tr> <tr> <td>≥ 40</td> <td>100</td> </tr> </tbody> </table>	Appliance weight (kg)	Drop height (mm)	< 10	200	≥ 10 and < 20	170	≥ 20 and < 30	150	≥ 30 and < 40	120	≥ 40	100		--				
Appliance weight (kg)	Drop height (mm)																		
< 10	200																		
≥ 10 and < 20	170																		
≥ 20 and < 30	150																		
≥ 30 and < 40	120																		
≥ 40	100																		
<b>6.2.12.5</b>	<b>Operation after drop test</b>		--																
	The sample is installed in accordance with the installation instructions. It is supplied at rated voltage or at the upper limit of the rated voltage range and operated at ambient temperature.		P																
	The sample is operated in cycles for 10 days (240 h), each cycle consisting of the compressor running for 10 min followed by a rest period of 5 min.		P																
	This test may be made on a separate sample.		P																
<b>6.2.12.6</b>	<b>Resonance test</b>		--																

Clause	Requirement + Test	result – Remark	Verdict
	The appliance shall be constructed so that its operation does not cause resonance points in the piping connected to the compressor.		P
	Compliance is checked by the following test:		P
	The sample is installed in accordance with the installation instructions. It is supplied at rated voltage or at the upper limit of the rated voltage range and operated at ambient temperature.		P
	The supply frequency is increased in steps of 1 Hz between 0,8 times and 1,2 times the rated frequency.		P
	The vibration amplitude is measured at critical points in the piping. There shall be no sudden increase of the amplitude when increasing the supply frequency within the specified range.		P
	NOTE 1 The vibration amplitude can be measured, for example, by sliding an arrow gauge along the piping. The arrow gauge is an isosceles triangle with a height equal to 10 times the base (see Figure 2 part A) and is held against the piping with the arrow axis perpendicular to the direction of the vibration to be measured. The amplitude is the value of A (see Figure 2 Part B) divided by 10.		P
	NOTE 2 Critical points are those with a bigger vibration amplitude.		P
	This test may be made on a separate sample.		P
<b>6.2.13</b>	<b>Transport test</b>		--
	To ensure the safety during transport following requirements shall apply:		--
	Based on the fact that repetitive pressure peaks seldom occur during transport, that all systems are strength pressure tested beforehand and taking into account the characteristic of the refrigerant, there are no additional pressure requirements related to transport of equipment without pressure relief devices.		P
	For equipment containing liquid refrigerant and having a pressure relief device on the section containing liquid refrigerant, the following shall apply:		N/A
	— pressure in parts protected by a pressure relief device shall not exceed 0,9 times the setting of that device during transport;		N/A
	— pressure shall be calculated or tested assuming that the system might be subjected to the highest transport temperature for a period of twelve hours;		N/A
	— for normal transport 55 °C shall be used as highest transport temperature;		N/A

Clause	Requirement + Test	result – Remark	Verdict
	<ul style="list-style-type: none"> <li>— for transport under tropical conditions 70 °C shall be used as highest transport temperature;</li> </ul>		N/A
	<ul style="list-style-type: none"> <li>— if however, the design of the equipment is as such that it cannot withstand certain temperatures during transport, then this shall be clearly marked on the packaging of the unit.</li> </ul>		N/A
<b>6.2.14</b>	<b>Protection against explosion hazards</b>		--
	For systems using flammable refrigerants, refrigerating systems shall be constructed so that any leaked refrigerant will not flow or stagnate so as to cause a fire or explosion hazard in areas within the equipment where components and apparatus which could be a source of ignition and which could function under normal conditions or in the event of a leak, are fitted.		N/A
	Refrigerating systems in the scope of and complying with EN 60335 series are deemed to comply with this clause.		N/A
	NOTE 1 Sources of ignition include hot surfaces that exceed specified temperature limits, flames and hot gases that are not suitably enclosed and electrical apparatus that could arc or spark. For other types of potential sources of ignition refer to EN 1127-1. Annex K gives guidance on the potential ignition sources.		N/A
	To determine whether a source of ignition is in a position where leaked refrigerant could flow or stagnate, EN 60079-10-1:2009 shall be used to estimate the size and extent of a potentially flammable zone.		N/A
	NOTE 2 EN 60079-10-1:2009, B.5.2 (estimation of hypothetical volume) or other forms of assessment may be used, e.g. computational modelling may be appropriate in some situations.		N/A
	Annex I provides a method of assessment that meets the requirements of EN 60079-10-1.		N/A
	Components and apparatus are not considered to be a source of ignition provided they comply with at least one of the following:		--
	<ul style="list-style-type: none"> <li>— -Positioned such that it is out of the potentially flammable zone where any leaked refrigerant could flow or stagnate, or</li> </ul>		N/A
	<ul style="list-style-type: none"> <li>— -Ventilated with a sufficiently high airflow that is either permanent or initiated prior to energizing the components and apparatus. Sufficiently high airflow is such that the concentration of refrigerant at the potential source of ignition does not exceed 50 % of the LFL, or</li> </ul>		N/A

Clause	Requirement + Test	result – Remark	Verdict
	<ul style="list-style-type: none"> <li>— -Requirements for protected equipment suitable for zone 2, zone 1 or zone 0 areas as defined in EN 60079-10-1, or</li> </ul>		N/A
	<ul style="list-style-type: none"> <li>— -For electrical equipment, the maximum possible energy of a spark or arc within its circuit will not ignite the most flammable concentration of the refrigerant used</li> </ul>		N/A
	NOTE3: EN 60079–11:2012, Clause 10 provides a test method.		N/A
	NOTE4: General requirements for types of protection are given in EN 60079–0. The types of protection within the EN 60079 series are based on specific gas groups, which may not represent class 2 and 2L refrigerants due to different flammability characteristics. The testing of the protection method may be carried out with the applicable refrigerant (EN 60079–0:2012, 4.4).		N/A
	EN 60079-15:2010, 19.3 and for limiting volume of sealed or encapsulated apparatus to 100 cm <sup>3</sup> does not apply.		N/A
	Where the components are protected from impact by an enclosure which complies with the impact test in EN 60079-0:2012, 26.4.2, the impact test on the components is not required.		N/A
	Consideration shall be given to the availability of the airflow for the duration of the equipment lifetime and appropriate controls put in place to prevent energizing the components or apparatus in the event that the airflow is diminished to a value that would result in a concentration exceeding the 50 % of the LFL		N/A
	The temperature of surfaces that may be exposed to leakage of A2, A2L, B2L, A3, B2, or B3 refrigerants shall not exceed the autoignition temperature of the refrigerant reduced by 100 K. Autoignition temperatures are given in EN 378-1:2016, Annex E.		N/A
	The disconnection and connection of electrical connectors on components is not considered to be normal operation. Where there is a plug and socket outlet they shall be considered part of the equipment. Disconnecting or connecting the plug from/to the socket outlet is considered to be part of normal operation unless the use of a special tool is required.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	For equipment having enclosures with doors and other movable panels, etc., the assessment shall also consider the extent of flammable zones when doors or panels are opened before or following a leak, if it is expected that they can be opened in normal operation. If the assessment demonstrates that a potentially flammable zone may extend beyond the boundary of the equipment, this information shall be provided in the documentation for the equipment		N/A
	NOTE 5 Systems may require conformity to the essential safety requirements of the Directive 94/9/EC March 1994 on the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosive atmospheres. Conformity to this standard does not demonstrate conformity to Directive 94/9/EC.		N/A
	NOTE 6 Separate components, such as thermostats, which are charged with less than 0,5 g of a flammable gas are not considered to cause a fire or explosion hazard in the event of leakage of the gas within the component itself.		N/A
<b>6.2.15</b>	<b>Requirements for ventilated enclosures</b>		--
	Where ventilated enclosures are applied for A2L, B2L, A2, B2, A3 and B3 refrigerants as defined in EN 378-1:2016, Annex C, following requirements apply.		N/A
	The enclosure shall provide airflow between the space and the interior of the enclosure. The manufacturer shall specify the ventilation duct by size and number of bends, in addition the maximum pressure drop in Pascal (Pa) may be given. The negative pressure measurement in the interior of the enclosure shall be 20 Pa or more and the flow rate to the exterior shall be at least $Q_{min}$ , with a minimum ventilation flow of 2 m <sup>3</sup> /h. The ventilation duct flow area shall not be restricted by any components. There shall be no ignition sources located in the duct.		N/A
	$Q_{min} = 15 \times s \times (mc/\rho) \geq 2 \text{ m}^3/\text{h}$		N/A
	where $Q_{min}$ is the volume flow of the ventilation (m <sup>3</sup> /h); 15 is the constant converting the 4 min leak rate to an heavy leak rate (1/h); s is 4 (safety factor); mc is refrigerant charge mass (kg); ρ is density of the refrigerant at atmospheric pressure at 25 °C (kg/m <sup>3</sup> ). Compliance is determined by test.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	<p>The ventilation system shall be operated as follows:</p> <ul style="list-style-type: none"> <li>— it shall run at all times, the airflow shall be monitored continuously and the refrigerating system is switched into a safe mode within 10 s in the event that the airflow is reduced below Q min. The safe mode shall be maintained until the airflow is restored, or</li> </ul>		N/A
	<ul style="list-style-type: none"> <li>— it shall be switched on by a refrigerant gas sensor before 25 % of the LFL is reached (see EN 378-1:2016, Annex E). The sensor shall be suitably located considering the density of the refrigerant. The sensor and ventilation function shall be checked at regular intervals according to the manufacturer's instructions. A failure shall be indicated and the system shall be switched in a safe mode with the fan switched on until the failure has been resolved.</li> </ul>		N/A
	A type test or individual test shall be performed to assess compliance with the requirements for the ventilation system.		N/A
<b>6.2.16</b>	<b>Electromagnetic compatibility and fields (EMC, EMF)</b>		--
	<p>Equipment has to be designed and constructed so that</p> <ul style="list-style-type: none"> <li>— emission of radiation is limited to the extent necessary for its operation and that the effects on exposed persons are not existing or reduced to non-dangerous proportions by complying with EN 61000-6-3 or EN 61000-6-4 as applicable and</li> </ul>		P
	<ul style="list-style-type: none"> <li>— external radiation does not interfere with its operation by complying with EN 61000-6-1 or EN 61000-6-2 as applicable</li> </ul>		P
	Where product standards are used for compliance in this particular field, then these are deemed adequate.		P
<b>6.2.17</b>	<b>Noise</b>		--
	Where refrigerating systems or heat pumps require operators, the location of the operator shall be indicated in the instruction manual according to 6.4.3.1.		P
	Where the noise emission at the location of the operator is considered a hazard e.g. where the emission sound pressure level exceeds 70 dB(A) the effect of the emissions shall be reduced to an acceptable level by means of acoustic insulation or isolation taking into account the technical measures to reduce noise at source given in EN ISO 11688-1.	The machine is for outdoor installation and not to be attended while operation, noise emission become a hazard to operator is not expected.	P



Clause	Requirement + Test	result – Remark	Verdict
	The A-weighted emission sound pressure level at the operator position shall be measured in accordance with EN ISO 11202. The operating conditions during the noise test shall be at full load.		P
	Where data on sound power levels are required the A-weighted sound power level shall be determined according to EN ISO 3744 (or EN ISO 3746); the operating conditions during the noise test shall be at full load.		N/A
	Refrigeration systems complying with EN 60335-2-40 are considered to comply with the requirements for noise in this clause.		P
<b>6.3</b>	<b>Testing</b>		--
<b>6.3.1</b>	<b>Tests</b>		--
	Before putting into service any refrigerating installation, all the components or the whole refrigerating system, shall undergo the following tests:		P
	a) strength pressure test according to 6.3.2;		P
	b) tightness test according to 6.3.3;		P
	c) functional test of safety switching devices for limiting the pressure;		P
	d) conformity test of the complete installation according to 6.3.4.		P
	Joints shall be accessible for inspection during testing for phase a and b above After strength pressure testing and tightness testing and before the system is started up for the first time, functional testing of all the electrical safety circuits shall be carried out.		P
	The results of these tests shall be recorded.		P
<b>6.3.2</b>	<b>Strength pressure test</b>		--
	Components shall be tested according to their product standard as indicated in Table 1. If the product standards in Table 1 are not followed, then, the strength pressure tests as indicated in 5.3.2.2 shall be performed on these components.		P
	If all components, piping and joints are tested or type approved beforehand according to Clause 5, then a tightness test on the complete assembly, as described in 6.3.3 is sufficient.	All components, piping and joints are tested according to clause 5.	P
	If components are not tested on beforehand as indicated above, then the assembly of these components has to be tested as specified in Clause 6 at the test pressure derived from the maximum allowable pressure (PS) of the system.		N/A
	For piping and piping joints not tested beforehand the following requirements apply:		--

Clause	Requirement + Test	result – Remark	Verdict
	a) For the remaining piping and piping joints of category II or higher (as defined in Annex B) one of the following tests shall be applied:	Conducted by PED (2014/68/EU) application. Not deal with this report.	N/A
	— perform the tests as described in EN 14276-2, or		N/A
	— individual proof test at minimum 1,43 x PS, or		N/A
	— remaining piping and piping joints have to be strength pressure tested at minimum 1,1 x PS. In addition, 10 % of the permanent joints of category II or higher have to be submitted to a nondestructive test in accordance with EN ISO 17638 or EN ISO 17640. For brazed joints, EN 12799 applies, for welds EN ISO 10675-1:2013 and EN ISO 10675-2:2013.		P
	NOTE 1 Strength pressure tests at 1,1 x PS are considered where strength pressure tests at 1,43 x PS may be harmful for the system. This procedure is only applied in case the other procedures are harmful for the system.		P
	b) If the category of the remaining piping and piping joints is less than or equal to category I (as defined in Annex B) then one of the following tests shall be applied:		P
	— carry out one of the tests required for piping and piping joints of category II or higher, or		N/A
	— test the remaining piping and piping joints at minimum 1,1 x PS, or		P
	— type approve the remaining piping and piping joints as described in 5.2.2.3 in combination with the tightness test as described in 6.3.3.		N/A
	c) If the category of the remaining piping and piping joints is less than or equal to category I (as defined in Annex B) and the unit fulfils the requirements of Annex C then a tightness test as described in 6.3.3 is sufficient.		P
	For the strength pressure test, the pressure relief devices and control devices may be removed if necessary.		P
	NOTE 2 For the connection of these parts, a tightness test is necessary if the parts are connected again to the equipment after the strength pressure test.		P
	The maximum allowable pressure can be separately specified for each part of the refrigerating system. In this case, the test pressure can be different for each part of the refrigerating system.		P

Clause	Requirement + Test	result – Remark	Verdict
	During this test, the low pressure side of the compressors complying with EN 60335-2-34 should not be subjected to test pressures in excess of PS on the low pressure side as defined by the manufacturer.		P
	The test on the assembly should be carried out by means of a non-hazardous gas. Oxygen should not be used. Oxygen free nitrogen is preferred for this test.		P
<b>6.3.3</b>	<b>Tightness test</b>		--
<b>6.3.3.1</b>	<b>General</b>		--
	The system shall be tested for tightness of the whole or in parts in accordance with this clause either before leaving the factory if it is factory assembled or on site if it is assembled or charged on site, if necessary in stages as the system is completed.		P
	Leak testing should be carried out prior to painting.		P
	Several techniques are used for testing for leaks depending on the production conditions, e. g. pressure with inert gas, radioactive gas traces. In order to avoid the emission of any hazardous substance, tightness testing may be done using inert gas such as nitrogen, helium or carbon dioxide. Oxygen acetylene or hydrocarbons shall not be used for reasons of safety. Air and gas mixtures shall be avoided as certain mixtures can be dangerous.		P
	NOTE A vacuum procedure can be used to get a rough indication of tightness.		N/A
	A test method shall be applied reaching equivalent results to the requirements of 6.3.3.2 or 6.3.3.3.		P
<b>6.3.3.2</b>	<b>For self-contained systems with refrigerant charge less than 5 kg which are tested with refrigerant in the system</b>		--
	No leaks shall be detected in following cases.		N/A
	a) For factory made joints:		N/A
	— Joints in sealed systems shall be tested under a pressure of at least $0,25 \times PS$ with detection equipment with a capability of 3 g/year of refrigerant or better;		N/A
	— Joints in other systems shall be tested under a pressure of at least $0,25 \times PS$ with detection equipment with a capability of 5 g/year of refrigerant or better.		N/A
	b) For joints made at the installation site:		N/A

Clause	Requirement + Test	result – Remark	Verdict
	— Joints shall be tested with detection equipment with a capability of 5 g/year of refrigerant or better, with the equipment in standstill and under operation or under a pressure of at least these standstill or operation conditions.		N/A
	The leak detection procedure shall take into account following: — the response time of the equipment; — the maximum distance between the leak and the leak testing equipment.		N/A
	The corresponding instructions have to be given by the manufacturer of the leak testing equipment. Where the system is not tested at the above required pressures or not tested with pure refrigerant, the constructor shall demonstrate the applied test method to be equivalent to the above requirements.		N/A
	The detection equipment shall be regularly calibrated according to the instructions of its manufacturer.		N/A
	Every detected leak shall be repaired and re-tested for tightness.		N/A
<b>6.3.3.3</b>	<b>For systems not covered by 6.3.3.2</b>		--
	Tests shall not be conducted using refrigerant as the test fluid.		P
	a) Factory test:		P
	All refrigerant-containing parts or unit systems shall be tested and proved tight by the manufacturer at not less than PS for which they are rated. Tests shall be performed with dry nitrogen or another non-flammable, non-reactive, dried gas. Oxygen, air, or mixtures containing them shall not be used. The means used to build up the test pressure shall have either a pressure limiting device or a pressure-reducing device and a gauge on the outlet side. The pressure limiting device shall be set above the test pressure but low enough to prevent permanent deformation of the system's components.		P
	There are two exceptions to test fluids mentioned in the above requirement:		--
	— Mixtures of dry nitrogen and inert gases in combination with flammable gas in concentrations not exceeding the lesser of a weight fraction (mass fraction) of 5 % or 25 % of the LFL are allowed for factory tests;		N/A
	— Compressed air without added refrigerant is allowed for factory tests provided the system is subsequently evacuated to less than 132 Pa absolute pressure before charging with refrigerant.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	b) Acceptance criteria:		--
	For refrigerants with GWP $\geq 150$ , the acceptance criterion for this test is that no leaks shall be detected when using detection equipment with a capability of $10^{-6}$ Pa m <sup>3</sup> /s or better, for example a helium sniffer.		P
	For refrigerants with GWP < 150, the acceptance criterion for this test is that no leaks shall be detected when using detection equipment with a capability of $10 \pm 3$ Pa m <sup>3</sup> /s or better, for example application of water with a foaming agent to the outer surface or a leak test spray.		N/A
	NOTE 1 For refrigerants with GWP < 150 alternative test methods can be found in EN 1779.		N/A
	NOTE 2 Lower test pressures can be applied provided that equal sensitivity can be shown.		N/A
	Any leak detected at this level of sensitivity shall be repaired and retested.		N/A
	c) Site tests		P
	All sections of the refrigerating system constructed on site shall be tightness tested before the plant is charged with refrigerant. The site test procedure and acceptance criteria shall conform to the requirements of 6.3.3.3 a) and 6.3.3.3 b). Elements that have already been tightness tested and that can be safely isolated from the site test need not be retested.		P
<b>6.3.4</b>	<b>Test of the complete installation before putting it into operation</b>		--
<b>6.3.4.1</b>	<b>General</b>		--
	Before the refrigerating system is put into operation, the assembly of the components comprising the refrigerating system shall be checked against appropriate installation according to drawings, flow-, pipe-, instrumentation- and electrical diagram of the system.		P
	For assemblies having the appropriate declaration of conformity, this requirement is considered to be fulfilled.		P
	Guidelines regarding the procedure for commissioning are listed in Annex J.		P
<b>6.3.4.2</b>	<b>Inspection of refrigerating system</b>		--
	The inspection of a refrigerating system shall be performed by a competent person (according to EN 13313) and shall include the following items:		P
	a) checking of documentation relating to pressure equipment;		P
	b) checking of safety devices and equipment according to 6.3.4.3;		P

Clause	Requirement + Test	result – Remark	Verdict
	c) checking that selected welds on piping are in accordance with EN 14276-2:		P
	NOTE This may include examination with ultrasonics or X-ray.		N/A
	d) checking that selected brazed joints on piping are in accordance with EN 14276-2;		P
	e) checking of refrigerant piping according to 6.3.4.4;		P
	f) checking and documentation of the alignment of open compressors, pumps, fans etc.;		P
	g) checking the record of the tightness test of the refrigerating system;		P
	h) visual inspection of the refrigerating system according to 6.3.4.5;		P
	i) checking the marking according to 6.4.2;		P
	This inspection shall be documented, see 6.4.3. No refrigerating system shall be put into operation, unless it is documented.		P
<b>6.3.4.3</b>	<b>Checking of safety devices</b>		--
<b>6.3.4.3.1</b>	<b>Fitting</b>		--
	A check shall be made to ensure that the required safety equipment for the refrigerating system is fitted and in working order and that the pressure at which those devices operate has been chosen so that the safety of the system is ensured.		P
<b>6.3.4.3.2</b>	<b>Compliance with appropriate standards</b>		--
	A check shall be made that safety devices comply with appropriate standards.		P
<b>6.3.4.3.3</b>	<b>Safety switching devices for limiting the pressure</b>		--
	A check shall be made, where appropriate, that the safety switching devices for limiting the pressure function and are fitted correctly.		P
<b>6.3.4.3.4</b>	<b>Externally mounted pressure relief valves</b>		--
	External pressure relief valves shall be checked to ensure that the correct set pressure is as stamped on the valve or is specified on a data plate.		N/A
<b>6.3.4.3.5</b>	<b>Bursting discs</b>		--
	The marking of the correct nominal bursting pressure of bursting discs (excluding internal discs) shall be checked.		N/A
<b>6.3.4.4</b>	<b>Checking of refrigerant piping</b>		--
	A check shall be made, where appropriate, that the refrigerating system piping has been installed in accordance with the drawings, specifications and appropriate standards.		P
<b>6.3.4.5</b>	<b>Visual inspection of the complete installation</b>		--

Clause	Requirement + Test	result – Remark	Verdict
	Visual inspection of the complete installation shall be carried out.		P
	NOTE Informative Annex G proposes a list with specific check items.		P
<b>6.4</b>	<b>Marking and documentation</b>		--
<b>6.4.1</b>	<b>General</b>		--
	Equipment shall comply with the requirements for marking in 6.4.2 and documentation 6.4.3.		P
	Equipment which is under the scope of and complies with EN 60335-2-24 or EN 60335-2-40 is considered to comply with the requirements for marking in 6.4.2 and documentation in 6.4.3.	Comply with EN 60335-2-40	P
<b>6.4.2</b>	<b>Marking</b>		--
<b>6.4.2.1</b>	<b>General</b>		--
	Every refrigerating system and its main components shall be identifiable by marking. This marking shall always be visible.		P
	Shut-off devices and main control devices shall be clearly labeled, if it is not obvious what they control.		P
	Service access points to refrigerating systems with A2L, A2, A3, B2L, B2 and B3 refrigerants shall be marked with the flame symbol according to EN ISO 7010-W021. For refrigerating systems in machinery rooms or open air, the warning notice in EN 378-3:2016,10.2 is deemed sufficient.		N/A
<b>6.4.2.2</b>	Refrigerating systems		--
	A clearly readable identification plate shall be located near or on the refrigerating system.		P
	The identification plate shall contain at least the following data: a) name and address of manufacturer and where applicable the name and address of the authorized representative;		P
	b) model, serial number or reference number;		P
	c) year in which the manufacturing process is completed;		P
	NOTE 1 The year of manufacture may also be part of the serial number, and all information may be part of the identification plate of the equipment and may be coded.		N/A
	d) number designation of the refrigerant in accordance with ISO 817 (also see EN 378-1:2016, informative Annex F);		P
	e) refrigerant charge;		P
	f) maximum allowable pressure(s) (PS)		P

Clause	Requirement + Test	result – Remark	Verdict
	g) mandatory marking. When A2L, A2, A3, B2L, B2 and B3 refrigerants are used, the flame symbol according to EN ISO 7010-W021 shall be displayed with a minimum height of 30 mm, and the symbol need not be in colour.		N/A
	The identification plate shall also contain details of electrical data as required by EN 60204-1, EN 60335-2-40, EN 60335-2-24 or EN 60335-2-89.		P
	NOTE 2 For machines and their related products intended to be put on the market in the EEA, CE marking is defined in the applicable European Directive(s), e.g. 2006/42/EC (Machinery, MD), 2014/35/EU (Low Voltage, LVD), 2014/30/EU (Electromagnetic compatibility, EMC), 014/34/EU (Explosive Atmospheres, ATEX) or 2014/68/EU (Pressure Equipment, PED).		P
	NOTE 3 For refrigerating systems using fluorinated greenhouse gases, regulation (EU) No 517/2014 sets labelling requirements which are different from the requirements given in this standard and additional marking is required e.g. GWP, tonne(s) of CO <sub>2</sub> equivalent.		P
<b>6.4.2.3</b>	<b>Piping and valves</b>		--
	Piping assembled and installed on site shall be marked by colour coding. This is not required if the piping flow is obvious by appearance.		P
	As a European Standard is not available, colour coding should be according to national codes.		P
	When the safety of persons or property can be affected by the release of the piping contents, labels identifying the contents shall be attached to the pipe near valves and where walls are penetrated.	Installation is required to be conducted by manufacturer or authorized person according to installation guide.	P
	The discharge piping from pressure relief valves shall be marked. Collecting lines for overflow valves shall be marked if the piping flow is not obvious from appearance.		P
	Valves which permit parts of the refrigerating system to be isolated shall be marked.	Marked.	P
	Shut-off devices and main control devices shall be clearly labelled, if it is not obvious what they control.		P
	The function of main shut-off devices, and controls for refrigerant and services (gas, air, water and electricity) shall be clearly marked.		P
	NOTE Codes can be used to identify the devices provided a key to the codes is located near the devices.		P
	Devices to be operated by authorized persons only should be marked.		P
<b>6.4.3</b>	<b>Documentation</b>		--



Clause	Requirement + Test	result – Remark	Verdict
<b>6.4.3.1</b>	<b>Installation documentation</b>		--
	Any documentation required by 6.3.4.2 shall be prepared on behalf of and signed by the competent person responsible for carrying out the inspection, test or checking.		P
	The installer shall document that the system has been installed in accordance with the design requirements and shall state the setting of safety and control devices, if adjustable, as left after commissioning.	The relevant record and format is provided in the manual.	P
<b>6.4.3.2</b>	Instruction manual		P
	The manufacturer and/or installer shall supply an adequate number of instruction manuals according EN ISO 12100 or leaflets and shall also provide safety instructions.		P
	Instruction manuals for the equipment shall be provided in following languages:		P
	— one of the official community languages, as drawn up by the manufacturer;	Chinese	P
	— -translation of the manual in the language or languages of the country where the equipment is to be used.	English	P
	The instruction manual shall at least contain the following information, if relevant:		--
	a) purpose of the system;	Described in the manual.	P
	b) description of the machinery and equipment;	Described in the manual.	P
	c) refrigerating system schematic diagram and electrical circuit diagram;	Described in the manual.	P
	d) instructions concerning starting, stopping and standstill of the system and parts thereof;	Described in the manual.	P
	e) instructions concerning the disposal of operating fluid and equipment;	Described in the manual.	P
	f) causes of the most common defects and measures to be taken, e.g. instructions concerning leakage detecting by authorized personnel and the need to contact competent maintenance technicians in the event of leakage or breakdown;	Described in the manual.	P
	g) precautions to be taken to prevent the freezing of water in condensers, coolers etc. at low ambient temperatures or by normal reduction in the system pressure/temperature;	Described in the manual.	P
	h) precautions to be taken when lifting or transporting systems or parts of systems;	Described in the manual.	P
	i) information displayed on the machine card according to 6.4.3.3, if necessary, in its entirety;	Described in the manual.	P
	j) reference to protective measures, first aid provisions and procedures to be followed in the event of emergencies, e.g. leakage, fire, explosion; refer to EN 378-3;	Described in the manual.	P

Clause	Requirement + Test	result – Remark	Verdict
	k) maintenance instructions for the entire system with a time schedule for preventive maintenance with respect to leakage, refer to EN 378-4;	Described in the manual.	P
	l) instructions concerning charging and discharging of refrigerant;	Described in the manual.	P
	m) instructions concerning the handling of refrigerant and the hazards associated with it;	Described in the manual.	P
	n) instructions concerning function and maintenance of safety and alarm devices and pilot lamps;	Described in the manual.	P
	o) guidance for the drafting of the logbook according to 6.4.3.5;	Described in the manual.	P
	p) instructions to avoid overpressure during use, maintenance and servicing;	Described in the manual.	P
	q) information concerning noise emission: Specify the location of operators if required (see 6.2.16) and indicate for these locations the A-weighted emission sound pressure levels. Additionally information concerning the sound power level shall be given if the equivalent A-weighted sound pressure level exceeds 80 dB(A).	Refer to clause 6.2.16.	P
	r) The noise data shall be accompanied by a statement of the measuring method used and the value of the associated uncertainty, <i>K</i> , using the dual-number form of declaration in accordance with EN ISO 4871;	Described in the manual.	P
	s) whether personal protection equipment (PPE) is required according to EN 378-3;	No PPE required.	N/A
	t) where regular draining of oil is required, instructions for draining oil to minimize the risk for emission of refrigerant to the atmosphere;		N/A
	u) where applicable data according to EN 378-3:2016, 6.4.1.		N/A
	The installer shall outline the emergency procedures, relevant to the refrigerating system, to be taken in the event of disturbances and accidents of other kinds.		P
	NOTE Information concerning hand-arm and whole body vibration are not relevant.		P
<b>6.4.3.3</b>	<b>On site information</b>		P
	The installer shall also provide adequately protected documentation that shall be situated near the operating site of the refrigerating system and be clearly readable.		P
	NOTE In the case of split or multi-split systems, the operating site may be considered as the outdoor unit.		P
	This on site information shall at least contain the following information:		P

Clause	Requirement + Test	result – Remark	Verdict
	a) name, address and telephone number of the installer, his service department, the service department of the party concerned or at any rate of the person responsible for the refrigerating system and the addresses and telephone numbers of fire department, police, hospitals and burn centers;	To be provided by contracted maintenance company in EU, the information of this clause will be documented in training content to installer, service person and operator.	P
	b) nature of the refrigerant by indicating its chemical formula and its number designation (see EN 378-1:2016, Annex E);		P
	c) instructions for shutting down the refrigerating system in case of emergency;		P
	d) maximum allowable pressures;		P
	e) details of the flammability if a flammable refrigerant is used (group A2L, A2, A3, B2L, B2, B3 refrigerant);	A1 refrigerant used in this system.	N/A
	f) details of the toxicity if a toxic refrigerant is used (group B1, B2L, B2, B3 refrigerant).		N/A
<b>6.4.3.4</b>	<b>Drawings</b>		--
	For complex systems for which it is difficult to see the function of each component a piping and instrument diagram of the refrigerating system shall be displayed on or near the machine card identifying the shut-off and control devices. This diagram shall be made according to EN 1861.		N/A
<b>6.4.3.5</b>	<b>Logbook</b>		--
	When the refrigerant charge exceeds 3 kg, a logbook shall be prepared upon installation of the system by the installer.	Documented in the manual.	P
	This logbook is to be regularly updated as specified in EN 378-4.	Documented in the manual.	P
	In the logbook, the following information shall be recorded:	Documented in the manual.	P
	a) details of the maintenance and repair works;	Documented in the manual.	P
	b) quantities, kind of (new, reused, recycled) refrigerant which have been charged on each occasion, the quantities of refrigerant which have been transferred from the system on each occasion (see also EN 378-4);	Documented in the manual.	P
	c) the results of any analysis of a reused refrigerant;	Documented in the manual.	P
	d) source of the reused refrigerant;	Documented in the manual.	P
	e) changes and replacements of components of the system;	Documented in the manual.	P
	f) the result of all periodic routine tests;	Documented in the manual.	P
	g) significant periods of non-use.	Documented in the manual.	P
	NOTE For refrigerating systems using fluorinated greenhouse gases, requirements for log book are specified in regulation (EU) No 517/2014.		P

Clause	Requirement + Test	result – Remark	Verdict
<b>Annex A</b> (normative)	<b>Additional requirements for refrigerating systems and heat pumps with R-717</b>	-	--
<b>A.1</b>	<b>Systems with a refrigerant charge above 50 kg</b>		N/A
	Refrigerating systems with a refrigerant charge above 50 kg shall have shut-off facilities in order to isolate components of the system like receivers, accumulators and flooded type heat exchangers.		N/A
	NOTE For an installation where earthquakes are anticipated, a seismoscope that triggers the emergency stop system may be required. This system resets manually.		N/A
	When pressure relief valves which blow off into the atmosphere are used as protection devices against excessive pressure, two pressure relief valves each of them having the total required relief capacity and connected by a changeover valve shall be used.		N/A
<b>A.2</b>	<b>Systems with a refrigerant charge above 3 000 kg</b>		N/A
	Groups of components with a maximum possible total refrigerant charge above 3 000 kg of R-717 shall be equipped with a functionally remote-controlled shut-off device in the liquid line. This device shall close in the case of control power failure, detection of a leak or emergency stop (e.g. according to EN ISO 13850). It shall be integrated into the emergency system with the means to re-open the device manually. If the shut-off device only operates in one direction (e.g. solenoid valve), back-flow shall be prevented, e.g. by means of a pump down circuit.		N/A
	Pumps shall be mounted directly between valves of which one shall be a remote controlled valve. To be able to carry out repairs on remote-controlled valves, it is recommended that a shut-off valve, which cannot be actuated during operation, be installed upstream.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	Consideration shall be given to hydrostatic expansion due to temperature rise of liquid refrigerant trapped in or between closed valves when the emergency stop system is activated. A hydrostatic relief device or other means shall be provided to prevent over-pressurization; this relief shall be into a lower pressure portion of the system. When the emergency stop system is triggered, it shall be possible to shut off the pipes between components such that no additional risks, such as the inclusion of liquid, can occur due to the emergency stop system.		N/A
	NOTE An emergency stop system consists of operations that are triggered manually or by means of leak detection devices and puts the refrigerating system in a safe operating mode.		N/A
<b>A.3</b>	<b>Pumps</b>	-	N/A
	Pumps for R-717 shall either be a centrifugal pump with hermetic motor, or be equipped with a double seal system. In addition, a dry run protection device for the pumps shall be installed in accordance with the manufacturer's operating instructions (e.g. differential pressure monitoring, minimum level safety switch). If a remote-controlled shut-off valve is installed upstream of the pumps (potential danger of cavitation is increased) it shall be fitted with a limit switch to indicate that the valve is closed and the pump shall be interlocked with the limit switch (closed circuit principle).		N/A
<b>Annex B</b> (normative )	<b>Determination of category for components and refrigerating system assemblies</b>		--
<b>B.1</b>	<b>General</b>		--
	For determination of category for components and refrigerating system assemblies, as required in Clauses 5 and 6 of this standard, the necessary steps shall be taken as indicated hereafter.	Done by PED (2014/68/EU) application.	P
<b>B.2</b>	<b>Classification of the refrigerant</b>		--
	For classification of the refrigerant, refer to EN 378-1:2016, Annex E.		P
<b>B.3</b>	<b>Determine the maximum allowable pressure of the assembly</b>		--
	Shall be according to 6.2.2.1.		P
<b>B.4</b>	<b>Determine the state (liquid or gas) of the refrigerant</b>		--

Clause	Requirement + Test	result – Remark	Verdict																																																																																																																																																																	
	If the vapour pressure at the maximum allowable temperature (at bubble point) is greater than 0,5 bar (0,05 MPa) above normal atmospheric pressure, then this fluid is considered to be a gas, otherwise the fluid is to be considered a liquid.		P																																																																																																																																																																	
<b>B.5</b>	<b>Determination of category of components</b>		--																																																																																																																																																																	
<b>B.5.1</b>	<b>General</b>		--																																																																																																																																																																	
	Before determination of the category of the assembly, the categories of the different components within the refrigerating systems shall be determined.		P																																																																																																																																																																	
	It is possible that the PS of the component is larger than the PS of the assembly that it has to fit into. Normally, for determination of category, the PS value of the assembly shall be used. In this case, the PS of the safety accessory to be used for the protection of this component shall be determined by the PS value of the assembly. In case protection for the component is provided at the PS of this component, then the PS value of the component shall be used for determination of the category of this component.		P																																																																																																																																																																	
<b>B.5.2</b>	<b>Pressure vessels and piping</b>		--																																																																																																																																																																	
	- Category determination for pressure vessels is given in Table B.1. <b>Table B.1 — Category determination for pressure vessels</b>	Liquid collector Category II	P																																																																																																																																																																	
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<b>B.5.3</b>	<b>Safety accessories</b>		--																																																																																																																							
	The category determination of safety accessories shall be based upon the category of the components they have to protect. The category of safety accessories, which are used for the protection of pressure equipment of category I or higher, shall be generally determined to category IV. By way of exception, safety accessories manufactured for specific pressure equipment / specific other components may be classified in the same category as the pressure equipment / other components they protect.		N/A																																																																																																																							
<b>B.5.4</b>	<b>Joining of pressure equipment</b>		--																																																																																																																							
	For practical determination of category, some examples are given here below: a) permanent connections between two parts shall comply with the highest category of the two parts;		P																																																																																																																							
	b) assemblies may be considered as an assembly of subassemblies in a sequence so that the permanent joint falls in the lowest possible category.		P																																																																																																																							
	For parts equipped with extension pipes, the category of the extension pipe shall determine the category of the connection. The connections to an extension pipe should not have any influence on the strength of a higher category vessel.		P																																																																																																																							
<b>B.6</b>	<b>Determination of category of the assembly</b>		--																																																																																																																							

Clause	Requirement + Test	result – Remark	Verdict
	The category of the assembly shall be determined based on the highest category of the components it consists of (as determined in previous point) without taking into account the category of the safety accessories.	Category II	P
<b>Annex C</b> (normative )	<b>Requirements for intrinsic safety test</b>		--
<b>C.1</b>	<b>General</b>		--
	Requirements for intrinsic safety test are only applicable for equipment which, according to the flow chart in 6.2.6.2, results in the option which requires the intrinsic safety test to be performed.		P
<b>C.2</b>	<b>Determination of the maximum pressure during abnormal operation</b>		--
<b>C.2.1</b>	<b>Determination of the pressure at the high pressure side (PHIS)</b>		--
	The heat exchanger at the high pressure side of the refrigeration system shall be subjected to following test in order to determine PHIS:		P
	The refrigeration system shall be installed taking into account the clearances to adjacent surfaces as specified by the manufacturer.		P
	The refrigeration system is operated at rated voltage or at the upper limit of the rated voltage range, at an ambient temperature of $23\text{ °C} \pm 5\text{ °C}$ .	415V, 3N-, At 25°C	P
	When steady-state conditions are attained, the heat-transfer fluid flow of the heat exchanger at the high pressure side shall be restricted or shut off, whichever is the most unfavourable with the refrigerating system operating.		P
	Where the refrigeration system is equipped with external heaters, they shall be operated. The highest pressure that occurred during this test is considered to be PHIS.	No heater used	N/A
<b>C.2.2</b>	<b>Determination of the pressure at the low pressure side (PLIS)</b>		P
	The heat exchanger at the low pressure side of the refrigeration system shall be subjected to following test in order to determine PLIS:		P
	The refrigeration system shall be installed taking into account the clearances to adjacent surfaces as specified by the manufacturer.		P
	The refrigeration system is not operated in order to simulate standstill conditions.		P
	The temperature of the heat transfer medium at the low pressure side heat exchanger shall be maintained at the maximum temperature specified by the manufacturer.		P



Clause	Requirement + Test	result – Remark	Verdict
	If the heat-transfer fluid is water, then this condition shall be maintained during 30 min. If the heat-transfer fluid is air, this condition shall be maintained for 1 h.		N/A
	For refrigeration systems or parts carrying liquid refrigerant during transport under tropical climate, the refrigeration system or the charged part of it shall be maintained at a temperature of 70 °C for 1 h.		N/A
	The highest pressure that occurred at the low pressure side is considered to be PLIS.		N/A
	NOTE The temperature of 70 °C is the maximum temperature expected during transport in a container under tropical climate conditions.		N/A
<b>C.2.3</b>	<b>Determination of PHIS and PLIS for reversible heat pumps</b>		P
	For reversible heat pumps the test is executed in both cooling and heating mode as described in C.2.1 and C.2.2. The highest values obtained in each section shall be taken into account to decide PHIs and PLIS for that section.		P
<b>C.3</b>	<b>Strength pressure test</b>		
	A pressure test shall be carried out on 3 samples of each component and joints, or on the assembly as a total.		P
	One of the following test methods shall be applied: <ul style="list-style-type: none"> <li>— Method 1 The test shall be conducted at 3 times PHIS on the high pressure side and at 3 times PLIS on the low pressure side.</li> </ul>		P
	<ul style="list-style-type: none"> <li>— Method 2 Test according to 5.3.2.2 where for the burst test and the first cycle PS is considered to be PHIS when the test is performed on the high pressure side and PLIS when the test is performed on the low pressure side.</li> </ul>		N/A
	For both methods the strength pressure test shall be carried out as a hydrostatic pressure test by means of water or some other liquid. Adequate precautions shall be taken to prevent danger to people and to minimize risk to property.		N/A
	Acceptance criteria: the part under test shall not rupture.		P
<b>C.4</b>	<b>Test results</b>		P
	The test report shall indicate: <ul style="list-style-type: none"> <li>— accepted ambient temperature see 6.2.2.1 and C.2.2;</li> </ul>		P
	<ul style="list-style-type: none"> <li>— method of strength pressure test.</li> </ul>		P

Clause	Requirement + Test	result – Remark	Verdict																																																															
<b>Annex D</b> (normative)	<b>List of significant hazards</b>		--																																																															
	This annex contains all significant hazards, hazardous situations and events, as for as they are dealt with in this standard, identified by risk assessment as significant for type of machinery and which requires action to eliminate or reduce the risk. The risk assessment shall be made according to EN ISO 12100:2010. The refrigerating systems and their equipment shall be manufactured in accordance with the principle listed in EN ISO 12100:2010 to eliminate or reduce the foreseeable risk.	Considered and applied.	P																																																															
	<p><b>Table D.1 — List of significant hazards</b></p> <table border="1"> <thead> <tr> <th>No. according to EN 1050</th> <th>Hazards, hazardous situations and hazardous events</th> <th>Relevant clause of EN 378-2:2008</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Mechanical hazards due to:</td> <td></td> </tr> <tr> <td>1.3</td> <td>Cutting or severing hazard</td> <td>6.2.11</td> </tr> <tr> <td>1.9</td> <td>High pressure fluid injection or ejection hazard</td> <td>5.2.1, 5.2.2, 5.3.2, 6.2.3</td> </tr> <tr> <td>2</td> <td>Electrical hazards due to:</td> <td></td> </tr> <tr> <td>2.1</td> <td>Contact of persons with live parts (direct contact)</td> <td>6.2.9</td> </tr> <tr> <td>2.2</td> <td>Contact of persons with parts which have become live under faulty conditions (indirect contact)</td> <td>6.2.9</td> </tr> <tr> <td>2.4</td> <td>Electrostatic phenomena</td> <td>6.2.9</td> </tr> <tr> <td>2.6</td> <td>Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short circuits, overloads etc.</td> <td>6.2.9, 6.2.10</td> </tr> <tr> <td>3</td> <td>Thermal hazards, resulting in:</td> <td></td> </tr> <tr> <td>3.1</td> <td>Burns, scalds and other injuries by a possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources</td> <td>6.2.6, 6.2.10, 6.2.13</td> </tr> <tr> <td>7.1</td> <td>Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts</td> <td>5.1.2, 5.3.1.4, 6.2.3.4.2.2</td> </tr> <tr> <td>7.2</td> <td>Fire or explosion hazard</td> <td>6.2.5.1, 6.2.6, 6.2.13</td> </tr> <tr> <td>10.1</td> <td>Failure/disorder of the control system</td> <td>6.2.9</td> </tr> <tr> <td>10.2</td> <td>Restoration of energy supply after an interruption</td> <td>6.2.6, 7.0)</td> </tr> <tr> <td>10.3</td> <td>External influences on electrical equipment</td> <td>6.2.9</td> </tr> <tr> <td>10.5</td> <td>Errors in the software</td> <td>6.2.5.2.2, 6.2.9</td> </tr> <tr> <td>13</td> <td>Failure of the power supply</td> <td>6.2.6.7</td> </tr> <tr> <td>14</td> <td>Failure of the control circuit</td> <td>6.2.5.2.2, 6.2.9</td> </tr> <tr> <td>15</td> <td>Errors of fitting</td> <td>6.2.3, 6.4.2.3, 6.4.3.2</td> </tr> <tr> <td>26</td> <td>Insufficient instruction</td> <td>5.3.4, 6.4</td> </tr> </tbody> </table>	No. according to EN 1050	Hazards, hazardous situations and hazardous events	Relevant clause of EN 378-2:2008	1	Mechanical hazards due to:		1.3	Cutting or severing hazard	6.2.11	1.9	High pressure fluid injection or ejection hazard	5.2.1, 5.2.2, 5.3.2, 6.2.3	2	Electrical hazards due to:		2.1	Contact of persons with live parts (direct contact)	6.2.9	2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	6.2.9	2.4	Electrostatic phenomena	6.2.9	2.6	Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short circuits, overloads etc.	6.2.9, 6.2.10	3	Thermal hazards, resulting in:		3.1	Burns, scalds and other injuries by a possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	6.2.6, 6.2.10, 6.2.13	7.1	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	5.1.2, 5.3.1.4, 6.2.3.4.2.2	7.2	Fire or explosion hazard	6.2.5.1, 6.2.6, 6.2.13	10.1	Failure/disorder of the control system	6.2.9	10.2	Restoration of energy supply after an interruption	6.2.6, 7.0)	10.3	External influences on electrical equipment	6.2.9	10.5	Errors in the software	6.2.5.2.2, 6.2.9	13	Failure of the power supply	6.2.6.7	14	Failure of the control circuit	6.2.5.2.2, 6.2.9	15	Errors of fitting	6.2.3, 6.4.2.3, 6.4.3.2	26	Insufficient instruction	5.3.4, 6.4		P
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	The category of the assembly should be determined as indicated in Annex B.		P																																																															
	NOTE This annex only explains the assessment requirements of the Pressure Equipment Directive, not the requirement for CE-marking in a total.		P																																																															

Clause	Requirement + Test	result – Remark	Verdict												
	Depending on the category of the assembly it is required to assess the assembly together with a notified body and to add a declaration of conformity as such as indicated in Table E.1.		P												
	<p style="text-align: center;"><b>Table E.1 — Assessment of the assembly for PED</b></p> <table border="1"> <thead> <tr> <th>category</th> <th>Declaration of conformity is required?</th> <th>Notified body?</th> </tr> </thead> <tbody> <tr> <td>&lt; I</td> <td>No</td> <td>No</td> </tr> <tr> <td>≥ II</td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td>= I</td> <td>Yes</td> <td>No</td> </tr> </tbody> </table>	category	Declaration of conformity is required?	Notified body?	< I	No	No	≥ II	Yes	Yes	= I	Yes	No		--
category	Declaration of conformity is required?	Notified body?													
< I	No	No													
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	Components should be assessed according to the component category if there is no CE-mark.		P												
	For components already CE-marked, documents according to Table E.2 should be provided.		P												
	<p style="text-align: center;"><b>Table E.2 — Assessment of components</b></p> <table border="1"> <thead> <tr> <th>category</th> <th>Required declaration of conformity</th> </tr> </thead> <tbody> <tr> <td>&lt; I</td> <td>—</td> </tr> <tr> <td>I</td> <td>PED and/or other directives</td> </tr> <tr> <td>≥ II</td> <td>PED</td> </tr> </tbody> </table> <p>NOTE As a pressure vessel of category I used in refrigerating systems is always submitted to LVD<sup>a</sup> and/or MD<sup>b</sup>, the exclusion of art 1.2 (f) of the PED applies. As such, conformity with PED is only to be assessed for category II, III and IV.</p> <p><sup>a</sup> LVD: DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits</p> <p><sup>b</sup> MD: Directive 2006/42/EC of the European parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EU (recast)*</p>	category	Required declaration of conformity	< I	—	I	PED and/or other directives	≥ II	PED		--				
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<b>Annex G (informative)</b>	<b>Checklist for external visual inspection of the installation</b>		--												
	For external visual inspection of the refrigerating system, the checklist covers the following items:		P												
	a) check for transit or storage damage to the equipment;		P												
	b) check that all components are as specified;		P												
	c) check that all safety devices, documents and equipment required by this European Standard are present;		P												
	d) check that all devices and arrangements for safety and environmental protection are present and in compliance with this European Standard;		P												
	e) check that pressure vessel documents, certificates, identification plates, instruction manual and documentation required in this European Standard are present;		P												
	f) check that volume of receivers is sufficient;		P												
	g) check instructions and directions to prevent deliberate discharge of refrigerants to the environment;		P												
	h) check that, where piping is accessible to the general public, the surface temperatures shall not endanger this general public;		P												

Clause	Requirement + Test	result – Remark	Verdict
	i) compare the complete installation with the refrigerating and electrical system drawings; check whether electrical supply is adequate for the power to be drawn;		P
	j) check documentation relating to pressure vessels if vessels are changed, modified or used for another refrigerant;		P
	k) check vibrations and movements caused by temperature and pressure under operation conditions;		P
	l) check installation of fittings and valves;		P
	m) check supports and fixing (materials, routing, connection);		P
	n) check quality of welding and other joints;		P
	o) check protection against mechanical damage;		P
	p) check protection against heat;		P
	q) check protection of moving parts;		P
	r) check accessibility for maintenance or repair and for inspection of piping;		P
	s) check valve arrangement;		P
	t) check quality of thermal insulation and vapour barriers;		P
	u) check fouling of heat exchange surfaces.		P
<b>Annex H (informative)</b>	<b>Stress corrosion cracking</b>		--
<b>Annex I (informative)</b>	<b>Leak simulation test for A2L, A2, A3, B2L, B2, B3 refrigerants</b>		--
	A leak simulation test according to 6.2.14 should comply with following method.		N/A
	A leak simulation test is carried out by introducing a release of refrigerant from a suitable container at a position on the refrigeration system.		N/A
	Refrigerant is released at the critical failure point. A critical failure point is any refrigerant containing part (pipework or component) that will result in the highest concentration of refrigerant at the potential source of ignition.		N/A
	A suitable container is separate from the refrigeration system and may be a refrigerant cylinder, hose and suitable release point.		N/A
	The equipment/system shall be arranged as intended for its installation and according to the installation manual. Where there are various possibilities for the installation, the arrangement that gives the most unfavourable result shall be used.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	For joints and components within the scope of EN 16084 the mass flow shall not be less than 1g/s $\pm$ 5%. For all other cases the mass flow rates shall not be less than 3g/s $\pm$ 5%.		N/A
	The refrigerant shall be released in vapour phase.		N/A
	The refrigerant is released in the direction that results in the highest concentration at the source of ignition being tested.		N/A
	The refrigerant shall be released at a pressure of at least 0,25 x PS of the applicable part of the system and not less than 2 bar.		N/A
	The total mass of the released refrigerant shall not be less than the charge of the refrigeration system or until the concentrations have not increased or changed by more than $\pm$ 10 % of the mean value within three minutes.		N/A
	NOTE Identify possible channels, ducts and cable sheathing that the refrigerant could possible pass through, e.g. leaks from within pipe insulation where the refrigerant may travel to other locations from where the leak originally occurs.		N/A
	During the test the system is switched off or operated under normal operation at rated voltage, whichever gives the most unfavourable result unless ventilation is activated prior to energizing any loads, in which case the test shall be conducted with the appliance operating.		N/A
	During a test where the appliance is operating, the refrigerant release is started at the same time as the appliance is switched on.		N/A
	If a part of the system has a minimum room size associated with it according to Part 1, the test is carried out in a room of that size within $\pm$ 20 %. The test is conducted in a room that has a residual airspeed of not more than 0,1m/s.		N/A
	The gas concentration is measured at intervals of no more than 5 s.		N/A
	The measured concentration of refrigerant gas surrounding the component shall not exceed 50% of the refrigerant LFL for the duration of the test.		N/A
	The test is performed twice and is repeated a third time if one of the tests gives more than 40% of the LFL.		N/A
	The instrument used for monitoring the refrigerant gas concentration shall have a fast response to the gas concentration, typically 2 s to 3 s and shall be located so as to not unduly influence the results of the test.		N/A
	The duration of test shall be at least two times the duration of the leak for the refrigerant charge to be released or until the concentrations have not increased or changed by more than $\pm$ 10% of the mean value within three minutes.		N/A

Clause	Requirement + Test	result – Remark	Verdict																																																												
<b>Annex J (informative)</b>	<b>Commissioning procedure</b>		--																																																												
<b>Annex K (informative)</b>	<b>Information on effective ignition sources</b>		--																																																												
	Types of ignition sources are described in EN 1127, and when evaluating whether ignition sources exist all relevant types should be evaluated. Table K.1 indicates which types of ignition sources are usually relevant to evaluate for refrigeration systems.		N/A																																																												
	Special aspects of the specific system being evaluated may lead to more ignition types being relevant.		N/A																																																												
	For example if a refrigeration system cools an infrared laser, then the possible ignition by “Electromagnetic waves from $3 \times 10^{11}$ Hz to $3 \times 10^{15}$ Hz” should be evaluated.		N/A																																																												
	<p style="text-align: center;"><b>Table K.1 — Relevance of ignition sources from EN 1127</b></p> <table border="1"> <thead> <tr> <th>Clause in EN 1127-1</th> <th>Ignition sources listed in EN 1127-1</th> <th>Usually relevant to evaluate for refrigeration systems under normal operation</th> <th>Examples</th> </tr> </thead> <tbody> <tr> <td>5.1</td> <td>Hot surfaces</td> <td>Yes</td> <td>Electrical heaters</td> </tr> <tr> <td>5.2</td> <td>Flames and hot gases</td> <td>Yes</td> <td>Gas heaters</td> </tr> <tr> <td>5.3</td> <td>Mechanically generated sparks</td> <td>Yes</td> <td>During service</td> </tr> <tr> <td>5.4</td> <td>Electrical apparatus</td> <td>Yes</td> <td>Electrical sparks from opening circuits.</td> </tr> <tr> <td>5.5</td> <td>Stray electric currents and cathodic corrosion protection</td> <td>No</td> <td>-</td> </tr> <tr> <td>5.6</td> <td>Static electricity</td> <td>Yes</td> <td>Large plastic surfaces</td> </tr> <tr> <td>5.7</td> <td>Lightning</td> <td>No</td> <td>It is highly unlikely that lightning will hit at the same time as a leak is occurring</td> </tr> <tr> <td>5.8</td> <td>Radio frequency (RF) electromagnetic waves from 104 Hz to <math>3 \times 10^{11}</math> Hz</td> <td>No</td> <td>-</td> </tr> <tr> <td>5.9</td> <td>Electromagnetic waves from <math>3 \times 10^{11}</math> Hz to <math>3 \times 10^{15}</math> Hz</td> <td>No</td> <td>-</td> </tr> <tr> <td>5.10</td> <td>Ionizing radiation</td> <td>No</td> <td>-</td> </tr> <tr> <td>5.11</td> <td>Ultrasonics</td> <td>No</td> <td>-</td> </tr> <tr> <td>5.12</td> <td>Adiabatic compression and shock waves</td> <td>No</td> <td>An air compressor taking air from the vicinity of a leak</td> </tr> <tr> <th>Clause in EN 1127-1</th> <th>Ignition sources listed in EN 1127-1</th> <th>Usually relevant to evaluate for refrigeration systems under normal operation</th> <th>Examples</th> </tr> <tr> <td>5.13</td> <td>Exothermic reactions, including self-ignition of dusts</td> <td>No</td> <td></td> </tr> </tbody> </table>	Clause in EN 1127-1	Ignition sources listed in EN 1127-1	Usually relevant to evaluate for refrigeration systems under normal operation	Examples	5.1	Hot surfaces	Yes	Electrical heaters	5.2	Flames and hot gases	Yes	Gas heaters	5.3	Mechanically generated sparks	Yes	During service	5.4	Electrical apparatus	Yes	Electrical sparks from opening circuits.	5.5	Stray electric currents and cathodic corrosion protection	No	-	5.6	Static electricity	Yes	Large plastic surfaces	5.7	Lightning	No	It is highly unlikely that lightning will hit at the same time as a leak is occurring	5.8	Radio frequency (RF) electromagnetic waves from 104 Hz to $3 \times 10^{11}$ Hz	No	-	5.9	Electromagnetic waves from $3 \times 10^{11}$ Hz to $3 \times 10^{15}$ Hz	No	-	5.10	Ionizing radiation	No	-	5.11	Ultrasonics	No	-	5.12	Adiabatic compression and shock waves	No	An air compressor taking air from the vicinity of a leak	Clause in EN 1127-1	Ignition sources listed in EN 1127-1	Usually relevant to evaluate for refrigeration systems under normal operation	Examples	5.13	Exothermic reactions, including self-ignition of dusts	No			--
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