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Klimatske naprave, enote za tekočinsko hlajenje in toplotne črpalke z električnimi kompresorji za segrevanje in hlajenje prostora - 2. del: Preskusni pogoji

Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 2: Test conditions

Luftkonditionierer, Flüssigkeitskühlsätze und Wärmepumpen mit elektrisch angetriebenen Verdichtern für die Raumbeheizung und -kühlung - Teil 2: Prüfbedingungen

Climatiseurs, groupes refroidisseurs de liquide et pompes à chaleur avec compresseur entraîné par moteur électrique pour le chauffage et la réfrigération des locaux - Partie 2: Conditions d'essai

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Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 2: Test conditions

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Luftkonditionierer, Flüssigkeitskühlsätze und Wärmepumpen mit elektrisch angetriebenen Verdichtern für die Raumbeheizung und -kühlung - Teil 2: Prüfbedingungen

This European Standard was approved by CEN on 30 May 2013.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Contents

Page

Foreword 3

1 Scope 4

2 Normative references 4

3 Terms and definitions 4

4 Test conditions 4

4.1 Environmental conditions and electrical power supply requirements 4

4.2 Rating conditions 5

Annex ZA (informative) **Relationship between this European Standard and the requirements of Commission Regulation (EC) No 206/2012** 18

Bibliography 19

Foreword

This document (EN 14511-2:2013) has been prepared by Technical Committee CEN/TC 113 “Heat pumps and air conditioning units”, the secretariat of which is held by AENOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2014 and conflicting national standards shall be withdrawn at the latest by February 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14511-2:2011.

The main changes with respect to the previous edition are listed below:

a) the addition of an Annex ZA related to the Commission Regulation (EC) n°206/2012.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Although this document has been prepared in the frame of the commission regulation (EU) No 206/2012 implementing Directive 2009/125/EC with regard to ecodesign requirements for air conditioners and comfort fans, it is also intended to support the essential requirements of the European Directive 2010/30/CE.

EN 14511 comprises the following parts under the general title *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling*:

— *Part 1: Terms, definitions and classification*,

— *Part 2: Test conditions*,

— *Part 3: Test methods*,

— *Part 4: Operating requirements, marking and instructions.*

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

1.1 The scope of EN 14511-1 is applicable.

1.2 This European Standard specifies the test conditions for the rating of air conditioners, liquid chilling packages and heat pumps, using either, air, water or brine as heat transfer media, with electrically driven compressors when used for space heating and/or cooling.

1.3 This European Standard specifies the conditions for which performance data shall be declared for single duct and double duct units for compliance to the Ecodesign regulation 206/2012 and Energy labelling regulation 626/2011.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14511-1:2013, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling — Part 1: Terms, definitions and classification*

EN 14511-4:2013, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling — Part 4: Operating requirements, marking and instructions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14511-1:2013 apply.

4 Test conditions

4.1 Environmental conditions and electrical power supply requirements

The tests shall be carried out under the environmental conditions specified in Table 1 or Table 2 depending on the location of the unit.

For all units, electrical power voltage and frequency shall be given by the manufacturer.

Table 1 —Environmental conditions for units designed for installation indoors

Type	Measured quantities	Rating test
Water-to-water and brine-to-water units	Dry bulb temperature	15 °C to 30 °C
Air-to-water units with duct connection on the air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Air-to-water units without duct connection on the air inlet side	Dry bulb temperature Wet bulb temperature	15 °C to 30 °C
Water-to-air and brine-to-air units with duct connection on the air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Water-to-air and brine-to-air units without duct connection on the air inlet and outlet side	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 5 or Table 6)
Air-to-air units with duct connection on the outdoor air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Air-to-air units without duct connection on the outdoor air inlet and outlet side	Dry bulb temperature Wet bulb temperature	As inlet temperature see Table 3 or Table 4

Table 2 — Environmental conditions for units designed for installation outdoors

Type	Measured quantities	Rating test
Air-to-water units	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Tables 12 to 15 and Table 16)
Water-to-air and brine-to-air units without duct connection on the air inlet side	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 5 and Table 6)
Water-to-water and brine-to-water operating in cooling mode	Dry bulb temperature	15 °C to 30 °C
Water-to-water and brine-to-water operating in heating mode	Dry bulb temperature	0 °C to 7 °C
Air-to-air units with duct connection on the indoor air inlet and outlet side	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 3 and Table 4)

4.2 Rating conditions

For the rating tests, the appropriate test conditions shall be applied in accordance with:

— Table 3 for air-to-air units in heating mode;

— Table 4 for air-to-air units in cooling mode;

— Table 5 for water-to-air and brine-to-air units in heating mode;

— Table 6 for water-to-air and brine-to-air units in cooling mode;

— Tables 7 to 10 for water-to-water and brine-to-water units in heating mode, depending on the temperature applications;

— Table 11 for water-to-water, brine-to-water, water-to-brine and brine-to-brine units in cooling mode;

— Tables 12 to 15 for air-to-water in heating mode, depending on the temperature applications;

— Table 16 for air-to-water and air-to-brine units in cooling mode;

— Table 17 for liquid chilling packages with remote condenser;

— Table 18 for liquid chilling packages for heat recovery condenser;

— Table 19 for air-cooled multisplit systems and modular air-cooled multisplit systems in the heating mode;

— Table 20 for air-cooled multisplit systems and modular air-cooled multisplit systems in the cooling mode;

— Table 21 for modular heat recovery air-cooled multisplit systems;

— Table 22 for water-cooled multisplit systems and modular water-cooled multisplit systems in the heating mode;

— Table 23 for water-cooled multisplit systems and modular water-cooled multisplit systems in the cooling mode.

For units with brine, the test shall be carried out with the brine specified by the manufacturer, see EN 14511-4:2013, 7.2.1.

NOTE 1 For air-to-water, brine-to-water and water-to-water units, the manufacturer may declare the water temperatures levels (lower, medium, high and very high) applicable to the heating mode.

NOTE 2 For comparison purposes between reverse cycle and non reverse cycle units, the conditions on the water side are given by the inlet and outlet water temperatures, possibly leading to different water flow rates in heating and cooling modes.

The rating tests in heating mode also apply for units having evaporatively cooled condenser, which performance in cooling mode is determined in accordance with EN 15218, and which can operate in heating mode.

The standard rating conditions, extracted from EN 14511-2:2013, Table 3 for heating mode and specified in Table ZA.1 shall be used to determine the rated capacity (P_{rated}), the rated power input (P_{COP}), the rated coefficient of performance (COP_{rated}) and the electricity consumption (Q_{DD}, Q_{SD}) in heating mode.

Table 3 — Air-to-air units - Heating mode

		Outdoor heat exchanger		Indoor heat exchanger	
		Inlet dry bulb temperature °C	**Inlet wet bulb temperature** °C	**Inlet dry bulb temperature** °C	**Inlet wet bulb temperature** °C
Standard rating conditions	Outdoor air / recycled air (e.g. window, double duct, split units)	7	6	20	15 max
	Exhaust air / recycled air (e.g. single duct heat pump)	20	12	20	12
	Exhaust air / outdoor air	20	12	7	6
Application rating conditions	Outdoor air / recycled air (e.g. window, double duct, split units)	2	1	20	15 max.
	Outdoor air / recycled air (e.g. window, double duct, split units)	- 7	- 8	20	15 max.
	Outdoor air / recycled air (e.g. window, double duct, split units)	- 15	-	20	15 max.
	Outdoor air / recycled air (e.g. window, double duct, split units)	12	11	20	15 max.
	Exhaust air / outdoor air	20	12	2	1
	Exhaust air / outdoor air	20	12	- 7	- 8

Table 4 — Air-to-air units - Cooling mode

		Outdoor heat exchanger		Indoor heat exchanger	
		Inlet dry bulb temperature °C	**Inlet wet bulb temperature** °C	**Inlet dry bulb temperature** °C	**Inlet wet bulb temperature** °C
Standard rating conditions	Comfort (outdoor air / recycled air) (e.g. window, double duct, split units)	35	24 [a]	27	19
	Comfort (exhaust air / recycled air)	27	19	27	19
	Comfort (exhaust air / outdoor air)	27	19	35	24
	Single duct [b, c]	35	24	35	24
	Control cabinet	35	24	35	24
	Close control	35	24	24	17
Application rating conditions	Comfort (outdoor air / recycled air) (e.g. window, double duct, split units)	27	19 [a]	21	15
	Single duct [b, c]	27	19	27	19
	Comfort (outdoor air / recycled air) (e.g. window, double duct, split units)	46	24 [a]	29	19
	Control cabinet	50	30	35	24
	Close control	27	19	21	15

[a] The wet bulb temperature condition is not required when testing units which do not evaporate condensate.

[b] When using the calorimeter room method, pressure equilibrium between indoor and outdoor compartments shall be obtained by introducing into indoor compartment, air at the same rating temperature conditions.

[c] The pressure difference between the two compartments of the calorimeter room shall not be greater than 1,25 Pa. This pressure equilibrium can be achieved by using an equalising device or by creating an open space area in the separation partition wall, which dimensions shall be calculated for the maximum airflow of the unit to be tested. If an open space is created in the partition wall, an air sampling device or several temperature sensors shall be used to measure the temperature of the air from the outdoor compartment to the indoor compartment.

Table 5 — Water-to-air and brine-to-air units - Heating mode

		Outdoor heat exchanger		Inlet heat exchanger	
		Inlet temperature °C	Outlet temperature °C	Inlet dry bulb temperature °C	Inlet wet bulb temperature °C
Standard rating conditions	Water [a]	10	7	20	15 max.
	Brine	0	-3	20	15 max.
	Water loop	20	17	20	15 max.
Application rating conditions	Water	15	[b]	20	15 max.
	Brine	5	[b]	20	15 max.

[a] The term “water” includes indifferently water from a river or a lake, ground water or water in a close water loop.

[b] The test is performed at the flow rate obtained during the test at the corresponding standard rating conditions

Table 6 — Water-to-air and brine-to-air units - Cooling mode

		Outdoor heat exchanger		Indoor heat exchanger	
		Inlet temperature °C	Outlet temperature °C	Inlet dry bulb temperature °C	Inlet wet bulb temperature °C
Standard rating conditions	Cooling tower	30	35	27	19
	Ground coupled (water or brine)	10	15	27	19
	Control cabinet	15	20	35	24
	Close control	30	35	24	17
Application rating conditions	Cooling tower	40	[a]	27	19
	Ground coupled (water or brine)	15	[a]	27	19
	Close control	15	[a]	21	15
	Close control	40	[a]	24	17

[a] The test is performed at the water flow rate obtained during the test at the corresponding standard rating conditions.