SLOVENSKI STANDARD
SIST EN 14511-2:2022

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Nadomešča:
SIST EN 14511-2:2018

Klimatske naprave, enote za hlajenje kapljevine, toplotne črpalke za ogrevanje in hlajenje prostora ter procesne hladilne naprave z električnimi kompresorji - 2. del: Preskusni pogoji

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

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

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

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27.080	Toplotne črpalke	Heat pumps
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EUROPEAN STANDARD

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English Version

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

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This European Standard was approved by CEN on 10 July 2022.

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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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 14511-2:2022) has been prepared by Technical Committee CEN/TC 113 “Heat pumps and air conditioning units”, the secretariat of which is held by UNE.

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of an identical text or by endorsement, at the latest by March 2023, and conflicting national standards shall be withdrawn at the latest by March 2023.

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

This document supersedes EN 14511-2:2018.

The main changes compared with EN 14511-2:2018 are as follows:

— update of normative references;

— deletion of Annex ZB on the relationship with Commission Regulation (EU) No 206/2012.

This document has been prepared in the frame of:

— Commission Regulation (EU) No 206/2012 of 6 March 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for air conditioners and comfort fans;

— Commission Delegated Regulation (EU) No 626/2011 of 4 May 2011 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of air conditioners;

— Commission Regulation (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters;

— Commission Delegated Regulation (EU) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device;

— Commission Regulation (EU) 2015/1095 of 5 May 2015 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for professional refrigerated storage cabinets, blast cabinets, condensing units and process chillers;

— Commission Regulation (EU) 2016/2281 of 30 November 2016 implementing Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for energy-related products, with regard to ecodesign requirements for air heating products, cooling products, high temperature process chillers and fan coil units.

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

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

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

— *Part 1: Terms and definitions*;

— *Part 2: Test conditions*;

— *Part 3: Test methods*;

— *Part 4: Requirements*.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

1.1 The scope of EN 14511-1:2022 is applicable.

1.2 This document 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. The document also specifies the test conditions for the rating of air-cooled and water(brine)-cooled process chillers.

1.3 This document specifies the conditions for which performance data are to 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 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.

EN 14511-1:2022, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers with electrically driven compressors — Part 1: Terms and definitions*

EN 14511-4:2022, *Air conditioners, liquid chilling packages and heat pumps for space heating and cooling and process chillers, with electrically driven compressors — Part 4: Requirements*

EN 15218:2013, *Air conditioners and liquid chilling packages with evaporatively cooled condenser and with electrically driven compressors for space cooling — Terms, definitions, test conditions, test methods and requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14511-1:2022 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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(brine)-to-water(brine) units	Dry bulb temperature	15 °C to 30 °C
Air-to-water(brine) units with duct connection on the air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Air-to-water(brine) units without duct connection on the air inlet side	Dry bulb temperature Wet bulb temperature	15 °C to 30 °C
Water(brine)-to-air units with duct connection on the air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Water(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	Inlet temperature (see Table 3 or Table 4)
Air-cooled process chillers ducted on the air side	Dry bulb temperature	15 °C to 30 °C
Water(brine)-cooled process chillers	Dry bulb temperature	15 °C to 30 °C

Table 2 — Environmental conditions for units designed for installation outdoors

Type	Measured quantities	Rating test
Air-to-water(brine) units	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Tables 12 to 16)
Water(brine)-to-air units without duct connection on the air inlet side	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 5 or Table 6)
Water(brine)-to-water(brine) units operating in cooling mode	Dry bulb temperature	15 °C to 30 °C
Water(brine)-to-water(brine) units 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 or Table 4)
Air-cooled process chillers (non-ducted on the air side)	Dry bulb temperature Wet bulb temperature	Inlet temperature (see Table 25)
Water(brine)-cooled process chillers	Dry bulb temperature	15 °C to 30 °C

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(brine)-to-air units in heating mode;

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

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

— Table 11 for water(brine)-to-water(brine) units in cooling mode;

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

— Table 16 for air-to-water(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;

— Table 24 for modular heat recovery water-cooled multisplit systems.

— Table 25 for process chillers

For units with brine, the test shall be carried out with the brine specified by the manufacturer, see EN 14511-4:2022, 6.2.1.

For air-to-water(brine), and water(brine)-to-water(brine) heat pumps, the manufacturer may declare the water(brine) temperatures levels (low, intermediate, medium, and high) applicable to the heating mode.

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

The rating tests in heating mode also apply to units having evaporatively cooled condenser, whose performance in cooling mode is determined in accordance with EN 15218:2013, and which can operate in heating mode.

The standard rating conditions, extracted from Table 3 for heating mode, 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 [a]	7	6	20	15 max
	Exhaust air / recycled air [b]	20	12	20	12
	Exhaust air / outdoor air	20	12	7	6
Application rating conditions	Outdoor air / recycled air [a]	2	1	20	15 max.
	Outdoor air / recycled air [a]	−7	−8	20	15 max.
	Outdoor air / recycled air [a]	−15	—	20	15 max.
	Outdoor air / recycled air [a]	12	11	20	15 max.
	Exhaust air / outdoor air	20	12	2	1
	Exhaust air / outdoor air	20	12	−7	−8

[a] For example, window, double duct, split units

[b] For example, single duct units

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	Outdoor air / recycled air [a]	35	24 [b]	27	19
	Exhaust air / recycled air	27	19	27	19
	Exhaust air / outdoor air	27	19	35	24
	Single duct [c, d]	35	24	35	24
	Control cabinet	35	24	35	24
	Close control	35	24	24	17
Application rating conditions	Outdoor air / recycled air [a]	27	19 [b]	21	15
	Single duct [c, d]	27	19	27	19
	Outdoor air / recycled air [a]	46	24 [b]	29	19
	Control cabinet	50	30	35	24
	Close control	27	19	21	15

[a] For example, window, double duct, split units

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

[c] 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.

[d] 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 equalizing 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.