

SLOVENSKI STANDARD
SIST EN 14511-2:2008**01-maj-2008****Nadomešča:****SIST EN 14511-2:2004**

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

SIST EN 14511-2:2008

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

Ta slovenski standard je istoveten z: EN 14511-2:2007**ICS:**

23.120	Zračniki. Vetrniki. Klimatske naprave	Ventilators. Fans. Air-conditioners
27.080	Toplotne črpalke	Heat pumps
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

SIST EN 14511-2:2008**en,fr,de**

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 14511-2

November 2007

ICS 23.120

Supersedes EN 14511-2:2004

English Version

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

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

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

This European Standard was approved by CEN on 12 October 2007.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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 SIST EN 14511-2:2008

Foreword

This document (EN 14511-2:2007) 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 May 2008, and conflicting national standards shall be withdrawn at the latest by May 2008.

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 14511-2:2004.

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 and definitions*
- *Part 2: Test conditions*
- *Part 3: Test methods*
- *Part 4: Requirements*

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

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EN 14511-2:2007 (E)**1 Scope**

This part of EN 14511 specifies the test conditions for the rating of air and water cooled air conditioners, liquid chilling packages, air-to-air, water-to-air, air-to-water and water-to-water heat pumps with electrically driven compressors when used for space heating and/or cooling. It also specifies test conditions for heat recovery operation of multisplit systems.

This European Standard applies to factory-made units that can be ducted.

This standard applies to factory-made liquid chilling packages with integral condensers or for use with remote condensers.

This standard applies to factory-made units of either fixed capacity or variable capacity by any means.

Packaged units, single split and multisplit systems are covered by this standard. Single duct and double duct units are covered by the standard.

In the case of units consisting of several parts, the standard applies only to those designed and supplied as a complete package, except for liquid chilling packages with remote condenser.

This standard is primarily intended for water and brine chilling packages but can be used for other liquid subject to agreement.

This standard applies to air-to-air air conditioners which evaporate the condensate on the condenser side.

The units having their condenser cooled by air and by the evaporation of external additional water are not covered by this standard.

This standard does not apply to units using transcritical cycles, e.g. with CO₂ as refrigerant.

Installations used for heating and/or cooling of industrial processes are not within the scope of this standard.

NOTE Part load testing of units is dealt with in CEN/TS 14825.

2 Normative references

The following referenced documents are indispensable for the application 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 14511-1:2007, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 1: Terms and definitions*

EN 14511-3:2007, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 3: Test methods*

EN 14511-4:2007, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 4: Requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14511-1:2007 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 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	As inlet temperatures see Table 9 or Table 10
Water-to-air units with duct connection on the air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Water-to-air units without duct connection on the air inlet and outlet side	Dry bulb temperature Wet bulb temperature	As inlet temperatures see Table 5 or Table 6
Air-to-air units with duct connection on the indoor air inlet and outlet side	Dry bulb temperature	15 °C to 30 °C
Air-to-air units without duct connection on the indoor air inlet and outlet side	Dry bulb temperature Wet bulb temperature	As inlet temperatures 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	As inlet temperatures see Table 9 and Table 10
Water-to-air units without duct connection on the air inlet side	Dry bulb temperature Wet bulb temperature	As inlet temperatures see Table 5 and Table 6
Air-to-air units with duct connection on the indoor air inlet and outlet side	Dry bulb temperature Wet bulb temperature	As inlet temperatures 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 units in heating mode;

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- Table 6 for water-to-air units in cooling mode;
- Table 7 for water-to-water units in heating mode;
- Table 8 for water-to-water units in cooling mode;
- Table 9 for air-to-water in heating mode;
- Table 10 for air-to-water in cooling mode;
- Table 11 for liquid chilling packages with remote condenser;
- Table 12 for liquid chilling packages for heat recovery condenser;
- Table 13 for basic, multiple circuit and modular air-cooled multisplit systems in the heating mode;
- Table 14 for basic, multiple circuit and modular air-cooled multisplit systems in the cooling mode;
- Table 15 for modular heat recovery air-cooled multisplit systems;
- Table 16 for basic, multiple circuit and modular water-cooled multisplit systems in the heating mode;
- Table 17 for basic, multiple circuit 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 7.2.1 of EN 14511-4:2007.

Table 3 — Air-to air heat pumps - 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	Outside air / recycled air (e.g. window, double duct, split units)	7	6	20	15 max
	Exhaust air / recycled air	20	12	20	12
	Exhaust air / outdoor air	20	12	7	6
Application rating conditions	Outside air / recycled air (e.g. window, double duct, split units)	2	1	20	15 max.
	Outside air / recycled air (e.g. window, double duct, split units)	- 7	- 8	20	15 max.
	Outside air / recycled air (e.g. window, double duct, split units)	- 15	-	20	15 max.
	Exhaust air / outdoor air	20	12	2	1
	Exhaust air / outdoor air	20	12	- 7	- 8

Table 4 — Air-to air heat pumps and air conditioners - 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 (outside 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 (outside air / recycled air) (e.g. window, double duct, split units)	27	19 ^a	21	15
	Single duct ^{b, c}	27	19	27	19
	Comfort (outside 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 heat pumps - 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	15	12/ ^a	20	15 max.
	Brine	0	-3/ ^a	20	15 max.
	Water loop	20	17/ ^a	20	15 max.
Application rating conditions	Water	10	^b	20	15 max.
	Brine	5	^b	20	15 max.
	Brine	- 5	^b	20	15 max.

^a For units designed for heating and cooling mode, the flow rate obtained during the test at standard rating conditions in cooling mode (see Table 6) is used.

^b The test is performed at the flow rate obtained during the test at the corresponding standard rating conditions.