



SLOVENSKI STANDARD
oSIST prEN 14511-4:2009
01-november-2009

?

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

Luftkonditionerer, Flüssigkeitskühlsätze und Wärmepumpen mit elektrisch angetriebenen Verdichtern für die Raumbeheizung und Kühlung - Teil 4: Anforderungen

Climatiseurs, groupes refroidisseurs de liquide et pompes à chaleur avec compresseur entraîné par moteur électrique pour le chauffage et la réfrigération des locaux - Partie 4: Exigences

Ta slovenski standard je istoveten z: prEN 14511-4

ICS:

- 23.120 Ventilators. Fans. Air-conditioners
- 27.080 Heat pumps
- 91.140.30 Ventilation and air-conditioning

oSIST prEN 14511-4:2009 en,fr

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 14511-4

September 2009

ICS 91.140.30

Will supersede EN 14511-4:2007

English Version

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

Climatiseurs, groupes refroidisseurs de liquide et pompes à chaleur avec compresseur entraîné par moteur électrique pour le chauffage et la réfrigération des locaux - Partie 4: Exigences

Luftkonditionerer, Flüssigkeitskühlsätze und Wärmepumpen mit elektrisch angetriebenen Verdichtern für die Raumbeheizung und Kühlung - Teil 4: Anforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 113.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents		Page
Foreword.....		3
1	Scope	4
2	Normative references	4
3	Terms and definitions	4
4	Requirements	4
5	Marking	9
6	Technical data sheet	9
7	Instructions	11
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EC Directive 2002/31/EC		13
Bibliography		14

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 14511-4:2012

<https://standards.iteh.ai/catalog/standards/sist/52819d82-b2ba-4260-8e9a-2f51f46e9881/sist-en-14511-4-2012>

Foreword

This document (prEN 14511-4:2009) has been prepared by Technical Committee CEN/TC 113 "Heat pumps and air conditioning units", the secretariat of which is held by AENOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14511-4:2007.

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 2002/31/EC.

For relationship with EU Directive 2002/31/EC, see informative Annex ZA, which is an integral part of this document.

prEN 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

ITh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 14511-4:2012

<https://standards.iteh.ai/catalog/standards/sist/52819d82-b2ba-4260-8e9a-2f51f46e9881/sist-en-14511-4-2012>

prEN 14511-4:2009 (E)**1 Scope**

1.1 The scope of prEN 14511-2:2009 is applicable.

1.2 This part of EN 14511 specifies minimum requirements which ensure that air conditioners, heat pumps and liquid chilling packages with electrical driven compressors are fit for the use designated by the manufacturer when used for space heating and/or cooling.

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 12102, *Air conditioners, liquid chilling packages, heat pumps and dehumidifiers with electrically driven compressors — Measurement of airborne noise — Determination of the sound power level*

prEN 14511-1:2009, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling — Part 1: Terms and definitions*

prEN 14511-2:2009, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling — Part 2: Test conditions*

prEN 14511-3:2009, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling — Part 3: Test methods*

EN 60204-1, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)*

EN 60335-2-40, *Household and similar electrical appliances— Safety — Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers (IEC 60335-2-40:2002, modified)*

EN 61000-3-11, *Electromagnetic compatibility (EMC) — Part 3-11: Limits; Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply system; Equipment with rated current ≤ 75 A and subject to conditional connection (IEC 61000-3-11:2000)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 14511-1:2009 apply.

4 Requirements**4.1 General**

Except where otherwise stated, tests shall be conducted as described in prEN 14511-2:2009 and prEN 14511-3:2009.

4.2 Temperature operating range**4.2.1 Starting test**

The unit shall be capable of operating within the limit of use indicated by the manufacturer.

For every condition stated in Table 1, and for both cooling and heating mode where applicable, the unit shall start up and operate for at least 20 min, without being stopped by the safety devices.

Table 1 — Operational requirements conditions

Type	Temperature at outdoor heat exchanger °C	Temperature at indoor heat exchanger °C	Voltage V
All types	Upper limit of use	Upper limit of use	Rated voltage
All types	Lower limit of use	Lower limit of use	Rated voltage

The temperatures are set at the beginning of the test and maintained constant during the test.

Test voltage shall be as specified in Table 1. It is set at the beginning of the test and maintained constant during the test.

The environmental conditions during the test shall be as specified in Tables 1 and 2 of prEN 14511-2:2009.

The flow rates shall be the same as that used for rating capacity test, as specified in prEN 14511-2:2009.

Deviation between individual values and set values shall be between:

- zero and minus twice the permissible deviation according to Table 2 of prEN 14511-3:2009, for the upper limit of use;
- zero and plus twice the permissible deviation according to Table 2 of prEN 14511-3:2009, for the lower limit of use.

Uncertainty of measurement shall be as specified in Table 1 of prEN 14511-3:2009.

4.2.2 Test at maximum operating conditions (cooling mode)

When operated at conditions stated in Table 2 during 1 h, then switch off for 3 min, and then switched on again for 1 h, the unit shall meet the following requirements:

- the unit shall suffer no damage;
- the unit motor shall operate continuously for the first hour without tripping of the motor overload protective devices;
- after the shut-down period of 3 min, the unit shall restart automatically no more than 5 min after restarting of the compressor;
- the unit motor shall operate again continuously for the rest of the second hour without tripping of the motor overload protective devices.

NOTE When possible, switching off the unit should be done through the control panel of the unit.

Table 2 — Maximum operating conditions

Type	Temperature at outdoor heat exchanger °C	Temperature at indoor heat exchanger °C	Voltage V
Control cabinet air conditioner	Upper limit of use	35	Rated voltage
All other types	Upper limit of use	Upper limit of use	Rated voltage

This test can be combined with the corresponding starting test, except for control cabinet air conditioners where the inlet temperature at the indoor heat exchanger is lowered to 35 °C after the starting time.

4.2.3 Freeze-up test

4.2.3.1 Air-cooled unit

After the unit has operated for 6 h at the conditions stated in Table 3, and after the last freeze up cycle has completed, the following requirements shall be fulfilled:

- no ice shall have accumulated on the evaporator;
- no ice shall drip from the unit;
- no water shall drip or be blown off the unit into the room.

4.2.3.2 Water-cooled units

After the unit has operated for 6 h at the conditions stated in Table 3 the following requirements shall be fulfilled:

- air flow through the unit shall not have dropped by more than 5 %;

NOTE It should be assured that the air flow through the unit is not adjusted during the test by some automatic control device.

- the water temperature difference through the unit shall not have dropped by more than 30 %;
- the saturated temperature corresponding to the pressure measured at the suction of the compressor shall not have decreased by more than 2 K.

Table 3 — Freeze up test conditions

Unit type	Temperature at outdoor heat exchanger	Temperature at indoor heat exchanger °C		Air flow rate
		Air	Water	
		Dry bulb	Wet bulb	
All types	Lowest limit of use	21	15	Lowest entering temperature Minimum setting as allowed by the manufacturer

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

4.3 Outside the operating range

If operating outside the temperature range can cause damage to the unit, it shall be provided with safety devices which ensure that the unit suffers no damage when the operating limits of use indicated by the manufacturer are exceeded and remains capable of operating when coming back within these limits. A safety device that does not automatically reset may trip provided that a warning device is fitted.

The manufacturer shall indicate any safety devices provided and their operating conditions according to 7.2.3.

4.4 Shutting off the heat transfer medium flows

To check the correct operating of the safety devices on the unit, the following faults shall be simulated consecutively. The unit shall have attained steady state in the standard rating conditions according to Tables 3 to 23 of prEN14511-2:2009 before every fault is simulated. Each fault simulated shall be maintained for at least 30 minutes.

NOTE In case the unit is provided without flow switch but it is required by the manufacturer instructions, the unit should be tested with an additional flow switch.

- a) Shutting off the heat transfer medium flow at the outdoor heat exchanger.
- b) Shutting off the heat transfer medium flow at the indoor heat exchanger.
- c) Shutting off the heat transfer medium flow at the heat recovery heat exchanger where applicable.

The unit is checked for any damage sustained during the test and if any safety devices have operated during the test. The unit shall suffer no damage and shall remain capable of operating after restoration of the flow rates. A safety device that does not automatically reset may trip provided that a warning device is fitted.

For units with defrosting system, an additional test shall be conducted at the test conditions specified in Table 4 by shutting off the heat transfer medium flow at the indoor heat exchanger, at the beginning of the defrosting phase.

Table 4 — Shutting off the heat transfer medium flows

Type of unit	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	Inlet water temperature °C	Outlet water temperature °C
Air-to-air units	2	1	20	15 max.		
Air-to-water units	2	1			a	45
Air-to-water units (for floor heating or similar application)	2	1			a	35

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

4.5 Complete power supply failure

Complete power supply failure lasting approximately 5 s shall be simulated. The unit shall have attained steady state conditions before the fault simulation, at the standard rating condition according to Table 3 to 23 of prEN 14511-2:2009.

After restoration of power the unit shall restart automatically no more than 20 min after the compressor has been allowed to restart by the control devices of the unit.

prEN 14511-4:2009 (E)

The unit is checked for any damage sustained during the test and if any safety devices have operated during the test.

The test does not apply when the manufacturer states that the machine does not automatically restart after power supply failure.

4.6 Condensate draining and enclosure sweat test

In heating mode, draining of condensate, including that formed on the enclosure, shall be made correctly when operating at the standard rating conditions given in Tables 3 to 23 of prEN 14511-2:2009.

In cooling mode, draining of condensate, including that formed on the enclosure, shall be made correctly when operating at conditions given in Table 5.

During the test of 4 h no condensed water shall drip, run or blow off the unit except through the drain.

For indoor units, drain holes shall be provided with suitable pipe connection, the minimum diameter of which shall be 12 mm.

Table 5 — Condensate draining and enclosure sweat test. Cooling mode

	Indoor heat exchanger temperatures				Outdoor heat exchanger temperatures			
	Inlet dry bulb °C	Inlet wet bulb °C	Inlet water °C	Outlet water °C	Inlet dry bulb °C	Inlet wet bulb °C	Inlet water °C	Outlet water °C
Air-to-air	27	24	-	-	27	24	-	-
Water-to-air	-	-	27	a	27	24	-	-
Close control, air cooled	27	b	-	-	27	b	-	-
Close control, water cooled	-	-	27	a	27	b	-	-
Control cabinet, air cooled	27	24	-	-	27	24 ^c	-	-
Control cabinet, water cooled	-	-	27	a	27	24 ^c	-	-

^a Same water flow rate as for the rating capacity test at the standard rating conditions.

^b With the highest relative humidity stated by the manufacturer.

NOTE If not possible, make the test at the lowest dry bulb temperature (greater than 27 °C) with 80 % relative humidity.

4.7 Defrosting

For air-to-air and air-to-water units, the functioning of any defrosting system shall be verified under any one of the application rating conditions with an outdoor air temperature of 2(1) °C (see Table 3, Tables 12 to 15 and Table 19 of prEN 14511-2:2009), where frosting occurs.

Successive frosting/defrosting cycles shall be repeated without running in progressively deteriorating average performances.

There shall not be growth of ice in and around the drip tray.