

**SLOVENSKI STANDARD**  
**SIST EN 14511-4:2004****01-september-2004****Nadomešča:****SIST EN 12055:2001****SIST EN 255-4:2001****SIST EN 814-3:2001**

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**Klimatske naprave, enote za tekočinsko hlajenje in toplotne črpalke z električnimi kompresorji za segrevanje in hlajenje prostora – 4. del: Zahteve**

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

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Luftkonditionierer, Flüssigkeitskühlsätze und Wärmepumpen mit elektrisch angetriebenen Verdichtern für die Raumheizung und -kühlung - Teil 4: Anforderungen

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

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**SIST EN 14511-4:2004****en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 14511-4**

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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 - Partie 4: Exigences

Luftkonditionierer, Flüssigkeitskühlsätze und Wärmepumpen mit elektrisch angetriebenen Verdichtern für die Raumheizung und -kühlung - Teil 4: Anforderungen

This European Standard was approved by CEN on 30 April 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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



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## Foreword

This document (EN 14511-4:2004) has been prepared by Technical Committee CEN/TC 113 "Heat pumps and air conditioners", 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 November 2004, and conflicting national standards shall be withdrawn at the latest by November 2004.

This document supersedes EN 255-4:1997, EN 814-3:1997 and partially EN 12055:1998.

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.

This standard consists of the following parts:

- Part 1: Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 1: Terms and definitions.
- Part 2: Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 2: Test conditions.
- Part 3: Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - Part 3: Test methods.
- Part 4: Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling - 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

**EN 14511-4:2004 (E)****1 Scope**

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

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, except water cooled multisplit systems.

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 cooling any 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 CO<sub>2</sub> 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**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 14511-1:2004, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling – Part 1: Terms and definitions*

EN 14511-2:2004, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling – Part 2: Test conditions.*

EN 14511-3:2004, *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 60204-1:1997).*

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, 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 systems – Equipment with rated current  $\leq 75$  A and subject to conditional connection (IEC 61000-3-11:2000).*

ENV 12102, *Air conditioners, heat pumps and dehumidifiers with electrically driven compressors – Measurement of airborne noise – Determination of the sound power level.*

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 14511-1:2004 apply.

## 4 Requirements

### 4.1 General

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

### 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.

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**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 EN 14511-2:2004.

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

Deviation between individual values and set values shall be between:

- zero and minus twice the permissible deviation according to Table 2 of EN 14511-3:2004, for the upper limit of use;
- zero and plus twice the permissible deviation according to Table 2 of EN 14511-3:2004, for the lower limit of use.

Uncertainty of measurement shall be as specified in Table 1 of EN 14511-3:2004.

## EN 14511-4:2004 (E)

## 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.

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## 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 shall 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		
<b>All types</b>	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 15 of EN14511-2:2004 before every fault is simulated. Each fault simulated shall be maintained for at least 1 h.

**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.

- Shutting off the heat transfer medium flow at the outdoor heat exchanger.
- Shutting off the heat transfer medium flow at the indoor heat exchanger.
- 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 will 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.