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Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling - Testing and rating at part load conditions and calculation of seasonal performance

EESTI STANDARDI EESSÕNA

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English Version

**Air conditioners, liquid chilling packages and heat pumps, with
electrically driven compressors, for space heating and cooling -
Testing and rating at part load conditions and calculation of
seasonal performance**

Climatiseurs, groupes refroidisseurs de liquide et pompes à
chaleur avec compresseur entraîné par moteur électrique
pour le chauffage et la réfrigération des locaux - Essais et
détermination des caractéristiques à charge partielle et
calcul de performance saisonnière

Luftkonditionierer, Flüssigkeitskühlsätze und
Wärmepumpen mit elektrisch angetriebenen Verdichtern
zur Raumbeheizung und -kühlung - Prüfung und
Leistungsbemessung unter Teillastbedingungen und
Berechnung der saisonalen Arbeitszahl

This European Standard was approved by CEN on 18 July 2013.

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Foreword

This document (EN 14825:2013) 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of an identical text or by endorsement, at the latest by March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.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 14825:2012.

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.

The main changes with respect to the previous edition are:

- a) Clause 3 “Terms, definitions, symbols, abbreviated terms and units” has been modified in order to be harmonised with Commission Regulation (EC) No 206/2012;
- b) modifications so that the text is aligned to the modified terms and definitions;
- c) a new normative Annex A, Applicable climate bin hours and hours for active mode, thermostat-off, standby, off mode for air conditioners below and equal to 12 kW, which includes Tables 26 and 37 of the previous standard;
- d) a new normative Annex G, Template for technical data sheet;
- e) a new informative Annex ZA, Relationship between this European Standard and the requirements of Commission Regulation (EC) No 206/2012;
- f) see the following cross references regarding structural changes:

EN 14825:2013	EN 14825:2012
6.1	-
6.2	6.2
6.3	6.1
6.4	6.3
6.5	6.4
7.1	7.1
7.2	7.2
7.3	7.1
7.4	7.3
7.5	7.4
Annex A	-
Annex B	Annex A
Annex C	Annex B
Annex D	Annex C
Annex E	Annex D
Annex F	Annex E
Annex G	-

Although this document be 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 may also be used to show compliance with the requirements of the European Directive 2010/30/EU and Commission Delegated Regulation (EU) No 626/2011.

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, 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.

Introduction

Heat pumps, air conditioners and liquid chilling packages are, at present, selected and compared at a rated condition. This condition does not represent the usual operating conditions of the equipment over a season. This operating condition can be better assessed by comparing equipment at representative reduced capacities and determining the Seasonal Energy Efficiency Ratio and Seasonal Coefficient of Performance.

Fixed capacity heat pumps, air conditioners and liquid chilling packages deal with varying loads by varying the operation time. The efficiency of the system is dependent on the effectiveness of the controlling thermostats. Variable capacity air conditioners, liquid chilling packages and heat pumps, by continuous or step control of the compressor, can more closely match the varying load improving system efficiency.

This European Standard provides part load conditions and calculation methods for calculating the Seasonal Energy Efficiency Ratio (SEER_{on}) and Seasonal Coefficient of Performance (SCOP_{on} and SCOP_{net}) of such units when they are used to fulfil the cooling and heating demands.

Other energy consumptions can occur when the unit is not used to fulfil the cooling and heating demands such as those from a crankcase heater or when the unit is on standby. These consumptions are considered in the calculation methods for reference SEER and reference SCOP.

Reference SEER/SEER_{on} and reference SCOP/SCOP_{on}/SCOP_{net} calculations may be based on calculated or tested values. In case of tested values, this European Standard gives the methods for testing heat pumps, air conditioners and liquid chilling packages at part load conditions.

The rating conditions and test methods of units operating at rated and application capacities are given in EN 14511-2 and EN 14511-3.

The methods for calculation of system energy efficiencies for specific heat pump systems in buildings are given in EN 15316-4-2.

1 Scope

This European Standard covers air conditioners, heat pumps and liquid chilling packages. It applies to factory made units defined in EN 14511-1, except single duct, control cabinet and close control units.

This European Standard gives the calculation methods for the determination of reference seasonal energy efficiency SEER and SEERon and reference seasonal coefficient of performance SCOP, SCOPon and SCOPnet.

Such calculation methods may be based on calculated or measured values.

In case of measured values, this European Standard covers the test methods for determination of capacities, EER and COP values during active mode at part load conditions. It also covers test methods for electric power consumption during thermostat-off mode, standby mode, off-mode and crankcase heater mode.

This European Standard serves as an input for the calculation of the system energy efficiency in heating mode of specific heat pump systems in buildings, as stipulated in the standard EN 15316-4-2.

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

EN 14511-3:2011, *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling — Part 3: Test methods*

EN 14511-4, *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, definitions, symbols, abbreviated terms and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14511-1 (unless otherwise stated) and the following apply.

3.1.1

active mode

mode corresponding to the hours with a cooling or heating load of the building and whereby the cooling or heating function of the unit is activated

Note 1 to entry: This condition may involve on/off-cycling of the unit in order to reach or maintain a required indoor air temperature.