SLOVENSKI STANDARD
oSIST prEN 14825:2017

01-april-2017

Klimatske naprave, enote za tekočinsko hlajenje in toplotne črpalke z električnimi kompresorji za ogrevanje in hlajenje prostora - Preskušanje in ocenitev ob delni obremenitvi ter izračun letnega učinka

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

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

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

Ta slovenski standard je istoveten z: **prEN 14825**

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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 systems

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 14825

January 2017

ICS 27.080; 91.140.30

Will supersede EN 14825:2016

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

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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-CENELEC Management Centre has the same status as the official versions.

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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.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (prEN 14825:2017) 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 enquiry.

This document will supersede EN 14825:2016.

The revision was necessary in order to harmonize this European standard with *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 Delegated Regulation (EU) 2015/1094 of 5 May 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of professional refrigerated storage cabinets,* and *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 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 Regulation(s), see informative Annex ZA, Annex ZB, Annex ZC, Annex ZD and Annex ZE which are integral parts of this document.

The technical content of the previous edition remains unchanged with the exceptions of technical modifcation that were deferred to the next revision at UAP stage of EN 14825:2016. The main changes with respect to requirements for *Commission Regulation (EU) 2015/1095 of 5 May 2015, Commission Delegated Regulation (EU) 2015/1094 of 5 May 2015 and COMMISSION REGULATION (EU) 2016/2281, of 30 November 2016, implementing Directive 2009/125/EC* are:

a) modification of the scope to include hybrid heat pumps; DX-to-water(brine) units, process chillers and units up to 2 MW;

b) modification of Clause 3 in order to be harmonized with Commission Regulation (EU) 2015/1095 of 5 May 2015, Commission Delegated Regulation (EU) 2015/1094 of 5 May 2015 and COMMISSION REGULATION (EU) 2016/2281, of 30 November 2016, implementing Directive 2009/125/EC;

c) modification of Table 1 to include references to European regulations which use different terms and symbols;

d) new numbering of Clause 5 and Clause 6;

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Clause 5	Clause 6
Clause 6	Clause 5

e) modification of Clause 5 to include new requirement for seasonal space cooling efficiency;

f) modification of Clause 6 to include requirements for hybrid heat pumps and DX-to-water(brine) units;

g) new Clause 7 with test methods for hybrid heat pumps with gas boilers;

h) modification of Clause 8 to include air-to-air units above 12 kW and hybrid heat pumps;

i) new Clause 9 to cover process cooling;

k) new Clause 10 to sover calculation of SEPR;

l) renumbering of Clause 8 to Clause 11

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Clause 8	Clause 11
Clause 9	Clause 12
Clause 10	Clause 13
Clause 11	Clause 14

m) modification of Clause 11, Clause 12, Clause 13 and Clause 14 to include units below 12 kW and ground coupled units;

n) new Annex C for process chillers;

o) new Annex D for air conditioners and air-to-air heat pumps above 12 kW, water(brine)-to-air units and liquid chilling packages;

p) renumbering of Annex C to Annex H

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Annex C	Annex E
Annex D	Annex F
Annex E	Annex G
Annex F	Annex H

Annex G Annex J

Annex H Annex L

q) new E.3 for hybrid heat pumps, new E.4 for process chillers, new E.5 for comfort chillers and air/water(brine)-to-air and air-conditioners below or equal to 2 MW and E.6 for Air-to-air and water(brine)-to-air heat pumps below or equal to 2 MW;

r) new Annex K for Calculation example for $SCOP_{on}$ for variable speed hybrid heat pump based on heat pump and boiler separated test;

s) modification Annex ZA to reflect the new numbering;

t) modification split of Annex ZB into Annex ZB and Annex ZC to reflect the new numbering and the different scheme of annexes for ecodesign and ecolabelling;

u) new informative Annex ZD, Relationship between this European Standard and the requirements of Commission Regulation (EU) 2015/1095 of 5 May 2015 and Commission Delegated Regulation (EU) 2015/1094 of 5 May 2015;

v) new informative Annex ZE, Relationship between this European Standard and the requirements of 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.

Although this document was 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.

This standard was prepared in the frame of the Commission Regulation (EU) No 813/2013 implementing Directive 2009/125/EC with regard to ecodesign requirements for space heaters and combination heaters. This European standard also aims at showing compliance with the requirements of the European Directive 2010/30/EU and Commission Delegated Regulation (EU) No 811/2013.

This standard was prepared in the frame of the 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, and Commission Delegated Regulation (EU) 2015/1094 of 5 May 2015 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of professional refrigerated storage cabinets.

This standard was prepared in the frame of the 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.

Introduction

Heat pumps, air conditioners and liquid chilling packages can be selected and compared at standard rating conditions. These conditions do not represent the usual operating conditions of the equipment over a season. Better comparison for equipment can be assessed by determining Seasonal Energy Efficiency Ratio and Seasonal Coefficient of Performance that enable to take into account more representative operating conditions and performance at rated capacities.

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 electric 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 SEER and SCOP.

This standard also considers Seasonal Energy Performance Ratio of process chillers (SEPR) which is representative of variations in loads throughout a complete year. Test conditions and test method are described to calculate this SEPR.

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

The standard rating conditions and test methods are given in EN 14511-2 and EN 14511-3.

1 Scope

This European Standard covers air conditioners, heat pumps and liquid chilling packages, including comfort and process chillers. It applies to factory made units defined in EN 14511-1, except single duct, double duct, control cabinet and close control units. It also covers direct exchange-to-water(brine) heat pumps (DX-to-water(brine)) as defined in EN 15879-1.

This European Standard also covers hybrid heat pumps as defined in this standard.

This European Standard gives the temperatures and part load conditions and the calculation methods for the determination of seasonal energy efficiency SEER and $SEER_{on}$, seasonal space cooling energy efficiency $\eta_{s,c}$ seasonal coefficient of performance SCOP, $SCOP_{on}$ and $SCOP_{net}$, and seasonal space heating energy efficiency $\eta_{s,h}$ and seasonal energy performance ratio SEPR.

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 power input during thermostat-off mode, standby mode, off-mode and crankcase heater mode.

NOTE 1 The word “unit” is used instead of the full terms of the products.

NOTE 2 The word “cooling” is used to refer to both space cooling and process cooling.

NOTE 3 The word “heating” is used to refer to space heating.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 267, *Automatic forced draught burners for liquid fuels*

EN 303-2, *Heating boilers - Part 2: Heating boilers with forced draught burners - Special requirements for boilers with atomizing oil burners*

EN 304, *Heating boilers - Test code for heating boilers for atomizing oil burners*

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

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

EN 15879-1, *Testing and rating of direct exchange ground coupled heat pumps with electrically driven compressors for space heating and/or cooling - Part 1: Direct exchange-to-water heat pumps*

EN 15502-1, *Gas-fired heating boilers - Part 1: General requirements and tests*

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 and EN 15879-1 where applicable, 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.

3.1.2
active mode seasonal coefficient of performance
$SCOP_{on}$
average coefficient of performance of the unit in active mode for the designated heating season, determined from the part load, supplementary heating capacity (where required) and bin-specific coefficients of performance ($COP_{bin}(T_j)$) and weighted by the bin hours where the bin condition occurs

Note 1 to entry: For calculation of $SCOP_{on}$, the energy consumption during thermostat-off mode, standby mode, off mode or crankcase heater mode is excluded. The energy consumption of a supplementary heater is added for the part load conditions where the declared capacity of the unit is lower than the heating load, regardless whether this supplementary heater is included in the unit or not.

Note 2 to entry: Expressed in kWh/kWh.

3.1.3
active mode seasonal energy efficiency ratio
$SEER_{on}$
average energy efficiency ratio of the unit in active mode for the cooling function, determined from part load and bin-specific energy efficiency ratios ($EER_{bin}(T_j)$) and weighted by the bin hours where the bin condition occurs

Note 1 to entry: For calculation of $SEER_{on}$, energy consumption during thermostat-off mode, standby mode, off mode or that of the crankcase heater are excluded.

Note 2 to entry: Expressed in kWh/kWh.

3.1.4
annual energy consumption for space cooling
Q_{CE}
energy consumption required to meet the reference annual cooling demand and calculated as the reference annual space cooling demand divided by the active mode seasonal energy efficiency ratio ($SEER_{on}$) and the energy consumption of the unit for thermostat-off-, standby-, off- and crankcase heater-mode during the cooling season

Note 1 to entry: Expressed in kWh