



SLOVENSKI STANDARD

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Condensing units for refrigeration - Rating conditions, tolerances and presentation of manufacturer's performance data

Condensing units for refrigeration - Rating conditions, tolerances and presentation of manufacturer's performance data

Verflüssigungssätze für die Kälteanwendung - Nennbedingungen, Toleranzen und Darstellung von Leistungsdaten des Herstellers

Unités de condensation pour la réfrigération - Conditions de détermination des caractéristiques, tolérances et présentation des performances du fabricant

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EUROPEAN STANDARD

EN 13215

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Condensing units for refrigeration - Rating conditions, tolerances and presentation of manufacturer's performance data

Unités de condensation pour la réfrigération - Conditions de détermination des caractéristiques, tolérances et présentation des performances du fabricant

Verflüssigungssätze für die Kälteanwendung - Nennbedingungen, Toleranzen und Darstellung von Leistungsdaten des Herstellers

This European Standard was approved by CEN on 14 February 2000.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

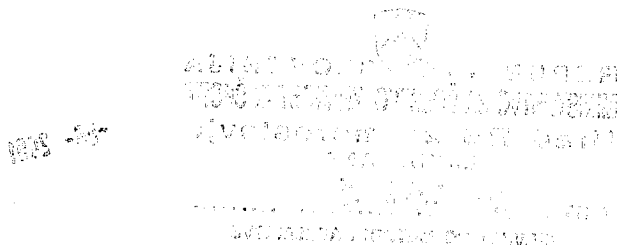
This European Standard has been prepared by Technical Committee CEN/TC 113 "Heat pumps and air conditioning units", the secretariat of which is held by AENOR.

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 September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

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

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1 Scope

This European Standard specifies the rating conditions, tolerances and presentation of manufacturer's performance data for single-stage condensing units for refrigeration with compressors of the positive-displacement type. This is required so that a comparison of different condensing units can be made. The performance data relate to the refrigerating capacity and power absorbed, they include correction factors and refer to full load operation of the condensing unit.

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.

prEN 378-1 : 1999

Refrigerating systems and heat pumps – Safety and environmental requirements – Part 1: Basic requirements, definitions, classification and selection criteria

ISO 817

Refrigerants – Number designation

ISO 917

Testing of refrigerant compressors

3 Definitions

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For the purposes of this European Standard, the definitions of prEN 378-1 : 1999 and the following apply:

3.1 condensing unit: Combination of one or more compressors, condensers or liquid receivers (when applicable) and the regulary furnished accessories, see 3.4.15 of prEN 378-1:1999.

3.2 refrigerating capacity: Product of the mass flow of refrigerant through the condensing unit and the difference between the specific enthalpy of the refrigerant at the condensing unit inlet, the refrigerant being superheated above the suction dew point temperature to the appropriate value (see table 1), and the specific enthalpy of the liquid refrigerant at the condensing unit outlet.

3.3 subcooling: Difference between the bubble point temperature of the refrigerant corresponding to the pressure at the condensing unit outlet and the temperature of the liquid refrigerant at the condensing unit outlet.

3.4 superheat: Difference between the dew point temperature of the refrigerant corresponding to the pressure at the condensing unit inlet and the temperature of the refrigerant vapour at the condensing unit inlet.

3.5 power absorbed:

– for externally driven compressors: the power at the compressor shaft and the power of the fan(s) and other electrical accessories;

– for motor compressors: the electrical power input at the motor terminals and the power of the fan(s) and other electrical accessories.

3.6 coefficient of performance (COP_r): Ratio of refrigerating capacity to the power absorbed.

4 Parameters for the presentation of performance data

The parameters as shown in table 1 shall be used for the presentation of the performance data.

Table 1 - Parameters for the presentation of performance data

Refrigerant	Parameters	Suction temperature (°C) or superheat (K) at the condensing unit inlet	Condensing unit application
Most commonly used halocarbons and hydrocarbons including refrigerant blends		32 °C	Household and similar refrigerators/freezers
		20 °C or 10 K	Other applications
R717		5 K	Any application using ammonia
Other refrigerants		As appropriate, to be clearly specified in performance data	

5 General requirements

The performance data of a condensing unit for refrigeration shall be presented in either tabular or graphical form as shown in 6.2. Data outside the allowable working range of the condensing unit shall not be included.

The performance of the condensing unit at the standard reference points in table 2 shall also be reported.

To calculate the performance at other suction temperatures/superheat and at other compressor speeds, correction factors shall be given as shown in clause 9.

Refrigerants shall be designated in accordance with ISO 817. The source from which the thermodynamic properties are taken shall be stated. <https://standards.iteh.ai/catalog/standards/sist/b3afa4c9-ca5f-4926-9650-e09eae2f0906/sist-en-13215-2001>

NOTE 1 It is recommended that an example illustrating the use of the performance data and the correction factors should be given.

NOTE 2 Other data such as the swept volume, number of cylinders and speed range may also be shown.

6 Performance data

6.1 General

6.1.1 Published performance shall be based on data obtained from tests performed in accordance with ISO 917 adapted to condensing units. If an oil separator is required to reach the performance, then this shall be indicated.

6.1.2 The performance data shall be presented as stated in clause 7 and for:

- open compressors at the rated speed;
- motor compressors at the rated voltage and frequency.

6.2 Tabular or graphical form

The performance data to be given, in either tabular or graphical form, shall comprise:

- the refrigerating capacity, in values able to be read to an accuracy of $\pm 2\%$;
- the power absorbed, in values able to be read to an accuracy of $\pm 2\%$;
- the evaporating temperature/suction dew point temperature, at intervals not greater than 5 K.

7 Standard reference points and conditions

7.1 General

The following data shall be given:

- refrigerating capacity;
- value of subcooling at the condensing unit outlet;
- power absorbed, including fan motors and factory supplied accessories.

The following further information shall be available upon request:

- performance when capacity controlled;
- application limits related to air or water temperature (minimum-maximum);
- for air cooled condensing units: air flow;
- for water cooled condensing units: water flow and pressure drop.

7.2 Standard reference points

The standard reference points shall be in accordance with table 2.

Table 2 - Standard reference points

Condensing unit applications	High evaporating temperature	Medium evaporating temperature	Low evaporating temperature	Household and similar refrigerators/freezers
Reference points				
Evaporating temperature (°C) – suction dew point	+ 5	- 10	- 35	- 25
Suction temperature (°C) or superheat (K)	+ 20 10 or 5 ¹⁾	+ 20 10 or 5 ¹⁾	+ 20 10 or 5 ¹⁾	+ 32
¹⁾ For R717.				

7.3 Air cooled condensing units

The condensing unit performance shall refer to an ambient temperature of 32 °C. The performance given applies to a clean condenser.

NOTE Performance data for the ambient temperatures 27 °C, 38 °C, 43 °C and 49 °C may be presented.

7.4 Water cooled condensing units

The standard reference points shall be 40 °C condensing temperature/dew point temperature corresponding to the compressor discharge pressure. The water inlet temperature shall be 30 °C and the fouling factor $5 \times 10^{-5} \text{ m}^2 \text{ K/W}$.

8 Tolerances

The following tolerances shall apply to manufacturer's stated performance in relation to the measured data obtained at the standard reference points in table 2. These tolerances are needed to take into account manufacturing differences during production.

Table 3 - Tolerances

Condensing unit applications	High evaporating temperature	Medium evaporating temperature	Low evaporating temperature	Household and similar refrigerators/freezers
Tolerance				
Refrigerating capacity ¹⁾ or mass flow	- 7,5 %	- 10,0 %	- 12,5 %	- 7,5 % or - 10 W ²⁾
Power absorbed ¹⁾	+ 7,5 %	+ 10,0 %	+ 12,5 %	+ 7,5 % or + 10 W ²⁾
¹⁾ In any case the tolerance on COP _p shall not exceed 10 %. ²⁾ For values less than 100 W.				

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9 Correction factors

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9.1 Superheat

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The correction factors applicable to the performance data relating to superheat (see clause 5) shall comprise:

- a) the change in refrigerating capacity (or mass flow) as a function of the superheat;
- b) the change in power absorbed as a function of the superheat.

Correction factors for different values of superheat shall be based on experimental data.

9.2 Compressor speed

The correction factors applicable to the performance data relating to the rated speed (see 6.1.2) shall comprise:

- a) the refrigerating capacity (or mass flow) as a function of varying compressor speeds;
- b) the power absorbed as a function of varying compressor speeds.

These correction factors do not apply to motor compressors.