SLOVENSKI STANDARD
oSIST prEN 12900:2024

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Nadomešča:
SIST EN 12900:2013

Kompresorji za hladilne tekočine - Pogoji določanja nazivne moči, toleranc in predstavitev tehničnih karakteristik

Refrigerant compressors - Rating conditions, tolerances and presentation of performance data

Kältemittel-Verdichter - Nennbedingungen, Toleranzen und Darstellung von Leistungsdaten

Compresseurs pour fluides frigorigènes - Détermination des caractéristiques, tolérances et présentation des données de performance

Ta slovenski standard je istoveten z: **prEN 12900**

ICS:

23.140	Kompresorji in pnevmatični stroji	Compressors and pneumatic machines
27.200	Hladilna tehnologija	Refrigerating technology

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EUROPEAN STANDARD

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ICS 23.140; 27.200

Will supersede EN 12900:2013

English Version

Refrigerant compressors - Rating conditions, tolerances and presentation of performance data

Compresseurs pour fluides frigorigènes - Conditions de détermination des caractéristiques, tolérances et présentation des performances par le fabricant

Kältemittel-Verdichter - Nennbedingungen, Toleranzen und Darstellung von Leistungsdaten

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.

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

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European foreword

This document (prEN 12900:2023) has been prepared by Technical Committee CEN/TC “Heat pumps and air conditioning units”, the secretariat of which is held by UNE.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12900:2013.

In comparison with the previous edition, the following technical modifications have been made:

a) The content was updated to match the current other standards in the topic area;

b) Clause 3 “Terms and definitions” was modified;

c) A definition of heating capacity was added to Clause 3;

d) Clause 4 has been revised to simplify the tables;

e) Annex A “Calculation of dew point temperatures from given mean temperatures” was added.

Introduction

The performance data of a refrigerant compressor is commonly expressed as the refrigerating capacity and power consumption when applied in an ideal refrigeration cycle. An ideal cycle is one in which there is no pressure drop or heat transmission through the pipework between the major circuit components. Optionally, the heating capacity, i.e. heat delivered by the condenser or gas cooler, can be shown.

This document defines the conditions that shall be quoted when performance data are presented, so that comparison of different compressors can be easily made.

1 Scope

This document specifies the rating conditions, tolerances and the method of presenting performance data of refrigerant compressors.

This document is applicable to single stage compressor and two stage compressor data with or without an additional intermediate pressure inlet.

The performance data of compressors used with R-744 in transcritical operation are covered in this document.

The data relating to the refrigerating capacity, heating capacity and power absorbed include requirements for part load operation where applicable. Presenting performance in this way enables a comparison of different compressors.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 13771-1, *Compressors and condensing units for refrigeration - Performance testing and test methods - Part 1: Refrigerant compressors*

EN 378-1:2016+A1:2020, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 1: Basic requirements, definitions, classification and selection criteria*

ISO 817, *Refrigerants — Designation and safety classification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 378-1:2016+A1:2020 and the following apply.

— ISO Online browsing platform: available at http://www.iso.org/obp/

— IEC Electropedia: available at http://www.electropedia.org/

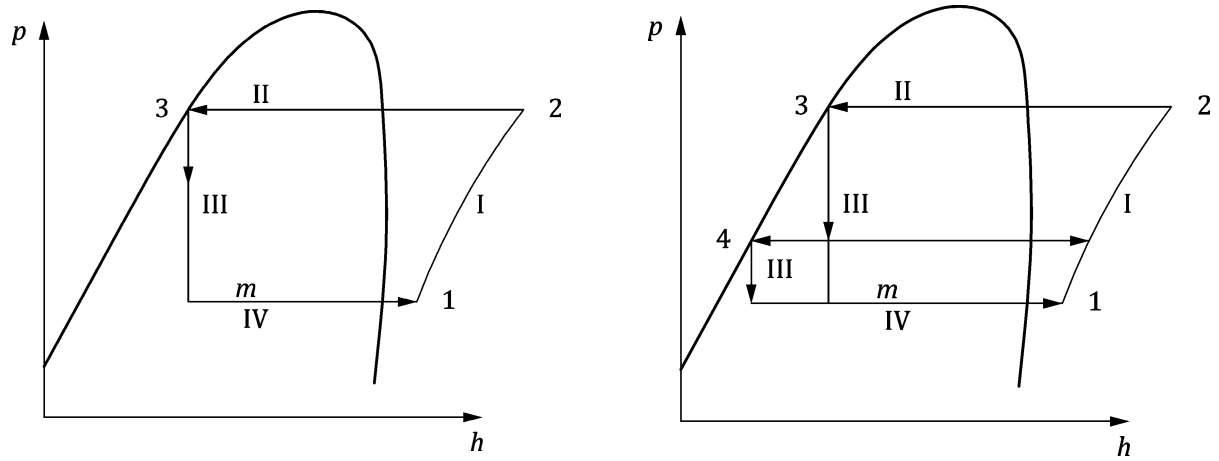
3.1
compressor
device for mechanically increasing the pressure of a refrigerant vapour

[SOURCE: EN 378-1:2016+A1:2020, 3.4.3]

3.2
refrigerating capacity
product of the refrigerant low pressure mass flow rate through the compressor and the specific refrigerant enthalpy difference between the compressor low pressure inlet and the state defined by subcooling, gas cooler outlet conditions or liquid temperature the state at inlet of the low pressure evaporator

Note 1 to entry: For single stage cycles the enthalpy difference is h1-h3 in the respective p-h diagram. For multi-stage expansion cycles it is h1-h4 in the respective p-h diagram. See Figure 1.

Note 2 to entry: The refrigerant at the low stage compressor inlet is superheated above the suction dew point temperature to the stated value.



a) p-h diagram for single stage cycles **b) p-h diagram for multi-stage cycles**

Key

1: compressor inlet
2: compressor outlet
3: inlet of the expansion device
4: (only in subfigure b)) inlet of the low stage expansion device

I: compression
II: condensation
III: expansion
IV: evaporation
m: compressor suction mass flow rate

Figure 1 — p-h diagram

3.3
heating capacity
Q_h
sum of refrigerating capacity and power absorbed

Note 1 to entry: As simplification all losses (compressor and inverter heat losses) for the power absorbed are assumed to create useful heat

3.4
subcooling
difference between the bubble point temperature of the refrigerant for a given pressure and the temperature of the liquid refrigerant

Note 1 to entry: The given pressure can be the compressor discharge pressure or the flash tank pressure

3.5
suction gas superheat
difference between the dew point temperature of the refrigerant corresponding to the compressor suction pressure and the suction gas temperature of the refrigerant at the compressor inlet

3.6
power absorbed
<open type compressors> power at the compressor shaft

3.7
power absorbed
<motor compressors directly operated by the power supply network> electrical power input at the motor terminals

3.8
power absorbed
<motor compressors driven with a frequency inverter for variable speed> electrical power input at the inverter input terminals

3.9
refrigerating coefficient of performance
COP_r
ratio of refrigerating capacity to the power absorbed

3.10
heating coefficient of performance
COP_h
ratio of heating capacity to the power absorbed

3.11
subcritical operation
operating condition with discharge pressure level below the critical pressure

3.12
transcritical operation
operating condition with discharge pressure level above the critical pressure

3.13
part load operation
operation with active capacity control at reduced capacity, for compressors with capacity control mechanism

3.14
fluid
refrigerant liquid, gas or vapour including the state of appearance close to and above the critical pressure

3.15
evaporating temperature
t_0
temperature between the evaporating dew point and the evaporator inlet temperature of the refrigerant at the pressure of the compressor inlet

Note 1 to entry: For refrigerants without glide the evaporating temperature is equal to the dew point temperature at the compressor inlet pressure.

Note 2 to entry: For refrigerants with glide the evaporating temperature is defined as dew point, as arithmetic mean or thermodynamic mean temperature as calculated according to Annex A.

3.16
condensing temperature
t_c
temperature between the condensing dew point and the bubble point of the refrigerant at the compressor discharge pressure

Note 1 to entry: For refrigerants without glide the condensing temperature is equal to the dew point temperature at the compressor discharge pressure.

Note 2 to entry: For refrigerants with glide the condensing temperature is defined as dew point, as arithmetic mean or thermodynamic mean temperature as calculated according to Annex A.

3.17
economiser heat exchanger
heat exchanger which cools refrigerant fluid leaving the condenser or gas cooler by evaporating a portion of that refrigerant at an intermediate pressure

4 Rating conditions

4.1 General

The parameters shown in Table 1 and in the following text shall be used for the presentation of performance data.

Table 1 — Parameters for suction condition options for presentation of performance

Refrigerant	Fixed superheat in K	Fixed suction temperature in °C	Fixed suction temperature for household and similar refrigerators/ freezers in °C
Halocarbons and hydrocarbons including blends	+10	+20	+32
R-744 (CO_2)	+10	n/a	+32
R-717 (NH_3)	+5	n/a	n/a
NOTE A fixed superheat temperature difference of 10 K or 5 K is representing operation of dry suction with small superheat as in dry expansion evaporators or other systems with relatively short pipe runs, where negligible superheat is generated outside the evaporator. A fixed suction temperature of 20 °C or up to 32 °C represents operation in systems with very efficient internal heat exchange, which makes the superheat generated in this internal heat exchanger useful.			

4.2 Ambient temperature around the compressor

The ambient temperature around the compressor is 35 °C.

4.3 Subcooling

The refrigerating capacity shall not allow for any fluid subcooling (0 K) in the condenser for subcritical application, with reference to the pressure at the compressor discharge.

4.4 Gas cooler outlet temperature

For transcritical R-744 applications the gas cooler outlet temperature shall be displayed.

4.5 Application of economising

The enthalpy of the fluid at the inlet to the economising means, a factory specified heat exchanger, an individually selected heat exchanger or an intermediate pressure vessel (flash tank), corresponds to the above mentioned subcooling respective gas cooler outlet temperature and compressor discharge pressure.

The enthalpy of the liquid leaving the economizer is used for calculating the refrigerating capacity.

— For factory specified heat exchanger application, the liquid temperature determined by testing is the reference.