



# SLOVENSKI STANDARD

## SIST EN 12900:2013

01-oktober-2013

Nadomešča:  
SIST EN 12900:2006

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

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

Kältemittel-Verdichter - Nennbedingungen, Toleranzen und Darstellung von Leistungsdaten des Herstellers

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

Ta slovenski standard je istoveten z: EN 12900:2013

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#### **ICS:**

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

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EUROPEAN STANDARD

EN 12900

NORME EUROPÉENNE

EUROPÄISCHE NORM

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ICS 23.140; 27.200

Supersedes EN 12900:2005

English Version

## Refrigerant compressors - Rating conditions, tolerances and presentation of manufacturer's 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 des Herstellers

This European Standard was approved by CEN on 8 June 2013.

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

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## Foreword

This document (EN 12900:2013) 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of an identical text or by endorsement, at the latest by January 2014 and conflicting national standards shall be withdrawn at the latest by January 2014.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 12900:2005.

The main changes with respect to the previous edition are listed below:

- a) Clause 3 “Terms and definitions” is modified;
- b) the revised standard takes into account the application of CO<sub>2</sub>;
- c) the requirements on part load conditions according to Mandate M/488 are considered.

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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.

**EN 12900:2013 (E)****1 Scope**

This European Standard specifies the rating conditions, tolerances and the method of presenting manufacturer's data for positive displacement refrigerant compressors. These include single stage compressors and single and two stage compressors using a means of fluid subcooling. This is required so that a comparison of different refrigerant compressors can be made. The data relate to the refrigerating capacity and power absorbed and include requirements for part-load operation where applicable.

**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 378-1:2008+A2:2012, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 1: Basic requirements, definitions, classification and selection criteria*

EN 13771-1, *Compressors and condensing units for refrigeration — Performance testing and test methods — Part 1: Refrigerant compressors*

ISO 817, *Refrigerants — Designation system*

**3 Terms and definitions**

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For the purposes of this document, the terms and definitions given in EN 378-1:2008+A2:2012 and the following apply.

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**3.1****positive displacement compressor**

compressor in which compression is obtained by changing the internal volume of the compression chamber

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[SOURCE: EN 378-1:2008+A2:2012, 3.4.6]

**3.2****refrigerating capacity**

product of the low pressure mass flow of refrigerant through the compressor and the difference between the specific enthalpy of the refrigerant at the low pressure of the compressor inlet and the specific enthalpy of fluid entering the evaporator expansion device

Note 1 to entry: This latter enthalpy is related to the stated fluid temperature under following pressure conditions:

- for single-stage expansion cycles the compressor discharge pressure;
- for multiple-stage expansion cycles the pressure (dew point temperature) at the corresponding compressor intermediate port.

The refrigerant at the low compressor inlet is superheated above the suction dew point temperature to the stated value.

Note 2 to entry: Condensing temperature is defined as saturated dew point temperature.

**3.3****subcooling**

difference between the bubble point temperature of the refrigerant corresponding to the compressor discharge pressure and the temperature of the liquid refrigerant below the bubble point

**3.4****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

**3.5****power absorbed**

- for externally driven compressors: the power at the compressor shaft
- for motor compressors: the electrical power input at the motor terminals
- for motor compressors with a specific means of factory assembled or factory specified frequency inverter for variable speed (part load) capacity regulation, the electrical power input at the inverter input terminals

**3.6****coefficient of performance**

$COP_r$

ratio of refrigerating capacity to the power absorbed

**3.7****subcritical operation**

operating condition with discharge pressure level below the critical pressure

**3.8****transcritical operation**

operating condition with discharge pressure level above the critical pressure

**3.9****part load operation**

for compressors with capacity control mechanism, part load is interpreted as operation with active capacity control at reduced capacity

Note 1 to entry: On/off cycling of the compressor motor is not considered as capacity control in this context for declaration of part load performance.

**3.10****fluid**

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

**3.11****evaporating temperature**

dew temperature corresponding to the suction pressure of the compressor

**3.12****condensing temperature**

dew temperature corresponding to the discharge pressure of the compressor

#### 4 Parameters for the presentation of performance data

The parameters as shown in Table 1 to Table 4 shall be used for the presentation of the performance data.

**Table 1 — Parameters for the presentation of performance data with compressors used in standard applications**

Refrigerant	Parameters		
	Suction gas temperature (°C) or superheat (K) at the compressor inlet	Ambient temperature around the compressor	Compressor Application
Halocarbons and hydrocarbons including refrigerant blends	32 °C	35 °C	Household and similar refrigerators/ freezers
	20 °C or 10 K		Other applications
R 744 (CO <sub>2</sub> )	32 °C		Household and similar refrigerators/ freezers
	10 K (30 °C <sup>a</sup> )		Other applications
R 717	5 K		Any application using ammonia
Other refrigerants	As appropriate, to be clearly specified in performance data		

<sup>a</sup> Reference point A5, Table 6.

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The refrigerating capacity shall not allow for any fluid subcooling for subcritical operation. For transcritical operation refrigeration capacity has to be related to the gas cooler outlet temperature and the compressor discharge pressure.

If reference points mentioned in Table 5 to Table 7 fall inside the compressor application envelope, compressor performances shall be displayed at those rating conditions.

For CO<sub>2</sub> transcritical applications gas cooler outlet temperature shall be displayed.

NOTE Tables 2 to 4 refer to economised cycles.



**Table 2 — Parameters for the presentation of performance data with compressors using a specific means of factory assembled or factory specified liquid subcooler (subcritical operation) or aftercooler (transcritical operation)**

Refrigerant	Suction gas temperature (°C) or superheat (K) at the compressor inlet	Ambient temperature around the compressor	Compressor application
Halocarbons and hydrocarbons including refrigerant blends	20 °C or 10 K	35 °C	Any application with factory assembled or factory specified subcooler or aftercooler
R 744 (CO <sub>2</sub> )	10 K <sup>a</sup>		
R 717 (NH <sub>3</sub> )	5 K		
Other refrigerants	As appropriate, to be clearly specified in performance data		
NOTE For subcritical operation liquid entering the subcooler is at saturated (bubble) temperature equivalent to the refrigerant pressure at the compressor outlet. For transcritical operation fluid entering the aftercooler is at gas cooler outlet temperature and compressor discharge pressure.			
<sup>a</sup> Or other conditions from Table 6.			

The refrigerating capacity includes the subcooling provided by the subcooler or additional cooling provided by the aftercooler. For CO<sub>2</sub> transcritical applications gas cooler outlet temperature shall be displayed.

**Table 3 — Parameters for the presentation of performance data with compressors using an individually selected liquid subcooler (subcritical operation) or aftercooler (transcritical operation)**

Refrigerant	Suction gas temperature (°C) or superheat (K) at the compressor inlet	Liquid subcooling (K) or temperature (°C)	Saturated intermediate (dew) temperature (°C) or pressure (bar)	Ambient temperature around the compressor	Compressor application
Halocarbons and hydrocarbons including refrigerant blends	20 °C or 10 K	5 K above bubble point temperature corresponding to the pressure at the intermediate port of the compressor	to be specified with reference to suction and discharge pressure	35 °C	Any application with individually selected subcooler or aftercooler
R 744 (CO <sub>2</sub> )	10 K <sup>a</sup>				
R-717 (NH <sub>3</sub> )	5 K				
Other refrigerants	As appropriate, to be clearly specified in performance data				
NOTE For subcritical operation liquid entering the subcooler is at saturated (bubble) temperature equivalent to the refrigerant pressure at the compressor outlet. For transcritical operation fluid entering the aftercooler is at gas cooler outlet temperature and compressor discharge pressure.					
<sup>a</sup> Or other conditions from Table 6.					

The refrigerating capacity includes the subcooling provided by the subcooler or additional cooling provided by the aftercooler. For CO<sub>2</sub> transcritical applications gas cooler outlet temperature shall be displayed.