



SLOVENSKI STANDARD
kSIST FprEN 16084:2010
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Hladilni sistemi in toplotne črpalke - Ocena tesnosti sestavnih delov in spojev

Refrigerating systems and heat pumps - Qualification of tightness of components and joints

Kälteanlagen und Wärmepumpen - Qualifizierung der Dichtheit der Bauteile und Verbindungen

Systèmes de réfrigération et pompes à chaleur - Qualification de l'étanchéité des composants et joints

Ta slovenski standard je istoveten z: FprEN 16084

ICS:

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|--------|----------------------|--------------------------|
| 27.080 | Toplotne črpalke | Heat pumps |
| 27.200 | Hladilna tehnologija | Refrigerating technology |

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EUROPEAN STANDARD
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ICS

English Version

Refrigerating systems and heat pumps - Qualification of tightness of components and joints

Systèmes de réfrigération et pompes à chaleur -
Qualification de l'étanchéité des composants et joints

Kälteanlagen und Wärmepumpen - Qualifizierung der
Dichtheit der Bauteile und Verbindungen

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Foreword

This document (FprEN 16084:2010) has been prepared by Technical Committee CEN/TC 182 “Refrigerating systems, safety and environmental requirements”, the secretariat of which is held by DIN.

This document is currently submitted to the Unique Acceptance Procedure.

FprEN 16084:2010 (E)**1 Scope**

This European Standard is intended to describe the qualification procedure for type approval of the tightness of hermetically sealed and closed components, joints and parts used in refrigerating systems and heat pumps as described in EN 378. The sealed and closed components, joints and parts concerned are, in particular, fittings, bursting discs, flanged or fitted assemblies. The tightness of flexible piping made from non metallic materials is dealt with in EN 1736. Metal flexible piping are covered by this standard.

The requirements contained in this document are applicable to joints of maximum DN 50 and components of maximum 5 l and maximum weight of 50 kg.

This document is intended to characterise their tightness, stresses met during their operations, following the fitting procedure specified by the manufacturer, and to specify the minimal list of necessary information to be provided by the supplier of a component to the person in charge of carrying out this procedure.

It specifies the level of tightness of the component, as a whole, and its assembly as specified by its manufacturer.

It applies to the hermetically sealed and closed components, joints and parts used in the refrigerating installations, including those with seals, whatever their material and their design are.

This document specifies additional requirements for mechanical joints that can be recognised as hermetically sealed joints.

2 Normative references

The following referenced documents are indispensable for the application 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 378-1:2008, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 1: Basic requirements, definitions, classification and selection criteria*

EN 1330-8:1998, *Non-destructive testing — Terminology — Part 8: Terms used in leak tightness testing*

EN 1736, *Refrigerating systems and heat pumps — Flexible pipe elements, vibration isolators, expansion joints and non-metallic tubes — Requirements, design and installation*

EN 12284, *Refrigerating systems and heat pumps — Valves — Requirements, testing and marking*

EN 12693, *Refrigerating systems and heat pumps — Safety and environmental requirements — Positive displacement refrigerant compressors*

EN 13185:2001, *Non-destructive testing — Leak testing — Tracer gas method*

EN ISO 175, *Plastics — Methods of test for the determination of the effects of immersion in liquid chemicals (ISO 175:1999)*

ISO 1817, *Rubber, vulcanized — Determination of the effect of liquids*

IEC 60068-2-6, *Environmental testing — Part 2-6: Tests — Test Fc: Vibration (sinusoidal)*

IEC 60068-2-64, *Environmental testing — Part 2-64: Tests — Test Fh: Vibration, broad-band random and guidance*

IEC 60335-2-34, *Household and similar electrical appliances — Safety — Part 2-34: Particular requirements for motor-compressors*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1330-8:1998 and EN 378-1:2008 and the following apply.

3.1

mass flow rate

q_m

value of the leak mass flow rate at any point of the component

NOTE The mass flow rate is expressed in grams (g) per year.

3.2

volume flow rate

Q

value of the leak volume flow rate at any point of the component

NOTE The volume flow rate is expressed in pascal cubic metres per second (Pa·m³/s).

3.3

hermetically sealed system

system in which all refrigerant containing parts are made tight by welding, brazing or a similar permanent connection which may include capped valves and capped service ports that allow proper repair or disposal and which have a tested tightness control level of less than 3 g per year under a pressure of at least a quarter of the maximum allowable pressure

NOTE Sealed systems as defined in EN 378-1:2008 equal hermetically sealed systems.

3.4

product family

group of products that have the same function, same technology, and same material for each functional part and sealing materials

3.5

permanent joints

means joints which cannot be disconnected excepts by destructive methods

[Adapted from the Pressure Equipment Directive 97/23/EC]

3.6

reusable joint

joint made without replacing the sealing material in general procedure

NOTE In some cases the tube is used as sealing material (e.g. flared joint).

3.7

same base material

material belonging to the same group as follows:

- steel group;
- aluminium and aluminium alloy group; and
- copper group

NOTE Subgroups of these material groups are considered to be same base materials (refer to EN 14276-2).

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4 Symbols

Symbols used in this standard are given in Table 1.

Table 1 — Symbols

| Symbol | Denomination | Unit |
|-------------|--|---------------------------------------|
| DK_{rel} | Percentage deviation of the minimum and maximum torque from the average of the minimum and maximum torque, $(K_{o,max} - K_{o,min}) / (K_{o,min} + K_{o,max})$ | |
| F | Frequency of vibrations | Hz |
| $K_{o,ave}$ | Average torques of the respective joint standard | |
| $K_{o,max}$ | Required maximum torques of the respective joint standard, if specified. Otherwise, the maximum torque values supplied by the manufacturer | |
| $K_{o,min}$ | Required minimum torques of the respective joint standard, if specified. Otherwise, the minimum torque values supplied by the manufacturer | |
| L | Length of tube | Mm |
| N | Number of cycles in temperature and in pressure (method 1) | |
| n_1 | Number of cycles in temperature and in pressure (method 2) | |
| n_2 | Number of cycles in pressure | |
| n_3 | Number of cycles in vibration | |
| n_{total} | Total number of cycles in temperature and in pressure | |
| N | Number of samples | |
| P | Tightness test pressure | bar |
| P_{max} | Maximal pressure of cycle | bar |
| P_{min} | Minimal pressure of cycle | bar |
| PS | Maximal allowable pressure | bar |
| P_{set} | Nominal set pressure of the device | bar |
| Q | Volume flow rate | $\text{Pa} \cdot \text{m}^3/\text{s}$ |
| Qm | Mass flow rate | g/yr |
| S | Vibration displacement (peak to peak value) | Mm |
| T_{max} | Maximal temperature of cycle | °C |
| T_{min} | Minimal temperature of cycle | °C |