



SLOVENSKI STANDARD
oSIST prEN 15834:2008

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

Kälteanlagen und Wärmepumpen - Qualifizierung der Dichtheit der Bauteile und Verbindungen

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ICS:

27.080	V[] [[d ^Á:] æ\ ^	Heat pumps
27.200	Hladilna tehnologija	Refrigerating technology

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

Kälteanlagen und Wärmepumpen - Qualifizierung der Dichtheit der Bauteile und Verbindungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 182.

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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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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Foreword

This document (prEN 15834:2008) 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 CEN Enquiry.

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1 Scope

This document is intended to describe the qualification procedure of the tightness of hermetically sealed and closed components, joints and parts used in the refrigerating industry and fixed air conditioning. The sealed and closed components, joints and parts concerned are, in particular, the fittings, the bursting discs, the flanged or fitted assemblies. The tightness of flexible piping made from non metallic materials is dealt with in prEN 1736. Metal flexible piping are covered by this standard.

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 references 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, *Refrigerating systems and heat pumps — Safety and environmental requirements — Part 1: Basic requirements, definitions, classification and selection criteria*.

<https://standards.iteh.ai/catalog/standards/sist/58a63cb8-7b44-4abd-92bd-171728de6577/en-378-1-2008>

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

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

EN 1779, *Non-destructive testing — Leak testing — Criteria for method and technique selection*.

EN 12263, *Refrigerating systems and heat pumps — Safety switching devices for limiting the pressure — Requirements and test*.

EN 13185, *Nondestructive testing — Leak testing — Tracer gas method*.

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

IEC 60068-2-64, *Environmental testing — Part 2 Test methods — Test Fh: Vibration, broad-band random (digital control) and guidance*.

3 Terms and definitions

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

3.1

maximal flow rate, Q_{\max}

value of the maximal leak flow rate at any point of the component, expressed in grams per year, at PS

3.2

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 grams per year under a pressure of at least a quarter of the maximum allowable pressure

NOTE Sealed systems as defined in prEN 378-1(2007) equal hermetically sealed systems.

3.3

product family

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

3.4

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. flare joint).

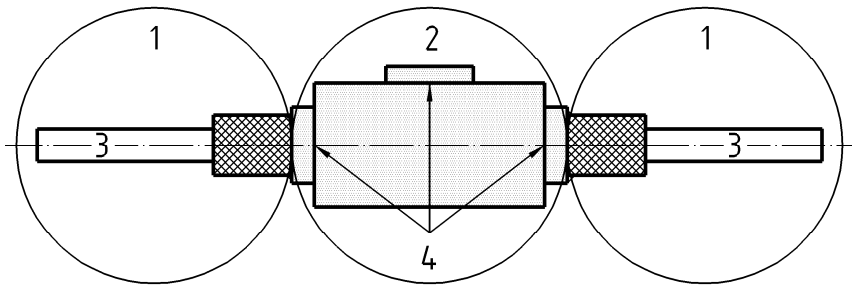
4 Symbols

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 (Hz)	frequency of vibrations
$K_{o,ave}$	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 (mm)	length of tube.
n	number of cycles in temperature and in pressure
n_{total}	total number of cycles in temperature and in pressure
N	number of samples
P (bar)	tightness test pressure
P_{max} (bar)	maximal pressure of cycle
P_{min} (bar)	minimal pressure of cycle
PS (bar)	maximal working pressure
P_{set} (bar)	nominal set pressure of the device
Q_{max} (g/yr)	maximal flow rate
s (mm)	vibration displacement (peak to peak value)
T_{max} (°C)	maximal temperature of cycle
T_{min} (°C)	minimal temperature of cycle

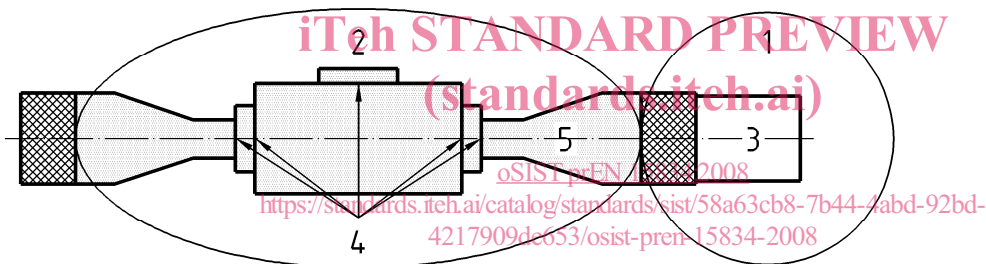
5 Test requirements

The required tests to be applied to components and joints used in refrigerating systems and heat pumps are given in Table 2 and in Table 3.

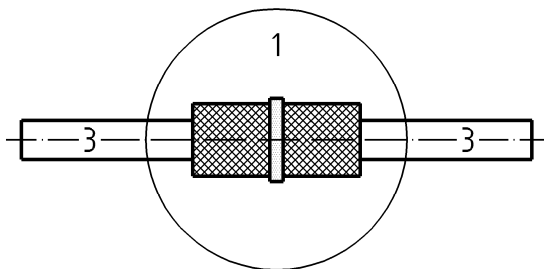
The following Figures show the principle of a component and a joint and their corresponding requirements in Table 2 or Table 3.



According to Table 2



According to Table 2



According to Table 3

Key

- 1 joint
- 2 component
- 3 pipe
- 4 component-joint
- 5 extension pipe

Figure 1 — Principle: component-joint

All component types and joints types shall be tested.

When a component may be connected with different types of joints, one of these joints shall be tested with component according to Table 2. The other possible types of joints shall be tested independently according to Table 3.

EXAMPLE A component having four types of joints shall be tested with the following sequence:

Table 1 — Test sequence for component and its different combinations of joints

Joint type	Tests for joints (if not tested with the body)	Test for component type (body)			
		I (e.g. solenoid)	II (e.g. expansion valve)	III (e.g. hand operated valve)	IV (.....)
A (e.g. brazing)	Yes	the manufacturer shall chose one type of joint	the manufacturer shall chose one type of joint	the manufacturer shall chose one type of joint	the manufacturer shall chose one type of joint
B (e.g. flare)	Yes				
C (e.g. screw connection)	Yes				
D (e.g. welding)	yes				
E (.....)	yes				

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Table 2 — Requirements for components

	Requirements							
	tightness test	PTV- test (pressure-temperature-vibration)	Operation cycle	Freezing test	Chemical compatibility with materials	Vacuum test	Additional test for hermetically sealed	
							Pressure test	Fatigue test
Components (including valves):								
Components having only permanent body joints: brazing and welding Identical base materials	YES	NO	NO	NO	NO	NO	NO	NO
Components having permanent body joints : brazing and welding Different base materials	YES	YES	NO	NO	NO	NO	NO	NO
Components having other permanent body joints : e.g. glue, permanent compression fittings, expansion joints	YES	YES	NO	YES if operating temperature below 0 °C	YES if non metallic parts	YES	YES	YES
Components with non permanent body joints	YES	YES	YES if any external stems, shaft seals or removable or replaceable parts	YES if operating temperature below 0 °C	YES if non metallic parts	YES	Not applicable	Not applicable

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Table 2 (continued)

	Requirements							
	tightness test	PTV- test (pressure- temperature -vibration)	Operation cycle	Freezing test	Chemical compatibility with materials	Vacuum test	Additional test for hermetically sealed	
							Pressure test	Fatigue test
Capped valves and capped service ports for hermetically sealed systems	YES	YES	YES	YES if operating temperature below 0 °C	YES if non metallic parts	YES	YES	YES
Safety valves	YES	YES	NO	NO	YES if non metallic parts	Not applicable	Not applicable	Not applicable
Flexible piping	Test according to EN 1736							

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Table 3 — Requirements for the joining of components

	Requirements							
	tightness test	PTV- test (pressure-temperature-vibration)	Operation cycle	Freezing test	Chemical compatibility with materials	Vacuum test	Additional test for hermetically sealed	
							Pressure test	Fatigue test
Joints and parts:								
Permanent piping joints: brazing and welding Identical base materials	YES	NO	NO	NO	NO	NO	NO	NO
Permanent piping joints: brazing and welding Different base materials	YES	YES	NO	NO	NO	NO	NO	NO
Other permanent piping joints : e.g. glue, permanent compression fittings, expansion joints	YES	YES	NO	YES	YES	YES	YES	YES
Non permanent piping joints	YES	YES	YES	YES	YES, if sealing material	YES	Not applicable	Not applicable
Gaskets and sealing	NO	NO	NO	NO	YES	NO	Not applicable	Not applicable

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6 Requirements for hermetically sealed systems

Hermetically sealed systems shall be constructed with components which have their tightness control level qualified as A1 or A2 as per Table 4. These components and joints shall be submitted to the relevant tests as specified in table 2 and 3.

7 Test procedures

7.1 General

The test characteristics to be applied to the components, joints and parts shall pass the qualification test. The test procedures are shown in Figure 2.

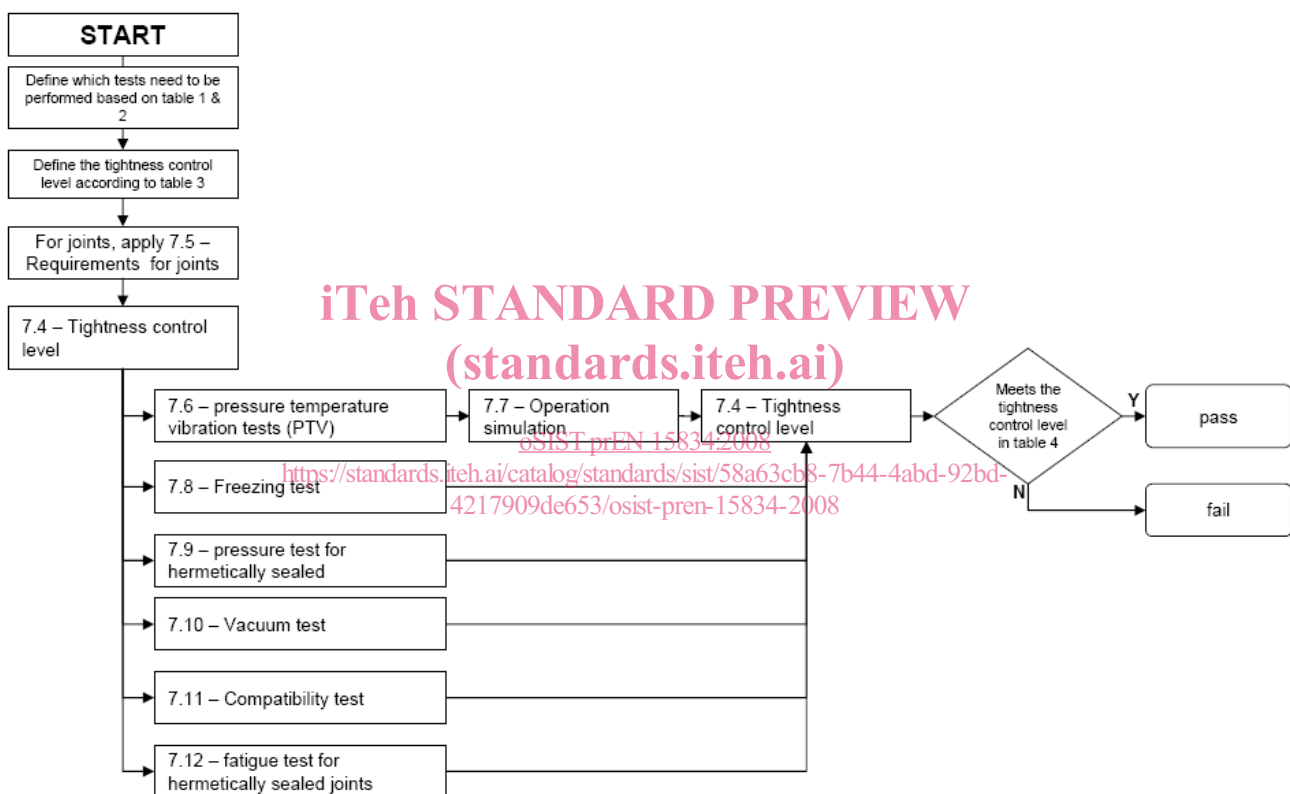


Figure 2 — Test procedure

7.2 Sampling

The largest, the smallest and any random samples in between of the product family shall be submitted to the test as required in Table 2 or Table 3. The samples used for pressure-temperature vibration test (7.6) and for operation simulation (7.7) shall be the same. For each of the other tests (7.8, 7.9, 7.10, 7.11, 7.12), different samples may be used.

7.3 Test temperature

Test temperature (ambient and gas) shall be 15° C to 35° C, unless otherwise specified as the test conditions.