



SLOVENSKI STANDARD
oSIST prEN 14276-2:2017

01-marec-2017

Tlačna oprema za hladilne sisteme in toplotne črpalke - 2. del: Cevovodi - Splošne zahteve

Pressure equipment for refrigerating systems and heat pumps - Part 2: Piping - General requirements

Druckgeräte für Kälteanlagen und Wärmepumpen - Teil 2: Rohrleitungen - Allgemeine Anforderungen

Équipements sous pression pour systèmes de réfrigération et pompes à chaleur - Partie 2 : Tuyauteries - Exigences générales

<https://standards.iteh.ai/standards/sist/c9c46904-a64d-4810-a7cb-3ad77f978458/sist-en-14276-2-2020>

Ta slovenski standard je istoveten z: prEN 14276-2

ICS:

23.020.32	Tlačne posode	Pressure vessels
27.080	Toplotne črpalke	Heat pumps
27.200	Hladilna tehnologija	Refrigerating technology

oSIST prEN 14276-2:2017

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 14276-2

January 2017

ICS 23.020.30; 27.080; 27.200

Will supersede EN 14276-2:2007+A1:2011

English Version

Pressure equipment for refrigerating systems and heat pumps - Part 2: Piping - General requirements

Équipements sous pression pour systèmes de réfrigération et pompes à chaleur - Partie 2 : Tuyauteries - Exigences générales

Druckgeräte für Kälteanlagen und Wärmepumpen - Teil 2: Rohrleitungen - Allgemeine Anforderungen

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.

This draft European Standard was established by CEN 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.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	4
Introduction	5
1 Scope.....	6
2 Normative references.....	6
3 Terms, definitions, symbols, quantities and units	8
3.1 Terms and definitions	8
3.2 Symbols, quantities and units.....	9
4 Material.....	9
4.1 General.....	9
4.2 Requirements for materials to be used for pressurized parts	9
4.3 Materials.....	10
4.3.1 General.....	10
4.3.2 Special considerations	10
4.4 Requirements for the prevention of brittle fracture	10
4.5 Material documentation	10
4.6 Materials for non-pressure retaining parts.....	10
5 Piping classification	10
5.1 Category of piping	10
6 Design.....	11
6.1 General.....	11
6.2 Corrosion, corrosion protection	11
6.3 Loading.....	11
6.4 Design temperature t_d and minimum material temperature	12
6.5 Calculation temperature t_c	12
6.5.1 General.....	12
6.5.2 Piping without heater.....	12
6.5.3 Piping with heater.....	12
6.6 Joint coefficient for welds	12
6.7 Design stress.....	13
6.8 Access and inspection openings, venting and draining provisions, filling and discharge provisions and handling devices.....	13
6.8.1 Access and inspection openings	13
6.8.2 Venting and draining provisions.....	13
6.8.3 Filling and discharge provisions.....	14
6.8.4 Handling devices	14
6.9 Design methods	14
6.9.1 General.....	14
6.9.2 Design by formula (DBF)	15
6.9.3 Joint design.....	16
7 Manufacturing.....	16
7.1 Material traceability	16
7.2 Manufacturing tolerances	16
7.3 Permanent joints.....	16
7.4 Forming of pressure parts	16

7.5	Post weld heat treatment.....	16
7.6	Internal cleanness	16
7.7	Repairs/reworks	16
7.8	Finishing operations.....	17
8	Testing and inspection.....	17
8.1	Performance of inspection and testing.....	17
8.2	Design documentation, review and approval.....	17
8.2.1	General	17
8.2.2	Design documentation.....	17
8.2.3	Design review and design approval.....	19
8.2.4	Design documentation change.....	19
8.3	Type approval	19
8.4	Calibration.....	19
8.5	Material	19
8.6	Manufacturing.....	19
8.7	Non-destructive testing.....	19
8.8	Subcontracted elements.....	19
8.9	Final inspection.....	19
8.9.1	General	19
8.9.2	Visual examination	20
8.9.3	Examination of documentation	20
8.9.4	Pressure test.....	20
8.10	Marking.....	22
8.11	Documentation	23
8.11.1	General	23
8.11.2	Operating instructions.....	23
8.11.3	Technical documentation for user	24
8.11.4	Records.....	24
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2014/68/EU.....		26
Bibliography		27

prEN 14276-2:2017 (E)**European foreword**

This document (prEN 14276-2:2017) 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.

This document will supersede EN 14276-2:2007+A1:2011.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive 2014/68/EU, see informative Annex ZA, which is an integral part of this document.

This document consists of the following parts under the general title *Pressure equipment for refrigerating systems and heat pumps*:

- *Part 1: Vessels — General requirements;*
- *Part 2: Piping — General requirements.*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 14276-2:2020

<https://standards.iteh.ai/catalog/standards/sist/c9c46904-a64d-4810-a7cb-3ad77f978458/sist-en-14276-2-2020>

Introduction

This European Standard recognizes the unique nature of piping for refrigerating systems or heat pumps and is intended to address the specific needs of the refrigeration and heat pump industry. This European Standard should be read in conjunction with the various parts of EN 13480 and prEN 14276-1.

The unique nature of a refrigerating system is defined in the introduction of prEN 14276-1.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 14276-2:2020

<https://standards.iteh.ai/catalog/standards/sist/c9c46904-a64d-4810-a7cb-3ad77f978458/sist-en-14276-2-2020>

prEN 14276-2:2017 (E)**1 Scope**

1.1 This European Standard specifies the requirements for material, design, manufacturing, testing and documentation for stationary piping intended for use in refrigerating systems, heat pumps and secondary cooling and heating systems. These refrigerating systems and heat pump systems are referenced in this standard as refrigerating systems as defined in EN 378-1.

1.2 This European Standard applies to piping, including welded or brazed attachments up to and including the flanges, screwed, welded or brazed connectors, or to the edge to be welded or brazed at the first circumferential joint connecting piping or other elements.

1.3 This European Standard applies to the selection, application and installation of safety accessories intended to protect the piping during the various phases of the refrigeration cycle.

1.4 This European Standard applies to the following piping:

- heat exchanger consisting of piping for the purpose of cooling or heating air where piping aspects are predominant;
- piping incorporated into an assembly (e.g. self-contained system, condensing unit);
- field erected piping.

1.5 This European Standard applies to piping with an internal pressure down to - 1 bar, to account for the evacuation of the piping prior to charging with refrigerant.

1.6 This European Standard applies to both the mechanical loading conditions and thermal conditions as defined in EN 13480-3 associated with refrigerating systems. It applies to piping subject to the maximum allowable temperatures for which nominal design stresses for materials are derived using prEN 14276-1 or as specified in this European Standard. In addition piping designed to this standard needs to have a maximum design temperature not exceeding 150 °C and a maximum design pressure not exceeding 160 bar. Outside of these limits, EN 13480 should be used for the design construction and inspection of the piping. Under these circumstances, the unique nature of a refrigerating plant, as indicated in the introduction of prEN 14276-1, needs also to be taken into account.

1.7 This European Standard applies to piping where the main pressure bearing parts are manufactured from metallic ductile materials as defined in Clause 4 and in prEN 14276-1.

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

EN 378-2, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation*

EN 378-3, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 3: Installation site and personal protection*

EN 378-4, *Refrigerating systems and heat pumps - Safety and environmental requirements - Part 4: Operation, maintenance, repair and recovery*

EN 764-1:2015+A1:2016, *Pressure equipment - Part 1: Vocabulary*

EN 764-2:2012, *Pressure equipment - Part 2: Quantities, symbols and units*

EN 764-4:2014, *Pressure equipment - Part 4: Establishment of technical delivery conditions for metallic materials*

EN 764-5:2014, *Pressure equipment - Part 5: Inspection documentation of metallic materials and compliance with the material specification*

EN 1653, *Copper and copper alloys - Plate, sheet and circles for boilers, pressure vessels and hot water storage units*

EN 10204, *Metallic products - Types of inspection documents*

EN 12178, *Refrigerating systems and heat pumps - Liquid level indicating devices - Requirements, testing and marking*

EN 12735-1, *Copper and copper alloys - Seamless, round tubes for air conditioning and refrigeration - Part 1: Tubes for piping systems*

EN 12735-2, *Copper and copper alloys - Seamless, round tubes for air conditioning and refrigeration - Part 2: Tubes for equipment*

EN 13445-3:2014, *Unfired pressure vessels - Part 3: Design*

EN 13480-2, *Metallic industrial piping - Part 2: Materials*

EN 13480-3:2012, *Metallic industrial piping - Part 3: Design and calculation*

prEN 14276-1:2017, *Pressure equipment for refrigerating systems and heat pumps - Part 1: Vessels - General requirements*

EN ISO 2553, *Welding and allied processes - Symbolic representation on drawings - Welded joints (ISO 2553)*

EN ISO 3452-1:2013, *Non-destructive testing - Penetrant testing - Part 1: General principles (ISO 3452-1:2013)*

EN ISO 4063, *Welding and allied processes - Nomenclature of processes and reference numbers (ISO 4063)*

EN ISO 10042:2005, *Welding - Arc-welded joints in aluminium and its alloys - Quality levels for imperfections (ISO 10042:2005)*

EN ISO 10675-1:2013, *Non-destructive testing of welds - Acceptance levels for radiographic testing - Part 1: Steel, nickel, titanium and their alloys (ISO 10675-1:2008)*

EN ISO 10675-2:2013, *Non-destructive testing of welds - Acceptance levels for radiographic testing - Part 2: Aluminium and its alloys (ISO 10675-2:2010)*

prEN 14276-2:2017 (E)

EN ISO 10893-8, *Non-destructive testing of steel tubes - Part 8: Automated ultrasonic testing of seamless and welded steel tubes for the detection of laminar imperfections (ISO 10893-8)*

EN ISO 10893-11, *Non-destructive testing of steel tubes - Part 11: Automated ultrasonic testing of the weld seam of welded steel tubes for the detection of longitudinal and/or transverse imperfections (ISO 10893-11)*

EN ISO 11666:2010, *Non-destructive testing of welds - Ultrasonic testing - Acceptance levels (ISO 11666:2010)*

EN ISO 16826:2014, *Non-destructive testing - Ultrasonic testing - Examination for discontinuities perpendicular to the surface (ISO 16826:2012)*

EN ISO 17636-1:2013, *Non-destructive testing of welds - Radiographic testing - Part 1: X- and gamma-ray techniques with film (ISO 17636-1:2013)*

EN ISO 17636-2:2013, *Non-destructive testing of welds - Radiographic testing - Part 2: X- and gamma-ray techniques with digital detectors (ISO 17636-2:2013)*

EN ISO 17637:2011, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637:2003)*

EN ISO 17640:2010, *Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment (ISO 17640:2010)*

EN ISO 23277:2015, *Non-destructive testing of welds - Penetrant testing - Acceptance levels (ISO 23277:2015)*

ISO 817, *Refrigerants - Designation and safety classification* 5-2:2020

<https://standards.iteh.ai/catalog/standards/sist/c9c46904-a64d-4810-a7cb-5-2-2020>

3 Terms, definitions, symbols, quantities and units

For the purposes of this document, the terms, definitions, symbols, quantities and units listed in EN 378-1:2016, EN 764-1:2015+A1:2016, EN 764-2:2012, EN 764-4:2014, EN 764-5:2014, prEN 14276-1:2017 and the following apply.

3.1 Terms and definitions

3.1.1

coil

heat exchanger consisting of pipe or tubing (more particularly made from one or more bent pipes) used to cool or heat air

Note 1 to entry: See Figure 1.

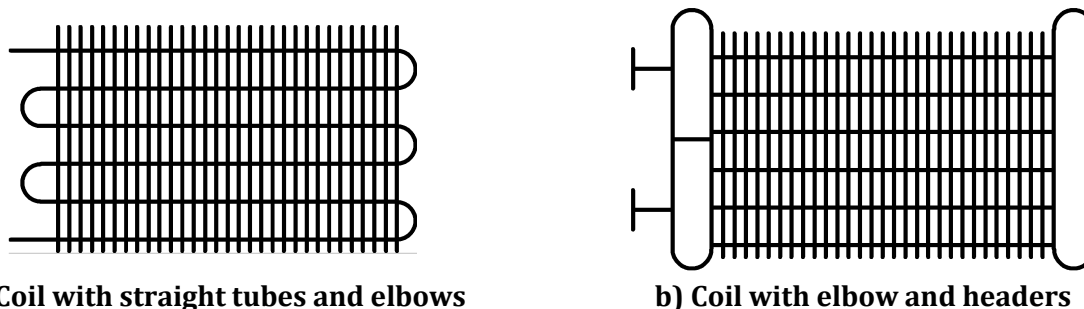


Figure 1 — Coil

3.2 Symbols, quantities and units

Symbols, quantities and units used in this standard are listed in Table 1.

Table 1 — Symbols, quantities and units

Symbol	Quantity	Unit
DN^a	Nominal diameter	—
D_e	External diameter of tube	mm
e	Thickness	mm
f	Nominal design stress at design temperature	MPa
P_c	Calculation pressure (in formula, P_c can be replaced by P)	MPa or bar ^b
P_d	Design pressure	MPa or bar ^b
PS	Maximum allowable pressure	MPa or bar ^b
PT	Penetrant testing	—
P_{test}	Test pressure	MPa or bar ^b
R	Radius of curvature for tube	mm
RT	Radiographic testing	—
t_c	Calculation temperature	°C
t_d	Design temperature	°C
UT	Ultrasonic testing	—
z	Joint coefficient for welds	—
^a	See also prEN 14276-1:2017, 3.1.8.	
^b	1 bar = 100 000 Pa = 0,1 MPa = 0,1 N/mm ² .	

4 Material

4.1 General

The materials referenced in this European Standard shall meet the requirements of prEN 14276-1 unless modified by the subclauses of this clause.

It is permitted to use non-metallic materials (e.g. gaskets, coatings, insulating materials, sight glasses) provided they are compatible with the other materials, refrigerants and lubricants present.

Sight glasses shall comply with EN 12178 for pressure bearing requirements.

4.2 Requirements for materials to be used for pressurized parts

Materials listed in this European Standard have been identified for use in refrigerating piping. If it is required to utilize a material not listed in this European Standard, the requirements of EN 13480-2 shall be followed where applicable and the unique nature of refrigerating plant requirements shall also be taken into account.