



# SLOVENSKI STANDARD

## SIST EN 13480-2:2024

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### Kovinski industrijski cevovodi - 2. del: Materiali

Metallic industrial piping - Part 2: Materials

Metallische industrielle Rohrleitungen - Teil 2: Werkstoffe

Tuyauteries industrielles métalliques - Partie 2: Matériaux

Ta slovenski standard je istoveten z: **EN 13480-2:2024**

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## Metallic industrial piping - Part 2: Materials

Tuyauteries industrielles métalliques - Partie 2:  
Matériaux

Metallische industrielle Rohrleitungen - Teil 2:  
Werkstoffe

This European Standard was approved by CEN on 9 July 2024.

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

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## EN 13480-2:2024 (E)

### European foreword

This document (EN 13480-2:2024) has been prepared by Technical Committee CEN/TC 267 “Industrial piping and pipelines”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by December 2024, and conflicting national standards shall be withdrawn at the latest by December 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13480-2:2017.

This new edition incorporates the Amendments which have been approved previously by CEN members, and the corrected pages up to Issue 3 without any further technical change. Annex Y provides details of significant technical changes between this European Standard and the previous edition.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

This European Standard EN 13480 for metallic industrial piping consists of eight interdependent and not dissociable Parts which are:

- *Part 1: General;*
- *Part 2: Materials;*
- *Part 3: Design and calculation;*
- *Part 4: Fabrication and installation;*
- *Part 5: Inspection and testing;*
- *Part 6: Additional requirements for buried piping;*
- *CEN/TR 13480-7, Guidance on the use of conformity assessment procedures;*
- *Part 8: Additional requirements for aluminium and aluminium alloy piping.*

Although these Parts may be obtained separately, it should be recognized that the Parts are inter-dependant. As such the manufacture of metallic industrial piping requires the application of all the relevant Parts in order for the requirements of the Standard to be satisfactorily fulfilled.

This European Standard will be maintained by a Maintenance MHD working group whose scope of working is limited to corrections and interpretations related to EN 13480. The contact to submit queries can be found at <https://unm.fr/en/maintenance-agencies/maintenance-agency-en-13480/>. A form for submitting questions can be downloaded from the link to the MHD website. After subject experts have agreed an answer, the answer will be communicated to the questioner. Interpretation sheets will be posted on the website of the MHD.

Amendments to this new edition may be issued from time to time and then used immediately as alternatives to rules contained herein. These amendments will be consolidated within EN 13480:2024 in accordance with the maintenance system of EN 13480 series approved by CEN/BT Decision C172/2021.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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## EN 13480-2:2024 (E)

### 1 Scope

This document specifies the requirements for steel products used for industrial piping and supports.

For some metallic materials other than steel, such as spheroidal graphite cast iron, aluminium, nickel, copper, titanium, requirements are or will be formulated in separate parts of this document.

For metallic materials which are not covered by a harmonized material standard and are not likely to be in near future, specific rules are given in this part or the above cited parts of this document.

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

EN 1092-1:2018, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1515-4:2021, *Flanges and their joints — Bolting — Part 4: Selection of bolting for equipment subject to the Pressure Equipment Directive 2014/68/EU*

EN 1591-1:2013, *Flanges and their joints — Design rules for gasketed circular flange connections — Part 1: Calculation*

EN 10028-1:2017, *Flat products made of steels for pressure purposes — Part 1: General requirements*

EN 10028-2:2017, *Flat products made of steels for pressure purposes — Part 2: Non-alloy and alloy steels with specified elevated temperature properties*

EN 10028-3:2017, *Flat products made of steels for pressure purposes — Part 3: Weldable fine grain steels, normalized*

EN 10028-4:2017, *Flat products made of steels for pressure purposes — Part 4: Nickel alloy steels with specified low temperature properties*

EN 10028-5:2017, *Flat products made of steels for pressure purposes — Part 5: Weldable fine grain steels, thermomechanically rolled*

EN 10028-6:2017, *Flat products made of steels for pressure purposes — Part 6: Weldable fine grain steels, quenched and tempered*

EN 10028-7:2016, *Flat products made of steels for pressure purposes — Part 7: Stainless steels*

EN 10204:2004, *Metallic products — Types of inspection documents*

EN 10213:2007+A1:2016, *Steel castings for pressure purposes*

EN 10216-1:2013, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 1: Non-alloy steel tubes with specified room temperature properties*

EN 10216-2:2013+A1:2019, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties*



EN 10216-3:2013, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 3: Alloy fine grain steel tubes*

EN 10216-4:2013, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 4: Non-alloy and alloy steel tubes with specified low temperature properties*

EN 10216-5:2021, *Seamless steel tubes for pressure purposes — Technical delivery conditions — Part 5: Stainless steel tubes*

EN 10217-1:2019, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 1: Electric welded and submerged arc welded non-alloy steel tubes with specified room temperature properties*

EN 10217-2:2019, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-3:2019, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 3: Electric welded and submerged arc welded alloy fine grain steel tubes with specified room, elevated and low temperature properties*

EN 10217-4:2019, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 4: Electric welded non-alloy steel tubes with specified low temperature properties*

EN 10217-5:2019, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 5: Submerged arc welded non-alloy and alloy steel tubes with specified elevated temperature properties*

EN 10217-6:2019, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 6: Submerged arc welded non-alloy steel tubes with specified low temperature properties*

EN 10217-7:2021, *Welded steel tubes for pressure purposes — Technical delivery conditions — Part 7: Stainless steel tubes*

EN 10222-1:2017, *Steel forgings for pressure purposes — Part 1: General requirements for open die forgings*

EN 10222-2:2017+A1:2021, *Steel forgings for pressure purposes — Part 2: Ferritic and martensitic steels with specified elevated temperature properties*

EN 10222-3:2017, *Steel forgings for pressure purposes — Part 3: Nickel steels with specified low temperature properties*

EN 10222-4:2017+A1:2021, *Steel forgings for pressure purposes — Part 4: Weldable fine grain steels with high proof strength*

EN 10222-5:2017, *Steel forgings for pressure purposes — Part 5: Martensitic, austenitic and austenitic-ferritic stainless steels*

EN 10253-2:2021, *Butt-welding pipe fittings — Part 2: Non alloy and ferritic alloy steels with specific inspection requirements*

EN 10253-4:2008, *Butt-welding pipe fittings — Part 4: wrought austenitic and austenitic-ferritic (duplex) stainless steels with specific inspection requirements*

EN 10269:2013, *Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties*

EN 10272:2016, *Stainless steel bars for pressure purposes*

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EN 10273:2016, *Hot rolled weldable steel bars for pressure purposes with specified elevated temperature properties*

EN 12074:2000, *Welding consumables — Quality requirements for manufacture, supply and distribution of consumables for welding and allied processes*

EN 13445-2:2021, *Unfired pressure vessels — Part 2: Materials*

EN 13445-3:2021, *Unfired pressure vessels — Part 3: Design*

EN 13445-4:2021, *Unfired pressure vessels — Part 4: Fabrication*

EN 13445-5:2021, *Unfired pressure vessels — Part 5: Inspection and testing*

EN 13479:2017, *Welding consumables — General product standard for filler metals and fluxes for fusion welding of metallic materials*

EN 13480-1:2024, *Metallic industrial piping — Part 1: General*

EN 13480-3:2024, *Metallic industrial piping — Part 3: Design and calculation*

EN 13480-4:2024, *Metallic industrial piping — Part 4: Fabrication and installation*

EN ISO 148-1:2016, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2016)*

EN ISO 898-1:2013, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread (ISO 898-1:2013)*

EN ISO 898-2:2012, *Mechanical properties of fasteners — Part 2: Nuts with specified proof load values — Coarse thread (ISO 898-2:2012)*

EN ISO 2566-1:2021, *Steel — Conversion of elongation values — Part 1: Carbon and low alloy steels (ISO 2566-1:2021)*

EN ISO 2566-2:2021, *Steel — Conversion of elongation values — Part 2: Austenitic steels (ISO 2566-2:2021)*

EN ISO 3269:2019, *Fasteners — Acceptance inspection (ISO 3269:2019)*

EN ISO 3506-1:2020, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs with specified grades and property classes (ISO 3506-1:2020)*

EN ISO 3506-2:2020, *Fasteners — Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts with specified grades and property classes (ISO 3506-2:2020)*

EN ISO 16426:2002, *Fasteners — Quality assurance system (ISO 16426:2002)*

CEN ISO/TR 15608:2017, *Welding — Guidelines for a metallic materials grouping system (ISO/TR 15608:2017)*

### 3 Terms and definitions, symbols and units

#### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13480-1:2024, EN 764-1:2015+A1:2016 and the following apply.

##### 3.1.1

**minimum metal temperature**  $T_M$

lowest temperature determined for any of the following conditions:

- normal operations;
- start up and shut down procedures;
- possible process upsets, such as flashings of fluid, which have an atmospheric boiling point below 0 °C;
- during pressure or leak testing.

Note to entry See also 3.1.2 and 3.1.3.

##### 3.1.2

**temperature adjustment term**  $T_A$

temperature relevant to the calculation of the design reference temperature  $T_R$  and dependent on the calculated tensile membrane stress at the appropriate minimum metal temperature

Note 1 to entry Values for temperature adjustment term  $T_A$  are given in Table B.2-12.

Note 2 to entry For tensile membrane stress reference is made to EN 13480-3:2024, Clause 12.

##### 3.1.3

**design reference temperature**  $T_R$

temperature used for determining the impact energy requirements and determined by adding the temperature adjustment  $T_A$  to the minimum metal temperature  $T_M$

$$T_R = T_M + T_A$$

##### 3.1.4

**impact test temperature**  $T_{KV}$

temperature at which the required resistance to impact energy is achieved

Note to entry See B.2.

##### 3.1.5

**impact energy**  $KV$

energy absorbed by a sample of material when subjected to a Charpy-V-notch impact test in accordance with EN ISO 148-1:2016

##### 3.1.6

**reference thickness**  $e_B$

thickness of a component to be used to relate the design reference temperature  $T_R$  of the component with its required impact test temperature  $T_{KV}$

Note 1 to entry See Tables B.2-2 to B.2-7 and Figures B.2-1 to B.2-11.

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Note 2 to entry      The reference thickness  $e_B$ , specified in Table B.5-1, is based on the nominal thickness (including corrosion allowance). For butt welded components  $e_B$  is the nominal wall thickness of the component at the edge of the weld preparation.

**3.2 Symbols and units**

For the purposes of this document, the symbols and units of EN 13480-1:2024 apply together with those given in Table 3.2-1.

**Table 3.2-1 — Symbols and units**

Symbol	Characteristic	Unit
$a_K$	Form factor	–
$b$	width	mm
$C$	constant	–
$e_B$	reference thickness	mm
$G$	shear modulus	N/mm <sup>2</sup> (MPa)
HB	Brinell hardness	–
HV	Vickers hardness	–
$h$	maximum permissible reinforcement of weld	mm
KV	Impact rupture energy	J
$L_o$	length (gauge length)	mm
$P$	pressure	bar
$P_{LM}$	parameter according to Larson-Miller	–
$R_e$	yield strength	N/mm <sup>2</sup> (MPa)
$R_{mTt}$	creep rupture strength for $T$ in h at temperature $t$	N/mm <sup>2</sup> (MPa)
$S_0$	original cross section area	mm <sup>2</sup>
$T_A$	temperature adjustment term	°C
$T_M$	minimum metal temperature	°C
$T_{KV}$	material impact test temperature	°C
$T_R$	design reference temperature	°C
$\alpha$	linear expansion coefficient	K <sup>-1</sup>
$\varepsilon$	strain	%
NOTE 1 N/mm <sup>2</sup> = 1 MPa		

## 4 Requirements for materials to be used for pressure containing parts in industrial piping

### 4.1 General

**4.1.1** Materials to be used for pressure containing parts in industrial piping shall meet the general requirements of 4.1 and the special provisions of 4.2 if applicable. Materials for pressure containing parts shall be ordered complying with the technical delivery conditions in 4.3.

Marking of materials for pressure containing parts shall be performed in accordance with 4.4.

Materials shall be selected in accordance with Annex A.

Materials shall be selected to be compatible with anticipated fabrication steps and to be suitable for the internal fluid and external environment. Both normal operating conditions and transient conditions occurring during fabrication, transport, testing, commissioning and decommissioning shall be taken into account when specifying the materials.

NOTE 1 The requirements of 4.1 and 4.2 can also be fulfilled when technical delivery conditions are developed for European Standards for materials, European Approval of Materials or Particular Material Appraisals.

NOTE 2 When technical delivery conditions for pressure-containing parts are developed, the structure and requirements of EN 764-4:2014 can be met. Exceptions can be technically justified.

The materials shall be grouped in accordance with CEN ISO/TR 15608:2017 to relate manufacturing and inspection requirements to generic material types.

NOTE 3 Materials have been allocated into these groups in accordance with their chemical composition and properties in relation to manufacture and heat treatment after welding.

**4.1.2** Materials for pressure containing parts compliant with the requirements of this European Standard shall be certified on the basis of EN 10204:2004.

NOTE The certification can be in accordance with EN 764-5:2014.

**4.1.3** The products shall be free from surface and internal defects which might impair their usability.

**4.1.4** The specified minimum elongation of the steel after fracture shall be:

—  $\geq 14\%$  for the transverse direction; and

—  $\geq 16\%$  for the longitudinal direction, or where this is the less critical direction, the transverse direction;

when measured on a gauge length,  $L_0$ , calculated as follows:

$$L_0 = 5,65\sqrt{S_0} \quad (4.1-1)$$

where

$S_0$  is the original cross sectional area within the gauge length in order to fulfil formula 4.1-1.

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However, lower elongation values than specified in 4.1 (e. g. for fasteners or castings) **can** also be applied, provided that appropriate measures shall be taken by the parties concerned to compensate for these lower values and that compliance with the specific requirements is verifiable.

NOTE Examples of appropriate measures:

- application of higher safety factors in design;
- performance of appropriate burst tests to demonstrate ductile material behaviour.

**4.1.5** When measured on a gauge length other than that stated in 4.1.4, the minimum elongation after fracture shall be determined by converting the elongation given in 4.1.4 in accordance with:

- EN ISO 2566-1:2021 for carbon and low alloy steels;
- EN ISO 2566-2:2021 for austenitic steels.

**4.1.6** Steels shall have a specified minimum impact energy measured on a Charpy V-notch impact test specimen (EN ISO 148-1:2016) as follows:

- $\geq 27$  J for ferritic and 1,5 % to 5 % Ni alloyed steels;
- $\geq 40$  J for steels of material groups 8, 9.3 and 10,

at a test temperature in accordance with Annex B, but not higher than 20 °C. The other requirements of Annex B shall also apply.

**4.1.7** The chemical composition of steels intended for welding or forming shall not exceed the values given in Table 4.1-1. Exceptions shall be technically justified.

**Table 4.1-1 — Maximum carbon, phosphorus and sulphur content for steel intended for welding or forming**

Material group (according to Table A.1)	Maximum content of cast analysis as mass fraction		
	% C	% P	% S
Steels (1 to 6 and 9)	0,23 <sup>a</sup>	0,035	0,025
Ferritic stainless steels (7.1)	0,08	0,040	0,015
Martensitic stainless steels (7.2)	0,06	0,040	0,015
Austenitic stainless steels (8.1) (8.3)	0,08	0,045	0,015 <sup>b</sup>
Austenitic stainless steels (8.2)	0,10	0,035	0,015
Austenitic-ferritic stainless steels (10)	0,030	0,035	0,015

<sup>a</sup> Maximum content of product analysis 0,25 % (mass fraction).

<sup>b</sup> For products to be machined a controlled sulphur content of 0,015 % (mass fraction) to 0,030 % (mass fraction) is permitted by agreement provided the resistance to corrosion is satisfied for the intended purpose.