

STN	Tvarovky na priváranie na tupo Časť 2: Nelegované a legované feritické ocele s osobitnými kontrolnými požiadavkami	STN EN 10253-2 13 2200
------------	---	--

Butt-welding pipe fittings - Part 2: Non alloy and ferritic alloy steels with specific inspection requirements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/21

Obsahuje: EN 10253-2:2021

Oznámením tejto normy sa ruší
STN EN 10253-2 (13 2200) z apríla 2008

134008

EUROPEAN STANDARD

EN 10253-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2021

ICS 77.140.20; 23.040.40; 77.140.45

Supersedes EN 10253-2:2007

English Version

Butt-welding pipe fittings - Part 2: Non alloy and ferritic alloy steels with specific inspection requirements

Raccords à souder bout à bout - Partie 2 : Aciers non alliés et aciers ferritiques alliés avec contrôle spécifique

Formstücke zum Einschweißen - Teil 2: Unlegierte und legierte ferritische Stähle mit besonderen Prüfanforderungen

This European Standard was approved by CEN on 30 May 2021.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN 10253-2:2021 (E)

Contents		Page
European foreword		6
Introduction		8
1	Scope	9
2	Normative references	9
3	Terms and definitions	13
4	Symbols and abbreviations	14
5	Classification and designation	15
5.1	Classification of grades	15
5.2	Designation of steel grades	15
5.3	Designation of fittings	15
5.3.1	General	15
5.3.2	Elbows and return bends	15
5.3.3	Reducers	15
5.3.4	Tees	16
5.3.5	Caps	16
6	Information to be supplied by the purchaser	16
6.1	Mandatory information	16
6.2	Options	16
6.3	Examples of an order	18
6.3.1	Example 1	18
6.3.2	Example 2	18
6.3.3	Example 3	18
6.3.4	Example 4	18
6.3.5	Example 5	18
7	Resistance to internal pressure	19
7.1	General	19
7.2	Fittings of type A	19
7.3	Fittings of type B	19
8	Manufacturing process	19
8.1	Steelmaking process	19
8.2	Product making process for fittings and heat treatment	19
8.2.1	Product making process	19
8.2.2	Welding	20
8.2.3	Heat treatment condition	21
9	Technical requirements	23
9.1	General	23
9.2	Chemical composition	23
9.2.1	Cast analysis	23
9.2.2	Product analysis	23
9.3	Mechanical properties	27
9.4	Creep rupture strength values	34
9.5	Weldability	34
10	Appearance and internal soundness (delivery conditions)	34

10.1	Definitions of surface imperfections	34
10.2	Appearance	36
10.3	Internal soundness	36
11	Dimensions and tolerances	36
11.1	Dimensions	36
11.1.1	General	36
11.1.2	Elbows	37
11.1.3	Tees	37
11.1.4	Reducers	38
11.1.5	Caps	39
11.1.6	Preferred diameters and wall thicknesses	39
11.2	Dimensional tolerances	41
11.2.1	Diameter	41
11.2.2	Out of roundness	41
11.2.3	Wall thickness tolerances	42
11.2.4	Tolerances on specific dimensions and form	42
11.2.5	Corrugation	43
11.3	Performance of the end bevelling	44
12	Inspection	45
12.1	Type of inspection	45
12.2	Inspection documents	45
12.2.1	Type of inspection documents	45
12.2.2	Content of inspection documents	45
12.3	Summary of inspection and testing	46
13	Sampling	48
13.1	Frequency of tests	48
13.1.1	Test unit	48
13.1.2	Number of test pieces per test unit	49
13.2	Preparation of samples and test pieces	49
13.2.1	Samples for product analysis	49
13.2.2	Samples and test pieces for mechanical tests	50
13.2.3	Test piece for the tensile test on the base material	50
13.2.4	Test piece for the tensile test transverse to the weld	50
13.2.5	Test piece for the weld bend test	50
13.2.6	Test piece for the impact test	50
14	Test methods	51
14.1	Chemical analysis	51
14.2	Tensile test on the base material	51
14.2.1	At room temperature	51
14.2.2	At elevated temperature	51
14.3	Transverse tensile test on the weld	51
14.4	Hardness test	51
14.5	Weld bend test	52
14.6	Impact testing	52
14.7	Dimensional testing	53
14.8	Visual testing (VT)	53
14.9	Non-destructive testing (NDT)	53
14.9.1	Personnel	53
14.9.2	NDT of the weld	53
14.9.3	NDT of cold formed tees	53
14.9.4	NDT for the detection of laminar imperfections	54

EN 10253-2:2021 (E)

14.9.5 NDT for the detection of longitudinal imperfections	54
14.9.6 NDT for the detection of transverse imperfections	54
14.9.7 NDT of bars and forgings	54
14.10 Positive material identification (PMI)	54
15 Marking	55
16 Protection and packaging	56
Annex A (normative) Dimensions	57
A.1 General	57
A.2 Elbows	57
A.3 Tees	59
A.4 Reducers	61
A.5 Caps	63
Annex B (normative) Determination of pressure factors and wall thickness	65
B.1 General	65
B.2 Symbols and units	65
B.3 Minimal and nominal wall thickness	68
B.4 Pressure factors of fittings of type A	68
B.4.1 General	68
B.4.2 Pressure factor	68
B.4.3 Elbows	69
B.4.4 Tees	69
B.4.5 Reducers	72
B.4.6 Caps	77
B.5 Wall thicknesses of fittings of type B	79
B.5.1 General	79
B.5.2 Elbows	79
B.5.3 Tees	80
B.5.4 Reducers	83
B.5.5 Caps	87
Annex C (normative) Pressure factor tables for Fittings of type A	89
C.1 General	89
C.2 Elbows	89
C.3 Tees	92
C.4 Reducers	99
C.5 Caps	108
Annex D (informative) Wall thickness tables for fittings of type B	109
D.1 General	109

D.2	Elbows	109
D.3	Tees	112
D.4	Reducers	121
D.5	Caps	136
Annex E (informative)	Recommended heat treatment temperatures	137
Annex F (informative)	Creep rupture strength values	138
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 2014/68/EU	143
Bibliography		145

EN 10253-2:2021 (E)

European foreword

This document (EN 10253-2:2021) has been prepared by Technical Committee CEN/TC 459 “ECISS - European Committee for Iron and Steel Standardization”, 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 February 2022, and conflicting national standards shall be withdrawn at the latest by February 2022.

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 10253-2:2007.

The main changes compared to the previous edition are listed below:

- a) Document technically and editorially revised;
- b) Updating of Clause 2 “Normative References”;
- c) Revision of chemical composition and steel grades;
- d) Revision of permissible deviations of the product analysis from specified limits on cast analysis;
- e) Revision of mechanical properties;
- f) Revision of minimum proof strength including minimum wall thickness;
- g) Revision of impact properties including minimum requirements;
- h) Revision of fitting dimensions and moving to new Annex A;
- i) Addition of creep rupture strength values;
- j) Revision of inspection and tests;
- k) Revision of pressure factors;
- l) Updating of Annex ZA to follow new EU Directive 2014/68/EU for pressure equipment;
- m) Updating of the Bibliography.

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 2014/68/EU.

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

EN 10253 comprises a series of European Standards about *Butt-welding pipe fittings*, namely:

- *Part 1: Wrought carbon steel for general use and without specific inspection requirements;*
- *Part 2: Non alloy and ferritic alloy steels with specific inspection requirements;*
- *Part 3: Wrought austenitic and austenitic-ferritic (duplex) stainless steels without specific inspection requirements;*
- *Part 4: Wrought austenitic and austenitic-ferritic (duplex) stainless steels with specific inspection requirements.*

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 organisations 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, Turkey and the United Kingdom.

EN 10253-2:2021 (E)

Introduction

In writing this document the competent committee recognized that there are two broad types of products commonly used, and decided to reflect these in the standard by differentiating between two parts.

EN 10253-1 describes fittings without formal reference to the pressure resistance, which are not intended to be used in applications, covered by the Pressure Equipment Directive (2014/68/EU) categories I to IV.

EN 10253-2 defines two types of fittings: Type A fittings have the same wall thickness at the welding ends and at the body of the fitting as a pipe having the same specified wall thickness. Their resistance to internal pressure is, in general, less than that of a straight pipe with the same dimensions. Type B fittings showing increased wall thickness at the body of the fitting are designed to resist the same internal pressure as a straight pipe with same dimensions. These two types of fittings are intended to be used in applications covered by the EU Directive 2014/68/EU. According to this Directive and further interpretation guidelines (e.g. guideline G – 19), seamless fittings are considered as materials whereas welded fittings are considered as components. Therefore, in some areas of this document, provisions for seamless and welded fittings are different.

The selection of steel type and requirement level depend on many factors; the properties of the fluid to be conveyed, the service conditions, the design code and any statutory requirements should all be taken into consideration. Therefore this document gives no detailed guidelines for the application of different fittings. It is the ultimate responsibility of the user to select the appropriate fitting for the intended application.

1 Scope

This document specifies the technical delivery requirements for seamless and welded butt-welding fittings (elbows, concentric and eccentric reducers, equal and reducing tees, caps) made of carbon and alloy steel in two test-categories which are intended for pressure purposes at room temperature, at low temperature or at elevated temperatures, and for the transmission and distribution of fluids and gases.

It specifies:

- a) type of fittings;
 - type A: Butt-welding fittings with reduced pressure factor;
 - type B: Butt-welding fittings for use at full service pressure;
- b) steel grades and their chemical compositions;
- c) mechanical properties;
- d) dimensions and tolerances;
- e) requirements for inspection and testing;
- f) inspection documents;
- g) marking;
- h) protection and packaging.

NOTE The selection of the appropriate fitting (material, thickness) is the ultimate responsibility of the manufacturer of the pressure equipment (see European Legislation for Pressure Equipment). In the case of a harmonized supporting standard for materials, presumption of conformity to the ESRs is limited to technical data of materials in the standard and does not presume adequacy of the material to a specific item of equipment. Consequently, it is essential that the technical data stated in the material standard be assessed against the design requirements of this specific item of equipment to verify that the ESRs of the PED are satisfied.

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 10020:2000, *Definition and classification of grades of steel*

EN 10021:2006, *General technical delivery conditions for steel products*

EN 10027-1:2016, *Designation systems for steels - Part 1: Steel names*

EN 10027-2:2015, *Designation systems for steels - Part 2: Numerical system*

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 10253-2:2021 (E)

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

EN 10160:1999, *Ultrasonic testing of steel flat product of thickness equal or greater than 6 mm (reflection method)*

EN 10168:2004, *Steel products - Inspection documents - List of information and description*

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

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 10220:2002, *Seamless and welded steel tubes - Dimensions and masses per unit length*

EN 10222-2:2017, *Steel forgings for pressure purposes - Part 2: Ferritic and martensitic steels with specified elevated temperatures properties*

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

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

EN 10228-3:2016, *Non-destructive testing of steel forgings - Part 3: Ultrasonic testing of ferritic or martensitic steel forgings*

EN 10266:2003, *Steel tubes, fittings and structural hollow sections - Symbols and definitions of terms for use in product standards*

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

EN 13480-2:2017, *Metallic industrial piping - Part 2: Materials*

EN 13480-3:2017, *Metallic industrial piping - Part 3: Design and calculation*

- EN 13480-5:2017, *Metallic industrial piping - Part 5: Inspection and testing*
- EN ISO 148-1:2016, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1:2016)*
- EN ISO 377:2017, *Steel and steel products - Location and preparation of samples and test pieces for mechanical testing (ISO 377:2017)*
- EN ISO 2566-1:1999, *Steel - Conversion of elongation values - Part 1: Carbon and low alloy steels (ISO 2566-1:1984)*
- EN ISO 3166-1:2020, *Codes for the representation of names of countries and their subdivisions — Part 1: Country code (ISO 3166-1:2020)*
- EN ISO 3183:2019, *Petroleum and natural gas industries - Steel pipe for pipeline transportation systems (ISO 3183:2019)*
- EN ISO 4136:2012, *Destructive tests on welds in metallic materials - Transverse tensile test (ISO 4136:2012)*
- EN ISO 4885:2018, *Ferrous materials - Heat treatments - Vocabulary (ISO 4885:2018)*
- EN ISO 5173:2010,¹ *Destructive tests on welds in metallic materials - Bend tests (ISO 5173:2009)*
- EN ISO 5817:2014, *Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817:2014)*
- EN ISO 6506-1:2014, *Metallic materials - Brinell hardness test - Part 1: Test method (ISO 6506-1:2014)*
- EN ISO 6892-1:2019, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2019)*
- EN ISO 6892-2:2018, *Metallic materials - Tensile testing - Part 2: Method of test at elevated temperature (ISO 6892-2:2018)*
- EN ISO 9016:2012, *Destructive tests on welds in metallic materials - Impact tests - Test specimen location, notch orientation and examination (ISO 9016:2012)*
- EN ISO 9606-1:2017, *Qualification testing of welders - Fusion welding - Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012 and Cor 2:2013)*
- EN ISO 9712:2012, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712:2012)*
- EN ISO 10893-3:2011,² *Non-destructive testing of steel tubes - Part 3: Automated full peripheral flux leakage testing of seamless and welded (except submerged arc-welded) ferromagnetic steel tubes for the detection of longitudinal and/or transverse imperfections (ISO 10893-3:2011)*

¹ As impacted by EN ISO 5173:2010/A1:2011.

² As impacted by EN ISO 10893-3:2011/A1:2019 and EN ISO 10893-3:2011/A2:2020.

EN 10253-2:2021 (E)

EN ISO 10893-4:2011, *Non-destructive testing of steel tubes - Part 4: Liquid penetrant inspection of seamless and welded steel tubes for the detection of surface imperfections (ISO 10893-4:2011)*

EN ISO 10893-5:2011, *Non-destructive testing of steel tubes - Part 5: Magnetic particle inspection of seamless and welded ferromagnetic steel tubes for the detection of surface imperfections (ISO 10893-5:2011)*

EN ISO 10893-8:2011,³ *Non-destructive testing of steel tubes - Part 8: Automated ultrasonic testing of seamless and welded steel tubes for the detection of laminar imperfections (ISO 10893-8:2011)*

EN ISO 10893-10:2011,⁴ *Non-destructive testing of steel tubes - Part 10: Automated full peripheral ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of longitudinal and/or transverse imperfections (ISO 10893-10:2011)*

EN ISO 10893-11:2011,⁵ *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 10893-11:2011)*

EN ISO 14284:2002, *Steel and iron - Sampling and preparation of samples for the determination of chemical composition (ISO 14284:1996)*

EN ISO 14732:2013, *Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732:2013)*

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

EN ISO 15614-1:2017, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2017, Corrected version 2017-10-01)*

EN ISO 17640:2018, *Non-destructive testing of welds - Ultrasonic testing - Techniques, testing levels, and assessment (ISO 17640:2018)*

EN ISO 18265:2013, *Metallic materials - Conversion of hardness values (ISO 18265:2013)*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN

³ As impacted by EN ISO 10893-8:2011/A1:2020.

⁴ As impacted by EN ISO 10893-10:2011/A1:2020.

⁵ As impacted by EN ISO 10893-11:2011/A1:2020.