
Cevni fittingi za soležne zware - 2. del: Nelegirana in feritna legirana jekla s posebnimi zahtevami kontrole

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

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

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

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**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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ECIS/TC 110.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 10253-2:2017) has been prepared by Technical Committee ECISS/TC 110 "Steel tubes, and iron and steel fittings", the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 10253-2:2007.

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.*

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Introduction

In writing this European Standard 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) classes 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 than 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 7/19), seamless fittings are considered as materials whereas welded fittings are considered as components. Therefore, in some areas of this European Standard, 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 standard gives no detailed guidelines for the application of different parts. It is the ultimate responsibility of the user to select the appropriate part for the intended application.

IMPORTANT — This document contains, in Annexes B, C and D, tables which have to be re-examined with regard to their correctness before publication of the standard. In the context of this CEN-Enquiry readers of this draft are therefore invited to comment on any amendments that may be required, particularly with regard to the tables in Annexes B, C and D.

1 Scope

This draft European Standard 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;
 - 1) type A: Butt-welding fittings with reduced pressure factor;
 - 2) 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.

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NOTE In the case of a harmonised 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10020, *Definition and classification of grades of steel*

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

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

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

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

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

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

EN 10052:1993, *Vocabulary of heat treatment terms for ferrous products*

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

EN 10168, *Steel products — Inspection documents — List of information and description*

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

EN 10217-1, *Welded steel tubes for pressure purposes — Technical delivery conditions*

EN 10217-2, *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, *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, *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, *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, *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, *Seamless and welded steel tubes — Dimensions and masses per unit length*

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

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

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

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

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

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

EN 13480 (all parts), *Metallic industrial piping*

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

- EN ISO 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1)*
- EN ISO 377, *Steel and steel products — Location and preparation of samples and test pieces for mechanical testing (ISO 377)*
- EN ISO 2566-1, *Steel - Conversion of elongation values — Part 1: Carbon and low alloy steels (ISO 2566-1)*
- EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes (ISO 3166-1)*
- EN ISO 3183, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems (ISO 3183)*
- EN ISO 4136, *Destructive tests on welds in metallic materials — Transverse tensile test (ISO 4136)*
- EN ISO 5173, *Destructive tests on welds in metallic materials — Bend tests (ISO 5173)*
- EN ISO 5817, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections (ISO 5817)*
- EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1)*
- EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*
- EN ISO 6892-2, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature (ISO 6892-2)*
- EN ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1)*
- EN ISO 10893-4, *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)*
- EN ISO 10893-5, *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)*
- 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 10893-10, *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)*
- EN ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition (ISO 14284)*
- EN ISO 14732, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials (ISO 14732)*
- CEN ISO/TR 15608, *Welding — Guidelines for a metallic materials grouping system (ISO/TR 15608)*
- EN ISO 15614-1, *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)*

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EN ISO 18265, *Metallic materials — Conversion of hardness values (ISO 18265)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10020, EN 10021, EN 10052:1993 and EN ISO 377 and the following apply.

3.1**employer**

organisation for which a person works on a regular basis

Note 1 to entry: The employer may be either the fitting manufacturer or supplier or a third party organisation providing a service, e.g. NDT.

3.2**model****3.2.1****model for elbows and return bends**

bending radius of the piece

3.2.2**model for reducers**

concentric or eccentric shape of the piece

3.3**purchaser**

person or organisation that orders products in accordance with this European Standard

Note 1 to entry: The purchaser is not necessarily, but may be, a manufacturer of pressure equipment in accordance with the EU Directive listed in Annex ZA.

Note 2 to entry: Where a purchaser has responsibilities under this EU Directive, this standard will provide a presumption of conformity with the essential requirements of the Directive so identified in Annex ZA.

3.4**weld during manufacture**

weld made for obtaining a fitting

Note 1 to entry: This term does not include the tube welds when a tube is used as starting material.

3.5**seamless fitting**

fitting manufactured without welding from starting material which is not welded

3.6**welded fitting****3.6.1****fitting made from welded tubes**

3.6.2

fitting made from sheet/plate or strip where welding is a part of the manufacturing process

3.7

test category

classification that indicates their extent and level of inspection and testing

4 Symbols and abbreviations

For the purposes of this document, the symbols defined in EN 10266 and the following apply:

A	Percentage of elongation at rupture, with reference to gauge length of $5,65 \sqrt{S_0}$
B	Back to face distance for return bends, expressed in millimetres
C	Centre to centre distance for return bends ($C \approx 2R$), expressed in millimetres
D	Specified outside diameter for elbows, return ends, equal tees, caps and the major outside diameter for reducers and reducing tees, expressed in millimetres
D_1	Specified minor outside diameter for reducers and reducing tees, expressed in millimetres
D_{\max}	Bigger diameter in one section, expressed in millimetres
D_{\min}	Smaller diameter in the same section, expressed in millimetres
F	Distance from the axis of the branch outlet to the face of the centre body of tees, expressed in millimetres
G	Distance from the axis of the centre line to the face of the branch outlet of reducing tees, expressed in millimetres
ID	Inside diameter at the welding ends of elbows, return bends, equal tees and at the major welding end of reducers and reducing tees ($ID = D - 2T$)
ID_1	Inside diameter at the minor welding end of reducers and reducing tees ($ID_1 = D_1 - 2T_1$)
K	Total height for caps, expressed in millimetres
L	Face to face distance for reducers, expressed in millimetres
P	Tolerance on the form of elbows
R	Bending radius of elbows and return bends, expressed in millimetres
R_1	Inside spherical radius of cap
R_2	Inside knuckle radius of cap
R_m	Tensile strength, expressed in megapascals
$R_{p0,2}$	Minimum 0,2 % proof strength, expressed in megapascals
$R_{t0,5}$	Minimum 0,5 % proof strength, expressed in megapascals
T	Specified wall thickness at the welding ends for elbows, return bends, equal tees and bends or on the D end for reducers and reducing tees, expressed in millimetres
T_1	Specified wall thickness on the D_1 welding end of reducers and reducing tees, expressed in millimetres

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TC	Test category
W	Distance from the extrados to the centre of a 90° elbow at the welding ends
X	Tolerance on the form of fittings
Z	Distance from the extrados to the centre of a 45° elbow at the welding ends

5 Classification of grades and designation**5.1 Classification of grades**

In accordance with the classification system in EN 10020, the steel grades P235TR2, P265TR2, P235GH, P265GH, P215NL and P265NL are non-alloy quality steels, P355N, P355NH and P355NL1 alloy quality steels and the other steel grades are classified as alloy special steels.

The steel grades P235GH, P265GH, P355N, P355NH and P355NL1 can be provided in accordance to test category TC1 or TC2. Any other steel grade given in Table 2 shall be provided only in accordance to TC2.

5.2 Designation of steel grades

For the fittings covered by this European Standard the steel designation consists of:

— the number of this European Standard (EN 10253-2),

plus either

— steel name in accordance with EN 10027-1,

or

— steel number allocated in accordance with EN 10027-2.

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5.3 Designation of fittings**5.3.1 General**

Fittings are designated by their name and the following parameters.

5.3.2 Elbows and return bends

Elbows and return bends are designated by the following parameters:

- model (2D, 3D or 5D);
- type (type A or type B);
- angle;
- outside diameter (D);
- wall-thickness (T).

5.3.3 Reducers

Reducers are designated by the following parameters:

- model (concentric (con) or eccentric (ecc));
- type (type A or type B);

- c) major diameter (D) and wall-thickness (T);
- d) minor diameter (D_1) and wall-thickness (T_1).

5.3.4 Tees

Equal tees are designated by the following parameters:

- a) type (type A or type B),
- b) outside diameter (D)
- c) wall-thickness (T).

Reducing tees are designated by the following parameters:

- a) type (type A or type B),
- b) major diameter (D) and wall-thickness (T)
- c) minor diameter (D_1) and wall-thickness (T_1).

5.3.5 Caps

Caps are designated by the following parameters:

- a) the type (type A or type B),
- b) the outside diameter (D)
- c) the wall-thickness (T).

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6 Information to be supplied by the purchaser

6.1 Mandatory information

The following information shall be supplied by the purchaser at the time of enquiry and order:

- a) quantity required (number of pieces);
- b) reference to this European Standard;
- c) designation of fittings (clause 5.3);
- d) designation of the steel grade (see 5.2);
- e) test category 1 or 2 (TC1/TC2) for unalloyed steels (see 12.3).

6.2 Options

A number of options are specified in this European Standard and these are listed below. In the event that the purchaser does not indicate a wish to implement any of these options at the time of enquiry and order, the fittings shall be supplied in accordance with the basic specification (see 6.1).

- 1) Steelmaking process (see 8.1);
- 2) Method of manufacture of the fitting (see 8.2.1);