INFO SERVICE

CHANGES IN THE STANDARD EN 10253-2/4

en

erne fittings
the safe connection

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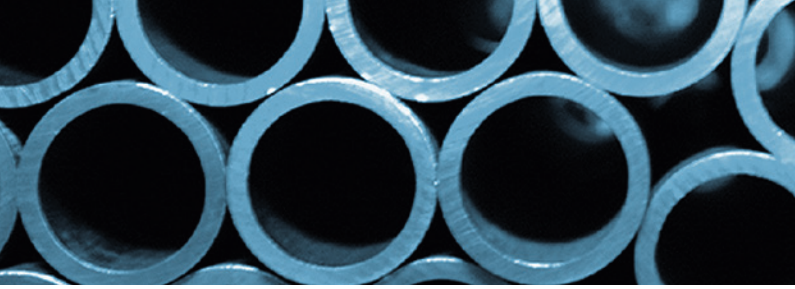
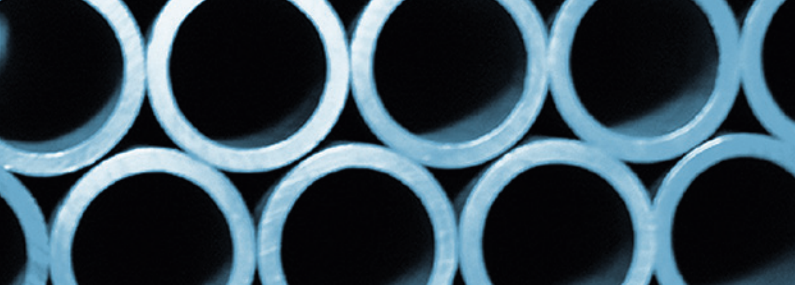


INTRODUCTION

The EN 10253 defines the European standard for butt-welding fittings. In November 2017, revised drafts of part 2 and part 4 were released to the public

The primary goal of the revision was to improve consistency between the two parts and to implement updates. These changes affect both the structure of the standard (e.g. fitting dimensions are now in Annex A for both parts), as well as the wording of the text, which is now identical if there are no technical differences. Current testing standards have been added, which often included a change from an EN standard to an EN ISO standard with a different number. Changes in other material standards (e.g. pipe standards) were also considered. The most important changes in the new drafts of the prEN 10253-2/4:2017, as compared to the EN 10253-2:3007 and EN 10253-4:2008 respectively, are presented in this informational brochure. If no issues arise over the next few months, it can be expected that the new editions of the standards will be released around the first half of 2019.



GENERAL INFORMATION

What the EN 10253 covers

The EN 10253 defines the European technical delivery requirements for steel butt-welding fittings. Specifically, the following product types are covered: elbows, concentric and eccentric reducers, equal and reduced tees, and caps.

How the standard is structured

The standard is divided into four parts, however only parts 2 and 4 will be covered in the brochure

- **Part 1** defines technical delivery requirements for seamless and welded butt-welding fittings made of carbon steel, without specific inspection requirements.
- **Part 2** defines technical delivery requirements for seamless and welded butt-welding fittings made of carbon steel and alloy steel, with specific inspection requirements.
- **Part 3** defines technical delivery requirements for seamless and welded butt-welding fittings made of austenitic and austenitic-ferritic (duplex) stainless steel, without specific inspection requirements.
- **Part 4** defines technical delivery requirements for seamless and welded butt-welding fittings made of austenitic and austenitic-ferritic (duplex) stainless steel, with specific inspection requirements.

The standard defines the following points:

a) type of fittings
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 packing

Note

The changes made in the drafts of these standards also affects the options. This means that the numbering of the options in the prEN 10253-2/4:2017 are not the same as the numbering of the options in the EN 10253-2:2007 and EN 10253-4:2008, respectively. The numbering between the drafts of part 2 and part 4 are also different.

TERMS

- **Type A** = Butt-welding fitting with a reduced pressure factor. The wall thickness at the beveled ends and fitting body is the same as a pipe with the same specified wall thickness. Their resistance to internal pressure is generally less than that of a pipe with the same specified dimensions.

- **Type B** = Butt-welding fitting for use at full service pressure. They have an increased wall thickness at the fitting body and are designed to withstand the same pressure as a pipe with the same specified dimensions.

- **Model** = The specific design of fitting. For elbows and 180° return bends, the model defines the bending radius (e.g. 2D, 3D, and 5D). For reducers, there are two models, concentric and eccentric.

- **Test Category** is a classification that indicates the extent and level of inspection and testing. There are two test categories, TC1 and TC2, where TC2 designates the higher level of inspection and testing requirements. In the prEN 10253-2, TC2 is a binding requirement for higher alloy steels.

COMPARISON prEN 10253-2/4:2017 >

INFORMATION TO BE SUPPLIED BY THE PURCHASER

prEN 10253-2/4:2017
Mandatory information: **prEN 10253-2** > Quantity required (number of pieces) > Reference to this European Standard > Type of fitting, A or B > Model e.g. 2D, 3D, 5D for Elbows > Angle (for Elbows only) > The diameter and the wall thickness > Steel grade > Test category TC1/TC2 for unalloyed steels (for other steels TC2 is mandatory) **prEN 10253-4** > Quantity required (number of pieces) > Reference to this European Standard > Type of fitting, A or B > Model e.g. 2D, 3D, 5D, or ID + 100, 3 ID, 5 ID for Elbows > Structural dimension > Angle (for Elbows only) > The diameter and the wall thickness > Steel grade > Test category TC1/TC2
Seamless (s) or welded (w) is selectable by option in both parts, otherwise it's up to the manufacturer.
NEW: Inclusion of testing category

EN 10253-2:2007 / EN 10253-4:2008

EN 10253-2:2007/EN 10253-4:2008

Mandatory information:

EN 10253-2
> Quantity required (number of pieces)
> Reference to this European Standard
> Type of fitting, A or B
> Model e.g. 2D, 3D, 5D for Elbows
> Angle (for Elbows only)
> The diameter and the wall thickness
> Steel grade

EN 10253-4
> Quantity required (number of pieces)
> Reference to this European Standard
> Type of fitting, A or B
> Model e.g. 2D, 3D, 5D, or ID + 100, 3 ID, 5 ID for Elbows
> Structural dimension
> Angle (for Elbows only)
> The diameter and the wall thickness
> Steel grade
> Seamless (s) or welded (w)

Seamless (s) or welded (w) is mandatory information in part 4, but only optional in part 2.

MANUFACTURING PROCESS

prEN 10253–2/4:2017
prEN 10253–2 Standards of starting material for welded fittings and fittings made of bar steel are mandatory. **prEN 10253–4** Standards of starting material for welded fittings and fittings made of bar steel are mandatory.
The requirements for the manufacture of fittings by welding have been harmonized and contain less detail, instead making more references to other standards.

STEEL GRADE / CHEMICAL COMPOSITION

prEN 10253–2/4:2017
The chemical composition is stated in table 3 (part 2), or in table 2 and 3 (part 4). Chemical requirements were adjusted to meet other material standards (for example: P235GH Nb max 0.020 as in EN 10216-2). The descriptions and requirements of steels for oil and gas industry pipe systems now match with those in EN ISO 3183 Annex M.
NEW: There is a new option to produce fittings according to EN 10253-2/4 using steel grades from other harmonized material standards.

EN 10253–2:2007/EN 10253–4:2008
EN 10253–2 Standards of starting material for welded fittings and fittings made of bar steel are mandatory. **EN 10253–4** Standards of all starting materials are mandatory.
Different requirements for welding of fittings in part 2 and part 4.

EN 10253–2:2007/EN 10253–4:2008
The chemical composition is stated in table 4 and tables 3 and 4, in the part 2 and part 4 respectively. The descriptions and requirements of steels for pipe systems of oil and gas industry fits with EN 10208-2.

MECHANICAL PROPERTIES

prEN 10253–2/4:2017

The mechanical properties are stated in tables 5 to 9 (part 2) and in tables 5 and 6 (part 4).
There is also an adjustment to meet other current material standards.

In Annex F (part 2) and Annex E (part 4), creep rupture strength values are now stated.

DIMENSIONS AND TOLERANCES

prEN 10253–2/4:2017

Dimensional lengths

prEN 10253–2
The dimensional lengths are stated in tables within Annex A.

prEN 10253–4
The dimensional lengths are stated in tables within Annex A. There are additional tables with the dimensional lengths for metric dimensions. For caps there is a new type “dished ends”.

The dimensional lengths of part 2 and 4 generally are the same. There are a few minor deviations between the new versions and the EN 10253-2:2007 and EN 10253-3:2008. The bending radii of 21.3 mm elbows with model 2D, as well as 21.3 mm and 26.9 mm elbows with model 3D, now match with those from the DIN 2605.

NEW: There is the possibility to agree upon different dimensional lengths.

EN 10253–2:2007/EN 10253–4:2008

The mechanical properties are stated in tables 6 to 9 (part 2) and in tables 6 and 7 (part 4).

EN 10253–2:2007/EN 10253–4:2008

Dimensional lengths

EN 10253–2
The dimensional lengths are stated in tables 10 to 16.

EN 10253–4
The dimensional lengths of fittings with fixed outside diameters are stated in Annex A.

There are occasional differences between dimensional length in part 2 and part 4.

Dimensional tolerances

prEN 10253–2 und prEN 10253–4:
± 1 % or ± 0.5 mm for the outside diameter, whichever is the greater, but maximum ± 5 mm.
There is an option to apply the tolerance to the internal diameter.

Tolerance of through flow

prEN 10253–2 and prEN 10253–4:
Minimum 80 % of the nominal internal diameter (Tees 70 %)
There is an option to agree on special tolerances.

Wall thickness tolerances at the welding ends

prEN 10253–2 and prEN 10253–4:
D ≤ 610 seamless and welded – 12.5 %
D > 610 seamless – 12.5 %
D > 610 welded – 0.35 mm or 0.50 mm
depending on wall thickness

Dimensional tolerances

EN 10253–2
± 1 % or ± 0.5 mm for the internal diameter, whichever is the greater, but maximum ± 5 mm
Basic Dimension: outside diameter [D] minus 2 x ordered wall thickness [T] (ID = D – 2T)
If the tolerance should apply to the outside diameter, option 9 must be ordered.

EN 10253–4
± 1 % or ± 0.5 mm for the outside diameter, whichever is the greater
Stricter tolerances can be agreed (Option 13).

Tolerance of through flow

prEN 10253–2 and prEN 10253–4:
Minimum 80 % of the nominal internal diameter (Tees 70 %).
For part 2, a special internal diameter can be chosen with option 10, for pigging operations.

Wall thickness tolerances at the welding ends

EN 10253–2
D ≤ 610 seamless and welded – 12.5 %
D > 610 seamless – 12.5 %
D > 610 welded – 0.35 mm or 0.50 mm
depending on wall thickness

EN 10253–4
D ≤ 610 seamless and welded – 12.5 %
D > 610 seamless and welded – 0.35 mm or 0.50 mm
depending on wall thickness

Tolerances on specific dimensions

prEN 10253–2 and prEN 10253–4:
Tolerances in both parts are identical. The same tolerances as those in part 2 until now.

Tolerances on the form of fittings

prEN 10253–2 and prEN 10253–4:
Tolerances in both parts are identical. The same tolerances as those in part 2 until now, including form tolerance P.

Tolerances for ovality

prEN 10253–2
At the welding ends
D ≤ 273.0 mm included in the diameter tolerance
273.0 < D ≤ 610 mm 2 %
D > 610 mm 1 %
On the body for elbow and return bends: 4 %

prEN 10253–4
At the welding ends
D ≤ 406.4 mm included in the diameter tolerance
D > 406.4 mm and D/T ≤100 2 %
For fittings with a D/T-ratio > 100 the values shall be agreed.
On the body for elbow and return bends: 4 %

There are no changes compared to EN 10253–2:2007 or EN 10253–4:2008.

Tolerances on specific dimensions

prEN 10253–2 and prEN 10253–4:
For the dimensions specific to fittings, the tolerances are given in Table 19 (part 2) and Table 10 (part 4).

Tolerances on the form of fittings

prEN 10253–2 and prEN 10253–4:
The tolerances on the form of every type of fitting (out-of-squareness, alignment) are the following:
≤ 1 % of the outside diameter at the point measured or 1 mm, whichever is the greater

In part 2 there is an additional tolerance indication P.

Tolerances for ovality

EN 10253–2
At the welding ends
D ≤ 273.0 mm included in the diameter tolerance
273.0 < D ≤ 610 mm 2 %
D > 610 mm 1 %
On the body for elbow and return bends: 4 %

EN 10253–4
At the welding ends
D ≤ 406.4 mm included in the diameter tolerance
D > 406.4 mm and D/T ≤ 100 2 %
For fittings with a D/T-ratio > 100 the values shall be agreed.
On the body for elbow and return bends: 4 %

End finishing

prEN 10253–2
≤ 3 mm – the ends may be square cut or slightly chamfered
> 3 mm to ≤ 20 mm – bevel angle 30°, root face 1.6 mm ± 0.8 mm
> 20 mm – the type of bevel shall be agreed
The wall thickness may be reduced by taper boring, the taper being not greater than
external: 30°
internal: 18°
Option for agreement on different execution of the ends.

prEN 10253–4
Fittings shall be delivered with square cut ends.
For Fittings with wall thickness ≥ 3.2 mm and ≤ 20 mm the ends can be beveled with an angle of 30° with a root face of 1.6 ± 0.8 mm.
> 20 mm – the type of bevel shall be agreed
The wall thickness may be reduced by taper boring, the taper being not greater than:
external: 30°
internal: 18°
Option for agreement on different execution of the ends.

End finishing

EN 10253–2

≤ 3 mm – the ends may be square cut or slightly chamfered
> 3 mm to ≤ 22 mm – bevel angle 30°, root face 1.6 mm ± 0.8 mm
> 22 mm – the type of bevel shall be agreed
The wall thickness may be reduced by taper boring, the taper being not greater than:
external: 30°
internal: 18°
Option 12: The end finishing shall be as specified.

EN 10253–4

Standard: The fittings shall be delivered with square cut ends. For fittings with wall thickness ≥ 3.2 mm, option 14 can be applied for a bevel with 30°, root face 1.6 ± 0.8 mm, and for wall thickness > 20 mm, a special bevel angle can be applied.

INSPECTION REQUEST

prEN 10253–2/4:2017

Test unit size

prEN 10253–2
In table 15, a maximum test lot size of 25 to 500 fittings is defined, depending on the diameter. The number of samples is limited to a maximum of 4, regardless of the number of the fittings. There is an option for a smaller maximum test lot size, which can be chosen from those listed in table 16.

prEN 10253–4
In table 11, a maximum test lot size of 10 to 2,500 fittings is defined for fittings with a wall thickness over 3 mm, depending on diameter. For cold-formed fittings with wall thickness up to 3 mm, a higher maximum of 50 to 10,000 pieces is allowed. There is an option for a smaller maximum test lot size, which can be chosen from those listed in table 13. In any case, the number of samples is limited to a maximum of 4, regardless of the number of fittings.

Test category

There are two test categories defined, TC1 and TC2, which are similar to the test categories for pipes.
For TC2, an additional test for longitudinal defects on starting material pipes is required.

prEN 10253–2
For the steel grades P235GH, P265GH, P355N, P355NH and P355NL1, test category TC1 or TC2 can be chosen. For all other steel grades TC2 is mandatory.

prEN 10253–4
For all steel grades the testing category TC1 or TC2 can be specified.

EN 10253–2:2007/EN 10253–4:2008

Test unit size

EN 10253–2
There's no max. quantity of fittings per test lot. If the test unit size shall be limited, purchaser can select Option 18 or 19.

EN 10253–4
Maximum number of pieces in a test unit is fixed in table 11. The test unit size is between 10 to 2,500, depending on the diameter.

Test category

No differences between the test categories

Chemical analysis

prEN 10253–2 and prEN 10253–4:
Heat analysis for each heat

Tensile test

prEN 10253–2 and prEN 10253–4:
For D ≥ 114.3 mm 1 tensile test per lot

NEW: Therefore it's no longer necessary to mention an option to enforce mechanical tests on the finished product.

Hardness test

prEN 10253–2
D < 114.3 mm: for 10 pieces of each test lot

prEN 10253–4
no hardness test necessary

Ring expending test

prEN 10253–4
For cold formed fittings with D < 114.3 mm, a ring expanding test or drift expanding test for each test lot.

Chemical analysis

EN 10253–2 and EN 10253–4:
Heat analysis for each heat

Tensile test

EN 10253–2
D ≥ 114.3 mm 1 tensile test per lot
Under certain conditions, the tensile test from the base material of unalloyed steels can be used. However, the use of option 14 precludes this.

EN 10253–4
D > 100 mm 1 tensile test of each test unit

Hardness test

EN 10253–2
D < 114.3 mm: for 10 pieces of each test lot

EN 10253–4
D ≤ 100 mm: for 10% of the fittings, at least 3 pcs.
Additionally the result of the mechanical tests of the base material has to be stated in the inspection certificate.

Ring expending test

EN 10253–4
On cold formed fittings of D ≤ 100 mm which have not received additional heat treatment, tensile testing may be replaced by a ring expanding test.

Impact testing

prEN 10253–2
For D ≥ 114.3 mm and wall thickness ≥ 5 mm – 1 impact test of each test lot for specific steel grades.

For following steel grades the impact testing is not mandatory: P235GH, P265GH, 16Mo3, 10CrMo5–5, 13CrMo4–5, 10CrMo9–10, X11CrMo5, X11CrMo9–1 and X10CrMoVNb9–1 (up to 16 mm wall thickness).
There is an option for the performance of an impact test for these steel grades as well.

prEN 10253–4
Impact testing is optional

Material identification

prEN 10253–2
Required for all fittings in alloy steel with diameter ≥ 114.3 mm

prEN 10253–4
Testing no longer required
NEW: Only an option for performing the testing.

Nondestructive testing of cold formed tees

prEN 10253–2
Liquid penetrant or magnetic particle testing of the side wall area

Nondestructive testing for longitudinal defects

prEN 10253–2 und prEN 10253–4
For test category TC2, it's required on the starting material pipe.

Impact testing

EN 10253–2
For D ≥ 114.3 mm and ≥ 5 mm wall thickness 1 impact test of each test unit for defined steel grades.

For following steel grades the impact testing is not binding: P235GH, P265GH, 16Mo3, 10CrMo5–5, 13CrMo4–5, 10CrMo0–10, X11CrMo5 and X11CrMo9–1
With option 16 the impact test can be agreed.

EN 10253–4
Impact test is optional (Option 5 and 6)

Material identification

EN 10253–2
Each fitting in alloy steel ≥ 219.1 mm must be tested

EN 10253–4
Each fitting must be tested

Nondestructive testing of cold formed tees

EN 10253–2
Liquid penetrant or magnetic particle testing of the side wall area

Nondestructive testing for longitudinal defects

prEN 10253–2 und prEN 10253–4
Not required

MARKING

prEN 10253-2/4:2017

prEN 10253-2
Marking of:
- Manufacturer
- Country of manufacture (ISO code)
- „EN2“, alternatively EN 10253-2
- Type: „A“ optional, „B“ mandatory
- Steel name or steel number
- Testing category „TC1“ optional, „TC2“ mandatory if TC1 and TC2 are applicable, otherwise optional
- „W“ for welded fittings required, „S“ for seamless fittings
- Heat number or a code number
- Mark of the inspection body (if applicable)
- Outside diameter D and, if applicable, D_1 (can be rounded)*
- Wall thickness T and, if applicable, T_1*

*) For small fittings the outside diameter and the wall thickness can be left out, but the complete marking has to be stated on the packing or a marking tag.

Allowed marking methods: Hard stamping and dot marking. There is an option to agree on marking requirements.

prEN 10253-4, Marking of:
- Manufacturer
- Country of manufacture or ISO code
- „EN4“, alternatively EN 10253-4
- Type: „A“ optional, „B“ mandatory
- Steel name or steel number
- Test category „TC1“ optional, „TC2“ mandatory if TC1 and TC2 are applicable, otherwise optional
- „W“ for welded fittings required, „S“ for seamless fittings, optional
- Heat number or a code number
- Mark of the inspection body (if applicable)
- Outside diameter D and, if applicable, D_1
- Wall thickness T and, if applicable, T_1

Allowed marking methods: hard stamping, dot marking, ink jet marking, electrochemical etching, laser marking.
There is an option to agree on marking requirements.

EN 10253-2:2007/EN 10253-4:2008

Each fitting has to be permanently marked.

EN 10253-2 Paragraph 15

Marking to be applied by hard stamping:

- Manufacturer's mark logo
- Country of manufacture (ISO code)
- Letters „EN2" used as reference to the Standard
- Letter „B" for fittings of type B
- Steel name or steel number
- Letter „W" (for welded fittings or for fittings made from welded tubes)
- Heat number or a code number
- Mark of the inspection body (for third party when applicable)
- Outside diameter D*
- Wall thickness T*

*) only for fittings D ≥ 88.9 mm

For reducing tees or reducers, the marking of dimensions shall include D_1 and T_1. For Fittings < 88.9 mm the marking is required on packing or a marking tag.

With option 25 or 26, the marking can be specifically agreed upon.

EN 10253-4 Paragraph 15

- The manufacturer's mark or trade mark
- Country of manufacture (ISO code)
- EN 10253-4, Type „A" or „B"
- Steel name or steel number
- Heat number or a code number
- Welded („W") or seamless („S")
- Outside diameter D**
- Wall thickness T**
- Mark of the inspection body

**) For reducing tees or reducers, the marking of dimensions shall include D_1 and T_1.

Methods of marking may be: ink jet marking, electrochemical etching, fibro marking, laser marking.

With option 22 the marking can be specifically agreed upon.

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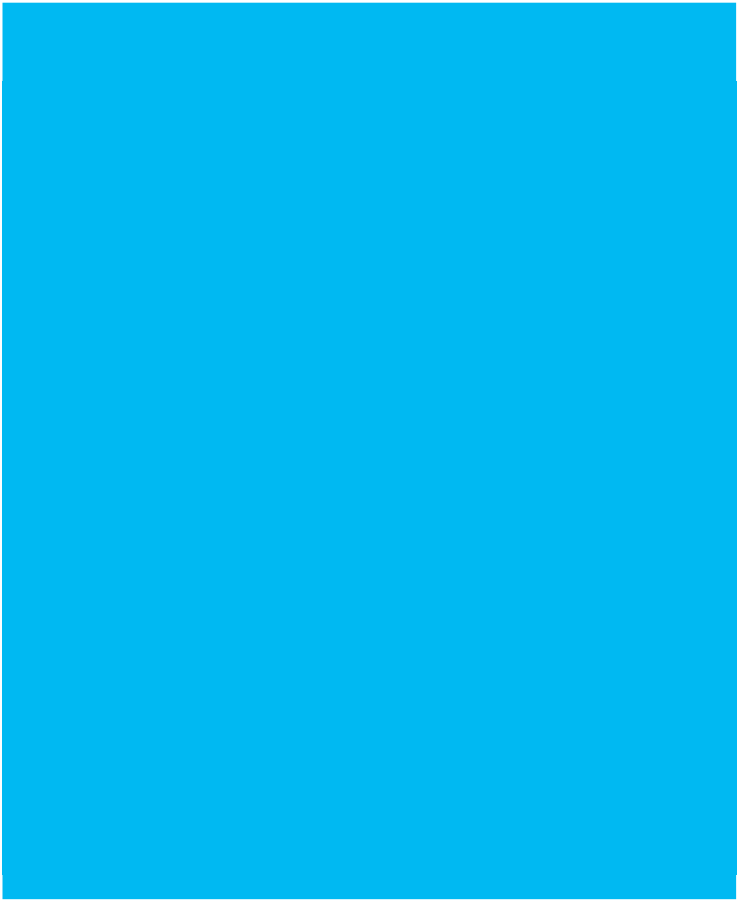

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