



# SLOVENSKI STANDARD

## SIST EN 1092-1:2018

01-julij-2018

Nadomešča:

SIST EN 1092-1:2007+A1:2013

SIST EN 1092-1:2007+A1:2013/AC:2014

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**Prirobnice in prirobnični spoji - Okrogle prirobnice za cevi, ventile, fitinge in pribor z oznako PN - 1. del: Jeklene prirobnice**

Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges

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Flansche und ihre Verbindungen - Runde Flansche für Rohre, Armaturen, Formstücke und Zubehörteile, nach PN bezeichnet - Teil 1: Stahlflansche

SIST EN 1092-1:2018

Brides et leurs assemblages - Brides circulaires pour tubes, appareils de robinetterie, raccords et accessoires, désignées PN - Partie 1 : Brides en acier

**Ta slovenski standard je istoveten z: EN 1092-1:2018**

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**ICS:**

23.040.60 Prirobnice, oglavki in spojni elementi Flanges, couplings and joints

**SIST EN 1092-1:2018**

**en,fr,de**

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EUROPEAN STANDARD

EN 1092-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2018

ICS 23.040.60

Supersedes EN 1092-1:2007+A1:2013

English Version

## Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges

Brides et leurs assemblages - Brides circulaires pour tubes, appareils de robinetterie, raccords et accessoires, désignées PN - Partie 1: Brides en acier

Flansche und ihre Verbindungen - Runde Flansche für Rohre, Armaturen, Formstücke und Zubehörteile, nach PN bezeichnet - Teil 1: Stahlflansche

This European Standard was approved by CEN on 27 November 2017.

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.

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

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

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## European foreword

This document (EN 1092-1:2018) has been prepared by Technical Committee CEN/TC 74 “Flanges and their joints”, the secretariat of which is held by DIN.

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 October 2018 and conflicting national standards shall be withdrawn at the latest by October 2018.

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 1092-1:2007+A1:2013.

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(s), see informative Annex ZA, which is an integral part of this document.

The major changes in comparison with EN 1092-1:2007+A1:2013 include:

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- a) standard references were updated;
  - b) several changes were made in some synoptic tables;
  - c) changes were implemented in thicknesses for types 36 and 37;
  - d) flanges Type 5 for PN 160 to PN 400 were implemented.

EN 1092, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated*, consists of the following four parts:

- *Part 1: Steel flanges;*
- *Part 2: Cast iron flanges;*
- *Part 3: Copper alloy flanges;*
- *Part 4: Aluminium alloy flanges.*

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, 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 the United Kingdom.

**EN 1092-1:2018 (E)****Introduction**

When the Technical Committee CEN/TC 74 started its work of producing this European Standard, it took as its basis the International Standard ISO 7005-1, Steel flanges.

In taking this decision, CEN/TC 74, agreed that this standard would differ significantly from the ISO standard in respect of the following:

- a) whereas ISO 7005-1 included in its scope both the original DIN based flanges and also the original ANSI/ASME based flanges, EN 1092-1 contains only the PN based flanges. CEN/TC 74 has produced a separate series of standards, EN 1759-1, EN 1759-3 and EN 1759-4, dealing with the ANSI/ASME based flanges in their original Class designations;
- b) the opportunity was taken to revise some of the technical requirements applicable to the DIN origin flanges.

Consequently, while the mating dimensions, the flange and facing types and designations are compatible with those given in ISO 7005-1, it is important to take account of the following differences which exist in EN 1092-1:

- 1) the p/T ratings of this standard have been reduced in many cases by either limiting the lower temperature ratings which can no longer exceed the PN value, or by increasing the rate at which allowable pressures shall reduce with increase in temperature;
- 2) in addition to the range of PN 2,5 to PN 40 DIN origin flanges contained in the ISO standard, EN 1092-1 also includes flanges up to PN 400.

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## 1 Scope

This European Standard for a single series of flanges specifies requirements for circular steel flanges in PN designations PN 2,5 to PN 400 and nominal sizes from DN 10 to DN 4000.

This European Standard specifies the flange types and their facings, dimensions, tolerances, threading, bolt sizes, flange jointing face surface finish, marking, materials, pressure/ temperature ratings and approximate flange masses.

For the purpose of this European Standard, “flanges” include also lapped ends and collars.

This European Standard applies to flanges manufactured in accordance with the methods described in Table 1.

Non-gasketed pipe joints are outside the scope of this European Standard.

## 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 1514-1:1997, *Flanges and their joints - Dimensions of gaskets for PN-designated flanges - Part 1: Non-metallic flat gaskets with or without inserts*

EN 1514-2:2014, *Flanges and their joints - Gaskets for PN-designated flanges - Part 2: Spiral wound gaskets for use with steel flanges*

EN 1515-2:2001, *Flanges and their joints - Bolting - Part 2: Classification of bolt materials for steel flanges, PN designated*

EN 1515-4:2009, *Flanges and their joints - Bolting - Part 4: Selection of bolting for equipment subject to the Pressure Equipment Directive 97/23/EC*

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

EN 1708-1:2010, *Welding - Basic welded joint details in steel - Part 1: Pressurized components*

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

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

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

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

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

EN 10216-2:2013, *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 10216-5:2013, *Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 5: Stainless steel tubes*

EN 10217-2:2002, *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 10217-3:2002, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes*

EN 10217-7:2014, *Welded steel tubes for pressure purposes - Technical delivery conditions - Part 7: Stainless steel tubes*

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

EN 10226-3:2005, *Pipes threads where pressure tight joint are made on the threads - Part 3: Verification by means of limit gauges*

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

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

EN 12516-1:2014, *Industrial valves - Shell design strength - Part 1: Tabulation method for steel valve shells*

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

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

EN 22768-1:1993, *General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1)*

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

EN ISO 887:2000, *Plain washers for metric bolts, screws and nuts for general purposes - General plan (ISO 887:2000)*

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

EN ISO 4014:2011, *Hexagon head bolts - Product grades A and B (ISO 4014:2011)*

EN ISO 4287:1998, *Geometrical product specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters (ISO 4287:1997)*

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 6892-1:2016, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2016)*

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 9692-2:1998, *Welding and allied processes - Joint preparation - Part 2: Submerged arc welding of steels (ISO 9692-2:1998)*

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EN ISO 9712:2012, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712:2012)*

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EN ISO 10675-1:2016, *Non-destructive testing of welds - Acceptance levels for radiographic testing - Part 1: Steel, nickel, titanium and their alloys (ISO 10675-1:2016)*

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

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)*

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 15614-1:2004)*

EN ISO 15614-13:2012, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 13: Upset (resistance butt) and flash welding (ISO 15614-13:2012)*

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 17637:2016, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637:2016)*

EN ISO 17638:2016, *Non-destructive testing of welds - Magnetic particle testing (ISO 17638:2016)*

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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 of welds - Acceptance levels (ISO 23277:2006)*

EN ISO 23278:2015, *Non-destructive testing of welds - Magnetic particle testing of welds - Acceptance levels (ISO 23278:2006)*

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads - Part 1: Dimensions, tolerances and designation*

ISO 4200:1991, *Plain end steel tubes, welded and seamless - General tables of dimensions and masses per unit length*

**3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

**3.1****DN**

alphanumeric designation of size for components of a pipework system, which is used for reference purposes and which comprises the letters DN followed by a dimensionless whole number that is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections

Note 1 to entry: The number following the letters DN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

Note 2 to entry: In those standards which use the DN designation system, any relationship between DN and component dimensions should be given, e.g. DN/OD or DN/ID.

[SOURCE: EN ISO 6708:1995, 2.1]

**3.2****PN**

alphanumeric designation which is used for reference purposes related to a combination of mechanical and dimensional characteristics of a component of a pipework system and which comprises the letters PN followed by a dimensionless number

Note 1 to entry: The number following the letters PN does not represent a measurable value and should not be used for calculation purposes except where specified in the relevant standard.

Note 2 to entry: The designation PN is not meaningful unless it is related to the relevant component standard number.

Note 3 to entry: The maximum allowable pressure of a pipework component depends on the PN number, the material and the design of the component, its maximum allowable temperature, etc. The relevant European Component standards include tables of specified pressure/temperature ratings or, in minimum, include rules how to determine pressure/temperature ratings.

Note 4 to entry: It is intended that all components with the same PN and DN designations have the same mating dimensions for compatible flange types.

[SOURCE: EN 1333:2006, 2.1]

**3.3****maximum allowable pressure****PS**

maximum pressure for which the equipment is designed, as specified by the equipment manufacturer

**3.4****maximum allowable temperature****TS**

maximum temperature for which the equipment is designed, as specified by the equipment manufacturer

**3.5****pressure equipment manufacturer**

any natural or legal person who manufactures pressure equipment or an assembly or has such equipment or assembly designed or manufactured, and markets that pressure equipment or assembly under his name or trademark or uses it for his own purposes

**3.6****flange manufacturer**

individual or organization that is responsible for the compliance of the flanges with the requirements of this European Standard

**3.7****purchaser**

person or organization 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. Where a purchaser has responsibilities under this EU Directive, this European Standard will provide a presumption of conformity with the essential requirements of the Directive so identified in Annex ZA. <https://standards.iteh.ai/standard/EN/1092-1-2018>

**4 Designation****4.1 General**

Table 6 specifies the flange types and collar types.

Figures 1 and 2 show flange types and collar types with the relevant flange type numbers. Flanges shall be denoted with “flange type” and the “flange description”. Collar components shall be denoted with collar type and the collar description.

Figure 3 shows flange facing types, which may be used with the flanges or components shown in Figures 1 and 2. Flange facings shall be denoted with “type” and the relevant symbol.

The range of DN, applicable to each flange type and collar and to each PN, shall be as given in Table 7, however not all dimensions are existing for each type.

**4.2 Standard designation**

Flanges and collars in accordance with this standard shall be designated with the following:

- a) designation, e.g. flange, lapped end or collar;
- b) number of this European Standard, i.e. EN 1092-1;
- c) number of flange type or collar type in accordance with Figures 1 and 2;

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- d) type of flange facing in accordance with Figure 3;
- e) DN (nominal size);
- f) bore diameter only if not according to this standard (for sizes greater than DN 600);
  - 1)  $B_1$  (only for types 01, 12 and 32);
  - 2)  $B_2$  (only for type 02);
  - 3)  $B_3$  (only for type 04);
- g) wall thickness  $S$  only if not according to this European Standard (only for types 11 and 34, 35, 36 and 37);
- h) bevelled wall thickness  $S_p$  if required (only for types 11 and 34 to 37, see Annex A);
- i) PN designation;
- j) for type 13 flanges type of thread ( $R_p$  or  $R_c$ );
- k) material and material standard (if necessary);
- l) any heat treatment required;
- m) type of material certificate, if required (see 5.13).

EXAMPLE 1 Designation of a flange type 11 with facing type B2 of nominal size DN 200, wall thickness 9 mm, PN 100, made of material P245GH:

Flange EN 1092-1/11/B2/DN 200 × 9/PN 100/P245GH

EXAMPLE 2 Designation of a flange type 01 of nominal size DN 800, with bore diameter  $B_1 = 818$  mm, PN 6, made of material P265GH:

Flange EN 1092-1/01/DN 800/818/PN 6/P265GH

EXAMPLE 3 Designation of a collar type 32 of nominal size DN 400, PN 10 and made of material P265GH:

Collar EN 1092-1/32/DN 400/PN 10/P265GH

EXAMPLE 4 Designation of a flange type 02 of nominal size DN 400, PN 10 and made of material 1.0425:

Flange EN 1092-1/02/DN 400/PN 10/1.0425

## 5 General requirements

### 5.1 Materials

#### 5.1.1 General

Flanges and collars to be used in pressure equipment shall be manufactured from materials fulfilling the essential safety requirements of pressure equipment European legislation. Materials specifications which meet the requirements for this European Standard are given in Table 9 (see also Annex D).

Collars type 35 to 37 shall only be manufactured of austenitic/austenitic ferritic steel.

The fabricated flange shall fulfil the mechanical properties of the material standard.

**WARNING** — The restrictions of the different material standards shall be followed.

NOTE 1 The materials given in Table 9 (see also Annex D) are tabulated in material groups containing materials of similar chemical/mechanical properties and corrosion resistance in order to facilitate an equivalent application of materials in a group depending on pressure, temperature and fluid.

NOTE 2 The materials of ancillary components (for example rings according to Annex H) are not within the scope of this European Standard.

#### 5.1.2 Methods of manufacture related to base material

Methods of manufacture: see Table 1.

Mechanical properties are dependent from dimensions of unmachined parts („ $v_R$ ” for forgings, „ $t$ ” for flat products).

As the result of the machining this dimensions will be reduced. For machined flanges and collars the flange dimensions  $C_1$  to  $C_4$  or F shall not be less than 80 % of „ $v_R$ ” for forgings, and the flange dimensions  $C_1$  to  $C_4$  or F shall not be less than 80 % of  $t$  for flat products.

Any deviations from the above should be agreed between the manufacturer and purchaser.