



SLOVENSKI STANDARD

oSIST prEN 1092-2:2022

01-september-2022

Prirobnice in prirobnični spoji - Okrogle prirobnice za cevi, ventile, fitinge in pribor z oznako PN - 2. del: Prirobnice iz litega železa

Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 2: Cast iron flanges

Flansche und ihre Verbindungen - Runde Flansche für Rohre, Armaturen, Formstücke und Zubehörteile, nach PN bezeichnet - Teil 2: Gußeisenflansche

Brides et leurs assemblages - Brides circulaires pour tuyaux, appareils de robinetterie, raccords et accessoires, désignées PN - Partie 2 : Brides en fonte

Ta slovenski standard je istoveten z: prEN 1092-2

ICS:

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

oSIST prEN 1092-2:2022

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1092-2

August 2022

ICS 23.040.60

Will supersede EN 1092-2:1997

English Version

Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 2: Cast iron flanges

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 74.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 1092-2:2022) has been prepared by Technical Committee CEN/TC 74 “Flanges and their joints”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1092-2:1997.

In comparison with the previous edition, the following technical modifications have been made:

- update of Normative references;
- introduction of new DN and PN;
- specification regarding repairs and face finish.

EN 1092 will consist of the following four parts:

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

This document is related to ISO 7005-2:1988 and ISO 2531:2009, as types of flanges and their mating dimensions are compatible with those flanges of the same DN and PN.

The mating dimensions of the flanges of this standard are compatible with those flanges of other materials in accordance with the other parts of EN 1092 series.

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Introduction

The product which is in permanent or temporary contact with water, intended for human consumption, does not adversely affect the quality of the drinking water and does not contravene the EC Directives and EFTA Regulations on the quality of drinking water.

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1 Scope

This document specifies requirements for circular flanges made from ductile, grey and malleable cast iron for DN 10 to DN 4000 and PN 2,5 to PN 100. See 4.1 and 4.2 for information regarding allowed DN and PN.

This document specifies the types of flanges and their facings, dimension and tolerances, bolt sizes, surface finish of jointing faces, marking, testing, quality assurance and materials together with associated pressure/temperature (p/T) ratings.

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 545:2010, *Ductile iron pipes, fittings, accessories and their joints for water pipelines - Requirements and test methods*

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

EN 1370:2012, *Founding — Examination of surface condition*

EN 1561:2011, *Founding - Grey cast irons*

EN 1563:2018, *Founding - Spheroidal graphite cast irons*

EN ISO 4287:2005, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287)*

EN ISO 5458:2018, *Geometrical product specifications (GPS) - Geometrical tolerancing - Pattern and combined geometrical specification (ISO 5458:2018)*

ISO 185:2005, *Grey cast irons — Classification*

ISO 887:2000, *Plain washers for metric bolts, screws and nuts for general purposes — General plan*

ISO 1083:2018, *Spheroidal graphite cast irons — Classification*

ISO 5922:2005, *Malleable cast iron*

ISO 7005-2:1988, *Metallic flanges — Part 2: Cast iron flanges*

prEN 1092-2:2022 (E)**3 Terms and definitions**

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1**flange**

flat circular end of a pipe component extending perpendicular to its axis, with bolt holes equally spaced on a circle (see Figure 1)

Note to entry A flange may be fixed (i.e. integrally cast, screwed or welded on) or adjustable; an adjustable flange comprises a ring, in one or several parts assembled together, which bears on an end joint hub and can be freely rotated around the pipe axis before jointing

3.2**DN (Nominal size)**

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]

3.3**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]

3.4

ductile iron

cast iron in which graphite is present substantially in spheroidal form

3.5

grey iron

cast iron in which graphite is present substantially in lamellar form

3.6

malleable iron

cast iron in which graphite is present substantially in nodular form (temper carbon), and can be partially or wholly decarburized

3.7

joint

connection between the flanged ends of piping systems components in which a gasket is used to effect a seal

4 Designation and types

4.1 Range of DN

DN 10 – DN 15 – DN 20 – DN 25 – DN 32 – DN 40 – DN 50 – DN 60 – DN 65 – DN 80 – DN 100 – DN 125 – DN 150 – DN 200 – DN 250 – DN 300 – DN 350 – DN 400 – DN 400 – DN 500 – DN 600 – DN 700 – DN 800 – DN 900 – DN 1000 – DN 1100 – DN 1200 – DN 1400 – DN 1500 – DN 1600 – DN 1800 – DN 2000 – DN 2200 – DN 2400 – DN 2500 – DN 2600 – DN 2800 – DN 3000 – DN 3200 – DN 3400 – DN 3600 – DN 3800 – DN 4000.

The range of DN applicable to each flange type and to each PN shall be as specified in Tables 2 to 4 as appropriate.

4.2 Range of PN designations

PN 2,5 – PN 6 – PN 10 – PN 16 – PN 25 – PN 40 – PN 63 – PN 100.

4.3 Types of flanges

Figure 1 illustrates flanges identified according to type:

05: blank flange

11: weld-neck flange

12: hubbed slip-on flange for welding

13: hubbed threaded flange

14: hubbed socket welding flange

16: adjustable flange

21: integral flange

NOTE By agreement between customer and manufacturer, an integral flange, modified as follows, can be supplied:

- a) bolt hole diameters and flange facing diameter in accordance with 1092-1:2018
- b) for ductile iron, flange thickness to be as grey iron flanges

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Such flanges shall be designated as type 21-2.

Figure 2 illustrates facing types A and B, which are used where applicable in conjunction with flanges shown in Figure 1 (see 5.7.1).

4.4 Standard designation

Flanges conforming to this standard shall be designated as follows:

- a) term: flange;
- b) number of this standard: EN 1092-2;
- c) DN (see 4.1);
- d) PN (see 4.2);
- e) number of flange type (see 4.3);
- f) material type and grade (see 5.1);
- g) flange facing type for malleable cast iron (see 5.7.1).

EXAMPLE Designation of a weld-neck flange DN100, PN 40, type 11, material designated type MI (malleable iron), with grade B30-06 and facing type A.

Flange EN 1092-2/DN100/PN40/11/MI B30-06/A

4.5 Information to be supplied by the purchaser

The information to be supplied by the purchaser shall be as given in Annex A.

5 General requirements**5.1 Flange materials**

Flanges shall be manufactured from the materials specified in Table 15. Material shall be selected according to their field of application (environment, temperature, pressure and size).

5.2 Repairs by welding

When necessary, flanges may be repaired, in order to remove surface imperfections and localized and visible defects. Repairs should not be accepted when metallurgy concern occurs. Repairs are carried out according to the manufacturer's written procedure.

5.3 Bolting

The bolting shall be chosen by the user according to the pressure, temperature, flange material and gasket. For joints comprising at least one grey iron flange it is recommended that bolting having a yield strength not exceeding 240 N/mm² should be used.

5.4 Gaskets

The gaskets are not within the scope of this standard. For information on types, dimensions and types of gaskets, see relevant EN 1514 standard.

5.5 Pressure/Temperature ratings (p/T)

5.5.1 General

The pressure/temperature ratings of the flanges manufactured from the materials specified in Table 15 shall be the allowable non-surge pressure at the temperature given in Tables 16 and 17 (ductile iron), 18 (grey iron) and 19 (malleable iron). Linear interpolation is permitted for intermediate temperatures.

NOTE The p/T rating of a flange is not necessarily the p/T rating of the whole pipework system. Gasket materials can also impose limitation on the p/T rating of a flanged joint and the gasket manufacturer is consulted when selecting the material of the gasket.

5.5.2 p/T Rating of flanged joints

Where two flanges in a flanged joint do not have the same p/T rating, the p/T rating of the joint at any temperature shall not exceed the lower of the two flanges ratings at that temperature.

NOTE 1 Temperature is that of the contained fluid. Use of a temperature other than that of the contained fluid is the responsibility of the user, subject to the requirements of any applicable code or regulation.

NOTE 2 Application of the p/T ratings given in this standard to flange joints, takes into consideration the risk of leakage due to forces and moments developed in the connecting pipework.

NOTE 3 Owing to the nature of any thread sealing method used, additional limitations can be placed on a threaded flange.

NOTE 4 These notes on service considerations are not intended to be exhaustive.

5.6 Dimensions

Dimensions of flanges shall be in accordance with the following Tables and Figures as appropriate:

- flanges PN 2,5: Table 6 and Figure 3;
- flanges PN 6: Table 7 and Figure 4;
- flanges PN 10: Table 8 and Figure 5;
- flanges PN 16: Table 9 and Figure 6;
- flanges PN 25: Table 10 and Figure 7;
- flanges PN 40: Table 11 and Figure 8;
- flanges PN 63: Table 12 and Figure 9;
- flanges PN 100: Table 13 and Figure 10

NOTE 1 Dimensions which are not given in this standard are determined by the manufacturer for his design of flange.

NOTE 2 Details of attachment for welded, threaded and adjustable flanges are not within the scope of this standard.

5.7 Flange facings

5.7.1 Types of facings

The flange facings specified (flat face type A and raised face type B) are illustrated in Figure 2 and their raised face dimensions shall be as given in Table 5.

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Flanges made of ductile iron shall have raised faces.

Flanges made of grey iron shall have raised faces. See 5.3 for the limitations on bolting due to this material.

Flanges made of malleable iron shall have either flat faces or raised faces.

NOTE The transition from the outside diameter of the raised face to the flange face is at the option of the manufacturer (i.e. either a radius or chamfer can be used).

5.7.2 Jointing face finish

All flange jointing faces shall be finished in accordance with Table 1. These faces shall be compared by visual or tactile means with reference specimens which conform with the R_a , and R_z roughness values given in Table 1.

Flange connections, for example in drinking water applications, may usually be equipped with coated flange surfaces for corrosion protection reasons. Table 1 does not include roughness relative to coated surfaces.

An appropriate combination of flanges with an adequate gasket to compensate for the settling of the coating shall be selected, e.g. rubber coated sealing ring with metal insert.

NOTE 1 It is not intended that instrument measurements are taken on the flange jointing faces: R_a and R_z values as defined in EN ISO 4287:2005 relate to the reference specimens.

NOTE 2 Other finishes can be agreed between the manufacturer and purchaser. Table A.1 — Numerical values of the surface finish parameters (R_a and R_z) of flange jointing faces

(standards.iteh.ai) **Table 1**

Manufacturing process	Values in micrometers	
	R_a	R_z
Turning ¹	3,2 to 12,5	12,5 to 50
Other machining processes ²	3,2 to 6,3	12,5 to 25
As cast ³	3,2 to 25	-

¹ "Turning" covers any method of machine operation producing either serrated concentric or serrated spiral grooves.

² Machining processes other than turning are permissible provided that they give a surface finish in compliance with the R_a and R_z values specified.

³ "As cast" covers surfaces produced by moulding processes where the resultant casting may or may not be subjected to shot or grit blast cleaning operations. Their roughness is assessed by comparison with reference specimens complying with EN 1370: 2012. As cast surfaces may have serrated concentric grooves to enhance gasket sealing efficiency. They are normally used for application where joints incorporate gaskets of readily deformable material, e.g. rubber, application for which the above surface characteristics may also apply to the other manufacturing processes.

5.8 Spot facing or back facing

Any spot facing or back facing required shall not reduce the flange thickness to less than the thickness specified. When spot facing is used, the diameter shall be large enough to accommodate the outside diameter of the equivalent normal series of washers complying with ISO 887:2000, for the bolt size being fitted. When a flange is back faced, it is permissible for the fillet radius to be reduced but it shall not be eliminated entirely. The bearing surfaces for the bolting shall be parallel to the flange face within 2°.

5.9 Tolerances

The tolerances or dimensions are as specified in Table 14.

5.10 Marking and stamping

5.10.1 Marking

Blank flanges and flanges which are supplied not attached to pipeline components shall be marked as follows:

- a) DN (nominal size);
- b) PN designation;
- c) material identification;
- d) manufacturer's name or trade-mark

EXAMPLE DN 300 PN 16 420-5 XXX

Where a flange is subsequently used to form an integral part of a component and the component has a lower pressure rating than that of the flange, the lower rating should be clearly marked on the component and the lower p/T rating applies.

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prEN 1092-2:2022 (E)**5.10.2 Stamping**

Where steel stamps are used, the marking shall be positioned on the outer rim of the flange. Low stress round nose stamps shall be used.

5.10.3 Omission of markings

If a flange is too small to enable all the markings required in 5.10.1 to be marked on the flange, then marking of nominal size may be omitted.

5.11 Quality assurance**5.11.1 General**

The following quality assurance requirement applies to all types of flanges except for those delivered attached to a pipeline component. The quality assurance requirements for those flanges are given in the appropriate component standards.

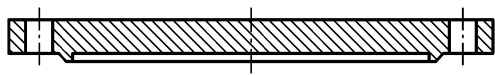
5.11.2 Quality assurance system

The manufacturer shall operate a quality assurance system, see EN ISO 9001:2015 for further information.

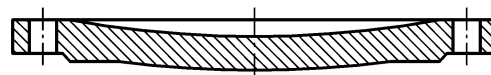
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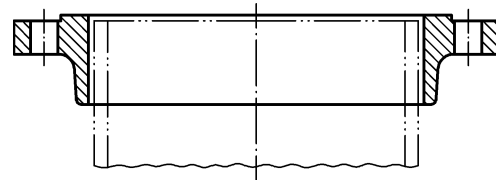
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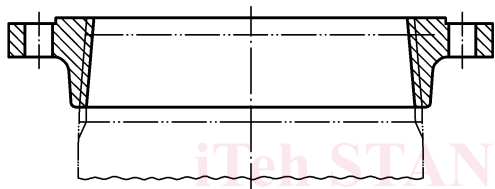
Type 05
Blank flange



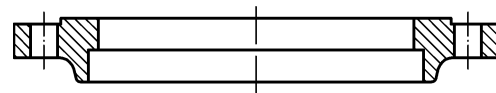
Type 11
Weld-neck flange



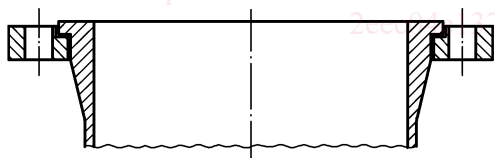
Type 12
Hubbed slip-on flange for welding



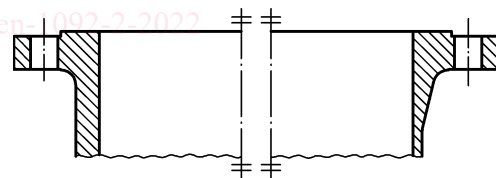
Type 13
Hubbed threaded flange



Type 14
Hubbed socket welding flange



Type 16
Adjustable flange



Type 21
Integral flange

Figure 1 — Types of flanges

NOTE 1 The transition from the edge of the raised face to the flange jointing face is either by radius or chamfer (see 5.7.1)

NOTE 2 Type 21 flange is an integral part of some other product or component.

NOTE 3 Flanges can be designated by type number or by description.