



BSI Standards Publication

## Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated

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Part 2: Cast iron flanges

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EUROPEAN STANDARD

**EN 1092-2**

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

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

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

This European Standard was approved by CEN on 22 October 2023.

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## European foreword

This document (EN 1092-2:2023) 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of an identical text or by endorsement, at the latest by May 2024, and conflicting national standards shall be withdrawn at the latest by May 2024.

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 1092-2:1997.

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 document are compatible with those flanges of other materials in accordance with the other parts of EN 1092 series.

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, Türkiye and the United Kingdom.

## Introduction

Materials that are in permanent or temporary contact with drinking water are not detrimental to the quality of the drinking water and do not violate EC Directives or EFTA regulations concerning the quality of drinking water.

Botop Steel

## 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.

NOTE 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)*

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*

## 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

NOTE 1 to entry: See Figure 1.

NOTE 2 to entry: A flange can 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 component standards include tables of specified pressure/temperature ratings (p/T) or, in minimum, include rules how to determine pressure/temperature ratings (p/T).

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 450 – 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:

- a) 05: blank flange
- b) 11: weld-neck flange
- c) 12: hubbed slip-on flange for welding
- d) 13: hubbed threaded flange
- e) 14: hubbed socket welding flange
- f) 16: adjustable flange
- g) 21: integral flange

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

- i) bolt hole diameters and flange facing diameter in accordance with EN 1092-1:2018;
- ii) for ductile iron, flange thickness to be as grey iron flanges.

Such flanges is 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 document shall be designated as follows:

- a) term: flange;
- b) number of this document: 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 can 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/mm<sup>2</sup> should be used.

#### **5.4 Gaskets**

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

#### **5.5 Pressure/Temperature ratings (p/T)**

##### **5.5.1 General**

The pressure/temperature ratings (p/T) of the flanges manufactured from the materials specified in Table 15 correspond to 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 p/T 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 For application of the p/T ratings given in this document to flange joints, take 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 document are determined by the manufacturer for his flange design.

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

### 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.

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, can 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 1 — Numerical values of the surface finish parameters ( $R_a$  and  $R_z$ ) of flange jointing faces**

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

<sup>1</sup>) "Turning" covers any method of machine operation producing either serrated concentric or serrated spiral grooves.  
<sup>2</sup>) 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.  
<sup>3</sup>) "As cast" covers surfaces produced by moulding processes where the resultant casting can or cannot 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 can 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 can 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      **DN300 PN16 420-5 XXX**

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

### 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 can be omitted.

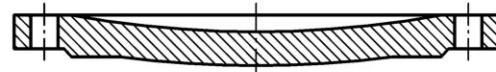
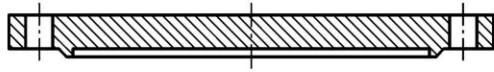
## 5.11 Quality assurance

### 5.11.1 General

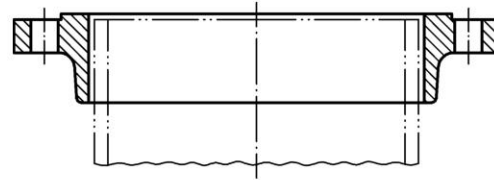
The following quality assurance requirement applies to all types of flanges except for those delivered attached to a pipeline component. The quality assurance requirements for those flanges are given in the appropriate component standards.

### 5.11.2 Quality assurance system

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

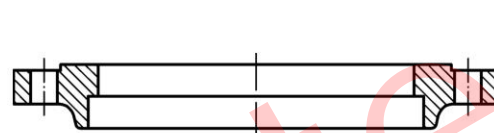
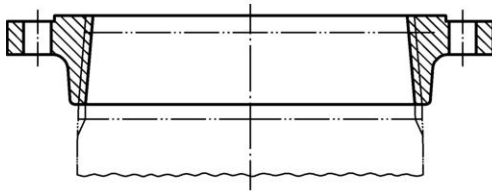


**Type 05**  
**Blank flange**



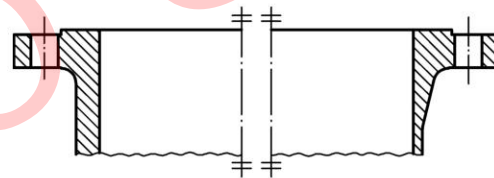
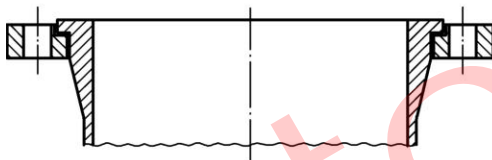
**Type 11**  
**Weld-neck flange**

**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.















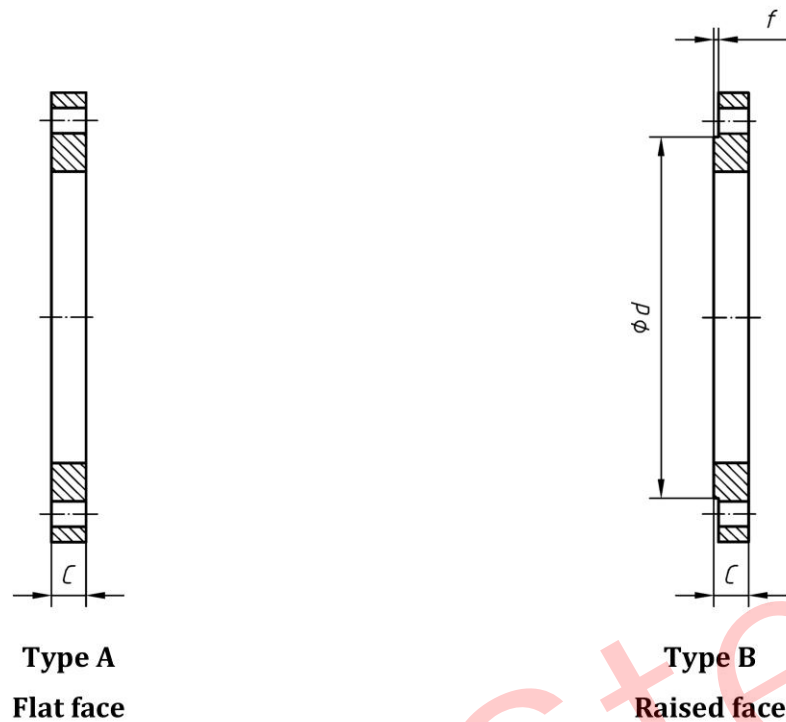


Figure 2 — Flange facing types A and B

NOTE See Table 5 for  $f$  and  $d$  values of type B.

Table 5 — Dimensions for type B flange facings

Dimensions in millimetres

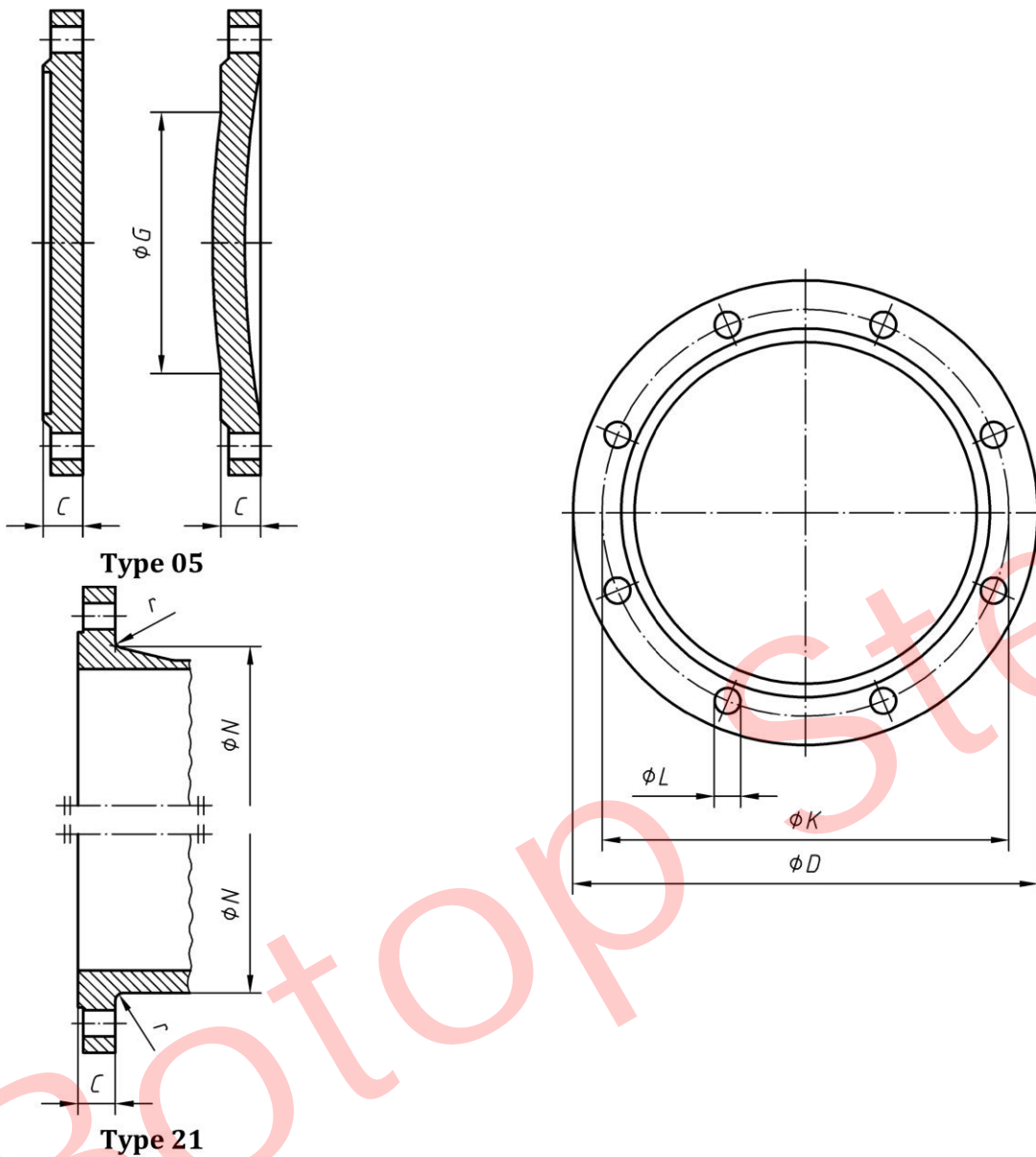
DN	$f$	$d$							
		PN 2,5	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
10	2	33	33	41	41	41	41	-	-
15	2	38	38	46	46	46	46	-	-
20	2	48	48	56	56	56	56	-	-
25	3	58	58	65	65	65	65	-	-
32	3	69	69	76	76	76	76	-	-
40	3	78	78	84	84	84	84	84	84
50	3	88	88	99	99	99	99	99	99
60	3	98	98	108	108	108	108	108	108
65	3	108	108	118	118	118	118	118	118
80	3	124	124	132	132	132	132	132	138
100	3	144	144	156	156	156	156	156	162
125	3	174	174	184	184	184	184	184	188
150	3	199	199	211	211	211	211	211	218
200	3	254	254	266	266	274	284	284	285

DN	f	d							
		PN 2,5	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
250	3	309	309	319	319	330	345	345	345
300	4	363	363	370	370	389	409	409	410
350	4	413	413	429	429	448	465	465	465
400	4	463	463	480	480	503	535	535	535
450	4	518	518	530	548	548	560	560	560
500	4	568	568	582	609	609	615	615	615
600	5	667	667	682	720	720	735	735	-
700	5	772	772	794	794	820	840	840	-
800	5	878	878	901	901	928	960	960	-
900	5	978	978	1001	1001	1028	1070	1070	-
1000	5	1078	1078	1112	1112	1140	1180	1180	-
1100	5	-	-	1218	1218	1240	1240	1240	-
1200	5	1280	1295	1328	1328	1350	1380	1380	-
1400	5	1480	1510	1530	1530	1560	1600	-	-
1500	5	-	-	1640	1640	1678	1678	-	-
1600	5	1690	1710	1750	1750	1780	1815	-	-
1800	5	1890	1918	1950	1950	1985	2035	-	-
2000	5	2090	2125	2150	2150	2210	-	-	-
2200	6	2295	2335	2370	2366	-	-	-	-
2400	6	2495	2545	2550	2570	-	-	-	-

Table 5 — Dimensions for type B flange facings

DN	f	d							
		PN 2,5	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
2500	6	-	2642	2665	2676	-	-	-	-
2600	6	2695	2750	2780	2832	-	-	-	-
2800	6	2910	2960	2968	3020	-	-	-	-
3000	6	3110	3160	3160	3172	-	-	-	-
3200	6	3310	3370	-	-	-	-	-	-
3400	6	3510	3580	-	-	-	-	-	-
3600	6	3720	3790	-	-	-	-	-	-
3800	6	3920	-	-	-	-	-	-	-
4000	6	4120	-	-	-	-	-	-	-

Dimensions in millimetres



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes; refer to Table 6 for the actual number.

NOTE For facing dimensions, see Table 5.

**Figure 3 — Dimensions of PN 2,5 flanges**

Table 6 — Dimensions of PN 2,5 flanges

		Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii
Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole	Bolting		Ductile iron <i>C</i>	Grey iron (1)	Malleable iron <i>C</i>	<i>G</i>	<i>N</i>	<i>r</i>	
			Number	Size							
DN	05/21				Flange type			05	21	21	
10	05/21				05/21			05	21	21	
15	05/21				05/21			05	21	21	
20	05/21				05/21			05	21	21	
25	05/21				05/21			05	21	21	
32	05/21				05/21			05	21	21	
40	05/21				05/21			05	21	21	
50	05/21				05/21			05	21	21	
60	05/21				05/21			05	21	21	
65	05/21				05/21			05	21	21	
80	05/21				05/21			05	21	21	
100	05/21				05/21			05	21	21	
125	05/21				05/21			05	21	21	
150	05/21				05/21			05	21	21	
200	05/21				05/21			05	21	21	
250	05/21				05/21			05	21	21	
300	05/21				05/21			05	21	21	
350	05/21				05/21			05	21	21	
Use PN 6 dimensions See Table 7											
(1) These flange thicknesses are also valid for ductile iron flanges type 21-2											

Table 6 — Dimensions of PN 2,5 flanges

DN	Mating dimensions					Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii
	Outside diameter D	Diameter of bolt circle K	Diameter of bolt hole L	Bolting		Ductile iron C	Grey iron (1) C	Malleable iron C			
				Number	Size						
	Flange type										
05/21						05/21		05		21	
400	1375	1320	31	32	M27	-	30	-	1185	1250	8
450	1575	1520	31	36	M27	-	30	-	1385	1452	8
500	1790	1730	31	40	M27	-	32	-	1585	1654	10
600	1990	1930	31	44	M27	-	34	-	1785	1856	10
700	2190	2130	31	48	M27	-	34	-	1985	2056	10
800	2405	2340	34	52	M30	-	36	-	2185	2260	10
900	2605	2540	34	56	M30	-	38	-	2385	2464	10
1000	2805	2740	34	60	M30	-	40	-	2585	2668	10
1200	3030	2960	37	64	M33	-	42	-	2785	2868	12

Use PN 6 dimensions  
See Table 7



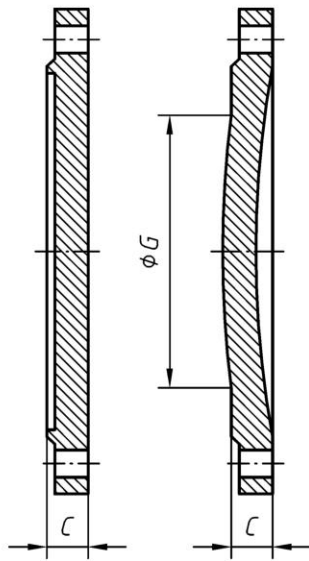
DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter D	Diameter of bolt circle K	Diameter of bolt hole L	Bolting		Ductile iron C	Grey iron (1) C				Malleable iron C
				Number	Size						
			05/21				05/21		05	21	21
(1) These flange thicknesses are also valid for ductile iron flanges type 21-2											

Table 6 — Dimensions of PN 2,5 flanges

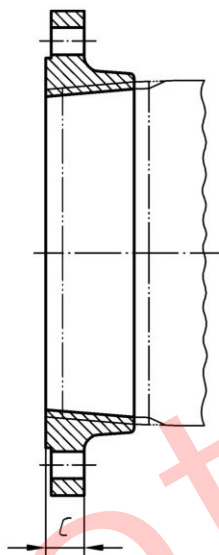
Dimensions in millimetres

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting		Ductile iron	Grey iron (1)				Malleable iron
				Number	Size						
	<i>D</i>	<i>K</i>	<i>L</i>			<i>C</i>	<i>C</i>	<i>C</i>	<i>N</i>	<i>r</i>	
			05/21				05/21		21	21	
3000	3230	3160	37	68	M33	-	42	-	2985	3068	12
3200	3430	3360	37	72	M33	-	44	-	3185	3268	12
3400	3630	3560	37	76	M33	-	46	-	3385	3472	12
3600	3840	3770	37	80	M33	-	48	-	3585	3676	12
3800	4045	3970	41	80	M36	-	48	-	3785	3876	12
4000	4245	4170	41	84	M36	-	50	-	3985	4076	12

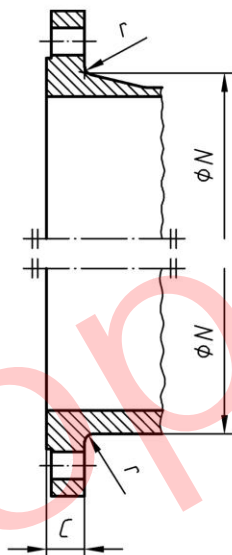
(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.



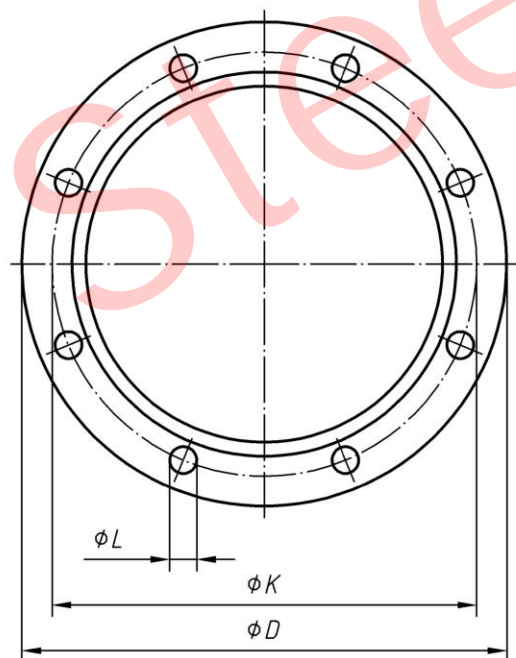
**Type 05**



**Type 13**



**Type 21**



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes; refer to Table 7 for the actual number.

NOTE For facing dimensions, see Table 5.

**Figure 4 — Dimensions of PN 6 flanges**

Table 7 — Dimensions of PN 6 flanges

DN	Mating dimensions				Flange thickness			Dimensions in millimetres			
	Outside diameter $D$	Diameter of bolt circle $K$	Diameter of bolt hole $L$	Bolting		Ductile iron $C$	Grey iron (1) $C$	Malleable iron $C$	Maximal diameter of shoulder $G$	Neck diameter $N$	Corner radii $r$
				Number	Size						
	Flange type										
05/13/21											
10	75	50	11	4	M10	-	12	12	-	20	3
15	80	55	11	4	M10	-	12	12	-	26	3
20	90	65	11	4	M10	-	14	14	-	34	4
25	100	75	11	4	M10	-	14	14	-	44	4
32	120	90	14	4	M12	-	16	16	-	54	5
40	130	100	14	4	M12	-	16	16	-	64	5
50	140	110	14	4	M12	-	16	16	-	74	5
60	150	120	14	4	M12	-	16	16	-	84	6
65	160	130	14	4	M12	-	16	16	-	94	6
80	190	150	19	4	M16	-	18	18	-	110	6
100	210	170	19	4	M16	-	18	18	-	130	6
125	240	200	19	8	M16	-	20	20	-	160	6
150	265	225	19	8	M16	-	20	20	-	182	8
200	320	280	19	8	M16	-	22	22	-	238	8
250	375	335	19	12	M16	-	24	24	-	284	10
300	440	395	23	12	M20	-	24	24	-	342	10
350	490	445	23	12	M20	-	-	-	335	392	10

DN	Mating dimensions			Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii
	Outside diameter $D$	Diameter of bolt circle $K$	Diameter of bolt hole $L$	Ductile iron $C$	Grey iron (1) $C$	Malleable iron $C$			
		Number	Size	Flange type					
				05/13/21	05/21	05/13/21	05	13/21	13/21

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.

Table 7 — Dimensions of PN 6 flanges

DN	Mating dimensions			Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii
	Outside diameter $D$	Diameter of bolt circle $K$	Diameter of bolt hole $L$	Ductile iron $C$	Grey iron (1) $C$	Malleable iron $C$			
		Number	Size	Flange type					
				05/13/21	05/21	05/13/21	05	13/21	13/21
400	540	495	23	M20	16	23	385	442	10
450	595	550	23	M20	16	23	435	494	12
500	645	600	23	M20	20	23	485	544	12
600	755	705	28	M24	20	28	585	642	12
700	860	810	28	M24	24	28	685	746	12
800	975	920	31	M27	24	31	785	850	12
900	1075	1020	31	M27	24	31	885	950	12
1000	1175	1120	31	M27	28	31	985	1050	12
1200	1405	1340	34	M30	32	34	1185	1264	12

Dimensions in millimetres

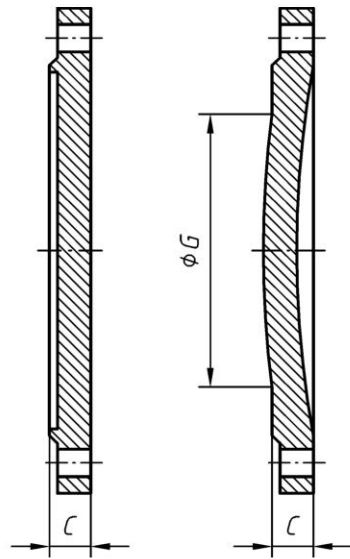
DN	Mating dimensions			Flange thickness			Maximal diameter of shoulder G	Neck diameter N	Corner radii r
	Outside diameter D	Diameter of bolt circle K	Diameter of bolt hole L	Ductile iron		Malleable iron			
				C	C				
				Flange type					
			05/13/21	05/21	05/13/21	05	13/21	13/21	
1400	1630	1560	37	-	-	1385	1480	12	
1600	1830	1760	37	-	-	1585	1680	12	
1800	2045	1970	41	-	-	1785	1878	15	
2000	2265	2180	44	-	-	1985	2082	15	
2200	2475	2390	44	-	-	-	-	15	
2400	2685	2600	44	-	-	-	-	15	
2500	2800	2705	44	-	-	-	2592	15	
2600	2905	2810	50	-	-	-	-	15	

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.

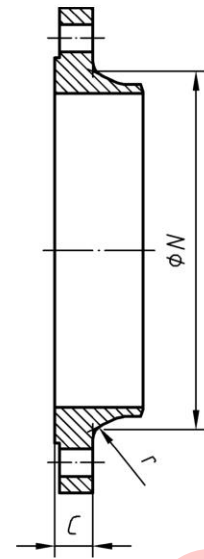
Table 7 — Dimensions of PN 6 flanges

DN		Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
		Outside diameter $D$	Diameter of bolt circle $K$	Diameter of bolt hole $L$	Bolting		Ductile iron $C$	Grey iron (1) $C$				Malleable iron $C$
					Number	Size						
		05/13/21				Flange type			05	13/21	13/21	
2800	3115	3020	50	50	64	M45	-	-	-	-	15	
3000	3315	3220	50	50	68	M45	-	-	-	-	15	
3200	3525	3430	50	50	72	M45	-	-	-	-	15	
3400	3735	3640	50	50	76	M45	-	-	-	-	15	
3600	3970	3860	57	57	80	M52	-	-	-	-	15	
3800	4170	4060	57	57	84	M52	-	-	-	-	15	
4000	4440	4300	62	62	84	M56	-	-	-	-	15	

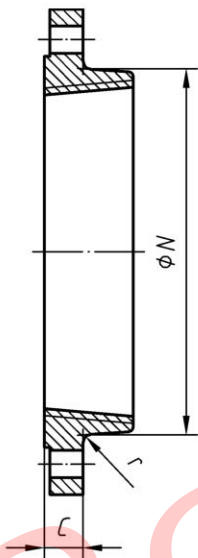
(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.



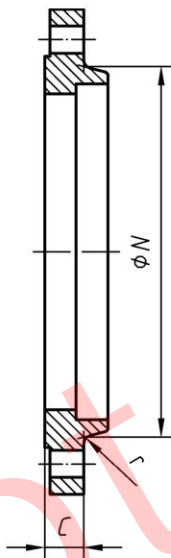
**Type 05 and Type 11**



**Type 12**



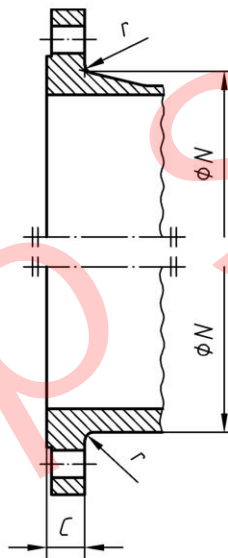
**Type 13**



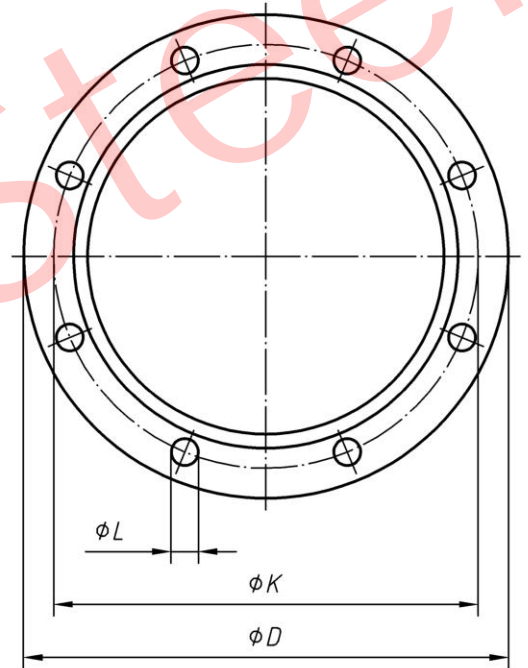
**Type 14**



**Type 16**



**Type 21**



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes; refer to Table 8 for the actual number.

NOTE For facing dimensions, see Table 5.

**Figure 5 — Dimensions of PN 10 flanges**



Table 8 — Dimensions of PN 10 flanges

DN	Mating dimensions					Flange thickness				Maximal diameter of shoulder	Neck diameter	Corner radii
	Outside diameter $D$	Diameter of bolt circle $K$	Diameter of bolt hole $L$	Bolting		Ductile iron (1) $C$	Grey iron (2) $C$	Malleable iron $C$	$G$			
				Number	Size							
	Flange type											
	05 / 11 / 12 / 13 / 14 / 16 / 21					05/11 12/13 14/21	16	05/13 21	05/13 21	05	11/12 13/14 21	11/12 13/14 21
10												
15												
20												
25												
32												
40												
50												
60												
65												
80												
100												
125												
150												
200	340	295	23	8	M20	20	29	26	24	-	246	8

Use PN16 dimensions  
See Table 9

(1) PN10 Ductile iron flanges can be used on socket pipelines up to pressure  $s$  of approximately 15 bar.  
(2) These flange thicknesses are also valid for ductile iron flanges type 21-2.

Table 8 — Dimensions of PN 10 flanges

DN	Mating dimensions				Flange thickness				Maximal diameter of shoulder	Neck diameter	Corner radii
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting		Ductile iron (1)	Grey iron (2)	Malleable iron			
				Number	Size						
	<i>D</i>	<i>K</i>	<i>L</i>			<i>C</i>	<i>C</i>	<i>C</i>			
	05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05/13 21	05/13 21	05	11/12 13/14 21	11/12 13/14 21
250	395 <sup>(3)</sup>	350	23	12	M20	22	32	28	-	298	10
300	445 <sup>(3)</sup>	400	23	12	M20	24,5	36	28	-	348	10
350	505	460	23	16	M20	24,5	39	30	335	408	10
400	565	515	28	16	M24	24,5	42	32	385	456	10
450	615	565	28	20	M24	25,5	45	32	435	502	12
500	670	620	28	20	M24	26,5	48	34	485	559	12
600	780	725	31	20	M27	30	55	36	585	658	12
700	895	840	31	24	M27	32,5	-	40	685	772	12
800	1015	950	34	24	M30	35	-	44	785	876	12
900	1115	1050	34	28	M30	37,5	-	46	885	976	12
1000	1230	1160	37	28	M33	40	-	50	985	1080	12
1100	1340	1270	37	32	M33	42,5	-	53	1085	1186	12
1200	1455	1380	41	32	M36	45	-	56	1185	1292	12

(1) PN10 Ductile iron flanges can be used on socket pipelines up to pressure s of approximately 15 bar.

(2) These flange thicknesses are also valid for ductile iron flanges type 21-2.

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole		Ductile iron (1) <i>C</i>	Grey iron (2) <i>C</i>	Malleable iron <i>C</i>			
			<i>L</i>	Number						
	05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05/13 21	05/13 21	11/12 13/14 21	11/12 13/14 21
(3) For ductile iron pipes and fittings, the outside diameters for the following flanges shall be: D = 455 mm.	DN				Flange type			D = 400 mm;		

Table 8 — Dimensions of PN 10 flanges

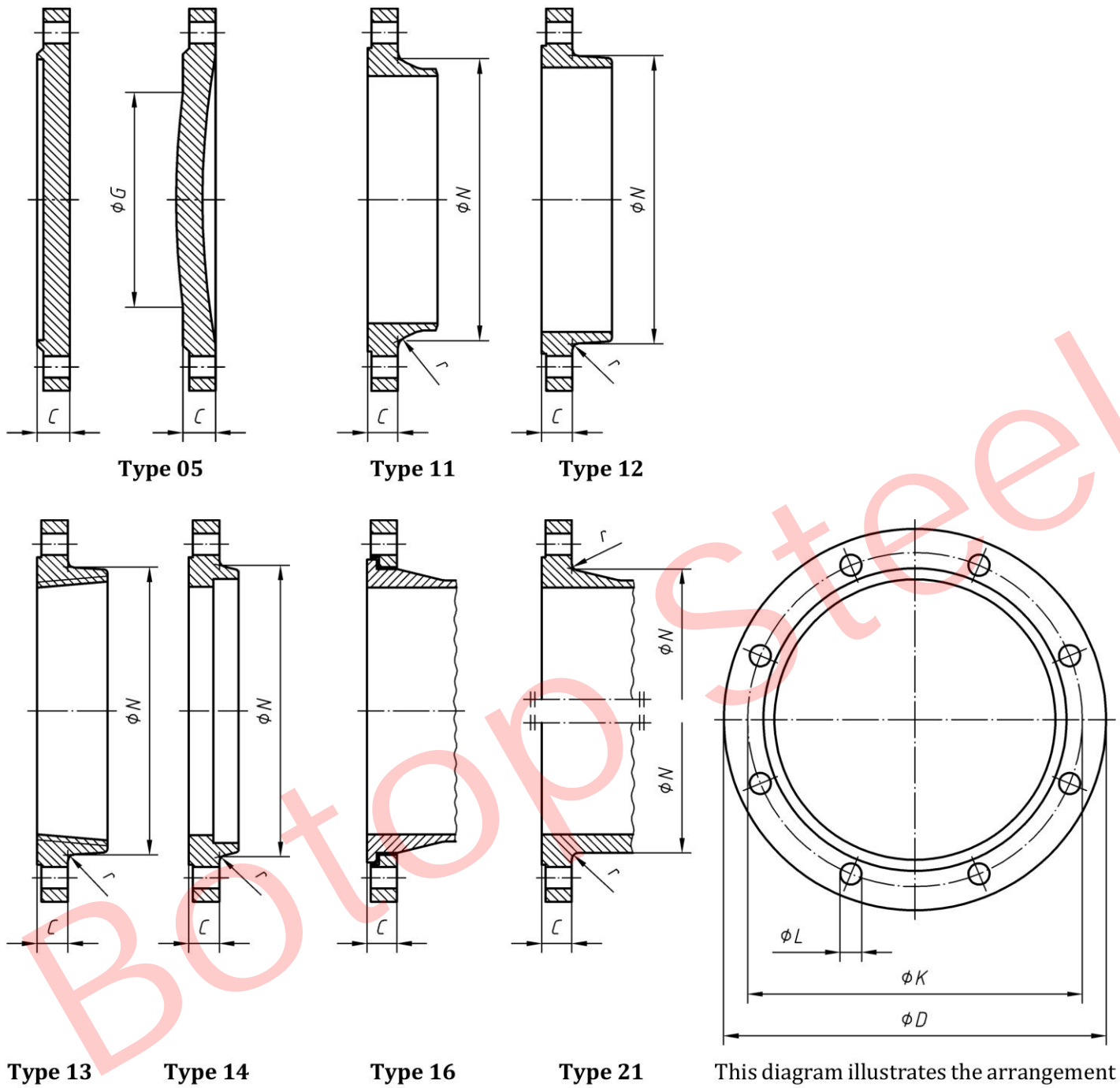
Dimensions in millimetres

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole		Ductile iron (1) <i>C</i>	Grey iron (2) <i>C</i>	Malleable iron <i>C</i>				
			<i>L</i>	Number							Size
	05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05/13 21	05/13 21	11/12 13/14 21	11/12 13/14 21	
	DN				Flange type			D = 400 mm;			
1400	1675	1590	44	36	M39	46	-	62	1385	1496	12
1500	1785	1700	44	36	M39	47,5	-	65	1485	1605	12
1600	1915	1820	50	40	M45	49	-	68	1585	1712	12
1800	2115	2020	50	44	M45	52	-	70	1785	1910	15

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron (1) <i>C</i>	Grey iron (2) <i>C</i>				Malleable iron <i>C</i>
				Number	Size						
	05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05/13 21	05/13 21	11/12 13/14 21	11/12 13/14 21	
2000	2325	2230	50	48	M45	55	74	1985	2120	15	
2200	2550	2440	57	52	M52	74	-	-	2320	15	
2400	2760	2650	57	56	M52	75	-	-	2494	15	
2500	2860	2750	57	56	M52	75	-	-	-	15	
2600	2960	2850	57	60	M52	88	-	-	2720	15	
2800	3180	3070	57	64	M52	-	-	-	2930	15	
3000	3405	3290	62	68	M56	90	-	-	3150	15	

(1) PN10 Ductile iron flanges can be used on socket pipelines up to pressure s of approximately 15 bar.

(2) These flange thicknesses are also valid for ductile iron flanges type 21-2.



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes; refer to Table 8 for the actual number.

NOTE For facing dimensions, see Table 5.

Figure 6 — Dimensions of PN 16 flanges

Table 9 — Dimensions of PN 16 flanges

DN		Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
		Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>				Malleable iron <i>C</i>
					Number	Size						
		05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05/13 21	05/13 21	11/12 13/14 21	11/12 13/14 21	
10						14	-	14	-	28	3	
15						14	-	14	-	32	3	
20						16	-	16	-	40	4	
25						16	-	16	-	50	4	
32						18	-	18	-	60	5	
40						19	22	18	-	70	5	
50						19	22	20	-	84	5	
60						19	22	20	-	94	6	
65						19	22	20	-	104	6	
80						19	22	22	-	120	6	
100						19	23	24	-	140	6	
125						19	24,5	26	-	170	6	
150						19	26	26	-	190	8	
200						20	29	30	-	246	8	
Use PN40 dimensions See Table 11												
60	175	135	19	4	M16	19	22	20	-	94	6	
65	185	145	19	4 <sup>(2)</sup>	M16	19	22	20	-	104	6	
80	200	160	19	8	M16	19	22	22	-	120	6	
100	220	180	19	8	M16	19	23	22	-	140	6	
125	250	210	19	8	M16	19	24,5	22	-	170	6	
150	285	240	23	8	M20	23	26	24	-	190	8	
200	340	295	23	12	M20	23	29	24	-	246	8	

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>				Malleable iron <i>C</i>
				Number	Size						
	05 / 11 / 12 / 13 / 14 / 16 / 21				Flange type			<i>G</i>	<i>N</i>	<i>r</i>	
	05/11 / 12/13 / 14/16 / 21				05/11 12/13 14/21	16	05/13 21	05/13 21	11/12 13/14 21	11/12 13/14 21	

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.  
 (2) According to EN 1092-1:2018, steel flanges in this DN and PN can be supplied with 8 holes. For compliance, equivalent cast iron flanges can be supplied with 8 holes, as special order and after agreement between manufacturer and customer.



Table 9 — Dimensions of PN 16 flanges

Mating dimensions						Flange thickness					Maximal diameter of shoulder			Neck diameter			Corner radii		
Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>	Malleable iron <i>C</i>	Maximal diameter of shoulder <i>G</i>	Neck diameter <i>N</i>	Corner radii <i>r</i>	Flange type								
			Number	Size							05/11 12/13 14/21	16	05/13 21	05/13 21	11/12 13/14 21				
DN	05 / 11 / 12 / 13 / 14 / 16 / 21				Flange type														
250	355	28	12	M24	22	32	26	296	10										
300	410	28	12	M24	24,5	32	28	350	10										
350	470	28	16	M24	26,5	36	-	410	10										
400	525	31	16	M27	28	38	-	458	10										
450	585	31	20	M27	30	40	-	516	12										
500	650	34	20	M30	31,5	42	-	576	12										
600	770	37	20	M33	36	48	-	690	12										
700	840	37	24	M33	39,5	54	-	760	12										
800	950	41	24	M36	43	58	-	862	12										
900	1050	41	28	M36	46,5	62	-	962	12										
1000	1170	44	28	M39	50	66	-	1076	12										
1100	1270	44	32	M39	53,5	-	-	1176	12										
1200	1390	50	32	M45	57	-	-	1282	12										

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.  
 (2) For ductile iron pipes and fittings, the outside diameters for the following flanges shall be: DN 250: D = 400 mm; - DN 300: D = 455 mm.

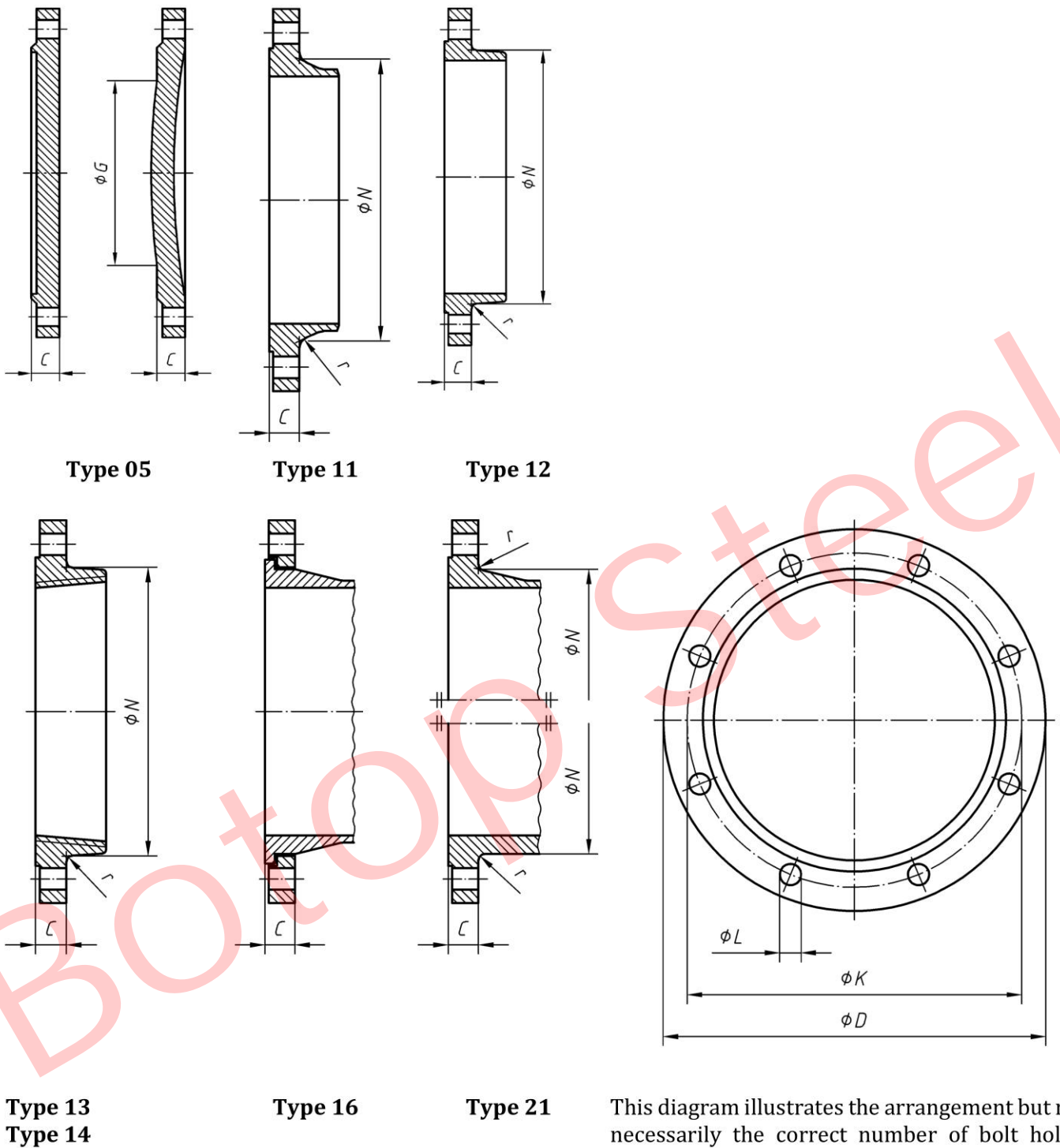


Table 9 — Dimensions of PN 16 flanges

Dimensions in millimetres

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting		Ductile iron	Grey iron				Malleable iron
				Number	Size						
	<i>D</i>	<i>K</i>	<i>L</i>	C		<i>C</i>	<i>C</i>				<i>C</i>
	05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05/13 21	05/13 21	05	11/12 13/14 21	11/12 13/14 21
1400	1685	1590	50	36	M45	60	-	-	1385	1482	12
1500	1820	1710	57	36	M52	62,5	-	-	1485	1586	12
1600	1930	1820	57	40	M52	65	-	-	1585	1696	12
1800	2130	2020	57	44	M52	70	-	-	1785	1896	15
2000	2345	2230	62	48	M56	75	-	-	1985	2100	15
2200 (1)	2555	2440	62	52	M56	90	-	-	-	2310	15
2400 (1)	2765	2650	62	56	M56	100	-	-	-	2506	15
2500 (1)	2870	2750	62	56	M56	90	-	-	-	2676	15
2600 (1)	3048	2908	62	72	M56	100	-	-	-	2750	15
2800 (1)	3240	3100	70	68	M64	100	-	-	-	2946	15
3000 (1)	3350	3240	62	64	M56	105	-	-	-	3120	15

(1) DN &gt; 2000 are not defined in EN1092-1:2018.



NOTE For facing dimensions, see Table 5.

Figure 7 — Dimensions of PN 25 flanges

Table 10 — Dimensions of PN 25 flanges

DN	Mating dimensions					Flange thickness				Dimensions in millimetres				
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>	Malleable iron <i>C</i>	Maximal diameter of shoulder <i>G</i>	Neck diameter <i>N</i>	Corner radii <i>r</i>			
				Number	Size							Flange type		
	05 / 11 / 12 / 13 / 14 / 16 / 21					05/11 12/13 14/21	05 21	05/13 21	11/12 13/14 21	11/12 13/14 21				
10						14								
15						14								
20						16								
25						16								
32						18								
40														
50														
60														
65														
80														
100														
125	270	220	28	8	M24	19	24,5	30	-	162	6			
150	300	250	28	8	M24	20	26	34	-	192	8			
200	360	310	28	12	M24	22	29	34	-	252	8			
250	425	370	31	12	M27	24,5	32	36	-	304	10			

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.

Table 10 — Dimensions of PN 25 flanges

Dimensions in millimetres

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>				Malleable iron <i>C</i>
				Number	Size						
	05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05 21				05/13 21
300	485	430	31	16	M27	27,5	36	40	-	364	10
350	555	490	34	16	M30	30	39	44	335	418	10
400	620	550	37	16	M33	32	42	48	385	472	10
450	670	600	37	20	M33	34,5	45	50	435	520	12
500	730	660	37	20	M33	36,5	48	52	485	580	12
600	845	770	41	20	M36	42	55	56	585	684	12
700	960	875	44	24	M39	46,5	-	-	685	780	12
800	1085	990	50	24	M45	51	-	-	785	882	12
900	1185	1090	50	28	M45	55,5	-	-	885	982	12
1000	1320	1210	57	28	M52	60	-	-	985	1086	12
1100	1420	1310	57	32	M52	64,5	-	-	1085	1186	12
1200	1530	1420	57	32	M52	69	-	-	1185	1296	12
1400	1755	1640	62	36	M56	74	-	-	1385	1508	12
1500	1865	1750	62	36	M56	77,5	-	-	1485	1617	12
1600	1975	1860	62	40	M56	81	-	-	1585	1726	12

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.

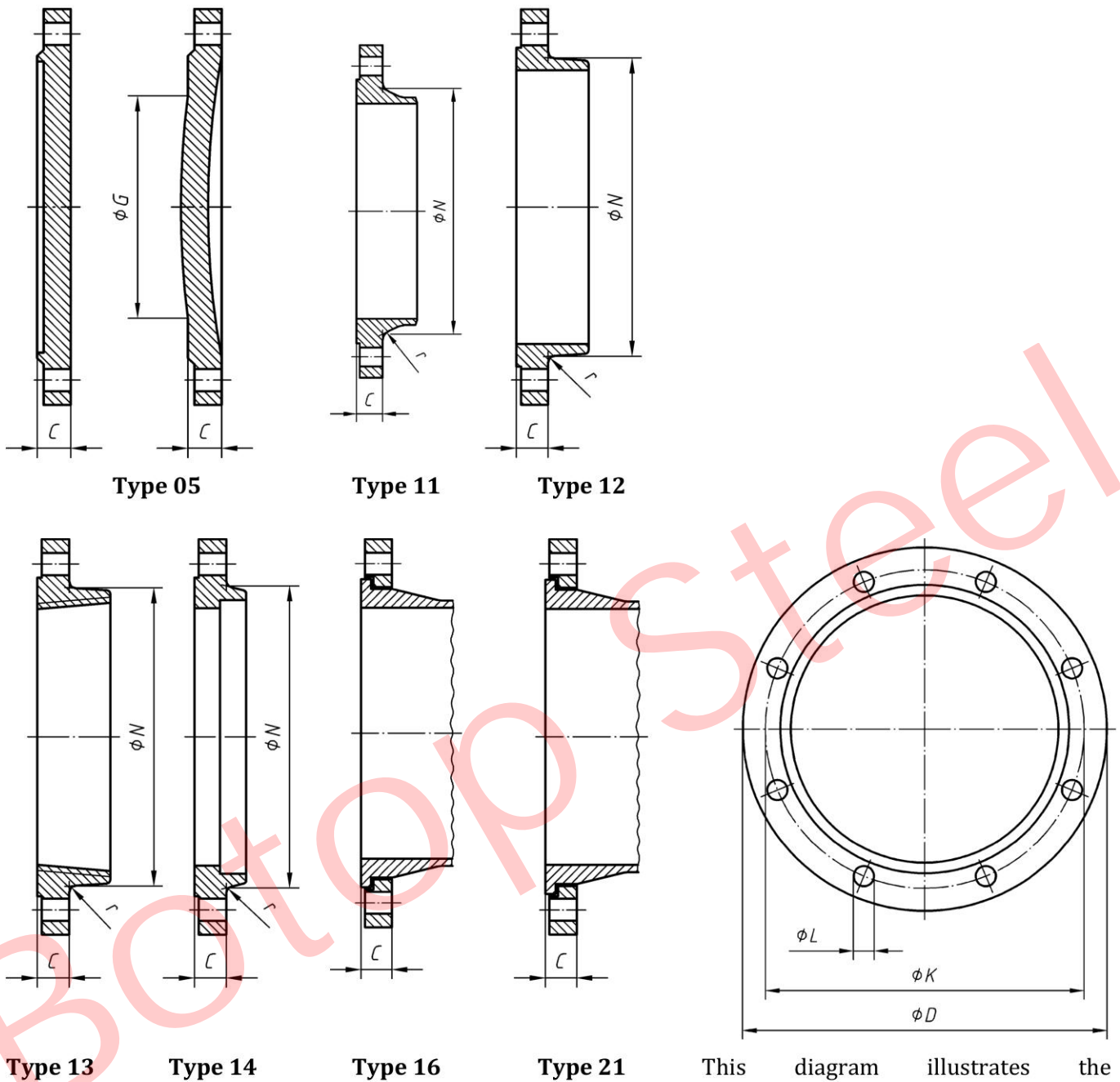
Table 10 — Dimensions of PN 25 flanges

Dimensions in millimetres

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting		Ductile iron	Grey iron				Malleable iron
				Number	Size						
<i>D</i>	<i>K</i>	<i>L</i>			<i>C</i>	<i>C</i>	<i>G</i>	<i>N</i>	<i>r</i>		
	05 / 11 / 12 / 13 / 14 / 16 / 21				05/11 12/13 14/21	16	05 21	05/13 21	11/12 13/14 21	11/12 13/14 21	
1800	2195	2070	70	44	88	-	-	-	1785	15	
2000	2425	2300	70	48	95	-	-	-	1985	15	

Flange type

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This diagram illustrates the arrangement but not necessarily the correct number of bolt holes; refer to Table 10 for the actual number.

NOTE For facing dimensions, see Table 5.

**Figure 8 — Dimensions of PN 40 flanges**

Table 11 — Dimensions of PN 40 flanges

DN		Mating dimensions				Flange thickness				Maximal diameter of shoulder	Neck diameter	Corner radii					
		Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>	Malleable iron <i>C</i>				G	N	<i>r</i>		
					Number	Size											
																Flange type	
05 / 11 / 12 / 13 / 14 / 16 / 21		05/11	12/13	14/21	16	05	05/13	21	05	11/12	13/14	21					
10	60	90	14	4	M12	-	-	-	16	05	14	05/13	21	05	11/12	13/14	21
15	65	95	14	4	M12	-	-	-	-	16	14	14	14	-	28	32	3
20	75	105	14	4	M12	-	-	-	-	18	16	16	16	-	40	40	4
25	85	115	14	4	M12	-	-	-	-	18	16	16	16	-	50	50	4
32	100	140	19	4	M16	-	-	-	-	20	18	18	18	-	60	60	5
40	110	150	19	4	M16	19	22	20	22	20	18	18	18	-	70	70	5
50	125	165	19	4	M16	19	22	22	22	22	20	20	20	-	84	84	5
60	135	175	19	8	M16	19	22	24	22	24	22	22	22	-	94	94	6
65	145	185	19	8	M16	19	22	24	22	24	22	22	22	-	104	104	6
80	160	200	19	8	M16	19	22	26	22	26	24	24	24	-	120	120	6
100	190	235	23	8	M20	19	23	28	23	28	24	24	24	-	142	142	6
125	220	270	28	8	M24	23,5	24,5	30	24,5	30	26	26	26	-	162	162	6
150	250	300	28	8	M24	26	26	34	26	34	28	28	28	-	192	192	8
200	320	375	31	12	M27	30	33	40	33	40	34	34	34	-	254	254	8
250	385	450	34	12	M30	34,5	37	46	37	46	38	38	38	-	312	312	10
300	450	515	34	16	M30	39,5	42	50	42	50	42	42	42	-	378	378	10

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>				Malleable iron <i>C</i>
				Number	Size						
	05 / 11 / 12 / 13 / 14 / 16 / 21				Flange type						
					05/11 12/13 14/21	16	05 21	05/13 21	11/12 13/14 21	11/12 13/14 21	

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.

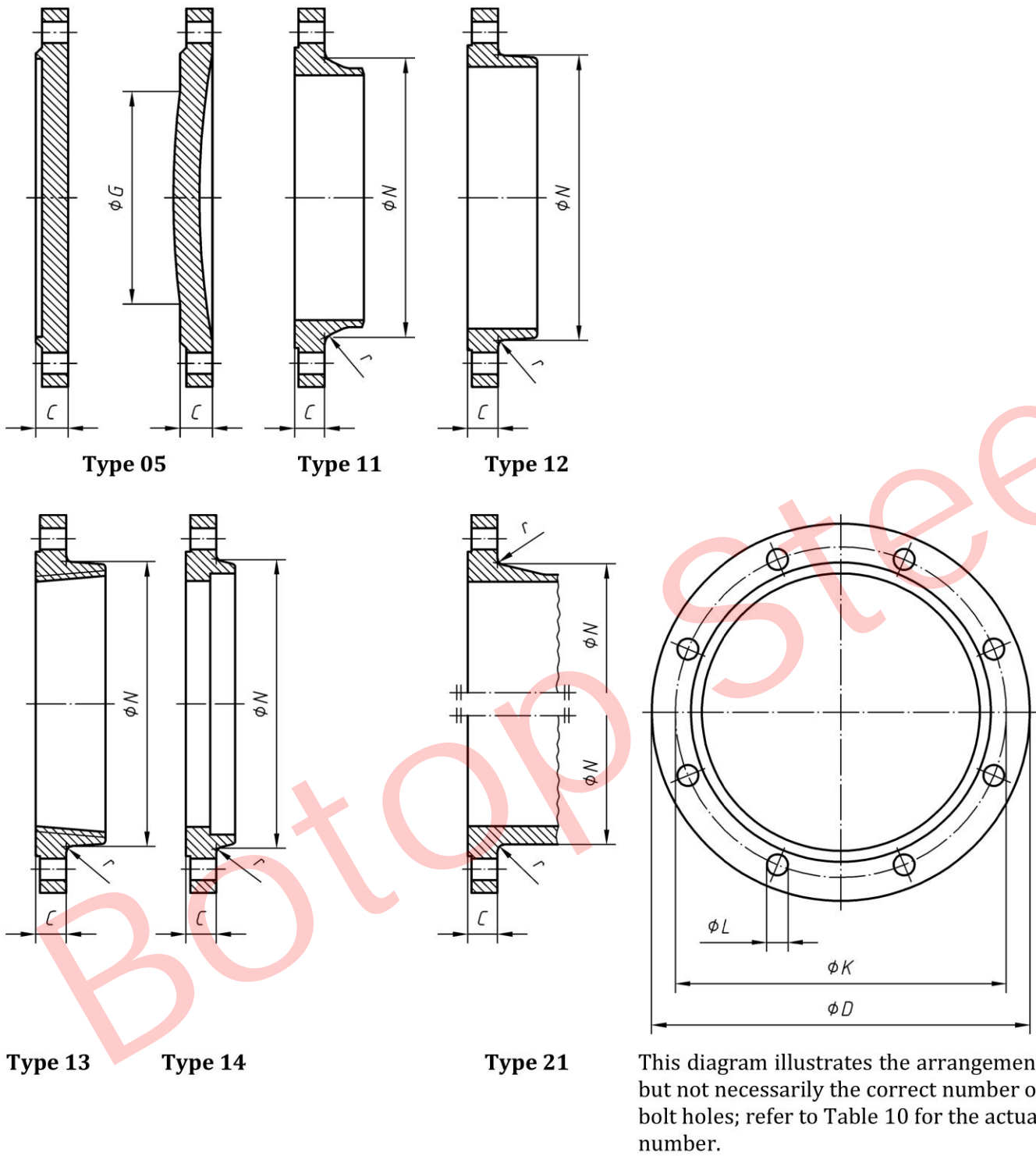


Table 11 — Dimensions of PN 40 flanges

DN		Mating dimensions				Flange thickness				Maximal diameter of shoulder	Neck diameter	Corner radii			
		Outside diameter $D$	Diameter of bolt circle $K$	Diameter of bolt hole $L$	Bolting		Ductile iron $C$	Grey iron (1) $C$	Malleable iron $C$				$G$	$N$	$r$
					Number	Size									
		05 / 11 / 12 / 13 / 14 / 16 / 21		05/11 12/13 14/21		16		05 21		05/13 21		11/12 13/14 21			
350	580	510	37	16	M33	44	46	54	335	432	10				
400	660	585	41	16	M36	48	-	62	385	498	10				
450	685	610	41	20	M36	49	-	-	435	522	12				
500	755	670	44	20	M39	52	-	-	485	576	12				
600	890	795	50	20	M45	58	-	-	585	686	12				
700	995	900	50	24	M45	65	-	-	-	780	12				
800	1140	1030	58	24	M52	70	-	-	-	900	12				
900	1250	1140	58	28	M52	75	-	-	-	1000	12				
1000	1360	1250	58	28	M52	80	-	-	-	1110	12				
1100	1465	1350	63	32	M56	85 <sup>(2)</sup>	-	-	-	1240 <sup>(2)</sup>	12 <sup>(2)</sup>				
1200	1575	1460	63	32	M56	88 <sup>(2)</sup>	-	-	-	1332 <sup>(2)</sup>	12 <sup>(2)</sup>				
1400	1795	1680	63	36	M56	110 <sup>(2)</sup>	-	-	-	1550 <sup>(2)</sup>	12 <sup>(2)</sup>				
1500	1915	1790	71	40	M64	-	-	-	-	-	-				
1600	2025	1900	71	40	M64	110 <sup>(2)</sup>	-	-	-	-	-				
1800	2270	2120	71	48	M64	110 <sup>(2)</sup>	-	-	-	1960 <sup>(2)</sup>	15 <sup>(2)</sup>				

DN	Mating dimensions				Flange thickness			Maximal diameter of shoulder	Neck diameter	Corner radii	
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Ductile iron <i>C</i>	Grey iron (1) <i>C</i>				Malleable iron <i>C</i>
				Number	Size						
	05 / 11 / 12 / 13 / 14 / 16 / 21				Flange type						
					05/11 12/13 14/21	16	05 21	05/13 21	11/12 13/14 21	11/12 13/14 21	

(1) These flange thicknesses are also valid for ductile iron flanges type 21-2.  
 (2) These values are given as recommendations only.



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes; refer to Table 10 for the actual number.

NOTE For facing dimensions, see Table 5.

Figure 9 — Dimensions of PN 63 flanges

Dimensions in millimetres

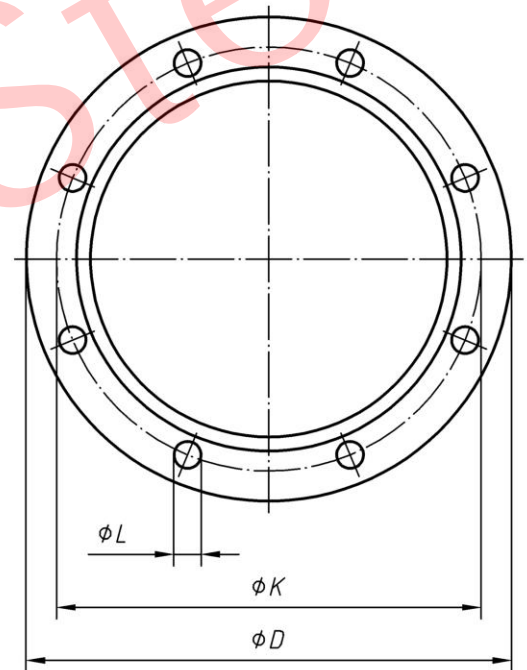
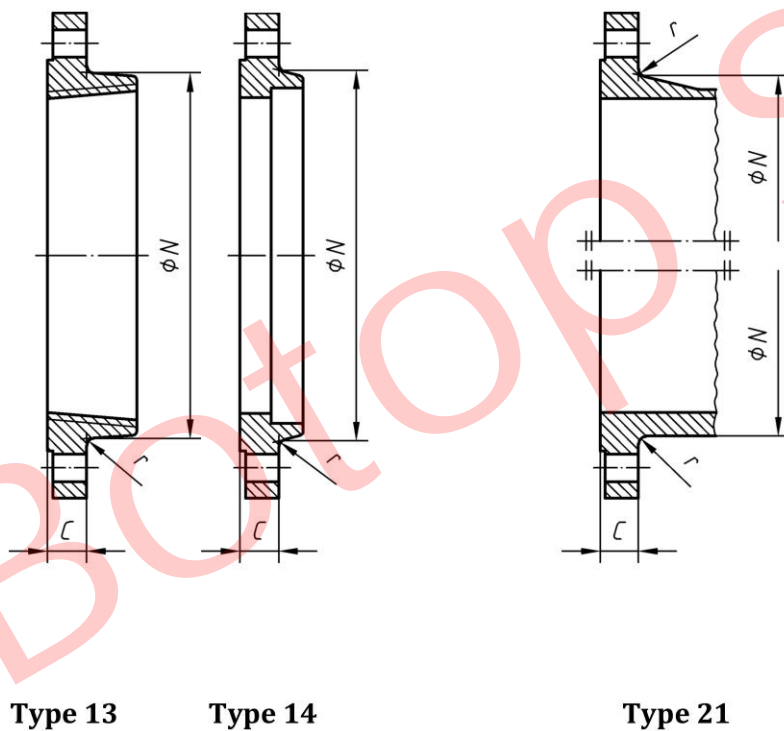
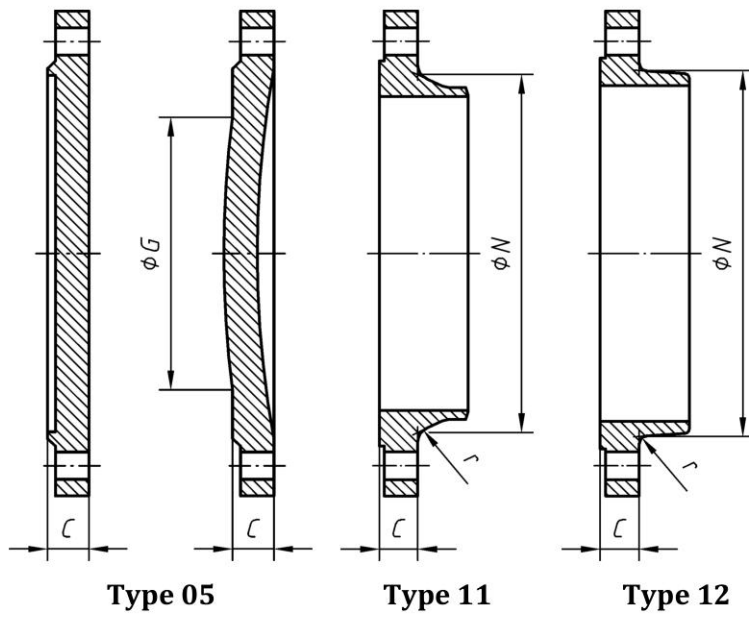
**Table 12 — Dimensions of PN63 flanges**

DN	Mating dimensions					Flange thickness Ductile iron <i>C</i>	Maximal diameter of shoulder <i>G</i>	Neck diameter <i>N</i>	Corner radii <i>r</i>
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting					
				Number	Size				
Flange type									
	05 / 11 / 12 / 13 / 14 / 21					05 21	05	11/12 13/14 21	11/12 13/14 21
40	170	125	23	4	M20	28	-	77	5
50	180	135	23	4	M20	28	-	87	5
60	190	145	23	8	M20	28	-	97	6
65	205	160	23	8	M20	28	-	112	6
80	215	170	23	8	M20	31	-	122	6
100	250	200	28	8	M24	33	-	142	6
125	295	240	31	8	M27	37	-	174	6
150	345	280	34	8	M30	39	-	208	8
200	415	345	37	12	M33	46	-	267	8
250	470	400	37	12	M33	50	-	322	10
300	530	460	37	16	M33	57	-	382	10
350	600	525	41	16	M36	61	335	438	10
400	670	585	44	16	M39	65	385	490	10
450	720	625	50	20	M45	-	-	-	-
500	800	705	50	20	M45	-	-	-	-
600	930	820	58	20	M52	-	-	-	-

Table 12 — Dimensions of PN63 flanges

Dimensions in millimetres

DN	Mating dimensions					Flange thickness Ductile iron <i>C</i>	Maximal diameter of shoulder <i>G</i>	Neck diameter <i>N</i>	Corner radii <i>r</i>
	Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting					
				Number	Size				
	05 / 11 / 12 / 13 / 14 / 21					05 21	05	11/12 13/14 21	11/12 13/14 21
	Flange type								
700	1045	935	58	24	M52	-	-	-	-
800	1165	1050	64	24	M56	-	-	-	-
900	1285	1170	64	28	M56	-	-	-	-
1000	1415	1290	72	28	M64	-	-	-	-
1100	1545	1410	80	32	M72	-	-	-	-
1200	1665	1530	80	32	M72	-	-	-	-



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes; refer to Table 10 for the actual number.

NOTE For facing dimensions, see Table 5.


**Figure 10 — Dimensions of PN 100 flanges**

Table 13 — Dimensions of PN 100 flanges

DN		Mating dimensions						Dimensions in millimetres			
		Outside diameter <i>D</i>	Diameter of bolt circle <i>K</i>	Diameter of bolt hole <i>L</i>	Bolting		Flange thickness Ductile iron <i>C</i>	Maximal diameter of shoulder <i>G</i>	Neck diameter <i>N</i>	Corner radii <i>r</i>	
					Number	Size					
		Flange type									
05 / 11 / 12 / 13 / 14 / 21											
40	170	125	23	4	M20	-	-	-	-	-	
50	195	145	27	4	M24	-	-	-	-	-	
60	205	155	27	8	M24	-	-	-	-	-	
65	220	170	27	8	M24	-	-	-	-	-	
80	230	180	28	8	M24	-	-	-	-	-	
100	265	210	31	8	M27	-	-	-	-	-	
125	315	250	34	8	M30	-	-	-	-	-	
150	355	290	34	12	M30	-	-	-	-	-	
200	430	360	37	12	M33	-	-	-	-	-	
250	505	430	39	12	M36	-	-	-	-	-	
300	585	500	44	16	M39	-	-	-	-	-	
350	655	560	50	16	M45	-	-	-	-	-	
400	715	620	50	16	M45	-	-	-	-	-	
450	745	635	58	20	M52	-	-	-	-	-	
500	870	760	58	20	M52	-	-	-	-	-	

**Table 14 — Tolerances on dimensions**

Linear dimensions in millimetres

Symbol	Designation		Tolerances					
<i>D</i>	Outside diameter		Not specified but the minimum outside diameter shall provide a sufficient bearing area for standard hexagonal bolt					
<i>d</i>	Facing diameter	DN	≤ 100	125 to 300	350 to 600	700 to 1200	≥ 1 400	
		Tolerance (mm)	-4	-4,5	-5	-5,5	-6	
			Maximal diameter can be greater than the nominal value, but no plus tolerance is given in this document					
<i>f</i>	Facing height		<i>f</i> = 1 mm min					
<i>b</i> (= <i>c-f</i> )	Flange thickness	Thickness (mm)	≤ 35	36 to 45	46 to 60	61 to 75	≥ 76	
		Tolerance (mm)	+4 -3	+4,5 -4	+5 -4	+6 -5	+7 -6	
<i>L</i>	Bolt hole diameter and tolerance (mm)		≤ M33	M36 to M39	M45 to M52	> M52		
			+1,5 0	+2 0	+2,5 0			
	Position of bolt hole <sup>1)</sup>		M10	M12	M14 to M20	M24 to M33	M36 to M52	> M52
			1	2	3	4	5	6
	Facing draught angle		≤ 2 °					
<p>1) The position of bolt holes takes into account the tolerance of bolt circle diameter and centre to centre.</p> <p>2) Z: tolerance on position; see ISO 5458:2018 for further explanations.</p>								



**Table 15 — Material and assigned PN values**

Material			PN <sup>1)</sup>							
Type	Reference standard	Grade	2,5	6	10	16	25	40	63	100
Ductile iron DI	EN 1563:2018 ISO 1083:2018	350-22	2)	2)	X	X	X	X	X	X
	EN 1563:2018 ISO 1083:2018	400-15			X	X	X	X	X	X
	EN 1563:2018 ISO 1083:2018	400-18			X	X	X	X	X	X
	EN 545:2010	420-5			X	X	X	X	X	X
	EN 1563:2018 ISO 1083:2018	500-7			X	X	X	X	X	X
	EN 1563:2018 ISO 1083:2018	500-14			X	X	X	X	X	X
	EN 1563:2018 ISO 1083:2018	600-3			X	X	X	X	X	X
Grey iron GI	EN 1561:2011 ISO 185:2005	200	X	X	X	X				
	EN 1561:201 ISO 185:2005	250	X	X	X	X	X	X		
Malleable iron MI	ISO 5922:2005	B 30-06		X	X	X				
	ISO 5922:2005	B 32-12		X	X	X	X	X		
	ISO 5922:2005	B 35-10		X	X	X	X	X		

1) « X » means that this grade can be used for this PN.

2) Type 21-2 flanges in PN 2,5 and PN 6 are possible by agreement between the manufacturer and the purchaser (see NOTES in Tables 6 and 7).

**Table 16 — Pressure/Temperature ratings (p/T) for high strength ductile iron flanges**  
 EN 545:2010 grade 420-5 and EN 1563:2018 / ISO 1083:2018 grades 500-7, 500-14 and 600-3

1)

	Temperature °C					
	-10 to 120	150	200	250	300	350
PN	Allowable non-surge pressure <sup>2)</sup> in bar					
10	10,0 <sup>3)</sup>	9,5	9,0	8,0	7,0	5,5
16	16,0	15,2	14,4	12,8	11,2	8,8
25	25,0	23,8	22,5	20,0	17,5	13,8
40	40,0	38,0	36,0	32,0	28,0	22,0
63	63,0	60,8	57,6	51,2	44,8	35,2
100	100,0	Not given in the standard				

1) Ductile iron range 600-3 flanges are limited to applications up to temperature of 120°C.  
 2) See also 5.5.  
 3) See Table 8.

**Table 17 — Pressure/Temperature ratings (p/T) for low strength ductile iron flanges**  
 EN 1563:2018 / ISO 1083:2018 grades 350-22 <sup>1)</sup>, 400-15 and 400-18 <sup>1)</sup>

	Temperature °C					
	-10 to 120	150	200	250	300	350
PN	Allowable non-surge pressure <sup>2)</sup> in bar					
10	10,0 <sup>3)</sup>	9,7	9,2	8,7	8,0	7,0
16	16,0	15,5	14,7	13,9	12,8	11,2
25	25,0	24,3	23	21,8	20,0	17,5
40	40,0	38,8	36,8	34,8	32,0	28,0
63	63,0	62	58,8	55,6	51,2	44,8
100	100,0	Not given in the standard				

1) EN-GJS-350-22-LT and EN-GJS-400-18-LT can be used down to -40°C and -20°C respectively.  
 2) See also 5.5.  
 3) See Table 8.

**Table 18 — Pressure/Temperature ratings (p/T) for grey iron flange EN 1561:2011 / ISO 185:2005 grades 200 and 250**

	Temperature °C						
	—	150	180	200	230	250	300
<b>PN</b>	<b>Allowable non-surge pressure <sup>1)</sup> in bar</b>						
2,5	2,5	2,3	2,1	2,0	1,9	1,8	1,5
6	6,0	5,4	5,0	4,8	4,4	4,2	3,6
10	10,0	9,0	8,4	8,0	7,4	7,0	6,0
16	16,0	14,4	13,4	12,8	11,8	11,2	9,6
25	25,0	22,5	21,0	20,0	18,5	17,5	15,0
40	40,0	36,0	33,6	32,0	29,6	28,0	24,0

1) See also 5.5.  
2) See Table 8.

**Table 19 — Pressure/Temperature ratings (p/T) for malleable iron flange ISO 5922:2005 grades B 30-06, B 32-12 and B 35-10**

	Temperature °C					
	-10 to 120	150	200	250	300	350
<b>PN</b>	<b>Allowable non-surge pressure <sup>1)</sup> in bar</b>					
6	6,0	5,8	5,5	5,2	4,8	4,2
10	10,0	9,7	9,2	8,7	8,0	7,0
16	16,0	15,5	14,7	13,9	12,8	11,2
25	25,0	24,3	23,0	21,8	20,0	17,5
40	40,0	38,8	36,8	34,8	32,0	28,0

1) See also 5.5.

## Annex A (normative)

### Information to be supplied by the purchaser

When a purchaser orders separate flanges which are supplied not attached to a pipeline component in accordance with this document, it shall state in his enquiry and/or order the following information:

- a) standard designation (see 4.4) and if appropriate b) and c) as follows;
- b) for flanges types 11, 12 and 14, the external diameter and thickness of pipe to which the flange is to be attached (see NOTE 3 in Annex B) when supplied separate, i.e. not as a part of some other pipe line component;
- c) type of thread for threaded flanges (type 13) when supplied separate, i.e. not as a part of some other pipe line component

Where appropriate, information required for items b) and c) should be agreed between purchaser and manufacturer.

#### EXAMPLE 1

For flanges in malleable iron type 11, 12 or 14:

**Flange/ EN1092-2/ DN 100/ PN40/ type 11/ MI B30-06/ A/ Ø 120 × 5**

#### EXAMPLE 2

For flanges in malleable iron type 13:

**Flange/ EN 1092-2/ DN 100/ PN40/ type 13/ MI B 30-6/ A/ Ø 118 × 2**

#### EXAMPLE 3

For flanges in materials other than malleable iron:

**Flange/ EN 1092-2/ DN 100/ PN 40/ type 11/ DI 400-15/ -/ Ø 120 × 5**

**Annex B**  
(Informative)

**NOTES to Tables 6 to 13**

NOTE 1 For all PNs, see Table 5 for dimensions  $d$  and  $f$ .

NOTE 2 Origins of the flange thicknesses:

— For ductile iron, see ISO 2531:2009.

— For grey iron and malleable iron, see ISO 7005-2:1988.

NOTE 3 Pipe dimensions affect the bore of the flange, and the external diameter and thickness of pipe which is to be joined to the flange are specified where appropriate. The bore size of integral flanges (type 21) on valve, fittings or accessories to which they form a part can be given in the appropriate standard for the component.

NOTE 4  $N$  is a reference dimension located at the intersection of the projection of the hub draft angle and the back face of the flange. For certain design of flanges e.g. flanges which are integral with pumps or valves, it can be impossible to use  $N$  and  $r$ .

NOTE 5 Dimension  $G$  is the limit of the shoulder at the intersection with the projection of the sealing face. It is intended to prevent any interference between this shoulder and the bore of the mating flange.

## Bibliography

- [1] ISO 13:1978, *Cast iron pipes, fittings and accessories for pressure pipelines*
- [2] EN 1514 (series), *Flanges and their joints — Dimensions of gaskets for PN designated flanges*
- [3] EN 1333:2006, *Flanges and their joints - Pipework components - Definition and selection of PN*
- [4] EN ISO 6708:1995, *Pipework components - Definition and selection of DN (nominal size) (ISO 6708:1995)*
- [5] EN ISO 5458:2018, *Geometrical product specifications (GPS) - Geometrical tolerancing - Pattern and combined geometrical specification (ISO 5458:2018)*
- [6] EN ISO 9001:2015, *Quality management systems - Requirements (ISO 9001:2015)*
- [7] ISO 7005-2:1988, *Metallic flanges — Part 2: Cast iron flanges*
- [8] ISO 2531:2009, *Ductile iron pipes, fittings, accessories and their joints for water applications*

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