AS/NZS 4331.2:1995
ISO 7005-2:1988

Australian/New Zealand Standard

Metallic flanges

Part 2: Cast iron flanges

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee ME/1, Pressure Equipment. It was approved on behalf of the Council of Standards Australia on 19 July 1995 and on behalf of the Council of Standards New Zealand on 24 October 1995. It was published on 5 December 1995.

The following interests are represented on Committee ME/1:

A.C.T. Occupational Health and Safety Office
Aluminium Development Council, Australia
Australian Chamber of Commerce and Industry
Australian Institute of Energy
Australian Institute of Petroleum
Australian Institute of Pressure Equipment Engineers
Australian Liquefied Petroleum Gas Association
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AS/NZS 4331.2:1995

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Metallic flanges

Part 2: Cast iron flanges

PUBLISHED JOINTLY BY:

STANDARDS AUSTRALIA
1 The Crescent,
Homebush NSW 2140 Australia

STANDARDS NEW ZEALAND
Level 10, Standards House,
155 The Terrace,
Wellington 6001 New Zealand

ISBN 0 7337 0008 X

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME/1 on Pressure Equipment. It is identical with and has been reproduced from ISO 7005-2:1988, *Metallic flanges,* Part 2: *Cast iron flanges*.

The objective of this Standard is to provide designers, manufacturers and users with an international Standard for flanges for use in pressure applications.

This Joint Standard is one of the following series that applies to metallic flanges:

AS/NZS

4331 Metallic flanges
4331.1 Part 1: Steel flanges
4331.2 Part 2: Cast iron flanges
4331.3 Part 3: Copper alloy and composite flanges

Under arrangements made between Standards Australia, Standards New Zealand and ISO, users of this Joint Standard are advised that in Australia copyright is vested in Standards Australia and in New Zealand copyright is vested in Standards New Zealand.

It is not intended this Standard be a mandatory replacement for any flange Standards already in use in Australia or New Zealand. Before flanges to this Standard are used with flanges of other Standards, compatibility for bolting, strength, gasket seating and the like should be checked.

Statements expressed in mandatory terms in notes to text, tables and figures are deemed to be requirements of this Standard.

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An **'informative'** annex is only for information and guidance.

As this Standard is reproduced from an international Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) In the source text, 'this International Standard' should read 'this Australia/New Zealand Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

References to international Standards should be replaced by equivalent Australian Standards, as follows:

Reference to International Standard		*Australian Standard*	
ISO		AS	
185:1988	Classification of grey cast iron	—	
887:1983	Plain washers for metric bolts, screws and nuts—General plan	—	
1083:1987	Spheroidal graphite cast iron—Classification	—	
2531:1986	Ductile iron pipes, fittings and accessories for pressure pipelines	2280	Ductile iron pressure pipes and fittings
5922:1981	Malleable cast iron	—	
6708:1980	Pipe components—Definition of nominal size	—	
7268:1983	Pipe components—Definition of nominal pressure	—	

ISO		AS
ASTM A 126:1984	Gray iron castings for valves, flanges, and pipe fittings	—
395:1980	Ferritic ductile iron pressure-retaining castings for use at elevated temperatures	—

Equivalent National Material Standards may be substituted for those specified in this Standard.

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First published as AS/NZS 4331.2:1995.

AUSTRALIAN/NEW ZEALAND STANDARD

Metallic flanges—

Part 2:
Cast iron flanges

Section 1: General

1.1 Scope

This part of ISO 7005 for a single system of flanges specifies requirements for circular grey, malleable and ductile cast iron flanges in the following nominal pressure ratings:

Series 1*	Series 2*
ISO PN10	ISO PN2,5
ISO PN16	ISO PN6
ISO PN20	ISO PN25
ISO PN50	ISO PN40

This part of ISO 7005 specifies the types of flanges and their facings, dimensions, bolt sizes, surface finish of faces, marking, testing, inspection and materials together with associated pressure/temperature ratings.

NOTES

1 Attention is drawn to the need to refer to the pressure/temperature rating tables for the permissible working pressures, particularly for flanges of ISO PN20 and ISO PN50.

2 Dimensions of gaskets will be the subject of a future International Standard.

1.2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7005. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7005 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 185: 1988, *Classification of grey cast iron.*

ISO 887 : 1983, *Plain washers for metric bolts, screws and nuts — General plan.*

ISO 1083: 1987, *Spheroidal graphite cast iron — Classification.*

ISO 2531 : 1986, *Ductile iron pipes, fittings and accessories for pressure pipelines.*

ISO 5922: 1981, *Malleable cast iron.*

ISO 6708 :1980, *Pipe components — Definition of nominal size.*

ISO 7268 :1983, *Pipe components — Definition of nominal pressure.*

ASTM A 126:1984, *Gray iron castings for valves, flanges, and pipe fittings.*

ASTM A 395: 1980, *Ferritic ductile iron pressure-retaining castings for use at elevated temperatures.*

1.3 Definitions and designations

1.3.1 Definitions

For the purposes of this part of ISO 7005, the definitions of nominal size (DN) as given in ISO 6708, and nominal pressure (PN) as given in ISO 7268, apply.

NOTE — In this part of ISO 7005, nominal pressure is designated by the letters "ISO PN" followed by the appropriate reference number.

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* Series 1 ratings are the basic ratings; series 2 ratings have limited application.

1.3.2 Designation of types and facings

Figure 1 illustrates flanges identified according to type.

05 — Blank flange

11 — Welding neck flange

12 — Hubbed slip-on flange for welding

13 — Hubbed threaded flange

14 — Hubbed socket welding flange

15 — Loose hubbed flange for lapped pipe end

21 — Integral flange

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

Section 2: General requirements

2.1 Pressure/temperature *(p/T)* ratings

2.1.1 General

The pressure/temperature ratings of the flanges manufactured from the materials specified in table 14 shall be the maximum allowable non-shock working pressures at the temperatures given in tables 15 (grey cast iron), 16 and 17 (ductile cast iron) and 18 (malleable cast iron). Linear interpolation is permitted for intermediate temperatures.

NOTE — The rating of a flange is not necessarily the rating of the whole pipework system.

2.1.2 Rating of flanged joints

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

NOTES

1 The temperature shown for a corresponding pressure rating is considered to be the same as that of the contained fluid. Use of a pressure rating corresponding to 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.

2 Application of the ratings given in this part of ISO 7005 to flange joints should take into consideration the risk of leakage due to forces and moments developed in the connecting pipework.

3 Owing to the nature of any thread sealant used, additional limitations may be placed on a threaded flange.

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

2.2 Materials

2.2.1 Range of materials

Flanges shall be manufactured from the materials specified in table 14.

NOTES

1. It is the responsibility of each national standards organization to determine which are the national materials equivalent to materials specified in this part of ISO 7005.

2 Where there is an appropriate application standard, it is the responsibility of the purchaser to ensure compliance with the requirements of that standard.

2.2.2 Gaskets

The various types, dimensions and materials used for gaskets are not within the scope of this part of ISO 7005.

2.2.3 Bolting

NOTES

1 Bolting materials are not within the scope of this part of ISO 7005 but materials for bolting should be chosen by the user according to the pressure, flange material and the selected gasket so that the flanged joint remains tight under the expected operating conditions.

2 For joints comprising grey cast iron flanges with raised faces, and where grey cast iron flanges are bolted to flanges of other materials and either or both of the flanges have a raised face, it is recommended that bolting having a yield strength not exceeding 240 N/mm^2 should be used. If higher strength bolting is used, it is recommended that mating flanges should have flat faces and that full-face gaskets, which extend to the outside diameter of the flange, should be used.

2.3 Dimensions

2.3.1 Range of nominal sizes

The range of nominal sizes applicable to each flange type and to each pressure rating shall be as specified in tables 2 to 4 as appropriate.

2.3.2 Dimensional details

Dimensions of flanges shall be in accordance with the following tables, as appropriate:

table 6 for ISO PN2,5 flanges

table 7 for ISO PN6 flanges

table 8 for ISO PN10 flanges

table 9 for ISO PN16 flanges

table 10 for ISO PN20 flanges

table 11 for ISO PN25 flanges

table 12 for ISO PN40 flanges

table 13 for ISO PN50 flanges

NOTE — Tolerances on dimensions are not specified in this part of ISO 7005 but guidance on the dimensions which should have tolerances and suggested tolerances are given in annex A.

2.3.3 Attachment of welded and threaded flanges

NOTE — Details of attachment for welded and threaded flanges are not specified in this part of ISO 7005.

2.4 Joint facings

2.4.1 Types of facings

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

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 a chamfer may be used).

2.4.2 Application

2.4.2.1 ISO PN2,5, ISO PN6, ISO PN10, ISO PN16, ISO PN25 and ISO PN40 flanges made of grey cast iron and ductile cast iron shall have raised faces.

2.4.2.2 ISO PN20 flanges made of grey cast iron shall have flat faces. ISO PN50 flanges made of grey cast iron shall have raised faces unless otherwise specified.

ISO PN20 and ISO PN50 flanges made of ductile cast iron shall have raised faces unless otherwise specified.

2.4.2.3 Flanges made in malleable cast iron shall have either

a) flat faces, or

b) raised faces.

2.4.3 Surface finish of flanges

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

NOTES

1 It is not intended that instrument measurements are taken on the flange faces, and the R_a and R_z values as defined in ISO 468: 1982, *Surface roughness — Parameters, their values and general rules for specifying requirements,* relate to the reference specimens.

2 Other finishes may be agreed between the manufacturer and purchaser.

Table 1 — Numerical values of the surface finish parameters, R_a and R_z, of flange faces

Values in micrometres

Manufacturing process	R_a	R_z
Turning[1)]	3,2 to 12,5	12,5 to 50
Other[2)]	3,2 to 6,3	12,5 to 25

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

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

2.5 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 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°.

2.6 Marking

2.6.1 Identification

Flanges other than integral shall be clearly marked as follows:

a) the nominal size (DN) and the nominal pressure rating (ISO PN);

b) material designation;

c) manufacturer's name or trade-mark.

EXAMPLE

DN 300 ISO PN16 400-5 XXXX

NOTES

1 Additionally, flange facing designations may be given.

2 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 lowest p/T rating will apply.

2.6.2 Stamping

Where steel stamps are used, the marking shall be positioned on the rim of the flange.

2.7 Inspection and test

ISO PN20 and ISO PN50 flanges specified are designed to be interchangeable with, but not identical to, grey cast iron Class 125 and Class 250 flanges to ANSI B16.1 respectively and with ductile cast iron Class 150 and Class 300 flanges to ANSI B16.42 respectively.

NOTES

1 It is recommended that ISO PN20 and ISO PN50 flanges be accepted by inspectors as complying with the dimensions specified in ANSI B16.1 or ANSI B16.42 as appropriate.

2 This part of ISO 7005 does not make provision for routine inspection or pressure testing of separate flanges. However, flanges may be required to be pressure tested after attachment to a pipe or other equipment or when forming an integral part of such equipment. The test pressure is then dependent on the requirements of the appropriate standard or code of practice in accordance with which the equipment has been manufactured.

2.8 Repairs

Where not otherwise prohibited by the applicable material standard or codes and regulations, repairs by welding are permitted for ductile cast iron. All welding repairs shall be carried out in accordance with a written procedure.

2.9 Information to be supplied by the purchaser

The following information should be supplied by the purchaser in the enquiry and/or order:

a) number of this part of ISO 7005, i.e. ISO 7005-2;

b) nominal size — DN followed by the appropriate number (see 2.3.1);

c) nominal pressure — ISO PN followed by the appropriate number (see 1.1);

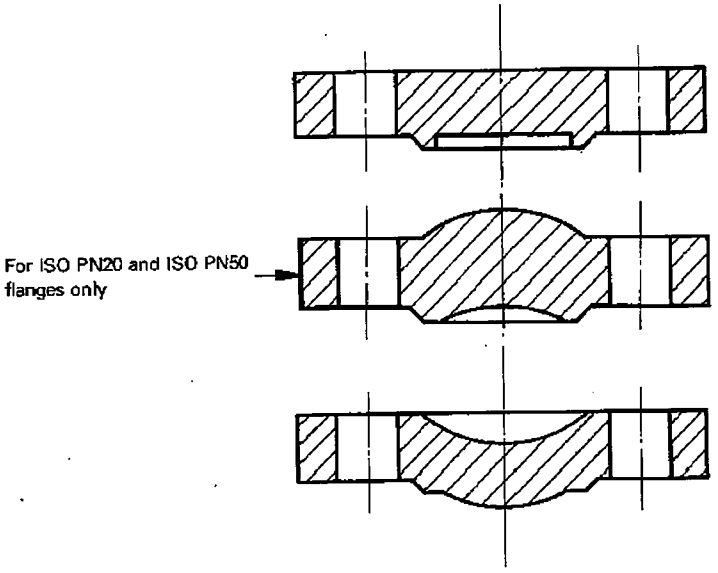
d) flange type number (see 1.3.2 and figure 1);

e) facing type letter (see 1.3.2 and figure 2);

f) material designation (see 2.2.1);

g) for flange types 11, 12, 14 and 15, the external diameter and thickness of pipe to which the flange is to be attached (see note 3 to tables 6 to 13) when supplied loose, i.e. not as a component of some other fitting;

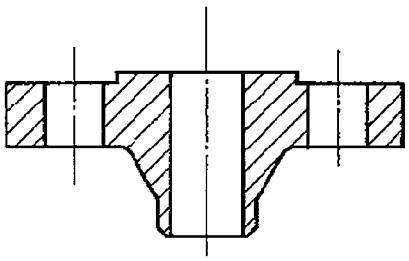
h) type of thread for threaded flanges (type 13) when supplied loose, i.e. not as a component of some other fitting.



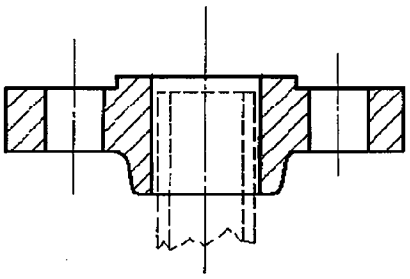
Type 05
Blank flange

NOTE — See the note to 2.4.1 regarding the transition from the outside diameter of the raised face.

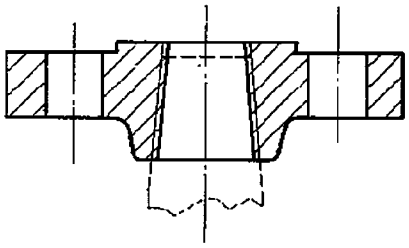
Figure 1 — Types of flanges



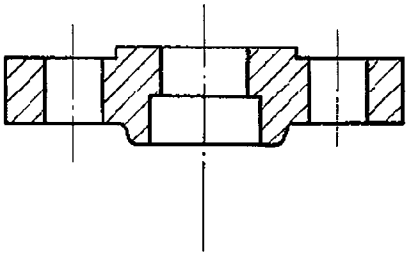
Type 11
Welding neck flange



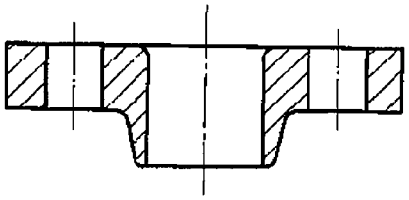
Type 12
Hubbed slip-on flange for welding



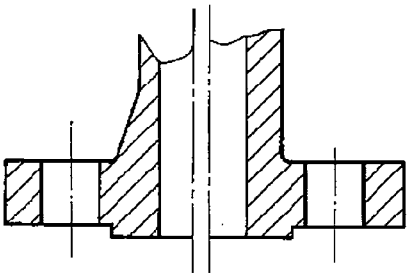
Type 13
Hubbed threaded flange



Type 14
Hubbed socket welding flange



Type 15
Loose hubbed flange for lapped pipe end



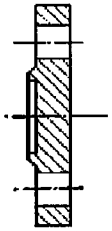
Type 21
Integral flange

NOTE — See the note to 2.4.1 regarding the transition from the outside diameter of the raised face.

Figure 1 — Types of flanges (*concluded*)

Section 3: Dimensions

Table 2 — Synoptic table for grey cast iron flanges

Type No.	Table	DN / ISO PN	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1 000	1 200	1 400	1 600	1 800	2 000	2 200	2 400	2 600	2 800	3 000	3 200	3 400	3 600	3 800	4 000
 05	6	2,5																																							
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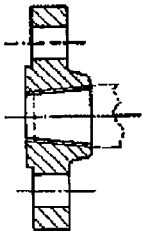 13		2,5																																							
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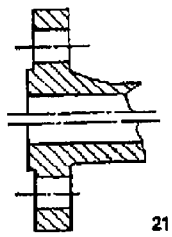 21	6	2,5	Use ISO PN6																																						
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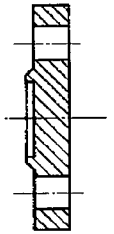
NOTES

1 A horizontal line indicates the range of nominal sizes (DN) in which flanges of a particular type and nominal pressure (ISO PN) may be ordered to this part of ISO 7005.

2 For ISO PN20 ISO PN50 flanges nominal size DN 750 is used instead of DN 700 (see tables 10 and 13).

Table 3 — Synoptic table for ductile cast iron flanges

Type No.	Table	DN / ISO PN	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1 000	1 200	1 400	1 600	1 800	2 000	2 200	2 400	2 600	2 800	3 000	3 200	3 400	3 600
 05		2,5																																					
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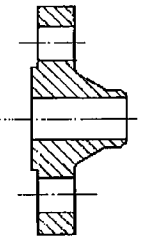 11		2,5																																					
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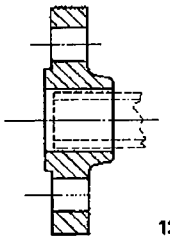 12		2,5																																					
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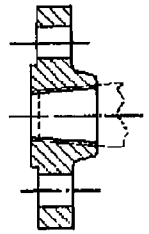 13		2,5	
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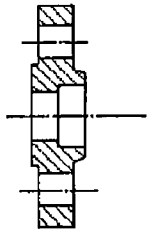 14		2,5	
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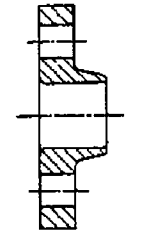 15		2,5	
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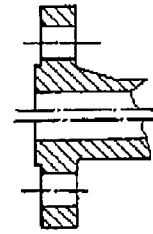
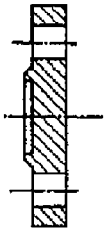
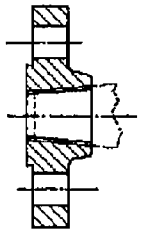
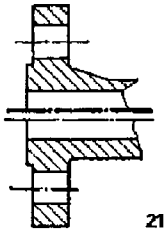
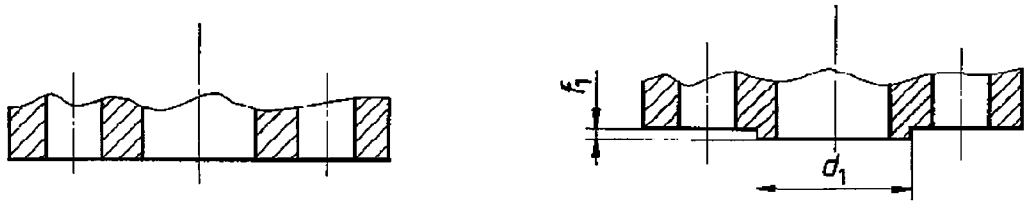
 21		2,5	
		6	
	8	10	
	9	16	
	10	20	
	11	25	
	12	40	
	13	50	

NOTE – A horizontal line indicates the range of nominal sizes (DN) in which flanges of a particular type and nominal pressure (ISO PN) may be ordered to this part of ISO 7005.

Table 4 — Synoptic table for malleable cast iron flanges

Type No.	Table	DN / ISO PN	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1 000	1 200	1 400	1 600	1 800	2 000	2 200	2 400	2 600	2 800	3 000	3 200	3 400	3 600
 05		2,5																																					
	7	6																																					
	8	10																																					
	9	16																																					
		20																																					
	11	25																																					
	12	40																																					
		50																																					
 13		2,5																																					
		6																																					
	8	10																																					
	9	16																																					
		20																																					
	11	25																																					
	12	40																																					
		50																																					
 21		2,5																																					
	7	6																																					
	8	10																																					
	9	16																																					
		20																																					
	11	25																																					
	12	40																																					
		50																																					

NOTE – A horizontal line indicates the range of nominal sizes (DN) in which flanges of a particular type and nominal pressure (ISO PN) may be ordered to this part of ISO 7005.



Type A
Flat face

Type B
Raised face

Figure 2—Flange facing types A and B*)

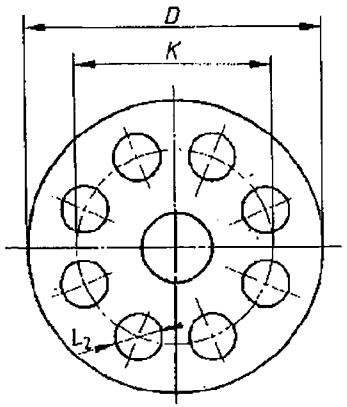
Table 5—Dimensions for type B flange facings[1)]

Nominal size DN	ISO PN2,5		ISO PN6		ISO PN10		ISO PN16		ISO PN20		ISO PN25		ISO PN40		ISO PN50			
															Grey cast iron		Ductile cast iron	
	d_1	f_1	d_1	f_1	d_1	f_1	d_1	f_1	d_1	f_1	d_1	f_1	d_1	f_1	d_1	f_1	d_1	f_1
10			33	2	41	2	41	2			41	2	41	2				
15			38	2	46	2	46	2			46	2	46	2				
20			48	2	56	2	56	2			56	2	56	2				
25			58	3	65	3	65	3	51	2	65	3	65	3	68	2	51	2
32			69	3	76	3	76	3	64	2	76	3	76	3	78	2	64	2
40			78	3	84	3	84	3	73	2	84	3	84	3	90	2	73	2
50			88	3	99	3	99	3	92	2	99	3	99	3	106	2	92	2
65			108	3	118	3	118	3	105	2	118	3	118	3	125	2	105	2
80			124	3	132	3	132	3	127	2	132	3	132	3	144	2	127	2
100			144	3	156	3	156	3	157	2	156	3	156	3	176	2	157	2
125			174	3	184	3	184	3	186	2	184	3	184	3	211	2	186	2
150			199	3	211	3	211	3	216	2	211	3	211	3	246	2	216	2
200	Use ISO PN6 dimensions		254	3	266	3	266	3	270	2	274	3	284	3	303	2	270	2
250			309	3	319	3	319	3	324	2	330	3	345	3	357	2	324	2
300			363	4	370	4	370	4	381	2	389	4	409	4	418	2	381	2
350			413	4	429	4	429	4	413	2	448	4	465	4	481	2	413	2
400			463	4	480	4	480	4	470	2	503	4	535	4	535	2	470	2
450			518	4	530	4	548	4	533	2	548	4	560	4	592	2	533	2
500			568	4	582	4	609	4	584	2	609	4	615	4	649	2	584	2
600			667	5	682	5	720	5	692	2	720	5	735	5	770	2	692	2
700			772	5	794	5	794	5			820	5			945[2)]	2		
800			878	5	901	5	901	5			928	5						
900			978	5	1 001	5	1 001	5			1 028	5						
1 000			1 078	5	1 112	5	1 112	5			1 140	5						
1 200	1 280	5	1 295	5	1 328	5	1 328	5			1 350	5						
1 400	1 480	5	1 510	5	1 530	5	1 530	5			1 560	5						
1 600	1 690	5	1 710	5	1 750	5	1 750	5			1 780	5						
1 800	1 890	5	1 918	5	1 950	5	1 950	5			1 985	5						
2 000	2 090	5	2 125	5	2 150	5	2 150	5			2 210	5						
2 200	2 295	6	2 335	6														
2 400	2 495	6	2 545	6														
2 600	2 695	6	2 750	6														
2 800	2 910	6	2 960	6														
3 000	3 110	6	3 160	6														
3 200	3 310	6	3 370	6														
3 400	3 510	6	3 580	6														
3 600	3 720	6	3 790	6														
3 800	3 920	6																
4 000	4 120	6																

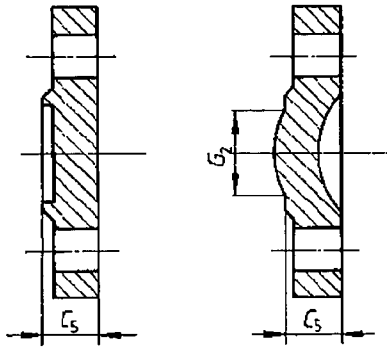
1) See 2.4.2.

2) For ISO PN50 flanges, nominal size DN 750 is used instead of DN 700.

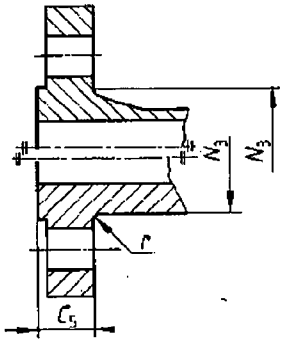
*) For application see 2.4.2.



Type 05



Type 21



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Refer to the column "number of bolts" in table 6 for the actual number.

NOTE – For facing dimensions, see table 5.

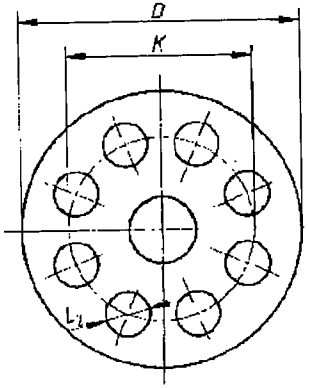
Table 6—Dimensions of ISO PN2,5 flanges

(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions					Flange thickness GI[1]	Maximum diameter of shoulder	Neck diameter	Corner radii
	Outside diameter of flange	Diameter of bolt circle	Diameter of bolt holes	Bolts					
				Number	Nominal size				
	D	K	L_2			C_5	G_2	N_3	r
	Flange type								
	05, 21					05, 21	05	21	21
10 to 1 000	Use ISO PN6 dimensions								
1 200	1 375	1 320	30	32	M27	30	1 185	1 250	8
1 400	1 575	1 520	30	36	M27	30	1 385	1 452	8
1 600	1 790	1 730	30	40	M27	32	1 585	1 654	10
1 800	1 990	1 930	30	44	M27	34	1 785	1 856	10
2 000	2 190	2 130	30	48	M27	34	1 985	2 056	10
2 200	2 405	2 340	33	52	M30	36	2 185	2 260	10
2 400	2 605	2 540	33	56	M30	38	2 385	2 464	10
2 600	2 805	2 740	33	60	M30	40	2 585	2 668	10
2 800	3 030	2 960	36	64	M33	42	2 785	2 868	12
3 000	3 230	3 160	36	68	M33	42	2 985	3 068	12
3 200	3 430	3 360	36	72	M33	44	3 185	3 268	12
3 400	3 630	3 560	36	76	M33	46	3 385	3 472	12
3 600	3 840	3 770	36	80	M33	48	3 585	3 676	12
3 800	4 045	3 970	39	80	M36	48	3 785	3 876	12
4 000	4 245	4 170	39	84	M36	50	3 985	4 076	12

1) See table 14 for an explanation of the abbreviated cast iron designations.

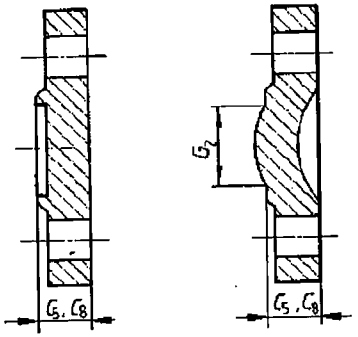


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Refer to the column "number of bolts" in table 7 for the actual number.

NOTE — For facing dimensions, see table 5.

Type 05



Type 21

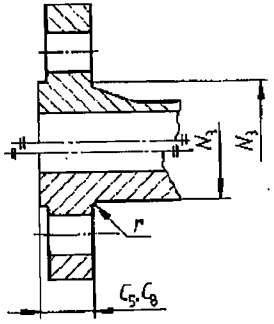


Table 7—Dimensions of ISO PN6 flanges

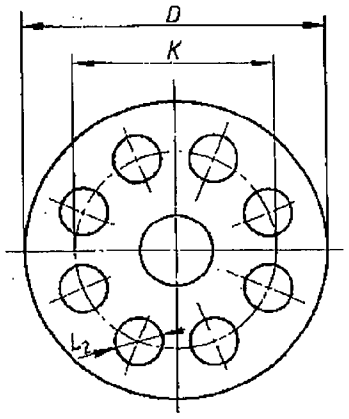
(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions: Outside diameter of flange D	Mating dimensions: Diameter of bolt circle K	Mating dimensions: Diameter of bolt holes L_2	Bolts: Number	Bolts: Nominal size	Flange thickness: GI[1] C_5	Flange thickness: MI[1] C_8	Maximum diameter of shoulder G_2	Neck diameter N_3	Corner radii r
	Flange type: 05, 21					05, 21		05	21	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
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	26		325	392	10
400	540	495	23	16	M20	28		375	442	10
450	595	550	23	16	M20	28		425	494	12
500	645	600	23	20	M20	30		475	544	12
600	755	705	26	20	M24	30		575	642	12
700	860	810	26	24	M24	32		675	746	12
800	975	920	31	24	M27	34		775	850	12
900	1 075	1 020	31	24	M27	36		875	950	12
1 000	1 175	1 120	31	28	M27	36		975	1 050	12
1 200	1 405	1 340	34	32	M30	40		1 175	1 264	12
1 400	1 630	1 560	37	36	M33	44		1 375	1 480	12
1 600	1 830	1 760	37	40	M33	48		1 575	1 680	12
1 800	2 045	1 970	40	44	M36	50		1 775	1 878	15
2 000	2 265	2 180	43	48	M39	54		1 975	2 082	15
2 200	2 475	2 390	43	52	M39	60			Manufacturer's option	15
2 400	2 685	2 600	43	56	M39	62				15
2 600	2 905	2 810	49	60	M45	64				15
2 800	3 115	3 020	49	64	M45	68				15
3 000	3 315	3 220	49	68	M45	70				15
3 200	3 525	3 430	49	72	M45	76				15
3 400	3 735	3 640	49	76	M45	80				15
3 600	3 970	3 860	56	80	M52	84				15

1) See table 14 for an explanation of the abbreviated cast iron designations.

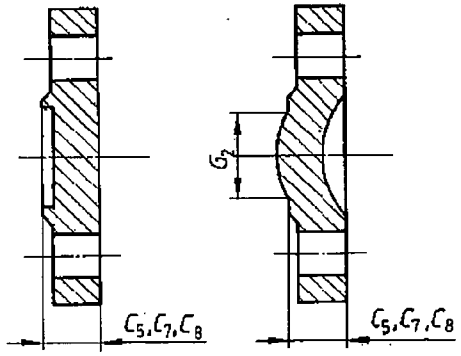


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

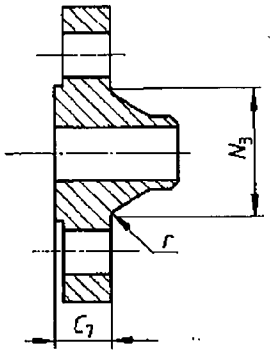
Refer to the column "number of bolts" in table 8 for the actual number.

NOTE — For facing dimensions, see table 5.

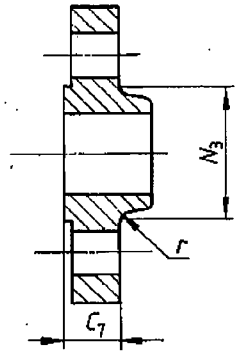
Type 05



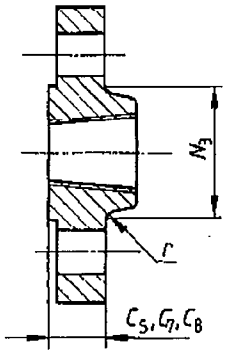
Type 11



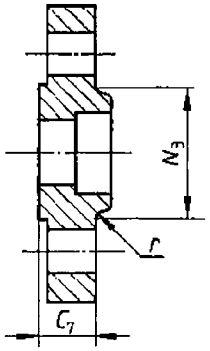
Type 12



Type 13



Type 14



Type 21

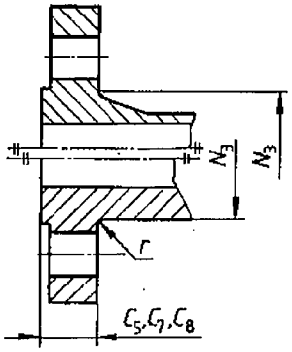


Table 8—Dimensions of ISO PN10 flanges

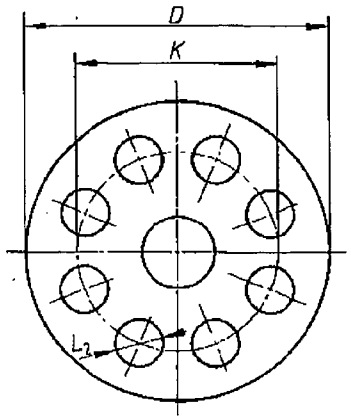
(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions					Flange thickness			Maximum diameter of shoulder	Neck diameter	Corner radii
	Outside diameter of flange	Diameter of bolt circle	Diameter of bolt holes	Bolts		GI[1]	DI[1]	MI[1]			
				Number	Nominal size						
	D	K	L_2			C_5	C_7	C_8	G_2	N_3	r
	Flange type										
	05, 11, 12, 13, 14, 21					05, 13, 21	05, 11, 12, 13, 14, 21	05, 13, 21	05	11, 12, 13, 14, 21	11, 12, 13, 14, 21
10	Use ISO PN16 dimensions					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						18	19	18		70	5
50						20	19	20		84	5
65						20	19	20		104	6
80						22	19	20		120	6
100						24	19	22		140	6
125						26	19	22		170	6
150						26	19	24		190	8
200	340	295	23	8	M20	26	20	24		246	8
250	395[2]	350	23	12	M20	28	22	26		298	10
300	445[2]	400	23	12	M20	28	24,5	26		348	10
350	505	460	23	16	M20	30	24,5		325	408	10
400	565	515	28	16	M24	32	24,5		375	456	10
450	615	565	28	20	M24	32	25,5		425	502	12
500	670	620	28	20	M24	34	26,5		475	559	12
600	780	725	31	20	M27	36	30		575	658	12
700	895	840	31	24	M27	40	32,5		675	772	12
800	1 015	950	34	24	M30	44	35		775	876	12
900	1 115	1 050	34	28	M30	46	37,5		875	976	12
1 000	1 230	1 160	37	28	M33	50	40		975	1 080	12
1 200	1 455	1 380	40	32	M36	56	45		1 175	1 292	12
1 400	1 675	1 590	43	36	M39	62	46		1 375	1 496	12
1 600	1 915	1 820	49	40	M45	68	49		1 575	1 712	12
1 800	2 115	2 020	49	44	M45	70	52		1 775	1 910	15
2 000	2 325	2 230	49	48	M45	74	55		1 975	2 120	15

1) See table 14 for an explanation of the abbreviated cast iron designations.

2) For ductile iron pipes and fittings to ISO 2531 the outside diameters for the following flanges shall be:
   - for DN 250, D = 400 mm;
   - for DN 300, D = 455 mm.

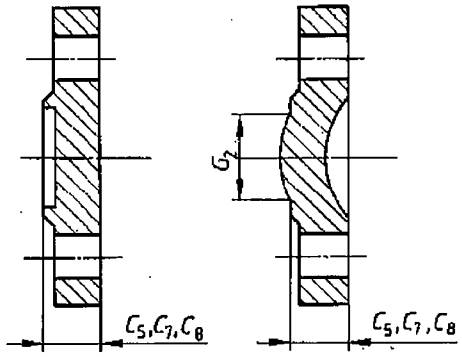


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

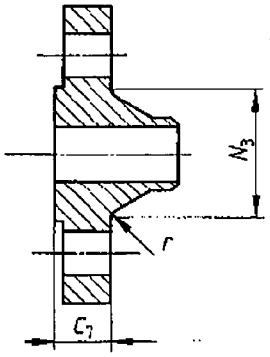
Refer to the column "number of bolts" in table 9 for the actual number.

NOTE — For facing dimensions, see table 5.

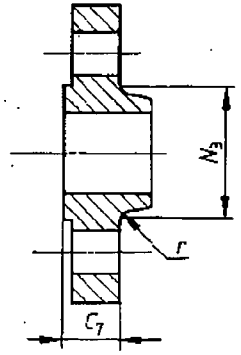
Type 05



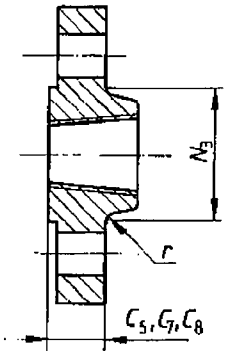
Type 11



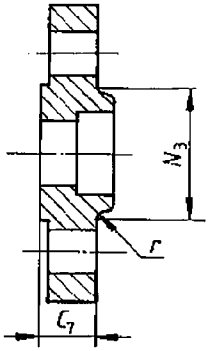
Type 12



Type 13



Type 14



Type 21

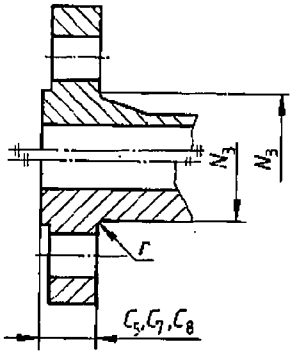


Table 9—Dimensions of ISO PN16 flanges

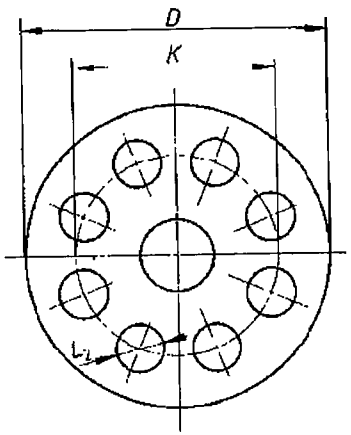
(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions					Flange thickness			Maximum diameter of shoulder	Neck diameter	Corner radii
	Outside diameter of flange D	Diameter of bolt circle K	Diameter of bolt holes L_2	Bolts: Number	Bolts: Nominal size	GI[1] C_5	DI[1] C_7	MI[1] C_8	G_2	N_3	r
	05, 11, 12, 13, 14, 21					Flange type: 05, 13, 21	05, 11, 12, 13, 14, 21	05, 13, 21	05	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						18	19	18		70	5
50						20	19	20		84	5
65	185	145	19	4	M16	20	19	20		104	6
80	200	160	19	8	M16	22	19	20		120	6
100	220	180	19	8	M16	24	19	22		140	6
125	250	210	19	8	M16	26	19	22		170	6
150	285	240	23	8	M20	26	19	24		190	8
200	340	295	23	12	M20	30	20	24		246	8
250	405[2]	355	28	12	M24	32	22	26		296	10
300	460[2]	410	28	12	M24	32	24,5	28		350	10
350	520	470	28	16	M24	36	26,5		325	410	10
400	580	525	31	16	M27	38	28		375	458	10
450	640	585	31	20	M27	40	30		425	516	12
500	715	650	34	20	M30	42	31,5		475	576	12
600	840	770	37	20	M33	48	36		575	690	12
700	910	840	37	24	M33	54	39,5		675	760	12
800	1 025	950	40	24	M36	58	43		775	862	12
900	1 125	1 050	40	28	M36	62	46,5		875	962	12
1 000	1 255	1 170	43	28	M39	66	50		975	1 076	12
1 200	1 485	1 390	49	32	M45		57		1 175	1 282	12
1 400	1 685	1 590	49	36	M45		60		1 375	1 482	12
1 600	1 930	1 820	56	40	M52		65		1 575	1 696	12
1 800	2 130	2 020	56	44	M52		70		1 775	1 896	15
2 000	2 345	2 230	62	48	M56		75		1 975	2 100	15

1) See table 14 for an explanation of the abbreviated cast iron designations.

2) For ductile iron pipes and fittings to ISO 2531 the outside diameters for the following flanges shall be:
   - for DN 250, D = 400 mm;
   - for DN 300, D = 455 mm.

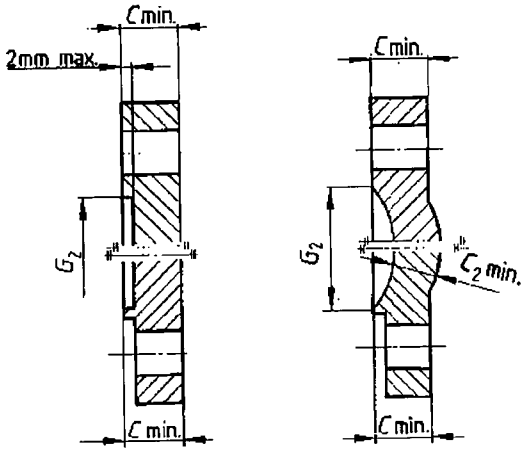


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Refer to the column "number of bolts" in table 10 for the actual number.

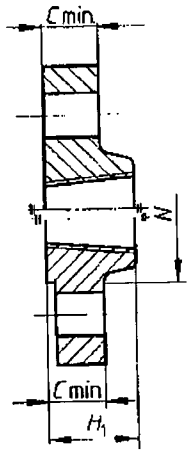
NOTE — For facing dimensions, see table 5.

Type 05

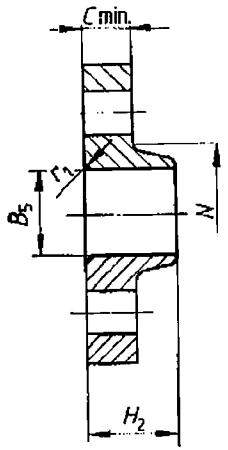


Grey cast iron blank flanges are supplied flat up to DN 250 and dished or domed for DN 300 and greater. Ductile cast iron blank flanges are supplied flat up to DN 250 and optionally flat, dished or domed for DN 300 and greater. The raised face is permitted to be on either the concave or the convex side of dished blank flanges.

Type 13



Type 15



Type 21

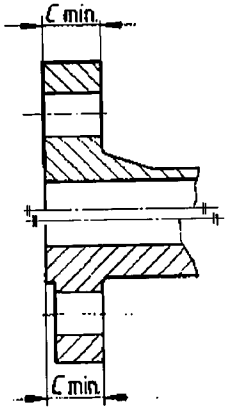


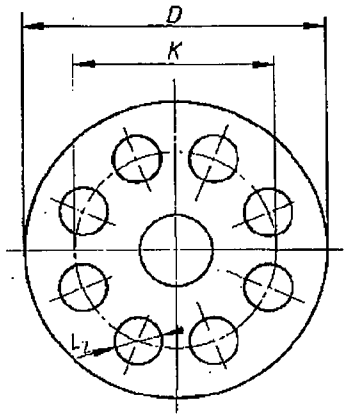
Table 10—Dimensions of ISO PN20 flanges

(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions: Outside diameter of flange D	Mating dimensions: Diameter of bolt circle K	Mating dimensions: Diameter of bolt holes L_2	Mating dimensions: Bolts: Number	Mating dimensions: Bolts: Nominal size	Flange thickness min. C: GI[1]	Flange thickness min. C: DI[1]		Hub diameter min. N: GI, DI[1]	Hub diameter min. N: DI[1]	Length of hub min. H_1: GI, DI[1]	Length of hub min. H_2: DI[1]	Bore min. B_5: DI[1]	Corner radius r_1: DI[1]	Diameter of port, radius of dish G_2	Thickness of dish min. C_2
	Flange type															
	05, 13, 15, 21					05, 13, 21	05, 13, 15	21	13	15	13	15	15	15	05	05
25	110	79,5	16	4	M14	11	14	11	50	50	18	18	35	4	25	
32	120	89	16	4	M14	13	15,5	13	60	60	21	21	44	5	32	
40	130	98,5	16	4	M14	14,5	17,5	14,5	65	65	22	22	50	6	38	
50	155	120,5	18	4	M16	16	19	16	80	80	25	25	63	8	51	
65	180	139,5	18	4	M16	17,5	22,5	17,5	90	90	28	28	76	8	64	
80	190	152,5	18	4	M16	19	24	19	110	110	30	30	92	10	76	
100	230	190,5	18	8	M16	24	24	24	135	135	33	33	117	11	102	
125	255	216	22	8	M20	24	24	24	165	165	37	37	145	11	127	
150	280	241,5	22	8	M20	25,5	25,5	25,5	190	190	40	40	172	13	152	
200	345	298,5	22	8	M20	28,5	28,5	28,5	245	245	44	44	223	13	203	
250	405	362	26	12	M24	30	30	30	305	305	49	49	278	13	254	
300	485	432	26	12	M24	32	32	32	355	355	56	56	329	13	305	20,5
350	535	476	29,5	12	M27	35	35	35	390	390	57	79	360	13	356	22,3
400	600	540	29,5	16	M27	36,5	36,5	36,5	445	445	64	87	412	13	406	25,4
450	653	578	32,5	16	M30	39,5	39,5	39,5	500	500	68	97	463	13	457	26,9
500	700	635	32,5	20	M30	43	43	43	555	555	73	103	515	13	508	28,4
600	815	749,5	35,5	20	M33	48	48	48	660	660	83	111	616	13	610	31,7
750	985	914,5	35,5	28	M33	54[2]									762	36,5
900	1 170	1 086	42	32	M39	60,5[2]									914	41,4

1) See table 14 for an explanation of the abbreviated cast iron designations.
2) Applied to type 05 and type 21 flanges only.

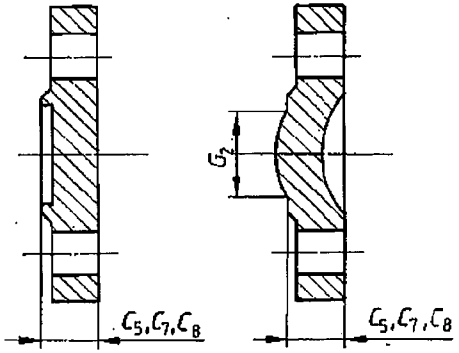


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

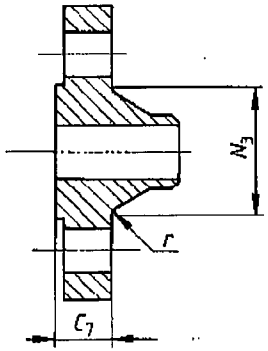
Refer to the column "number of bolts" in table 11 for the actual number.

NOTE — For facing dimensions, see table 5.

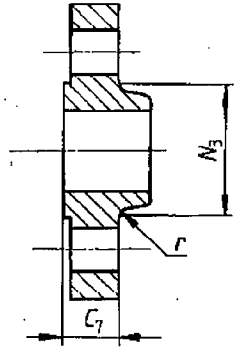
Type 05



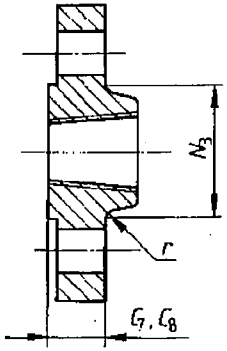
Type 11



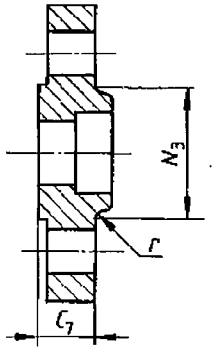
Type 12



Type 13



Type 14



Type 21

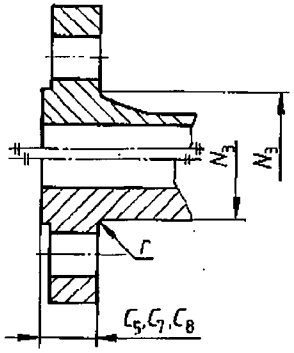


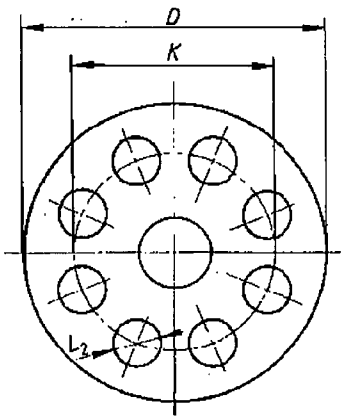
Table 11—Dimensions of ISO PN25 flanges

(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions: Outside diameter of flange D	Mating dimensions: Diameter of bolt circle K	Mating dimensions: Diameter of bolt holes L_2	Bolts: Number	Bolts: Nominal size	Flange thickness: GI[1] C_5	Flange thickness: DI[1] C_7	Flange thickness: MI[1] C_8	Maximum diameter of shoulder G_2	Neck diameter N_3	Corner radii r
	05, 11, 12, 13, 14, 21					Flange type 05, 21	05, 11, 12, 13, 14, 21	05, 13, 21	05	11, 12, 13, 14, 21	11, 12, 13, 14, 21
10	Use ISO PN40 dimensions										
15											
20											
25											
32											
40											
50											
65											
80											
100	235	190	23	8	M20	28	19	24		142	6
125	270	220	28	8	M24	30	19	26		162	6
150	300	250	28	8	M24	34	20	28		192	8
200	360	310	28	12	M24	34	22	30		252	8
250	425	370	31	12	M27	36	24,5	32		304	10
300	485	430	31	16	M27	40	27,5	34		364	10
350	555	490	34	16	M30	44	30		325	418	10
400	620	550	37	16	M33	48	32		375	472	10
450	670	600	37	20	M33	50	34,5		425	520	12
500	730	660	37	20	M33	52	36,5		475	580	12
600	845	770	40	20	M36	56	42		575	684	12
700	960	875	43	24	M39		46,5		675	780	12
800	1 085	990	49	24	M45		51		775	882	12
900	1 185	1 090	49	28	M45		55,5		875	982	12
1 000	1 320	1 210	56	28	M52		60		975	1 086	12
1 200	1 530	1 420	56	32	M52		69		1 175	1 296	12
1 400	1 755	1 640	62	36	M56		74		1 375	1 508	12
1 600	1 975	1 860	62	40	M56		81		1 575	1 726	12
1 800	2 195	2 070	70	44	M64		88		1 775	1 920	15
2 000	2 425	2 300	70	48	M64		95		1 975	2 150	15

1) See table 14 for an explanation of the abbreviated cast iron designations.

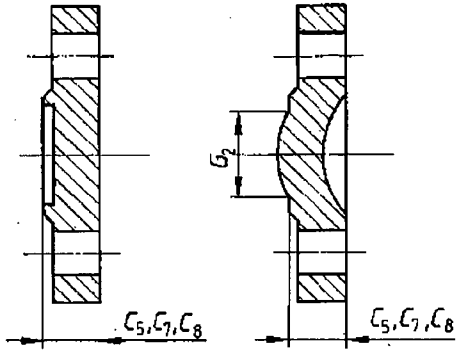


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

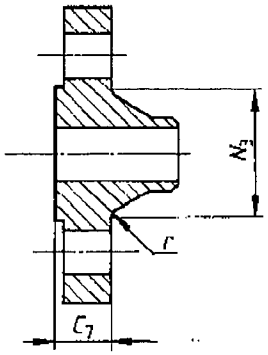
Refer to the column "number of bolts" in table 12 for the actual number.

NOTE — For facing dimensions, see table 5.

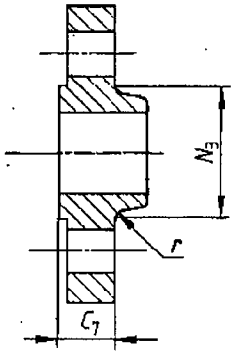
Type 05



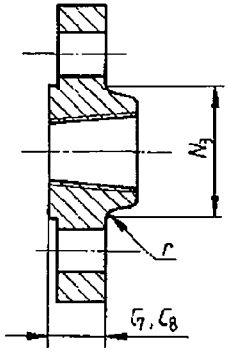
Type 11



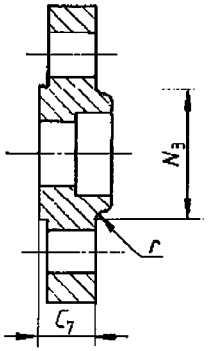
Type 12



Type 13



Type 14



Type 21

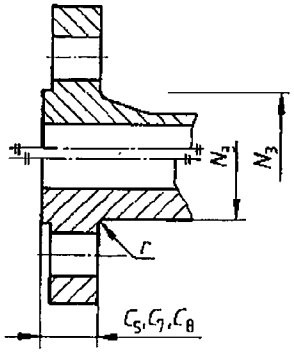


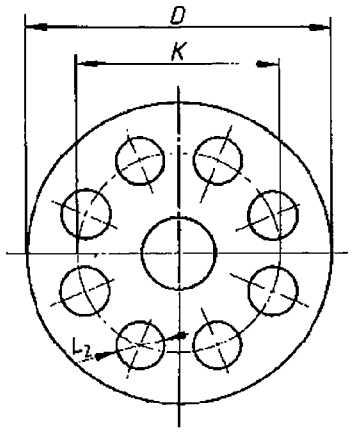
Table 12—Dimensions of ISO PN40 flanges

(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions: Outside diameter of flange D	Diameter of bolt circle K	Diameter of bolt holes L_2	Bolts: Number	Bolts: Nominal size	Flange thickness: GI[1] C_5	Flange thickness: DI[1] C_7	Flange thickness: MI[1] C_8	Maximum diameter of shoulder G_2	Neck diameter N_3	Corner radii r
	Flange type: 05, 11, 12, 13, 14, 21					05, 21	05, 11, 12, 13, 14, 21	05, 13, 21	05	11, 12, 13, 14, 21	11, 12, 13, 14, 21
10	90	60	14	4	M12	16		14		28	3
15	95	65	14	4	M12	16		14		32	3
20	105	75	14	4	M12	18		16		40	4
25	115	85	14	4	M12	18		16		50	4
32	140	100	19	4	M16	20		18		60	5
40	150	110	19	4	M16	20	19	18		70	5
50	165	125	19	4	M16	22	19	20		84	5
65	185	145	19	8	M16	24	19	22		104	6
80	200	160	19	8	M16	26	19	24		120	6
100	235	190	23	8	M20	28	19	24		142	6
125	270	220	28	8	M24	30	23,5	26		162	6
150	300	250	28	8	M24	34	26	28		192	8
200	375	320	31	12	M27	40	30	34		254	8
250	450	385	34	12	M30	46	34,5	38		312	10
300	515	450	34	16	M30	50	39,5	42		378	10
350	580	510	37	16	M33	54	44		325	432	10
400	660	585	40	16	M36	62	48		375	498	10
450	685	610	40	20	M36		49		425	522	12
500	755	670	43	20	M39		52		475	576	12
600	890	795	49	20	M45		58		575	686	12

1) See table 14 for an explanation of the abbreviated cast iron designations.

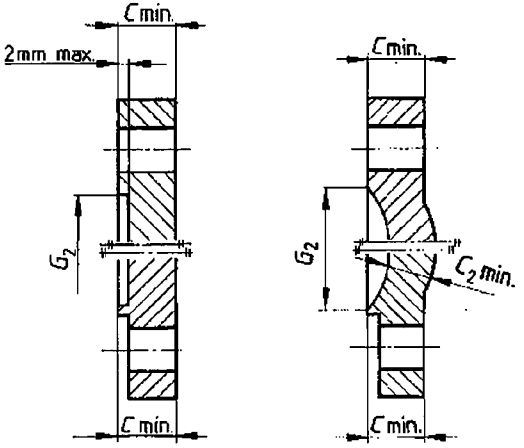


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Refer to the column "number of bolts" in table 13 for the actual number.

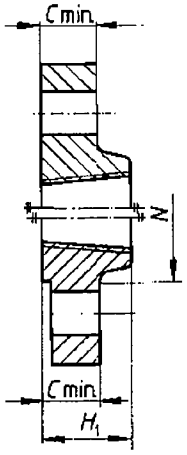
NOTE — For facing dimensions, see table 5.

Type 05

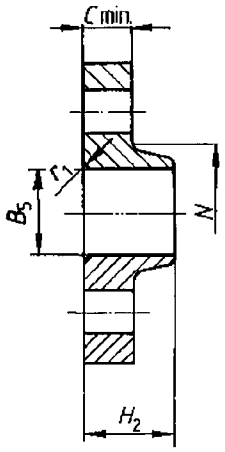


Grey cast iron blank flanges are supplied flat up to DN 200 and dished or domed for DN 250 and greater. Ductile cast iron blank flanges are supplied flat up to DN 200 and optionally flat, dished or domed for DN 250 and greater. The raised face is permitted to be on either the concave or the convex side of dished blank flanges.

Type 13



Type 15



Type 21

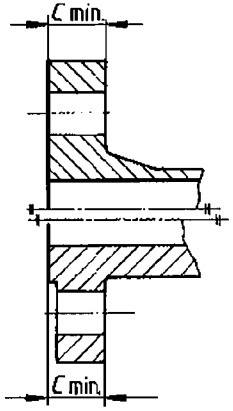


Table 13—Dimensions of ISO PN50 flanges

(See the notes at the end of this section.)

Dimensions in millimetres

Nominal size DN	Mating dimensions: Outside diameter of flange D	Mating dimensions: Diameter of bolt circle K	Mating dimensions: Diameter of bolt holes L_2	Mating dimensions: Bolts: Number	Mating dimensions: Bolts: Nominal size	Flange thickness min. C	Hub diameter min. N		Length of hub min. H_1		H_2	Bore min. B_5	Corner radius r_1	Diameter of port, radius of dish G_2	Thickness of dish min. C_2
						GI[1], DI[1]	GI[1]	DI[1]	GI[1]	DI[1]	DI[1]	DI[1]	DI[1]		
	Flange type														
	05, 13, 15, 21					05, 13, 15, 21	13	13, 15	13	13	15	15	15	05	05
25	125	89	18	4	M16	17,5	55	55	22	27	27	35	5	25	
32	135	98,5	18	4	M16	19	65	65	25	27	27	44	5	32	
40	155	114,5	22	4	M20	20,5	70	70	28	30	30	50	6	38	
50	165	127	18	8	M16	22,5	85	85	32	33	33	63	8	51	
65	190	149,5	22	8	M20	25,5	100	100	36	38	38	76	8	64	
80	210	168	22	8	M20	28,5	120	120	40	43	43	92	10	76	
100	255	200	22	8	M20	32	145	145	44	48	48	117	11	102	
125	280	235	22	8	M20	35	180	180	48	51	51	145	11	127	
150	320	270	22	12	M20	36,5	205	205	49	52	52	172	13	152	
200	380	330	26	12	M24	41	260	260	56	62	62	223	13	203	
250	445	387,5	29,5	16	M27	48	320	320	60	67	95	278	13	254	23,8
300	520	451	32,5	16	M30	51	375	375	65	73	102	329	13	305	25,4
350	585	514,5	32,5	20	M30	54	415	425	68	76	111	360	13	337	28,4
400	650	571,5	35,5	20	M33	57	470	485	73	83	121	412	13	387	31,8
450	710	628,5	35,5	24	M33	60,5		535		89	130	463	13	432	35,1
500	775	686	35,5	24	M33	63,5		590		95	140	515	13	483	38,1
600	915	813	42	24	M39	70		705		106	152	616	13	584	41,1
750	1 095	997	48	28	M45	76[2]								737	50,8

1) See table 14 for an explanation of the abbreviated cast iron designations.
2) For type 05 and type 21 grey cast iron flanges only.

Notes to tables 6 to 13

1 **All ISO PNs:** For dimensions d_1 and f_1, see table 5.

2 **IS0 PN2,5, ISO PN6, ISO PN10, ISO PN16, ISO PN25 and ISO PN40:** The ductile, grey and malleable cast iron flange thicknesses specified are:

C_5, grey cast iron thicknesses to DIN 2530, DIN 2531, DIN 2532, DIN 2533, DIN 2534 and DIN 2535;

C_7, ductile cast iron thicknesses to ISO 2531;

C_8, malleable cast iron thicknesses equal to C_3 dimension for steel type 21 flanges given in ISO 7005-1.

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 should be specified where appropriate. The bore sizes of integral (type 21) flanges on valves and fittings to which they form a part may be given in the appropriate standard for the component.

4 For bolts to ISO 261 used in conjunction with ISO PN20 and ISO PN50 flanges:

— for sizes up to and including M45, use metric coarse series;

— for sizes M48 and above, use a constant 4 mm pitch.

Section 4: Materials and pressure/temperature (p/T) ratings

4.1 Materials

Table 14 — Material applicable for each ISO PN

Material			Mechanical properties			ISO PN							
Type	Reference standard	Grade/Class	Minimum tensile strength R_m min. N/mm²	Minimum elongation after fracture A min. %	Minimum 0,2 % proof stress $R_{p0,2}$ min. N/mm²	2,5	6	10	16	20	25	40	50
Grey cast iron GI	ISO 185	200	200			×	×	×	×	×			×
	ISO 185	250	250			×	×	×	×	×	×	×	×
	ASTM A 126	A[1)]	145							×			×
	ASTM A 126	B	214							×			×
Ductile cast iron DI	ISO 1083	350-22	350	22	220			×	×	×	×	×	×
	ISO 2531	400-5	400	5	300			×	×	×	×	×	×
	ISO 1083	400-15	400	15	250			×	×	×	×	×	×
	ISO 1083	500-7	500	7	320			×	×	×	×	×	×
	ISO 1083	600-3	600	3	370			×	×	×	×	×	×
	ASTM A 395	414-18	414	18	276					×			×
Malleable cast iron MI	ISO 5922	B 32-12	320	12	190		×	×	×		×	×	
	ISO 5922	B 35-10	350	10	200		×	×	×		×	×	

1) Grey cast iron to ASTM A 126 Class A is limited to flanges of nominal size up to and including DN 300.

4.2 Pressure/temperature ratings

Table 15 - Pressure/temperature ratings for grey cast iron flanges

Nominal pressure ISO PN	Material		Temperature, °C							
			– 10 to 65	120	150	180	200	230	250	300
	ISO	ASTM	Maximum permissible working pressure, bar [1] (gauge)							
2,5	185	—	2,5	2,5	2,3	2,1	2	1,9	1,8	1,5
6	185	—	6	6	5,4	5	4,8	4,4	4,2	3,6
10	185	—	10	10	9	8,4	8	7,4	7	6
16	185	—	16	16	14,4	13,4	12,8	11,8	11,2	9,6
20 (≤ DN 300)	—	A 126 Class A	12,1	10,3	9,6	8,6				
20 (≤ DN 300)	185	A 126 Class B	13,8	12,1	11,4	10,3	9,8	8,6		
20 (300 < DN ≤ 600)	185	A 126 Class B	10,3	8,6	7,6	6,9				
20 (600 < DN ≤ 900)	185	A 126 Class B	10,3	5,9	3,4					
25	185[2]	—	25	25	22,5	21	20	18,5	17,5	15
40	185[2]	—	40	40	36	33,6	32	29,6	28	24
50 (≤ DN 300)	—	A 126 Class A	27,6	23,4	21,4	18,3	17,7			
50 (≤ DN 300)	185	A 126 Class B	34,5	28,6	25,9	23,1	20,8	17,2		
50 (300 < DN ≤ 600)	185	A 126 Class B	20,7	17,9	16,6	15,2	14,1			
50 (600 < DN ≤ 750)	185	A 126 Class B	20,7	13,8	10,3	6,9				

1) 1 bar = 0,1 MPa
2) ISO PN25 and ISO PN40 flanges manufactured in grey cast iron are limited to ISO 185 grade 250.

Table 16 — Pressure/temperature ratings for ductile cast iron flanges to ISO 2531 grade 400-5 and to ISO 1083 grades 500-7 and 6OO-3[1]

Nominal pressure ISO PN	Temperature, °C					
	– 10 to 120	150	200	250	300	350
	Maximum permissible working pressure, bar[2] (gauge)					
10	10	9,5	9	8	7	5,5
16	16	15,2	14,4	12,8	11,2	8,8
20	15,5	14,8	13,9	12,1	10,2	8,6
25	25	23,8	22,5	20	17,5	13,8
40	40	38	36	32	28	22
50	40,2	39	36	35	33	31

1) Ductile cast iron grade 600-3 flanges are limited to applications up to temperatures of 120°C.
2) 1 bar = 0,1 MPa

Table 17 — Pressure/temperature ratings for ductile cast iron flanges to ISO 1083 grades 350-22 and 400-15 and ASTM A 395 Class 414-18

Nominal pressure ISO PN	Temperature, °C						
	– 10 to 40	120	150	200	250	300	350
	Maximum permissible working pressure, bar[2] (gauge)						
10	10	10	9,7	9,2	8,7	8	7
16	16	16	15,5	14,7	13,9	12,8	11,2
20	17,5	15,5	14,8	13,9	12,1	10,2	8,6
25	25	25	24,3	23,	21,8	20	17,5
40	40	40	38,8	36,8	34,8	32	28
50	44	40,2	39	36	35	33	31
1) 1 bar = 0,1 MPa							

Table 18 — Pressure/temperature ratings for malleable cast iron flanges to ISO 5922

Nominal pressure ISO PN	Temperature, °C					
	– 10 to 120	150	200	250	300	350
	Maximum permissible working pressure, bar[2] (gauge)					
6	6	5,8	5,5	5,2	4,8	4,2
10	10	9,7	9,2	8,7	8	7
16	16	15,5	14,7	13,9	12,8	11,2
25	25	24,3	23	21,8	20	17,5
40	40	38,8	36,8	34,8	32	28
1) 1 bar = 0,1 MPa						

Annex A

(informative)

Guidance on tolerances on dimensions

This annex lists dimensions which should be given a tolerance and also gives suggested tolerances.

NOTE — ISO/TC 5/SC 10 Working Group 6 has been instructed to prepare a table of tolerances which become mandatory by revision or by amendment to this part of ISO 7005.

Table A.1 — Tolerances on dimensions

Dimensions and tolerances in millimetres

<table>
<tr><th colspan="2" rowspan="2">Dimensions for all types</th><th colspan="39">DN</th></tr>
<tr><th>10</th><th>15</th><th>20</th><th>25</th><th>32</th><th>40</th><th>50</th><th>65</th><th>80</th><th>100</th><th>125</th><th>150</th><th>200</th><th>250</th><th>300</th><th>350</th><th>400</th><th>450</th><th>500</th><th>600</th><th>700</th><th>800</th><th>900</th><th>1 000</th><th>1 200</th><th>1 400</th><th>1 600</th><th>1 800</th><th>2 000</th><th>2 200</th><th>2 400</th><th>2 600</th><th>2 800</th><th>3 000</th><th>3 200</th><th>3 400</th><th>3 600</th><th>3 800</th><th>4 000</th></tr>
<tr><th>Symbol</th><th>Designation</th><th colspan="39">Suggested tolerances</th></tr>
<tr><td>D</td><td>Outside diameter</td><td colspan="39">Not specified but the minimum shall provide a sufficient bearing area for the nut- or bolt-head</td></tr>
<tr><td>d_1</td><td>Facing diameter</td><td colspan="10">+ 4,5
− 4</td><td colspan="5">+ 5,5
− 4,5</td><td colspan="5">+ 6,5
− 5</td><td colspan="5">+ 8,5
− 5,5</td><td colspan="14">+ 10
− 6</td></tr>
<tr><td>f_1</td><td>Facing height</td><td colspan="39"><table><tr><th colspan="5">Height</th></tr><tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><th colspan="5">Tolerances</th></tr><tr><td>+ 1
− 1</td><td>+ 1,5
− 2</td><td>+ 2
− 4</td><td>+ 2,5
− 4</td><td>+ 3
− 5</td></tr></table></td></tr>
<tr><td>b[1)]</td><td>Flange thickness at edge</td><td colspan="39"><table><tr><th colspan="5">Thickness</th></tr><tr><td>≤ 25</td><td>26 to 40</td><td>41 to 55</td><td>56 to 70</td><td>≥ 71</td></tr><tr><th colspan="5">Tolerances</th></tr><tr><td>± 4</td><td>± 4,5</td><td>± 5</td><td>± 6</td><td>± 7</td></tr></table></td></tr>
<tr><td>L_2</td><td>Diameter of bolt holes</td><td colspan="39"><table><tr><th colspan="2">Diameter of bolt holes</th></tr><tr><td>≤ 20</td><td>≥ 22</td></tr><tr><th colspan="2">Tolerances</th></tr><tr><td>+ 0,5
0</td><td>+ 1
0</td></tr></table></td></tr>
<tr><td>K</td><td>Diameter of bolt circle</td><td colspan="39"><table><tr><th colspan="5">Diameter of bolt circle for bolt size</th></tr><tr><td>M10</td><td>M12 to M24</td><td>M27 to M45</td><td>M52</td><td>≥ M56</td></tr><tr><th colspan="5">Tolerances</th></tr><tr><td>± 1</td><td>± 1,5</td><td>± 2</td><td>± 3</td><td>± 3,5</td></tr></table></td></tr>
<tr><td>—</td><td>Centre to centre of adjacent bolt holes</td><td colspan="39"><table><tr><th colspan="5">Centre to centre for bolt size</th></tr><tr><th>M10</th><th>M12 to M24</th><th>M27 to M45</th><th>M52</th><th>≥ M56</th></tr><tr><th colspan="5">Tolerances</th></tr><tr><td>± 0,5</td><td>± 0,75</td><td>± 1</td><td>± 1,5</td><td>± 1,75</td></tr></table></td></tr>
<tr><td>—</td><td>Parallelism of bolting surface with joint surface</td><td colspan="39">2 ° max.</td></tr>
<tr><td colspan="41">1) $b = c - f_1$</td></tr>
</table>

Annex B
(informative)

Bibliography

ISO 261: 1973, *ISO general purpose metric screw threads — General plan.*

ISO 7005-1: — [1], *Metallic flanges —Part 1: Steel flanges.*

DIN 2530: 1976, *Cast iron flanges; nominal pressure 2,5.*

DIN 2531: 1976, *Cast iron flanges; nominal pressure 6.*

DIN 2532: 1976, *Cast iron flanges; nominal pressure 10.*

DIN 2533: 1976, *Cast iron flanges; nominal pressure 16.*

DIN 2534: 1976, *Cast iron flanges; nominal pressure 25.*

DIN 2535: 1976, *Cast iron flanges; nominal pressure 40.*

1) To be published.