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BS EN FLANGE

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Table 1 — Methods of manufacture

Type of Flange and Collar	Forged [a]	Made from flat products (plates)	Machined from rolled or forged bars and forged sectional steel	Bended and electric welded form bars, sectional steel or strip	Pressed from welded or seamless pipes or flat products
01 (Plate flange for welding)	yes	yes	yes	yes	no
02 (Loose plate flange for Types 32—37)	yes	yes	yes	yes	no
04 (Loose plate flange for Type 34)	yes	yes	yes	yes	no
05 (Blind flange)	yes	yes	yes	no	no
11 (Weld-neck flange)	yes	no	yes	yes, for > DN 700	no
12 (Hubbed slip-on flange for welding)	yes	no	yes	no	no
13 (Hubbed threaded flange)	yes	no	yes	no	no
21 (Integral flange)	yes	no	yes	no	no
32 (Weld-on plate collar)	yes	yes	yes	yes	no
33 (Lapped end pipe)	yes	yes	yes	yes	yes
34 (Weld-neck collar)	yes	no	yes	yes	no
35 (Welding neck)	yes	yes	yes	yes	no
36 (Pressed collar with long neck)	yes	no	no	yes	yes
37 (Pressed collar)	yes	yes	no	yes	yes

Table 2 — Surface finish for jointing faces

Facing types	Method of machining	Radius of tool nose mm	R_a [a] pm		R_z [a] pm	
		min.	min.	max.	min.	max.
A, B1 [b], E, F	Turning [c]	1,0	3,2	12,5	12,5	50
B2 [b], C, D, G, H	Turning [c]	—	0,8	3,2	3,2	12,5

NOTE For certain applications, e.g. low temperature gases, it may be necessary to stipulate closer control to the surface finish.

[a] R_a and R_z are defined in EN ISO 4287.

[b] Types B1 and B2 are raised face (type B) flanges with different specified surface roughness values.

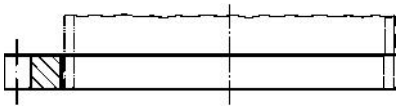
B1 : Standard facing for all PN numbers.

B2 : Only if agreed between the purchaser and the flange manufacturer.

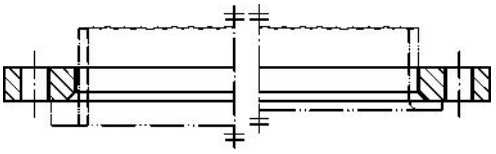
[c] The term 'turning' includes any method of machine operation producing either serrated concentric or serrated spiral grooves.

Table 3 — Surface finish

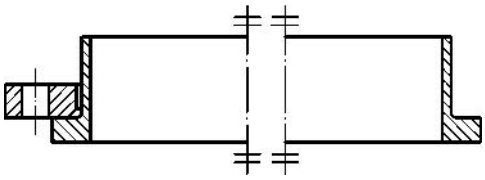
Flange type	Outer diameter		Centre bore diameter		Bolt holes	Spot facing
	Ra max	Rz max	Ra max	Rz max		
01 (Plate flange for welding)	25	160	25	160	b	c
02 (Loose plate flange for Types 32—37)	25	160	25	160	b	
04 (Loose plate flange for Type 34)	25	160	25	160	b	
05 (Blind flange)	25	160	n.	a.	b	c
11 (Weld-neck flange)	25 a	160 a	25 a	160 a	b	c
12 (Hubbed slip-on flange for welding)	25 a	160 a	25 a	160 a	b	c
13 (Hubbed threaded flange)	25 a	160 a	See thread standard		b	c
21 (Integral flange)	25 a	160 a	25 a	160 a		c
32 (Weld-on plate collar)	25	160	25	160		
33 (Lapped end pipe)	25	160	25	160		
34 (Weld-neck collar)	25 a	160 a	25 a	160 a		
35 (Weldring neck)	25 a	160 a	25 a	160 a		
36 (Pressed collar with long neck)	25 a	160 a	25 a	160 a		
37 (Pressed collar)	25 a	160 a	25 a	160 a		
[a] Or up to PN 40 un-machined.						
[b] Bolt holes > PN 40 only drilled.						
[c] Chip machining spot facing for PN > 63 (see 5.8.2)						



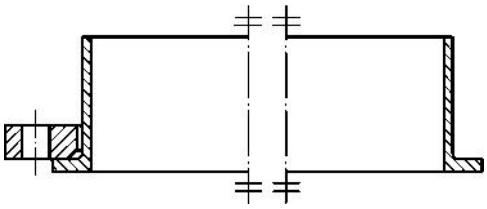
Type 01
Plate flange for welding



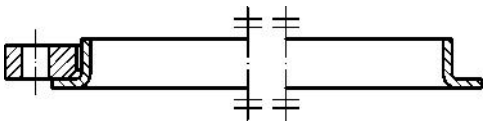
Type 02
Loose plate flange with weld-on collar (see type 32) or lapped pipe end (see type 33)



Type 02
Loose plate flange with weld ring neck (see type 35)

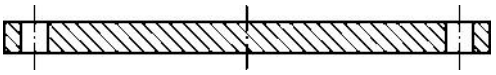


Type 02
Loose plate flange
with pressed collar with long neck (see type 36)

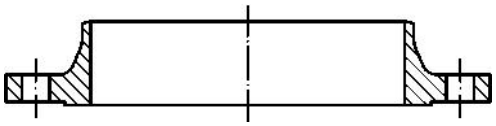


Type 02
Loose plate flange
with pressed collar (see type 37)

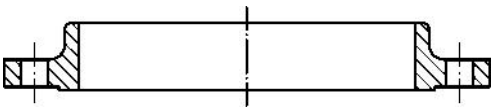
Type 04
Loose plate flange with weld-neck collar (see type 34)



Type 05
Blind flange

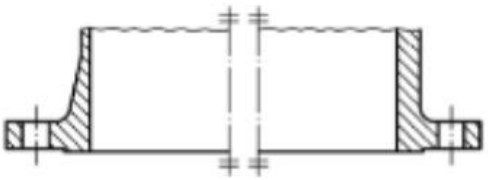


Type 11
Weld-neck flange



Type 12
Hubbed slip-on flange for welding

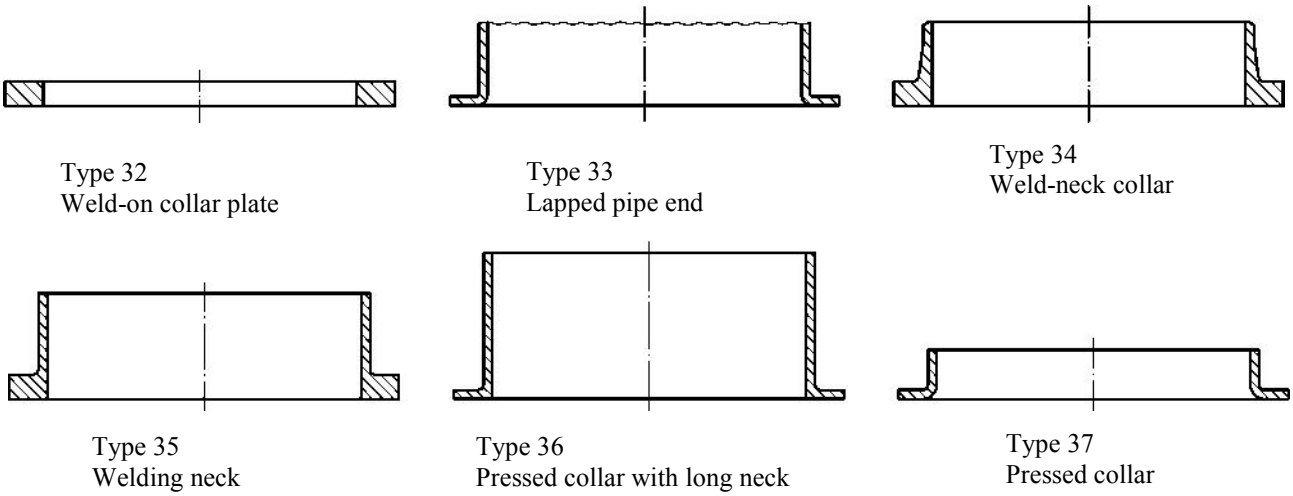
Type 13
Hubbed threaded flange



Type 21
Integral flange

NOTE These sketches are diagrammatic only, in particular no detail is shown for the mating surfaces (see Figure 3).

Figure 1 — Flange types



NOTE These sketches are diagrammatic only.

Figure 2 — Collars types 32 to 37

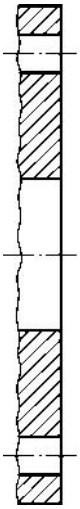
Table 5 — Types of steel flanges and collars

Type No	Description
01	Plate flange for welding
02	Loose plate flange with weld-on plate collar or for lapped pipe end
04	Loose plate flange with weld-neck collar
05	Blind flange
11	Weld-neck flange
12	Hubbed slip-on flange for welding
13	Hubbed threaded flange
21 [a]	Integral flange
32 [b]	Weld-on plate collar
33 [a, b]	Lapped pipe end
34 [b]	Weld-neck collar
35 [b]	Weldring neck
36 [b]	Pressed collar with long neck
37 [b]	Pressed collar

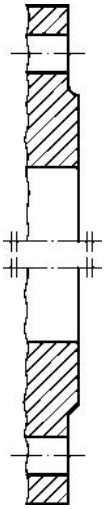
NOTE Type numbers have been made non-consecutive to permit possible future additions.

[a] This is an integral part of a pressure equipment or a component.

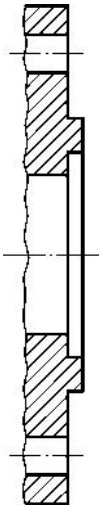
[b] Type numbers 32, 33, 35, 36 and 37 are for use with type 02 flanges and type number 34 for use with type 04 flanges.



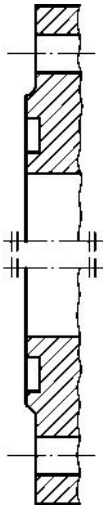
Type A
Flat face



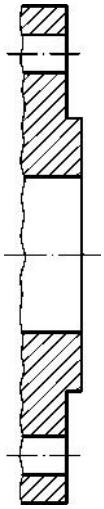
Type B
Raised face (B1 and B2 (see Table 2))



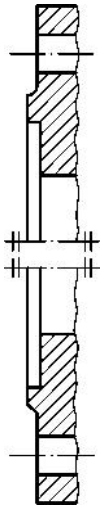
Type C
Tongue



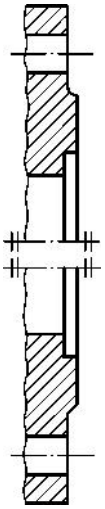
Type D
Groove



Type E
Spigot



Type F
Recess



Type G
O-ring spigot

Type H
O-ring groove

NOTE 1 The transition from the edge of the raised face to the flange face may be by radius or chamfer for types B, D, F and G only (see 5.7.1).

NOTE 2 B1 and B2 are raised face (type B) for different applications (see 5.7.2.2, 5.7.2.3 and Table 2).

NOTE 3 For the dimensions of flange facings, see Figure 4 and Table 8.

Figure 3 — Flange facing types

Table 7 — Synoptic table

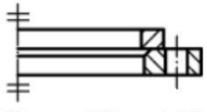
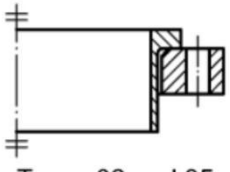
Flange type or collar type	PN \ DN	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000
 Type 01	2,5	dimensions identical with PN 6																								X														
	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X											
	10	dimensions identical with PN 40						dimensions identical with PN 16						X	X	X	X	X	X	X	X	X	X	X	X	X															
	16	dimensions identical with PN 40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																
	25	dimensions identical with PN 40												X	X	X	X	X	X	X	X	X	X																		
	40	XX X X X XX							X	X	X	X	X	X	X	X	X	X																						
	63	dimensions identical with PN 100							X	X	X	X	X	X	X	X	X	X																						
	100	XX X X X XX							X	X	X	X	X	X	X	X	X																								
 Types 02 and 32	2,5	dimensions identical with PN 6																																						
	6	XX X X XX						XX X X XX						X	X	X	X	X	X	X	X																		
	10	dimensions identical with PN 40						dimensions identical with PN 16						X	X	X	X	X	X	X	X																				
	16	dimensions identical with PN 40						X	X	X	X	X	X	X	X	X	X	X	X	X	X																				
	25	dimensions identical with PN 40												X	X	X	X	X	X	X	X																				
	40	XX X X X X X X X X XX												X	X	X	X	X	X	X	X																				
 Types 02 and 35	2,5	dimensions identical with PN 6																																						
	6	XX X X XX						XX X X XX						X	X	X	X	X	X	X	X	X	X	X	X	X														
	10	dimensions identical with PN 40						dimensions identical with PN 16						X	X	X	X	X	X	X	X	X	X	X	X	X															
	16	dimensions identical with PN 40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																
	25	dimensions identical with PN 40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																		
	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																						

Table 7 *(continued)*

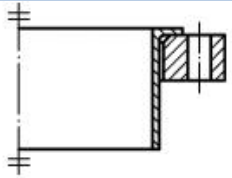
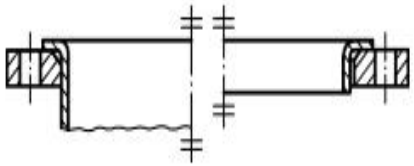
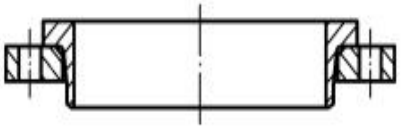
Flange type or collar type	PN \ DN	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000
 Type 02 and 36	2,5	dimensions identical with PN 10																	X	X																				
	6	dimensions identical with PN 10																	X	X																				
	10	dimensions identical with PN 16												X	X	X	X	X																						
	16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																						
 Types 02 and 33/37	2,5	dimensions identical with PN 10																																						
	6	dimensions identical with PN 10																																						
	10	X	X	X	X	X	X	X	X	X	X	X	X	X																										
	16	X	X	X	X	X	X	X	X	X	X	X	X	X																										
 Types 04 and 34	10	dimensions identical with PN 40						dimensions identical with PN 16						X	X	X	X	X	X	X																				
	16	dimensions identical with PN 40						X	X	X	X	X	X	X	X	X	X	X	X	X																				
	25	dimensions identical with PN 40												X	X	X	X	X	X	X																				
	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																				

Table 7 *(continued)*

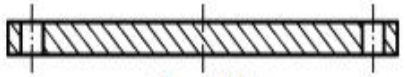
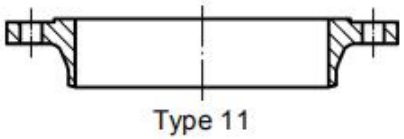
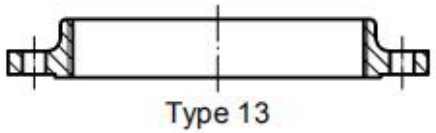
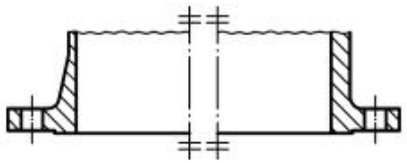
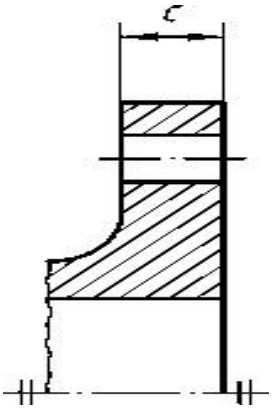
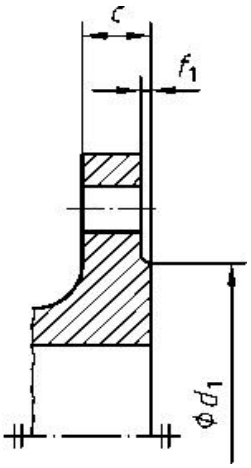
Flange type or collar type	DN	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000
	PN																																							
 Type 05	2,5	dimensions identical with PN 6																								X													
	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
	10	dimensions identical with PN40						dimensions identical with PN16					X	X	X	X	X	X	X	X	X	X	X	X	X	X													
	16	dimensions identical with PN40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X															
	25	dimensions identical with PN40											X	X	X	X	X	X	X	X	X																		
	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																			
	63	←Use PN 100→						X	X	X	X	X	X	X	X	X	X	X																					
	100	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																							
 Type 11	2,5	dimensions identical with PN 6																						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	10	dimensions identical with PN40						dimensions identical with PN16					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
	16	dimensions identical with PN40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
	25	dimensions identical with PN40											X	X	X	X	X	X	X	X	X	X	X	X	X														
	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																			
	63	dimensions identical with PN100						X	X	X	X	X	X	X	X	X	X																							
	100	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																							
	160	X	X		X		X	X	X	X	X	X	X	X	X																								
	250	dimensions identical with PN320	X		X		X	X	X	X	X	X	X	X																									
	320	X	X		X		X	X	X	X	X	X	X	X																									
	400	X	X		X		X	X	X	X	X	X	X																									

Table 7 *(continued)*

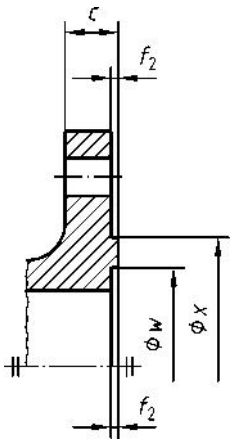
Flange type or collar type	DN / PN	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000
 Type 12	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																								
	10	dimensions identical with PN40						dimensions identical with PN16						X	X	X	X	X	X	X	X																			
	16	dimensions identical with PN40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																
	25	dimensions identical with PN40												X	X	X	X	X	X	X	X																			
	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																			
	63	dimensions identical with PN100						X	X	X	X	X	X																											
	100	X	X	X	X	X	X	X	X	X	X	X	X																											
 Type 13	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																								
	10	dimensions identical with PN40						dimensions identical with PN16						X	X	X	X	X	X	X	X																			
	16	dimensions identical with PN40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																
	25	dimensions identical with PN40												X	X	X	X	X	X	X	X																			
	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																			
	63	dimensions identical with PN100						X	X	X	X	X	X																											
	100	X	X	X	X	X	X	X	X	X	X	X	X																											
 Type 21	2.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X														
	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
	10	dimensions identical with PN40						dimensions identical with PN16						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
	16	dimensions identical with PN40						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
	25	dimensions identical with PN40												X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																			
	63	dimensions identical with PN100						X	X	X	X	X	X	X	X	X	X	X																							
	100	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																							
	160	X	X		X		X	X	X	X	X	X	X	X	X	X																							
	250	X	X		X		X	X	X	X	X	X	X	X	X	X																							
	320	X	X		X		X	X	X	X	X	X	X	X	X	X																							
	400	X	X		X		X	X	X	X	X	X	X	X	X	X																							



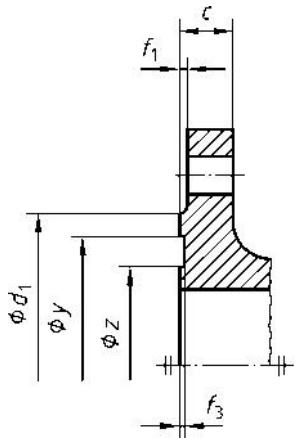
Type A: Flat face



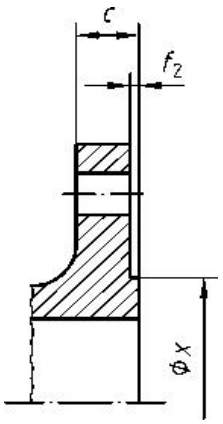
Type B: Raised face (B1 and B2)



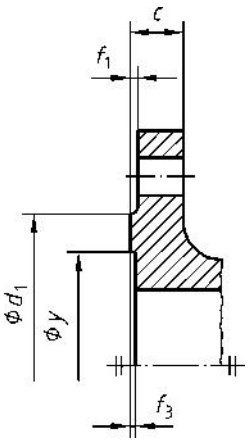
Type C: Tongue



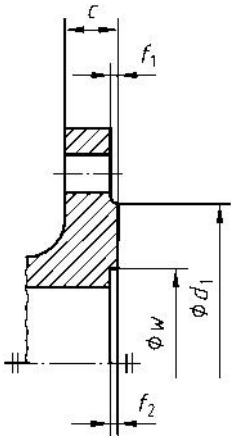
Type D: Groove



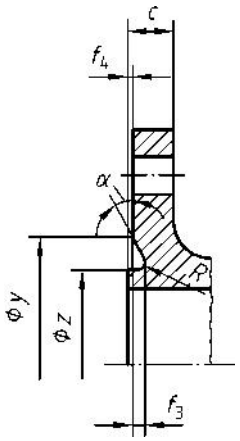
Type E: Spigot



Type F: Recess



Type G: O-ring spigot



Type H: O-ring groove

NOTE 1 Dimension *c* includes the raised face thickness.

NOTE 2 Cross section diameter of the O-ring is 2 x *R*.

Figure 4 — Flange facing (dimensions see Tables 6 and 8 to 19)

Table 8 — Flange facing dimensions

DN	d1												F1	F2	F3	F4	W [b]	X	y	Z [b]	a =	R
	PN 2,5 [a]	PN 6 [a]	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160	PN 250	PN 320	PN 400										
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm
10	35	35	40	40	40	40	40	40	40	40	40	40	2	4,5	4,0	2,0	24	34	35	23	-	2,5
15	40	40	45	45	45	45	45	45	45	45	45	45					29	39	40	28	-	
20	50	50	58	58	58	58	58	58	58	58	58	58					36	50	51	35	41°	
25	60	60	68	68	68	68	68	68	68	68	68	68					43	57	58	42		
32	70	70	78	78	78	78	78	78	78	78	78	78					51	65	66	50		
40	80	80	88	88	88	88	88	88	88	88	88	88	3				61	75	76	60		
50	90	90	102	102	102	102	102	102	102	102	102	102					73	87	88	72		
65	110	110	122	122	122	122	122	122	122	122	122	122					95	109	110	94		
80	128	128	138	138	138	138	138	138	138	138	138	138					106	120	121	105		
100	148	148	158	158	162	162	162	162	162	162	162	162		5,0	4,5	2,5	129	149	150	128	32°	3
125	178	178	188	188	188	188	188	188	188	188	188	188					155	175	176	154		
150	202	202	212	212	218	218	218	218	218	218	218	218					183	203	204	182		
200	258	258	268	268	278	285	285	285	285	285	285	285					239	259	260	238		
250	312	312	320	320	335	345	345	345	345	345	345	—					292	312	313	291		
300	365	365	370	378	395	410	410	410	410	—	—	—	4				343	363	364	342		
350	415	415	430	438	450	465	465	465	—	—	—	—		5,5	5,0	3,0	395	421	422	394	27°	3,5
400	465	465	482	490	505	535	535	535	—	—	—	—					447	473	474	446		
450	520	520	532	550	555	560	560	560	—	—	—	—					497	523	524	496		
500	570	570	585	610	615	615	615	615	—	—	—	—					549	575	576	548		
600	670	670	685	725	720	735	735	—	—	—	—	—	5				649	675	676	648		
700	775	775	800	795	820	840	840	—	—	—	—	—					751	777	778	750		
800	880	880	905	900	930	960	960	—	—	—	—	—					856	882	883	855		
900	980	980	1 005	1 000	1 030	1 070	1 070	—	—	—	—	—					961	987	988	960		
1 000	1 080	1 080	1 110	1 115	1 140	1 180	1 180	—	—	—	—	—		6,5	6,0	4,0	1 062	1 092	1 094	1 060	28°	4
1 200	1 280	1 295	1 330	1 330	1 350	1 380	1 380	—	—	—	—	—					1 262	1 292	1 294	1 260		
1 400	1 480	1 510	1 535	1 530	1 560	1 600	—	—	—	—	—	—					1 462	1 492	1 494	1 460		
1 600	1 690	1 710	1 760	1 750	1 780	1 815	—	—	—	—	—	—					1 662	1 692	1 694	1 660		
1 800	1 890	1 920	1 960	1 950	1 985	—	—	—	—	—	—	—					1 862	1 892	1 894	1 860		
2 000	2 090	2 125	2 170	2 150	2 210	—	—	—	—	—	—	—					2 062	2 092	2 094	2 060		
2 200	2 295	2 335	2 370	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
2 400	2 495	2 545	2 570	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
2 600	2 695	2 750	2 780	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
2 800	2 910	2 960	3 000	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
3 000	3 110	3 160	3 210	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
3 200	3 310	3 370	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
3 400	3 510	3 580	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
3 600	3 720	3 790	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
3 800	3 920	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—
4 000	4 120	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	—	—

a Flange facing types C, D, E, F, G and H according to Figure 4 are not used for PN 2,5 and 6.

b Flange facing types G and H according to Figure 4 are only used for PN 10 to PN 40.

Table 9 — Material selection for the manufacturing of flanges

Group	Forgings			Flat products		
	Material name	Standard	Material number	Material name	Standard	Material number
2E0	—	—	—	—	—	—
3E0		—	—	P235GH	EN 10028-2	1.0345
3E0	—	—	—	—	—	—
3E0	P245GH	EN 10222-2	1.0352	P265GH	EN 10028-2	1.0425
3E1	P280GH	EN 10222-2	1.0426	P295GH	EN 10028-2	1.0481
4E0	16Mo3	EN 10222-2	1.5415	16Mo3	EN 10028-2	1.5415
5E0	13CrMo4-5	EN 10222-2	1.7335	13CrMo4-5	EN 10028-2	1.7335
6E0	11CrMo9-10	EN 10222-2	1.7383	12CrMo9-10	EN 10028-2	1.7375
	—	—	—	10CrMo9-10	EN 10028-2	1.7380
6E1	X16CrMo5-1 +NT	EN 10222-2	1.7366	—	—	—
7E0	—	—	—	P275NL1	EN 10028-3	1.0488
	—	—	—	P275NL2	EN 10028-3	1.1104
7E1	—	—	—	P355NL1	EN 10028-3	1.0566
	—	—	—	P355NL2	EN 10028-3	1.1106
8E0	—	—	—	—	—	—
8E2	P285NH	EN 10222-4	1.0477	P275NH	EN 10028-3	1.0487
	P285QH	EN 10222-4	1.0478	—	—	—
8E3	P355NH	EN 10222-4	1.0565	P355N	EN 10028-3	1.0562
	P355QH1	EN 10222-4	1.0571	P355NH	EN 10028-3	1.0565
10E0	X2CrNi18-9	EN 10222-5	1.4307	X2CrNi18-9	EN 10028-7	1.4307
11E0	X5CrNi18-10	EN 10222-5	1.4301	X5CrNi18-10	EN 10028-7	1.4301
	X6CrNi18-10	EN 10222-5	1.4948	X6CrNi18-10	EN 10028-7	1.4948

Table 9 *(continued)*

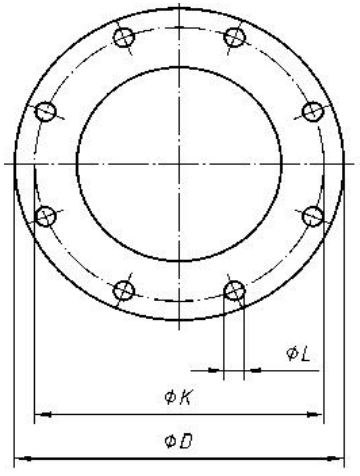
Group	Forgings			Flat products			Castings			Bars,		
	Material name	Standard	Material number	Material name	Standard	Material number	Material name	Standard	Material number	Material name	Standard	Material number
12E0	X6CrNiTi18-10	EN 10222-5	1.4541	X6CrNiTi18-10	EN 10028-7	1.4541	—	_	—	X6CrNiTi18-10	EN 10272	1.4541
	X6CrNiNb18-10	EN 10222-5	1.4550	X6CrNiNb18-10	EN 10028-7	1.4550	GX5CrNiNb19-11	EN 10213-4	1.4552	X6CrNiNb18-10	EN 10272	1.4550
	X6CrNiTiB18-10	EN 10222-5	1.4941	X6CrNiTiB18-10	EN 10028-7	1.4941	—	—	—	—	—	—
13E0	X2CrNiMo17-12-2	EN 10222-5	1.4404	X2CrNiMo17-12-2	EN 10028-7	1.4404	GX2CrNiMo19-11-2	EN 10213-4	1.4409	X2CrNiMo17-12-2	EN 10272	1.4404
	X2CrNiMo17-12-3	EN 10222-5	1.4432	X2CrNiMo17-12-3	EN 10028-7	1.4432	—	—	—	X2CrNiMo17-12-3	EN 10272	1.4432
	X2CrNiMo18-14-3	EN 10222-5	1.4435	X2CrNiMo18-14-3	EN 10028-7	1.4435	—	—	—	X2CrNiMo18-14-3	EN 10272	1.4435
	X1NiCrMoCu25-20-5	EN 10222-5	1.4539	X1NiCrMoCu25-20-5	EN 10028-7	1.4539	GX2NiCrMo28-20-2	EN 10213-4	1.4458	X1NiCrMoCu25-20-5	EN 10272	1.4539
	—	—	—	X1NiCrMoCu31-27-4	EN 10028-7	1.4563	—	—	—	X1NiCrMoCu31-27-4	EN 10272	1.4563
13E1	X2CrNiMoN17-11-2	EN 10222-5	1.4406	X2CrNiMoN17-11-2	EN 10028-7	1.4406	—	—	—	X2CrNiMoN17-11-2	EN 10028	1.4406
13E1	X2CrNiMoN17-13-3	EN 10222-5	1.4429	X2CrNiMoN17-13-3	EN 10028-7	1.4429	—	—	—	X2CrNiMoN17-13-3	EN 10028	1.4429
13E1	—	—	—	X2CrNiMoN17-13-5	EN 10028-7	1.4439	—	—	—	X2CrNiMoN17-13-5	EN 10028	1.4439
13E1	—	—	—	X1NiCrMoCuN25-20-7	EN 10028-7	1.4529	—	—	—	X1NiCrMoCuN25-20-7	EN 10028 7	1.4529
13E1	—	—	—	X1 CrNiMoCuN20-18-7	EN 10028-7	1.4547	—	—	—	X1CrNiMoCuN20-18-7	EN 10272	1.4547
14E0	X5CrNiMo17-12-2	EN 10222-5	1.4401	X5CrNiMo17-12-2	EN 10028-7	1.4401	GX5CrNiMo19-11-2	EN 10213-4	1.4408	X5CrNiMo17-12-2	EN 10272	1.4401
14E0	X3CrNiMo17-13-3	EN 10222-5	1.4436	X3CrNiMo17-13-3	EN 10028-7	1.4436	—	—	—	X3CrNiMo17-13-3	EN 10272	1.4436
15E0	X6CrNiMoTi17 -12-2	EN 10222-5	1.4571	X6CrNiMoTi17-12-2	EN 10028-7	1.4571	—	—	—	X6CrNiMoTi17-12-2	EN 10272	1.4571
	—	—	—	X6CrNiMoNb17-12-2	EN 10028-7	1.4580	GX5CrNiMoNb19-	EN 10213-4	1.4581	X6CrNiMoNb17-12-2	EN 10272	1.4580
16E0	—	—	—	—	—	—	GX2CrNiMoCuN25-6-3-3	EN 10213-4	1.4517	—	—	—
	—	—	_	X2CrNiN23-4	EN 10028-7	1.4362	—	—	_	X2CrNiN23-4	EN 10272	1.4362
	X2CrNiMoN22-5-3	EN 10222-5	1.4462	X2CrNiMoN22-5-3	EN 10028-7	1.4462	GX2CrNiMoN22-5-3	EN 10213-4	1.4470	X2CrNiMoN22-5-3	EN 10272	1.4462
	X2CrNiMoN25-7-4	EN 10222-5	1.4410	X2CrNiMoN25-7-4	EN 10028-7	1.4410	—	—	—	X2CrNiMoN25-7-4	EN 10272	1.4410
	—	—	—	—	—	—	GX2CrNiMoN26-7-4	EN 10213-4	1.4469	—	—	—

Table 9 *(continued)*

Group	Seamless tubes			Welded tubes		
	Material name	Standard	Material number	Material name	Standard	Material number
2E0		—	—	—	—	—
3E0	P195GH	EN 10216-2	1.0348	P195GH	EN 10217-2	1.0348
	P235GH	EN 10216-2	1.0345	P235GH	EN 10217-2	1.0345
3E1	P265GH	EN 10216-2	1.0425	P265GH	EN 10217-2	1.0425
4E0	16Mo3	EN 10216-2	1.5415	16Mo3	EN 10217-2	1.5415
5E0	13CrMo4-5	EN 10216-2	1.7335	—	—	—
6E0	10CrMo9-10	EN 10216-2	1.7380	—	—	—
6E0	11CrMo9-10	EN 10216-2	1.7383	—	—	—
6E1	X11CrMo5-1+NT1	EN 10216-2	1.7362+NT1	—	—	—
7E0	P275NL1	EN 10216-3	1.0488	P275NL1	EN 10217-3	1.0488
	P275NL2	EN 10216-3	1.1104	P275NL2	EN 10217-3	1.1104
7E1	P355NL1	EN 10216-3	1.0566	P355NL1	EN 10217-3	1.0566
	P355NL2	EN 10216-3	1.1106	P355NL2	EN 10217-3	1.1106
7E2	12Ni14	EN 10216-4	1.5637	—	—	—
	X10Ni9	EN 10216-4	1.5682	—	—	—
7E3	13MnNi6-3	EN 10216-4	1.6217	—	—	—
8E0	P275NL1	EN 10216-3	1.0488	P275NL1	EN 10217-3	1.0488
8E0	P275NL2	EN 10216-3	1.1104	P275NL2	EN 10217-3	1.1104
8E2	_	—	—	—	—	—
8E3	P355NH	EN 10216-3	1.0565	P355NH	EN 10217-3	1.0565
9E0	X20CrMoV11-1	EN 10216-2	1.4922	—	—	—
9E1	X10CrMoVNb9-1	EN 10216-2	1.4903	—	—	—
10E0	X2CrNi18-9	EN 10216-5	1.4307	X2CrNi18-9	EN 10217-7	1.4307
	X2CrNi19-11	EN 10216-5	1.4306	X2CrNi19-11	EN 10217-7	1.4306
	X1CrNi25-21	EN 10216-5	1.4335	—	—	—
10E1	X2CrNiN18-10	EN 10216-5	1.4311	X2CrNiN18-10	EN 10217-7	1.4311
11E0	X5CrNi18-10	EN 10216-5	1.4301	X5CrNi18-10	EN 10217-7	1.4301
11E0	X6CrNi18-10	EN 10216-5	1.4948	—	—	—
12E0	X6CrNiTi18-10	EN 10216-5	1.4541	X6CrNiTi18-10	EN 10217-7	1.4541
	X6CrNiNb18-10	EN 10216-5	1.4550	X6CrNiNb18-10	EN 10217-7	1.4550
	X7CrNiTi18-10	EN 10216-5	1.4940	—	—	—
	X7CrNiTiB18-10	EN 10216-5	1.4941	—	—	—
	X7CrNiNb18-10	EN 10216-5	1.4912	—	—	—
	X8CrNiNb16-13	EN 10216-5	1.4961	—	—	—

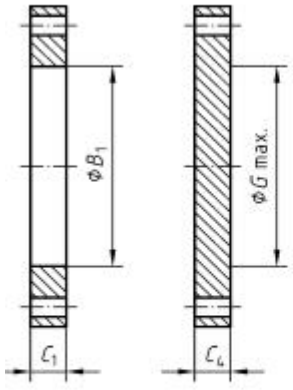
Table 9 *(concluded)*

Group	Seamless tubes			Welded tubes		
	Material name	Standard	Material number	Material name	Standard	Material number
13E0	X2CrNiMo17-12-2	EN 10216-5	1.4404	X2CrNiMo17-12-2	EN 10217-7	1.4404
	—	—	—	X2CrNiMo17-12-3	EN 10217-7	1.4432
	X2CrNiMo18-14-3	EN 10216-5	1.4435	X2CrNiMo18-14-3	EN 10217-7	1.4435
	X1NiCrMoCu25-20-5	EN 10216-5	1.4539	X1NiCrMoCu25-20-5	EN 10217-7	1.4539
	X1NiCrMoCu31-27-4	EN 10216-5	1.4563	X1NiCrMoCu31-27-4	EN 10217-7	1.4563
	—	—	—	X2CrNiMoN18-15-4	EN 10217-7	1.4438
	X6CrNiMo17-13-2	EN 10216-5	1.4918	—	—	—
13E1	X2CrNiMoN17-13-3	EN 10216-5	1.4429	X2CrNiMoN17-13-3	EN 10217-7	1.4429
	X2CrNiMoN17-13-5	EN 10216-5	1.4439	X2CrNiMoN17-13-5	EN 10217-7	1.4439
	X1CrNiMoN25-22-2	EN 10216-5	1.4466	—	—	—
	X1CrNiMoCuN20-18-7	EN 10216-5	1.4547	X1 CrNiMoCuN20-18-7	EN 10217-7	1.4547
	X1NiCrMoCuN25-20-7	EN 10216-5	1.4529	X1NiCrMoCuN25-20-7	EN 10217-7	1.4529
14E0	X5CrNiMo17-12-2	EN 10216-5	1.4401	X5CrNiMo17-12-2	EN 10217-7	1.4401
	X3CrNiMo17-13-3	EN 10216-5	1.4436	X3CrNiMo17-13-3	EN 10217-7	1.4436
15E0	X6CrNiMoTi17-12-2	EN 10216-5	1.4571	X6CrNiMoTi17-12-2	EN 10217-7	1.4571
	X6CrNiMoNb17-12-2	EN 10216-5	1.4580	—	—	—
16E0	X2CrNiMoS18-5-3	EN 10216-5	1.4424	—	—	—
	X2CrNiMoN22-5-3	EN 10216-5	1.4462	X2CrNiMoN22-5-3	EN 10217-7	1.4462
	X2CrNiN23-4	EN 10216-5	1.4362	X2CrNiN23-4	EN 10217-7	1.4362
	X2CrNiMoN25-7-4	EN 10216-5	1.4410	X2CrNiMoN25-7-4	EN 10217-7	1.4410
	X2CrNiMoCuN25-6-3	EN 10216-5	1.4507	—	—	—
	X2CrNiMoCuWN25-7-4	EN 10216-5	1.4501	X2CrNiMoCuWN25-7-4	EN 10217-7	1.4501



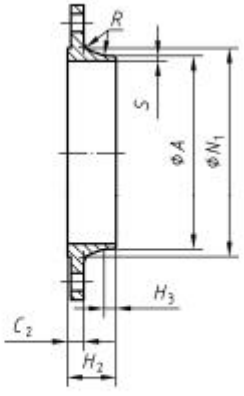
This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Refer to the column "Bolting Number" in Table 10 for actual number.

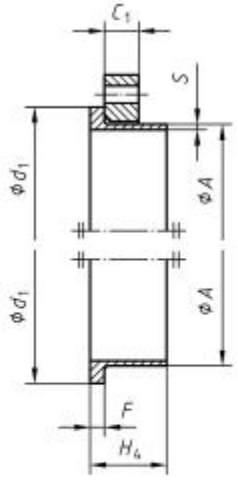


Type 01

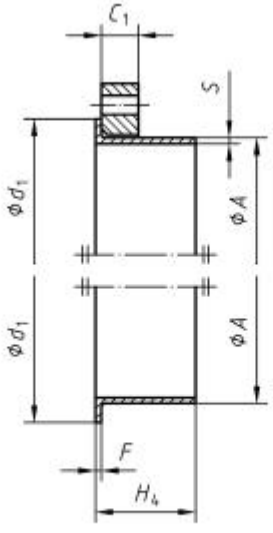
Type 05



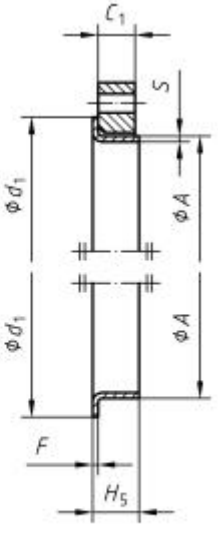
Type 11



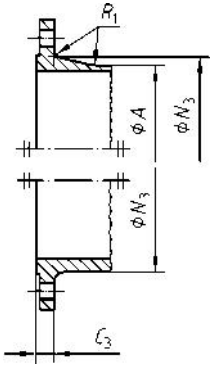
Type 02 and 35



Type 02 and 36



Type 02 and 37



Type 21

NOTE 1 Dimension N_1 is measured at the intersection of the hub draft angle and the back face of the flange.

Figure 5 — Dimensions of PN 2,5 flanges

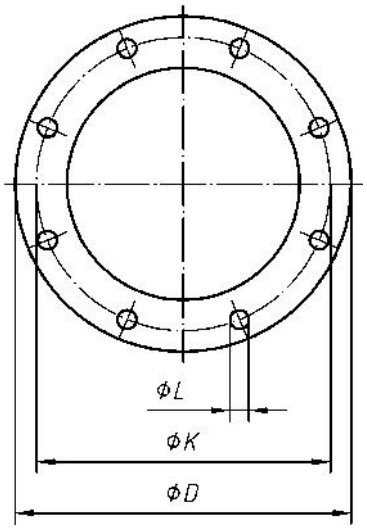
Table 10 — Dimensions of PN 2,5 flanges

DN	Mating dimensions					Outside dia-meter of neck	Bore diameters		Flange thickness			Collar thickness					Diameter of shoulder	Length					Neck diameters		Corner radii	Wall thickness (see 5.6.1)
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting																						
	D	*K*	*L*	Number | Size		*A*	B1	B2	C1	C2	C3	C4	*F*					GMAX	H2	H3	H4		H5	N1	N3	R1	*S*
	Flange type																										
	01,02, 05, 11, 21					11 21 35 — 37	01 32	02	01 02	11 21	05	32	35	36	37	05	11	11	35	36	37	11	21	11 13	11, 35 to 37
10	75	50	11	4	M10	17.2	18.0	21	12	12	12	10	5	2	2.5	-	28	6	28	35	7	26	20	4	See Annex A
15	80	55	11	4	M10	21.3	22.0	25	12	12	12	10	5	2	2.5	-	30	6	30	38	7	30	26	4	
20	90	65	11	4	M10	26.9	27.5	31	14	14	14	10	6	2.5	3	-	32	6	32	40	8	38	34	4	
25	100	75	11	4	M10	33.7	34.5	38	14	14	14	10	7	2.5	3	-	35	6	35	40	10	42	44	4	
32	120	90	14	4	M12	42.4	43.5	46	16	14	14	10	8	3	3	-	35	6	35	42	12	55	54	6	
40	130	100	14	4	M12	48.3	49.5	53	16	14	14	10	8	3	3	-	38	7	38	45	15	62	64	6	
50	140	110	14	4	M12	60.3	61.5	65	196	14	14	12	8	3	3	-	38	8	38	45	20	74	74	6	
65	160	130	14	4	M12	76.1	77.5	81	16	14	14	12	8	3	3	55	38	9	38	45	20	88	94	6	
80	190	150	18	4	M16	88.9	90.5	94	18	16	16	12	10	3	4	70	42	10	42	50	25	102	110	8	
100	210	170	18	4	M16	114.3	116.0	120	18	16	16	14	10	4	4	90	45	10	45	52	25	130	130	8	
125	240	200	18	8	M16	139.7	141.5	145	20	18	18	14	10	4	4	115	48	10	48	55	25	155	160	8	
150	265	225	18	8	M16	168.3	170.5	174	20	18	18	14	10	5	4	140	48	12	48	55	25	184	182	10	
200	320	280	18	8	M16	219.1	221.5	226	22	20	20	16	11	5	5	190	55	15	55	62	30	236	238	10	
250	375	335	18	12	M16	273.0	276.5	281	24	22	22	18	12	8	-	235	60	15	60	68	-	290	284	12	
300	440	395	22	12	M20	323.9	327.5	333	24	22	22	18	12	8	-	285	62	15	62	68	-	342	342	12	
350	490	445	22	12	M20	355.6	359.5	365	26	22	22	18	13	8	-	330	62	15	62	68	-	385	392	12	
400	540	495	22	16	M20	406.4	411.0	416	28	22	22	20	14	8	-	380	65	15	65	72	-	438	442	12	
450	595	550	22	16	M20	457.0	462.0	467	30	22	24	20	15	8	-	425	65	15	65	72	-	492	484	12	
500	645	600	22	20	M20	508.0	513.5	519	30	24	24	22	16	8	-	475	68	15	68	75	-	538	544	12	
600	755	705	26	20	M24	610.0	616.5	622	32	30	30	22	16	-	-	575	70	16	70	-	-	640	642	12	
700	860	810	26	24	M24	711.0		721	40	30	40	-	16	-	-	670	76	16	70	-	-	740	746	12	
800	975	920	30	24	M27	813.0		824	44	30	44	-	16	-	-	770	76	16	70	-	-	842	850	12	
900	1075	1020	30	24	M27	914.0		926	48	30	48	-	16	-	-	860	74	16	70	-	-	942	950	12	
1000	1175	1120	30	28	M27	1016.0	a	1028	52	30	52	-	18	-	-	960	74	16	70	-	-	1045	1050	16	
1200	1375	1320	30	32	M27	1219		1234	60	32	50	-	20			1160	94	16	90	-	-	1245	-	16	

Table 10 *(continued)*

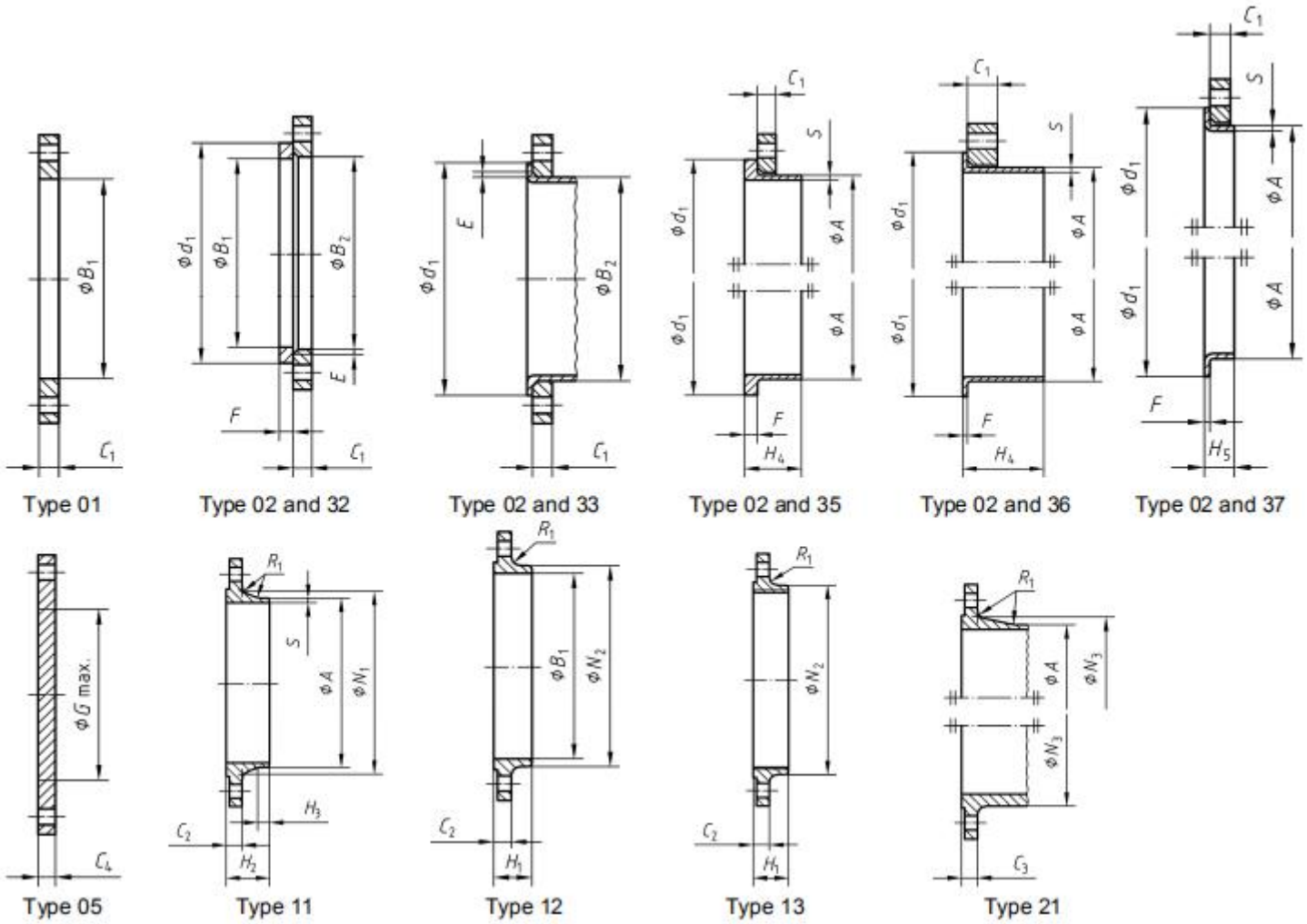
DN	Mating dimensions					Outside diameter of neck	Bore diameters		Flange thickness			Collar thickness					Diameter of shoulder	Length					Neck diameters		Corner radii	Wall thickness (see 5.6.1)
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting																						
	D	*K*	*L*	Number	Size	*A*	B1	B2	C1	C2	C3	C4	*F*					GMAX	H2	H3	H4		H5	N1	N3	R1	*S*
	01, 02, 05, 11, 21					11 21 35 — 37	01 32	02	01 02	11 21	05	32	35	36	37	05	11	11	35	36	37	11	21	11	11,35 to 37
1 400	1 575	1 520	30	36	M27	1 422	a	-	-	38	-	-	-	-	-	1 346	96	16	-	-	-	1 445	-	16	See Annex A
1 600	1 790	1 730	30	40	M27	1 626		-	-	46	-	-	-	-	-	1 546	102	20	-	-	-	1 645	-	16	
1 800	1 990	1 930	30	44	M27	1 829		-	-	46	-	-	-	-	-	1 746	110	20	-	-	-	845	-	16	
2 000	2 190	2 130	30	48	M27	2 032		-	-	50	-	-	-	-	-	1 950	122	22	-	-	-	045	-	16	
2 200	2 405	2 340	33	52	M30	2 235	-	-	-	56	-	-	-	-	-	-	129	25	-	-	-	2 248	-	18	
2 400	2 605	2 540	33	56	M30	2 438	-	-	-	62	-	-	-	-	-	-	143	25	-	-	-	2 448	-	18	
2 600	2 805	2 740	33	60	M30	2 620	-	-	-	64	-	-	-	-	-	-	148	25	-	-	-	2 648	-	18	
2 800	3 030	2 960	36	64	M33	2 820	-	-	-	74	-	-	-	-	-	-	161	25	-	-	-	2848	-	18	
3 000	3 230	3 160	36	68	M33	3 020	-	-	-	80	-	-	-	-	-	-	170	25	-	-	-	3050	-	18	
3 200	3 430	3 360	36	72	M33	3 220	-	-	-	84	-	-	-	-	-	-	180	25	-	-	-	3250	-	20	
3 400	3 630	3 560	36	76	M33	3 420	-	-	-	90	-	-	-	-	-	-	194	28	-	-	-	3450	-	20	
3 600	3 840	3 770	36	80	M33	3 620	-	-	-	96	-	-	-	-	-	-	201	28	-	-	-	3652	-	20	
3 800	4 045	3 970	39	80	M36	3 820	-	-	-	102	-	-	-	-	-	-	212	28	-	-	-	3852	-	20	
4 000	4 245	4 170	39	84	M36	4 020	-	-	-	106	-	-	-	-	-	-	226	28	-	-	-	4052	-	20	

[a] To be specified by the purchaser.



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

Refer to the column "Bolting Number" in Table 11 for the actual number.



NOTE 1 Dimensions N_1, N_2 and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

NOTE 2 For dimension see Table 8.

NOTE 3 For dimensions g_{max} refer to NOTE 1 of 5.6.1.

NOTE 4 Type 33; lapped pipe end without determination of thickness and height.

Figure 6 — Dimensions of PN 6 flanges

Table 11 — Dimensions of PN 6 flanges

Dimensions in millimetres

DN	Mating dimensions					Outside diameter of neck	Bore diameters		Flange thickness			Chamfer		Collar thickness			Diameter of shoulder	Length						Neck diameters			Corner radii	Wall thickness (see 5.6.1)
	Outside diameter	Diameter of bolt	Diameter of bolt	Bolting																								
	D	*K*	*L*	Number	Size	*A*	B_1	B_2	C1	C2 C3	C_4	*E*		*F*			G_{max}	*H1*	*H2*	H_3	*H4*	*H5*	*N1*	*N2*	*N3*	R_1	*S*
	Flange type																											
	01,02, 05, 11, 12, 13, 21					11	01			11																11	11, 35
						21 [a]	12	02	02	13	05	02	32	35	36	37	05	13	11	11	35	36	37	11	13	21	13	to
						35 - 37	32			21																21	37
10	75	50	11	4	M10	17,2	18,0	21	12	12	12	3	10	5	2	2,5	—	20	28	6	28	35	7	26	25	20	4	See Annex A
15	80	55	11	4	M10	21,3	22,0	25	12	12	12	3	10	5	2	2,5	—	20	30	6	30	38	7	30	30	26	4	
20	90	65	11	4	M10	26,9	27,5	31	14	14	14	4	10	6	2,5	3	—	24	32	6	32	40	8	38	40	34	4	
25	100	75	11	4	M10	33,7	34,5	38	14	14	14	4	10	7	2,5	3	—	24	35	6	35	40	10	42	50	44	4	
32	120	90	14	4	M12	42,4	43,5	46	16	14	14	5	10	8	3	3	—	26	35	6	35	42	12	55	60	54	6	
40	130	100	14	4	M12	48,3	49,5	53	16	14	14	5	10	8	3	3	—	26	38	7	38	45	15	62	70	64	6	
50	140	110	14	4	M12	60,3	61,5	65	16	14	14	5	12	8	3	3	—	28	38	8	38	45	20	74	80	74	6	
65	160	130	14	4	M12	76,1	77,5	81	16	14	14	6	12	8	3	3	55	32	38	9	38	45	20	88	100	94	6	
80	190	150	18	4	M16	88,9	90,5	94	18	16	16	6	12	10	3	4	70	34	42	10	42	50	25	102	110	110	8	
100	210	170	18	4	M16	114,3	116,0	120	18	16	16	6	14	10	4	4	90	40	45	10	45	52	25	130	130	130	8	
125	240	200	18	8	M16	139,7	141,5	145	20	18	18	6	14	10	4	4	115	44	48	10	48	55	25	155	160	160	8	
150	265	225	18	8	M16	168,3	170,5	174	20	18	18	6	14	10	5	4	140	44	48	12	48	55	25	184	185	182	10	
200	320	280	18	8	M16	219,1	221,5	226	22	20	20	6	16	11	5	5	190	44	55	15	55	62	30	236	240	238	10	
250	375	335	18	12	M16	273,0	276,5	281	24	22	22	8	18	12	8		235	44	60	15	60	68	—	290	295	284	12	
300	440	395	22	12	M20	323,9	327,5	333	24	22	22	8	18	12	8		285	44	62	15	62	68	—	342	355	342	12	
350	490	445	22	12	M20	355,6	359,5	365	26	22	22	8	18	13	8		330	—	62	15	62	68	—	385	—	392	12	
400	540	495	22	16	M20	406,4	411,0	416	28	22	22	8	20	14	8		380	—	65	15	65	72	—	438	—	442	12	
450	595	550	22	16	M20	457,0	462,0	467	30	22	24	8	20	15	8	—	425	—	65	15	72	72	—	492	—	494	12	

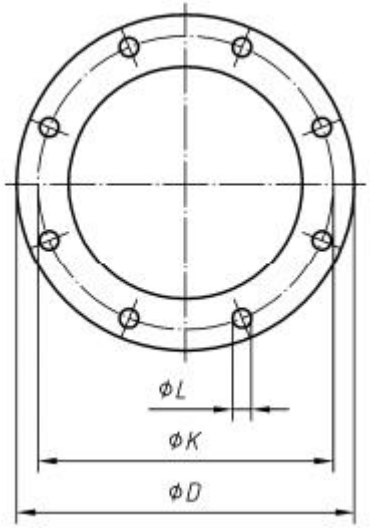
Table 11 *(concluded)*

Dimensions in millimetres

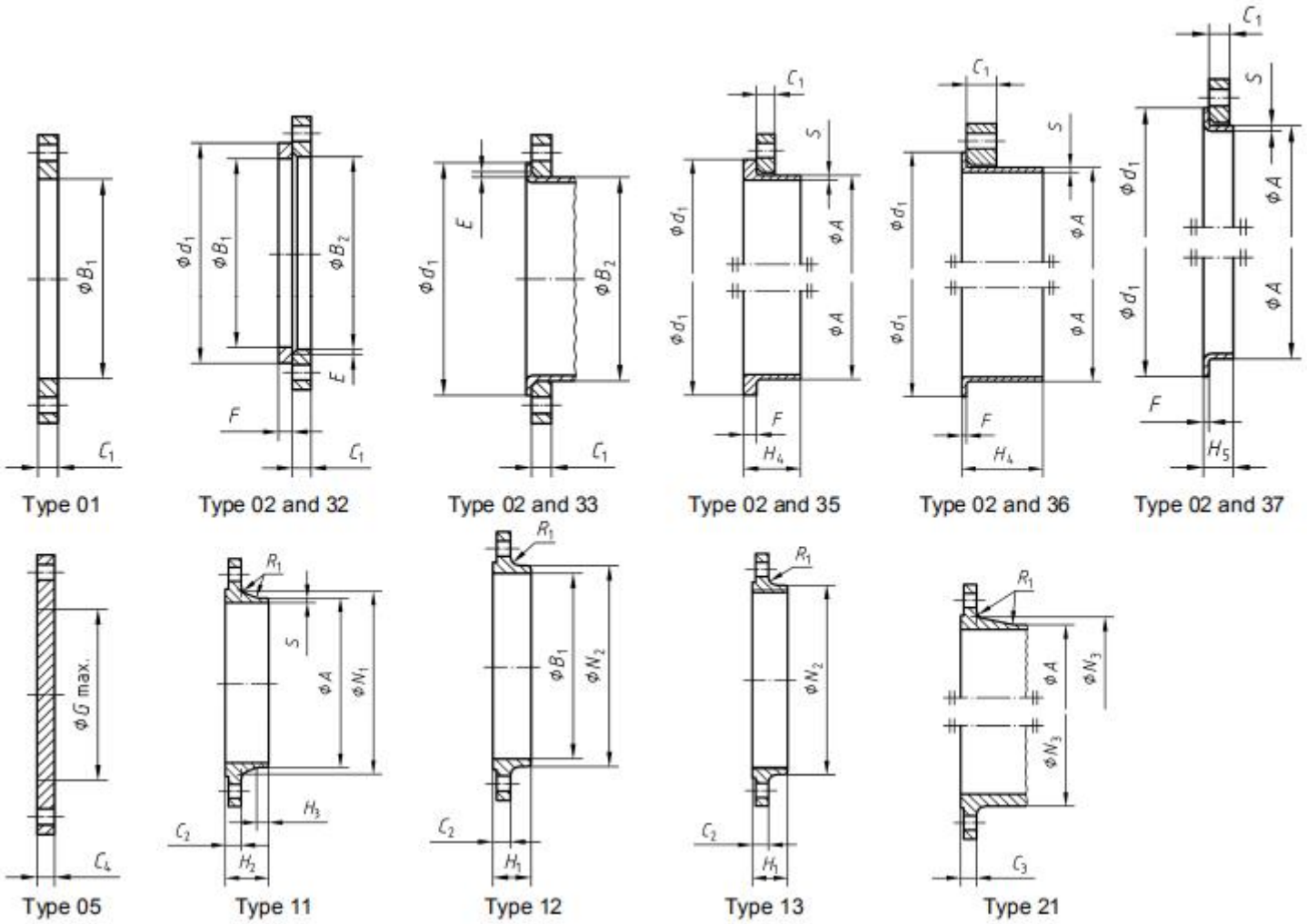
DN	Mating dimensions					Outside diameter of neck	Bore diameters		Flange thickness		Chamfer		Collar thickness				Diameter of shoulder	Length						Neck diameters			Corner radii	Wall thickness (see 5.6.1)
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting		Outside diameter of neck	Bore diameters		Flange thickness		Chamfer		Collar thickness				Diameter of shoulder	Length						Neck diameters			Corner radii	Wall thickness (see 5.6.1)
	D	*K*	*L*	Number	Size	*A*	B_1	B_2	C1	C2 C3	C_4	*E*	*F*				G_{max}	*H1*	*H2*	H_3	*H4*	*H5*	*N1*	*N2*	*N3*	R_1	*S*
	Flange type																											
	01,02, 05, 11, 12, 13, 21					11	01			11																11	11, 35
						21 [a]	12	02	02	13	05	02	32	35	36	37	05	13	11	11	35	36	37	11	13	21	13	to
						35 - 37	32			21																21	37
500	645	600	22	20	M20	508,0	513,5	519	30	24	24	8	22	16	8	—	475	—	68	15	75	75	—	538	—	544	12	See Annex A
600	755	705	26	20	M24	610,0	616,5	622	32	30	30	8	22	16	—	—	575	—	70	16	70	—	—	640	—	642	12	
700	860	810	26	24	M24	711,0		721	40	30	40	4	—	16	—	—	670	—	76	16	70	—	—	740	—	746	12	
800	975	920	30	24	M27	813,0		824	44	30	44	4	—	16	—	—	770	—	76	16	70	—	—	842	—	850	12	
900	1 075	1 020	30	24	M27	914,0		926	48	34	48	4	—	16	—	—	860	—	78	16	70	—	—	942	—	950	12	
1 000	1 175	1 120	30	28	M27	1 016,0		1 028	52	38	52	4	—	18	—	—	960	—	82	16	70	—	—	1 045	—	1 050	16	
1 200	1 405	1 340	33	32	M30	1 219,0	b	1 234	60	42	60	5	—	20	—	—	1 160	—	10	20	90	—	—	1 248	—	1 264	16	
1 400	1 630	1 560	36	36	M33	1 422,0		—	72	56	68	—	—	—	—	—	1 346	—	11	20	—	—	—	1 452	—	1 480	16	
1 600	1 830	1 760	36	40	M33	1 626,0		—	80	63	76	—	—	—	—	—	1 546	—	11	20	—	—	—	1 655	—	1 680	16	
1 800	2 045	1 970	39	44	M36	1 829,0		—	88	69	84	—	—	—	—	—	1 746	—	13	20	—	—	—	1 855	—	1 878	16	
2 000	2 265	2 180	42	48	M39	2 032,0		—	96	74	92	—	—	—	—	—	1 950	—	14	25	—	—	—	2 058	—	2 082	16	
2 200	2 475	2 390	42	52	M39	2 235,0		—	—	81	—	—	—	—	—	—	—	—	15	25	—	—	—	2 260	—	—	18	
2 400	2 685	2 600	42	56	M39	2 438,0	—	—	—	87	—	—	—	—	—	—	—	—	16	25	—	—	—	2 462	—	—	18	
2 600	2 905	2 810	48	60	M45	2 620,0		—	—	91	—	—	—	—	—	—	—	—	17	25	—	—	—	2 665	—	—	18	
2 800	3 115	3 020	48	64	M45	2 820,0	—	—	—	101	—	—	—	—	—	—	—	—	18	30	—	—	—	2 865	—	—	18	
3 000	3 315	3 220	48	68	M45	3 020,0	—	—	—	102	—	—	—	—	—	—	—	—	19	30	—	—	—	3 068	—	—	18	
3 200	3 525	3 430	48	72	M45	3 220,0	—	—	—	106	—	—	—	—	—	—	—	—	20	30	—	—	—	3 272	—	—	20	
3 400	3 735	3 640	48	76	M45	3 420,0	—	—	—	110	—	—	—	—	—	—	—	—	21	35	—	—	—	3 475	—	—	20	
3 600	3 970	3 860	56	80	M52	3 620,0	—	—	—	124	—	—	—	—	—	—	—	—	22	35	—	—	—	3 678	—	—	20	

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

[b] To be specified by the purchaser.



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes. Refer to the column "Bolting Number" in



NOTE 1 Dimensions N_1, N_2 and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

NOTE 2 For dimension see Table 8.

NOTE 3 For dimensions G_{max} refer to NOTE 1 of 5.6.1.

NOTE 4 Type 33; lapped pipe end without determination of thickness and height.

Figure 7 — Dimensions of PN 10 flanges

Table 12 — Dimensions of PN 10 flanges

Dimensions in millimetres

DN	Mating dimensions					Outside diameter of neck	Bore diameters			Flange thickness				Chamfer	Collar thickness				Diameter of shoulder	Length						Neck diameters			Corner radii	Wall thickness (see 5.6.1)	
	Outside diameter	Diameter of bolt	Diameter of bolt	Bolting		Outside diameter of neck	Bore diameters			Flange thickness				Chamfer	Collar thickness				Diameter of shoulder	Length						Neck diameters			Corner radii	Wall thickness (see 5.6.1)	
	D	*K*	*L*	Number | Size		*A*	*B1*	*B2*	*B3*	C1	C2	C3	C4	*E*		*F*			G_{max}	H1	H2	H3	H4		H5	N1	N2	N3	R_1	S	
	Flange type																														
	01, 02, 04, 05, 11, 12, 13, 21					11 21[a] 34[c] 35 - 37	01 12 32	02	04	01 02 04	11 12 13	21	05	02 04	32 34	35	36	37	05	12 13	11 34[c]	11 34[c]	35	36	37	11 34[c]	12 13	21	11 12 13 21, 34	34	11, 35 to 37
10	90	60	14	4	M12	17.2	18.0	21	31	14	16	16	16	3	12	5	2	2.5	—	22	35	6	35	35	7	28	30	28	4	1.8	See Annex A
15	95	65	14	4	M12	21.3	22.0	25	35	14	16	16	16	3	12	5	2	2.5	—	22	38	6	38	38	7	32	35	32	4	2.0	
20	105	75	14	4	M12	26.9	27.5	31	42	16	18	18	18	4	14	6	2.5	3	—	26	40	6	40	40	8	40	45	40	4	2.3	
25	115	85	14	4	M12	33.7	34.5	38	49	16	18	18	18	4	14	7	2.5	3	—	28	40	6	40	40	10	46	52	50	4	2.6	
32	140	100	18	4	M16	42.4	43.5	47	59	18	18	18	18	5	14	8	3	3	—	30	42	6	42	42	12	56	60	60	6	2.6	
40	150	110	18	4	M16	48.3	49.5	53	67	18	18	18	18	5	14	8	3	3	—	32	45	7	45	45	15	64	70	70	6	2.6	
50	165	125	18	4	M16	60.3	61.5	65	77	20	18	18	18	5	16	8	3	4	—	28	45	8	45	45	20	74	84	84	6	2.9	
65	185	145	18	8	M16	76.1	77.5	81	96	20	18	18	18	6	16	8	3	4	55	32	45	10	45	45	20	92	104	104	6	2.9	
80	200	160	18	8	M16	88.9	90.5	94	108	20	20	20	20	6	16	10	3	4	70	34	50	10	50	50	25	105	118	120	6	3.2	
100	220	180	18	8	M16	114.3	116.0	120	134	22	20	20	20	6	18	10	4	4	90	40	52	12	52	52	25	131	140	140	8	3.6	
125	250	210	18	8	M16	139,7	141,5	145	162	22	22	22	22	6	18	10	4	4	115	44	55	12	55	55	25	156	168	170	8	4,0	
150	285	240	22	8	M20	168,3	170,5	174	188	24	22	22	22	6	20	10	4	4	140	44	55	12	55	55	25	184	195	190	10	4,5	
200	340	295	22	8	M20	219.1	221.5	226	240	24	24	24	24	6	20	11	5	4	190	44	62	16	62	62	30	234	246	246	10	6.3	
250	395	350	22	12	M20	273.0	276.5	281	294	26	26	26	26	8	22	12	8	—	235	46	68	16	68	68	—	292	298	298	12	6.3	
300	445	400	22	12	M20	323.9	327.5	333	348	26	26	26	26	8	22	12	8		285	46	68	16	68	68		342	350	348	12	7.1	
350	505	460	22	16	M20	355.6	359.5	365	400	30	26	26	26	8	22	13	8	—	330	53	68	16	68	68	—	385	400	408	12	7.1	
400	565	515	26	16	M24	406.4	411.0	416	450	32	26	26	26	8	24	14	8	—	380	57	72	16	72	72	—	440	456	456	12	7.1	
450	615	565	26	20	M24	457.0	462.0	467	498	36	28	28	28	8	24	15	—	—	425	63	72	16	72	—	—	488	502	502	12	7.1	
500	670	620	26	20	M24	508.0	513.5	519	550	38	28	28	28	8	26	16	—	—	475	67	75	16	75	—	—	542	559	559	12	7.1	
600	780	725	30	20	M27	610.0	616.5	622	650	42	30	34	34	8	26	18	—	—	575	75	82	18	80	—	—	642	658	658	12	—	
700	895	840	30	24	M27	711.0	b	721	—	50	35	b	38	8	—	20	—	—	670	—	85	18	80	—	—	746	—	772	12	—	
800	1 015	950	33	24	M30	813.0		824	—	56	38		48	8		20	—	—	770	—	96	18	90			850	—	876	12	—	
900	1 115	1 050	33	28	M30	914.0		926	—	62	38		50	8		22	—	—	860	—	99	20	95			950	—	976	12	—	
1 000	1 230	1 160	36	28	M33	1 016.0		1 028	—	70	44		54	8	—	24	—	—	960	—	105	20	95	—	—	1 052	—	1 080	16	—	
1 200	1 455	1 380	39	32	M36	1 219.0		1 234	—	83	55		66	8	—	26	—	—	1 160	—	132	25	115	—	—	1 256	—	1 292	16	—	
1 400	1 675	1 590	42	36	M39	1 422.0	—	—	—		65			—			—	—		—	143	25	—			1 460	—	1 496	16	—	
1 600	1 915	1 820	48	40	M45	1 626.0		—	—	b	75		—	—	—	—	—	—	—	—	159	25	—	—	—	1 666	—	1 712	16	—	
1 800	2 115	2 020	48	44	M45	1 829.0	—	—	—		85		—	—	—	—	—	—	—	—	175	30	—	—	—	1 868	—	1 910	16	—	

Table 12 *(concluded)*

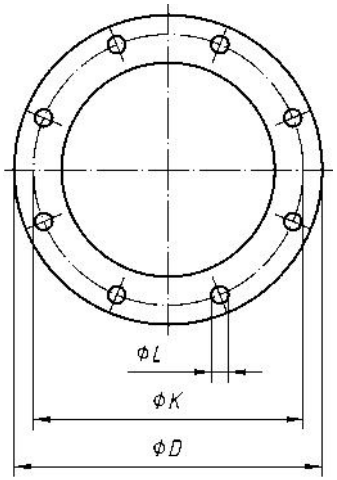
Dimensions in millimetres

DN	Mating dimensions					Outside diameter of neck	Bore diameters			Flange thickness				Chamfer	Collar thickness	Diameter of shoulder	Length						Neck diameters			Corner radii	Wall thickness (see 5.6.1)	
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting																								
				Number	Size																							
	D	*K*	*L*			*A*	*B1*	*B2*	*B3*	C1	C2	C3	C4	*E*	*F*	G_{max}	H1	H2	H3	H4	H5	N1	N2	N3	R_1	*S*	
	Flange type																											
	01,02, 04, 05, 11, 12, 13, 21					11 21 [a] 34 [c]	01 12 32	02	04	01 02 04	11 12 13	21	05	02 04	32 34	35	36	37	05	12 13	11 34	11 34	35	36	37	11 34	12 13	21	11 12 13	34	11, 35 to 37
						35 - 37																					21, 34		
2 000	2 325	2 230	48	48	M45	2 032,0	—	—	—	b	90	—	—	—	—	—	—	—	—	—	186	30	—	—	—	2 072	—	2 120	16	—	See Annex A
2 200	2 550	2 440	56	52	M52	2 235,0	—	—	—		100	—	—	—	—	—	—	—	—	—	202	35	—	—	—	2 275	—	—	18	—	
2 400	2 760	2 650	56	56	M52	2 438,0	—	—	—		110	—	—	—	—	—	—	—	—	—	218	35	—	—	—	2 478	—	—	18	—	
2 600	2 960	2 850	56	60	M52	2 620,0	—	—	—		110	—	—	—	—	—	—	—	—	—	224	40	—	—	—	2 680	—	—	18	—	
2 800	3 180	3 070	56	64	M52	2 820,0	—	—	—		124	—	—	—	—	—	—	—	—	—	244	40	—	—	—	2 882	—	—	18	—	
3 000	3 405	3 290	62	68	M56	3 020,0	—	—	—		132	—	—	—	—	—	—	—	—	—	257	45	—	—	—	3 085	—	—	18	—	

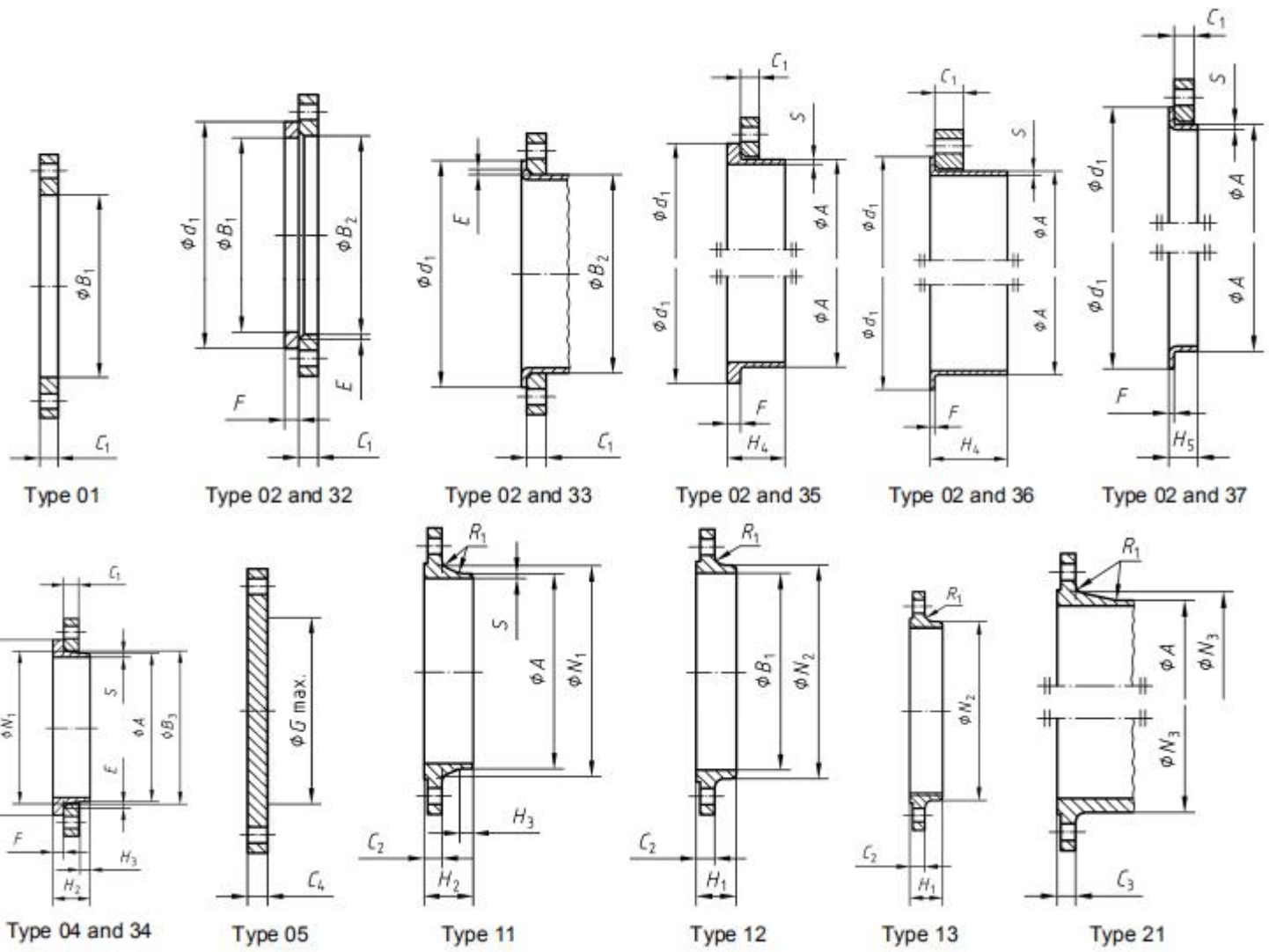
[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

[b] To be specified by the purchaser.

[c] Use is limited up to DN 600.



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes. Refer to the column "Bolting Number" in



NOTE 1Dimensions N_1, N_2 and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

NOTE 2 For dimension * see Table 8.

NOTE 3 For dimensions g_{max} refer to NOTE 1 of 5.6.1.

NOTE 4 Type 33; lapped pipe end without determination of thickness and height.

Figure 8 — Dimensions of PN 16 flanges

Table 13 — Dimensions of PN 16 flanges

Dimensions in millimetres

DN	Mating dimensions					Outside diameter of neck	Bore diameters			Flange thickness				Chamfer	Collar thickness				Diameter of shoulder	Length						Neck diameters			Corner radii	Wall thickness (see 5.6.1)	
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting																											
	D	*K*	*L*	Number	Size	*A*	B_1	B_2	B_3	C1	*C2*	*C3*	*C4*	*E*	*F*				*G*max	*H1*	*H2*	*H3*	*H4*	*H5*	*H1*	*N2*	*N3*	*R1*	*S*	
	Flange type																														
	01, 02, 04, 05, 11, 12, 13, 21					11 21 [a] 34 [d] 35 - 37	01 12 32	02	04	01 02 04	11 12 13	21	05	02 04	32 34	35	36	37	05	12 13	11 34 [c]	11 34[c]	35	36	37	11 34 [c]	12 13	21	11 12 13 34	34	11, 35 to 37	
10	90	60	14	4	M12	17,2	18,0	21	31	14	16	16	16	3	12	5	2	2,5	—	22	35	6	35	35	7	28	30	2	4	1,8	See Annex A
15	95	65	14	4	M12	21,3	22,0	25	35	14	16	16	16	3	12	5	2	2,5	—	22	38	6	38	38	7	32	35	3	4	2,0	
20	105	75	14	4	M12	26,9	27,5	31	42	16	18	18	18	4	14	6	2,5	3	—	26	40	6	40	40	8	40	45	4	4	2,3	
25	115	85	14	4	M12	33,7	34,5	38	49	16	18	18	18	4	14	7	2,5	3	—	28	40	6	40	40	10	46	52	5	4	2,6	
32	140	100	18	4	M16	42,4	43,5	47	59	18	18	18	18	5	14	8	3	3	—	30	42	6	42	42	12	56	60	6	6	2,6	
40	150	110	18	4	M16	48,3	49,5	53	67	18	18	18	18	5	14	8	3	3	—	32	45	7	45	45	15	64	70	7	6	2,6	
50	165	125	18	4	M16	60,3	61,5	65	77	20	18	18	18	5	16	8	3	4	—	28	45	8	45	45	20	74	84	8	6	2,9	
65	185	145	18	8[b]	M16	76,1	77,5	81	96	20	18	18	18	6	16	8	3	4	55	32	45	10	45	45	20	92	104	10	6	2,9	
80	200	160	18	8	M16	88,9	90,5	94	108	20	20	20	20	6	16	10	3	4	70	34	50	10	50	50	25	105	118	12	6	3,2	
100	220	180	18	8	M16	114,3	116,0	120	134	22	20	20	20	6	18	10	4	4	90	40	52	12	52	52	25	131	140	14	8	3,6	
125	250	210	18	8	M16	139,7	141,5	145	162	22	22	22	22	6	18	10	4	4	115	44	55	12	55	55	25	156	168	17	8	4,0	
150	285	240	22	8	M20	168,3	170,5	174	188	24	22	22	22	6	20	10	5	5	140	44	55	12	55	55	25	184	195	19	10	4,5	
200	340	295	22	12	M20	219,1	221,5	226	240	26	24	24	24	6	20	11	6	6	190	44	62	16	62	62	30	235	246	24	10	6,3	
250	405	355	26	12	M24	273,0	276,5	281	294	29	26	26	26	8	22	12	10	—	235	46	70	16	70	68	—	292	298	29	12	6,3	
300	460	410	26	12	M24	323,9	327,5	333	348	32	28	28	28	8	24	14	10	—	285	46	78	16	78	68	—	344	350	35	12	7,1	
350	520	470	26	16	M24	355,6	359,0	365	400	35	30	30	30	8	26	18	10	—	330	57	82	16	82	68	—	390	400	41	12	8,0	

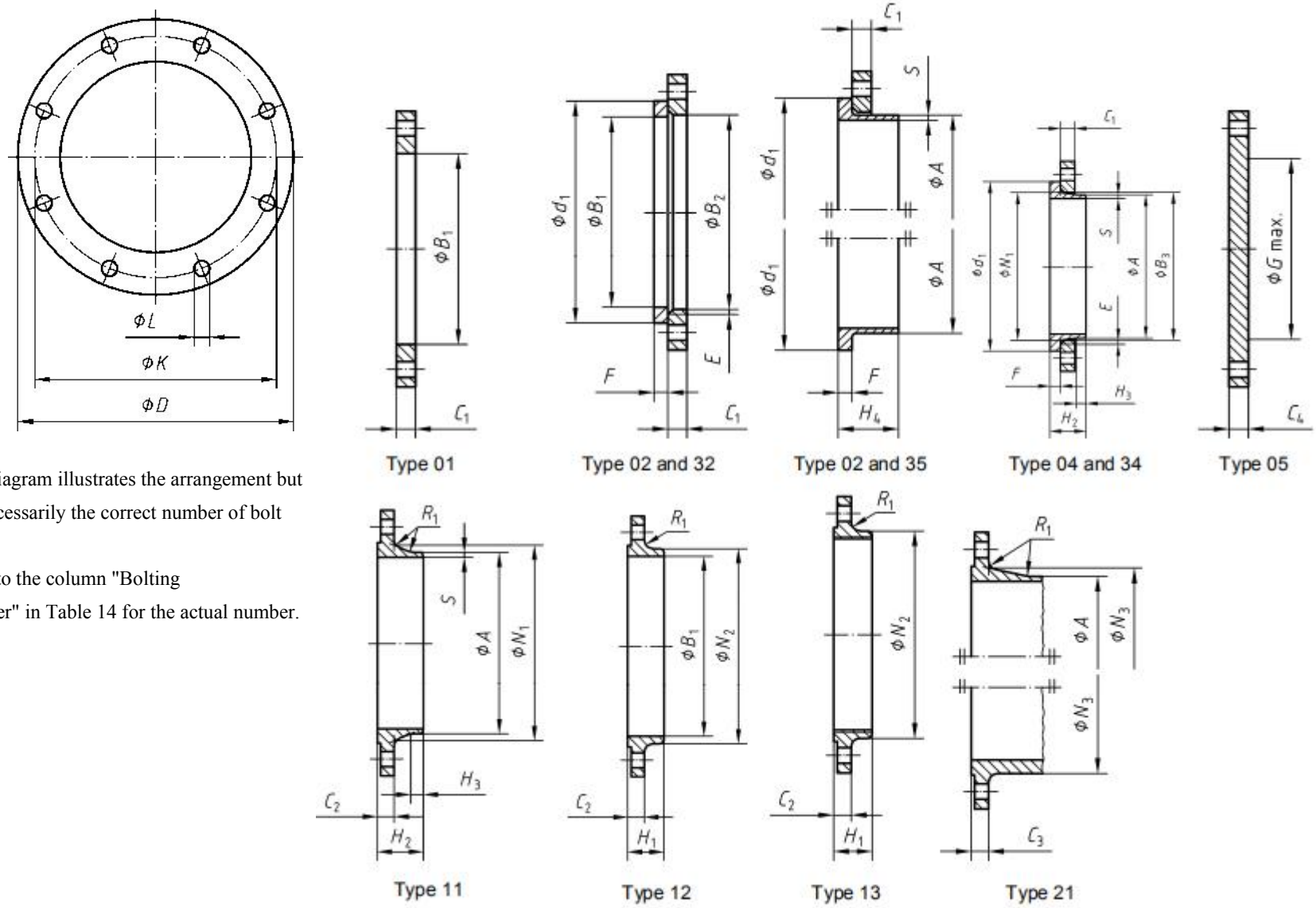
400	580	525	30	16	M27	406,4	411,0	416	454	38	32	32	32	8	28	20	10	—	380	63	85	16	85	72	—	445	456	458	12	8,0
450	640	585	30	20	M27	457,0	462,0	467	500	42	34	40	40	8	30	22	—	—	425	68	83	16	87	—	—	490	502	516	12	8,0
500	715	650	33	20	M30	508,0	513,5	519	556	46	36	44	44	8	32	22	—	—	475	73	84	16	90	—	—	548	559	576	12	8,0
600	840	770	36	20	M33	610,0	616,5	622	660	55	40	54	54	8	32	24	—	—	575	83	88	18	95	—	—	670	658	690	12	8,8
700	910	840	36	24	M33	711,0		721	—	63	40		58	8	—	26	—	—	670	83	104	18	100	—	—	755	760	760	12	—
800	1 025	950	39	24	M36	813,0		824	—	74	41		62	8	—	28	—	—	770	90	108	20	105	—	—	855	864	862	12	—
900	1 125	1 050	39	28	M36	914,0	c	926	—	82	48		64	8	—	30	—	—	860	94	118	20	110	—	—	955	968	962	12	—
1000	1 255	1 170	42	28	M39	1 016,0		1 030	—	90	59		68	8	—	35	—	—	960	100	137	22	120	—	—	1058	1072	1 076	16	—
1200	1 485	1 390	48	32	M45	1 219,0	—	—	—		78	c	—	—	—	—	—	—	1 160	—	160	30	—	—	—	1262	—	1 282	16	—
1400	1 685	1 590	48	36	M45	1 422,0	—	—	—		84		—	—	—	—	—	—	1 346	—	177	30	—	—	—	1465	—	1 482	16	—
1600	1 930	1 820	56	40	M52	1 626,0	—	—	—	c	102		—	—	—	—	—	—	1 546	—	204	35	—	—	—	1668	—	1 696	16	—
1800	2 130	2 020	56	44	M52	1 829,0	—	—	—		110		—	—	—	—	—	—	1 746	—	218	35	—	—	—	1870	—	1 896	16	—
2000	2 345	2 230	62	48	M56	2 032,0	—	—	—		124		—	—	—	—	—	—	1 950	—	238	40	—	—	—	2072	—	2 100	16	—

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

[b] According to EN 1092-2 (Cast iron flanges) and EN 1092-3 (Copper alloy flanges), the flanges in this DN and PN may be supplied with 4 holes. Where steel flanges are required with 4 holes, these may be supplied by agreement between flange manufacturer and purchaser.

[c] To be specified by the purchaser.

[d] Use is limited up to DN 600.



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

Refer to the column "Bolting Number" in Table 14 for the actual number.

NOTE 1 Dimensions N_1, N and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

NOTE 2 For dimension d_i, see Table 8.

NOTE 3 For dimensions G_{max} refer to NOTE 1 of 5.6.1.

Figure 9 — Dimensions of PN 25 flanges

Table 14 — Dimensions of PN 25 flanges

Dimensions in millimetres

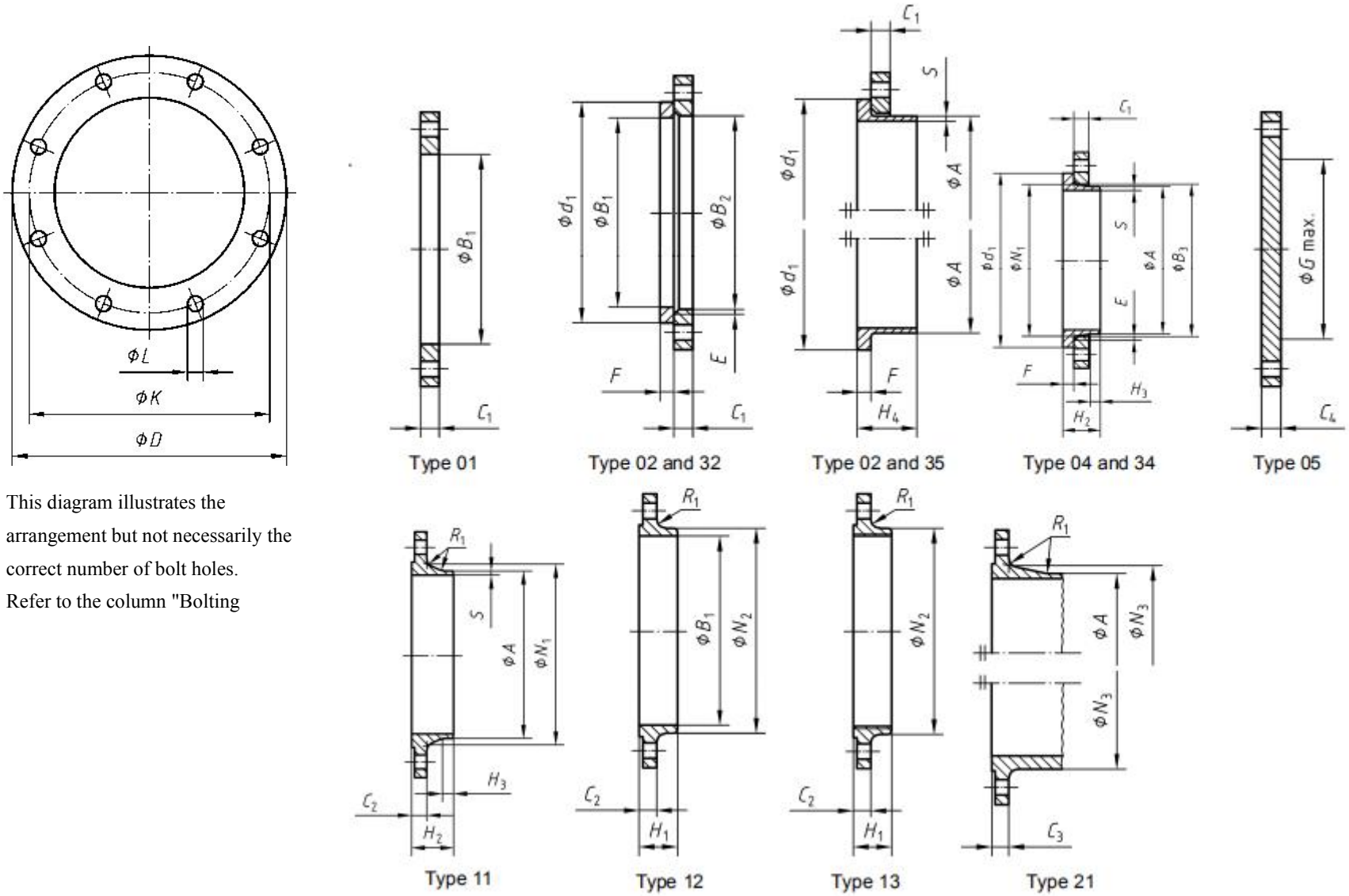
DN	Mating dimensions					Outside diameter of neck	Bore diameters			Flange thickness				Chamfer	Collar thickness		Diameter of shoulder	Length				Neck diameters			Corner radii	Wall thickness (see 5.6.1)	
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting																							
	D	*K*	*L*	Number	Size	A	B1	B2	B3	C1	C2	C3	C4	E	F		Gmax	H1	H2	H3	H4	N1	N2	N3	R1	*S*	
	Flange type																										
	01, 02, 04, 05, 11, 12, 13, 21					11 21[a] 34[c] 35	01 12 32	02	04	01 02 04	11 12 13	21	05	02 04	32 34	35	05	12 13	11 34 [c]	11 34 [c]	35	11 34	12 13	21	11 12 13 21, 34	34	11, 35	
10	90	60	14	4	M12	17.2	18.0	21	31	14	16	16	16	3	12	5	—	22	35	6	35	28	30	28	4	1.8	See Annex A
15	95	65	14	4	M12	21.3	22.0	25	35	14	16	16	16	3	12	5	—	22	38	6	38	32	35	32	4	2.0	
20	105	75	14	4	M12	26.9	27.5	31	42	16	18	18	18	4	14	6	—	26	40	6	40	40	45	40	4	2.3	
25	115	85	14	4	M12	33.7	34.5	38	49	16	18	18	18	4	14	7	—	28	40	6	40	46	52	50	4	2.6	
32	140	100	18	4	M16	42.4	43.5	47	59	18	18	18	18	5	14	8	—	30	42	6	42	56	60	60	6	2.6	
40	150	110	18	4	M16	48.3	49.5	53	67	18	18	18	18	5	14	8	—	32	45	7	45	64	70	70	6	2.6	
50	165	125	18	4	M16	60.3	61.5	65	77	20	20	20	20	5	16	10	—	34	48	8	48	75	84	84	6	2.9	
65	185	145	18	8	M16	76.1	77.5	81	96	22	22	22	22	6	16	11	55	38	52	10	52	90	104	104	6	2.9	
80	200	160	18	8	M16	88.9	90.5	94	114	24	24	24	24	6	18	12	70	40	58	12	58	105	118	120	8	3.2	
100	235	190	22	8	M20	114.3	116.0	120	138	26	24	24	24	6	20	14	90	44	65	12	65	134	145	142	8	3.6	
125	270	220	26	8	M24	139.7	141.5	145	166	28	26	26	26	6	22	16	115	48	68	12	68	162	170	162	8	4.0	
150	300	250	26	8	M24	168.3	170.5	174	194	30	28	28	28	6	24	18	140	52	75	12	75	192	200	192	10	4.5	
200	360	310	26	12	M24	219.1	221.5	226	250	32	30	30	30	6	26	18	190	52	80	16	80	244	256	25	10	6.3	
250	425	370	30	12	M27	273.0	276.5	281	302	35	32	32	32	8	26	18	235	60	88	18	88	298	310	30	12	7.1	
300	485	430	30	16	M27	323.9	327.5	333	356	38	34	34	34	8	28	20	285	67	92	18	92	352	364	36	12	8.0	
350	555	490	33	16	M30	355.6	359.5	365	408	42	38	38	38	8	32	22	332	72	100	20	100	398	418	41	12	8.0	
400	620	550	36	16	M33	406.4	411.0	416	462	48	40	40	40	8	34	24	380	78	110	20	110	452	472	47	12	8.8	
450	670	600	36	20	M33	457.0	462.0	467	510	54	46	46	50	8	36	26	425	84	110	20	110	500	520	52	12	8.8	
500	730	660	36	20	M33	508.0	513.5	519	568	58	48	48	51	8	38	28	475	90	125	20	125	558	580	58	12	10.0	
600	845	770	39	20	M36	610.0	616.5	622	670	68	48	58	66	8	40	30	575	100	125	20	115	660	684	68	12	11.0	
700	960	875	42	24	M39	711.0	b	721	—	85	50	b	b	8	—	30	—		129	20	125	760	—	78	12		
800	1 085	990	48	24	M45	813.0		824	—	95	53			8		35		—	138	22	135	864	—	88	12		
900	1 185	1 090	48	28	M45	914.0		—		b	57			—	—	—	—		148	24		968	—	98	12		
1 000	1 320	1 210	56	28	M52	1 016.0	—		—		63			—	—	—	—		160	24		1 070		1 086	16		
1 200	d																										
1 400																											
1 600																											
1 800																											
2 000																											

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

[b] To be specified by the purchaser.

[c] Use is limited up to DN 500.

[d] Only mating dimensions fixed, see Annex J.



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "Bolting

NOTE 1 Dimensions N_1, N_2 and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

NOTE 2 For dimension d_i, see Table 8.

NOTE 3 For dimensions G_{max} refer to NOTE 1 of 5.6.1.

Figure 10 — Dimensions of PN 40 flanges

Table 15 — Dimensions of PN 40 flanges

Dimensions in millimetres

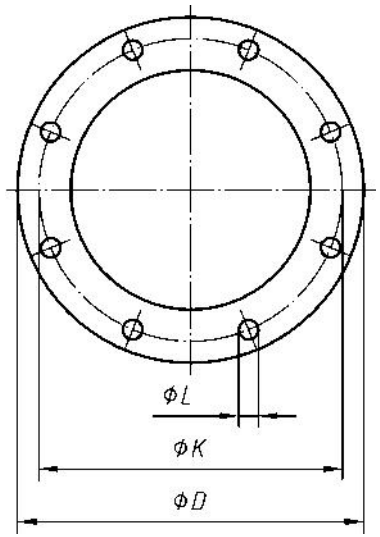
DN	Mating dimensions					Outside diameter of neck	Bore diameters			Flange thickness				Chamfer	Collar thickness	Diameter of shoulder	Length				Neck diameters			Corner radii	Neck thickness (see 5.6.1)	
	Outside diameter	Diameter of bolt	Diameter of bolt	Bolting																						
	D	*K*	*L*	Number	Size	*A*	*B1*	*B2*	*B3*	C1	*C2*	*C3*	*C4*	*E*	*F*	*Gmax*	H1	H2	H3	H4	N1	N2	N3	*R1*	*S*	
	Flange type																									
	01, 02, 04, 05, 11, 12, 13, 21					11 21 [a] 34 [c]	01 12 32	02	04	01 02 04	11 12 13	21	05	02 04	32 34[c]	35	05	12 13	11 34 [c]	11 34 [c]	35	11 34	12 13	21	11 12 13	34[c]	11, 35	
10	90	60	14	4	M12	17,2	18,0	21	31	14	16		16	3	12	5	—	22	35	6	35	28	30	28	4	1,8	See Annex A
15	95	65	14	4	M12	21,3	22,0	25	35	14	16		16	3	12	5	—	22	38	6	38	32	35	32	4	2,0	
20	105	75	14	4	M12	26,9	27,5	31	42	16	18		18	4	14	6	—	26	40	6	40	40	45	40	4	2,3	
25	115	85	14	4	M12	33,7	34,5	38	49	16	18		18	4	14	7		28	40	6	40	46	52	50	4	2,6	
32	140	100	18	4	M16	42,4	43,5	47	59	18	18		18	5	14	8	—	30	42	6	42	56	60	60	6	2,6	
40	150	110	18	4	M16	48,3	49,5	53	67	18	18		18	5	14	8	—	32	45	7	45	64	70	70	6	2,6	
50	165	125	18	4	M16	60,3	61,5	65	77	20	20		20	5	16	10	—	34	48	8	48	75	84	84	6	2,9	
65	185	145	18	8	M16	76,1	77,5	81	96	22	22		22	6	16	11	55	38	52	10	52	90	104	104	6	2,9	
80	200	160	18	8	M16	88,9	90,5	94	114	24	24		24	6	18	12	70	40	58	12	58	105	118	120	8	3,2	
100	235	190	22	8	M20	114,3	116,0	120	138	26	24		24	6	20	14	90	44	65	12	65	134	145	142	8	3,6	
125	270	220	26	8	M24	139,7	141,5	145	166	28	26		26	6	22	16	115	48	68	12	68	162	170	162	8	4,0	
150	300	250	26	8	M24	168,3	170,5	174	194	30	28		28	6	24	18	140	52	75	12	75	192	200	192	10	4,5	
200	375	320	30	12	M27	219,1	221,5	226	250	36	34		36	6	28	20	190	52	88	16	88	244	260	254	10	6,3	
250	450	385	33	12	M30	273,0	276,5	281	312	42	38		38	8	30	22	235	60	105	18	105	306	312	312	12	7,1	
300	515	450	33	16	M30	323,9	327,5	333	368	52	42		42	8	34	25	285	67	115	18	115	362	380	378	12	8,0	
350	580	510	36	16	M33	355,6	359,5	365	418	58	46		46	8	36	28	330	72	125	20	125	408	424	432	12	8,8	
400	660	585	39	16	M36	406,4	411,0	416	472	65	50		50	8	42	32	380	78	135	20	135	462	478	498	12	11,0	
450	685	610	39	20	M36	457,0	462,0	467	510	[d]	57		57	8	46	—	425	84	135	20	—	500	522	522	12	12,5	
500	755	670	42	20	M39	508,0	513,5	519	572		57		57	8	50	—	475	90	140	20	—	562	576	576	12	14,2	
600	890	795	48	20	M45	610,0	616,5	622	676		72		72	8	54	—	575	100	150	20	—	666	686	686	12	16,0	
700	[b]																									
800																										
900																										
1 000																										
1 200																										
1 400																										
1 600																										

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

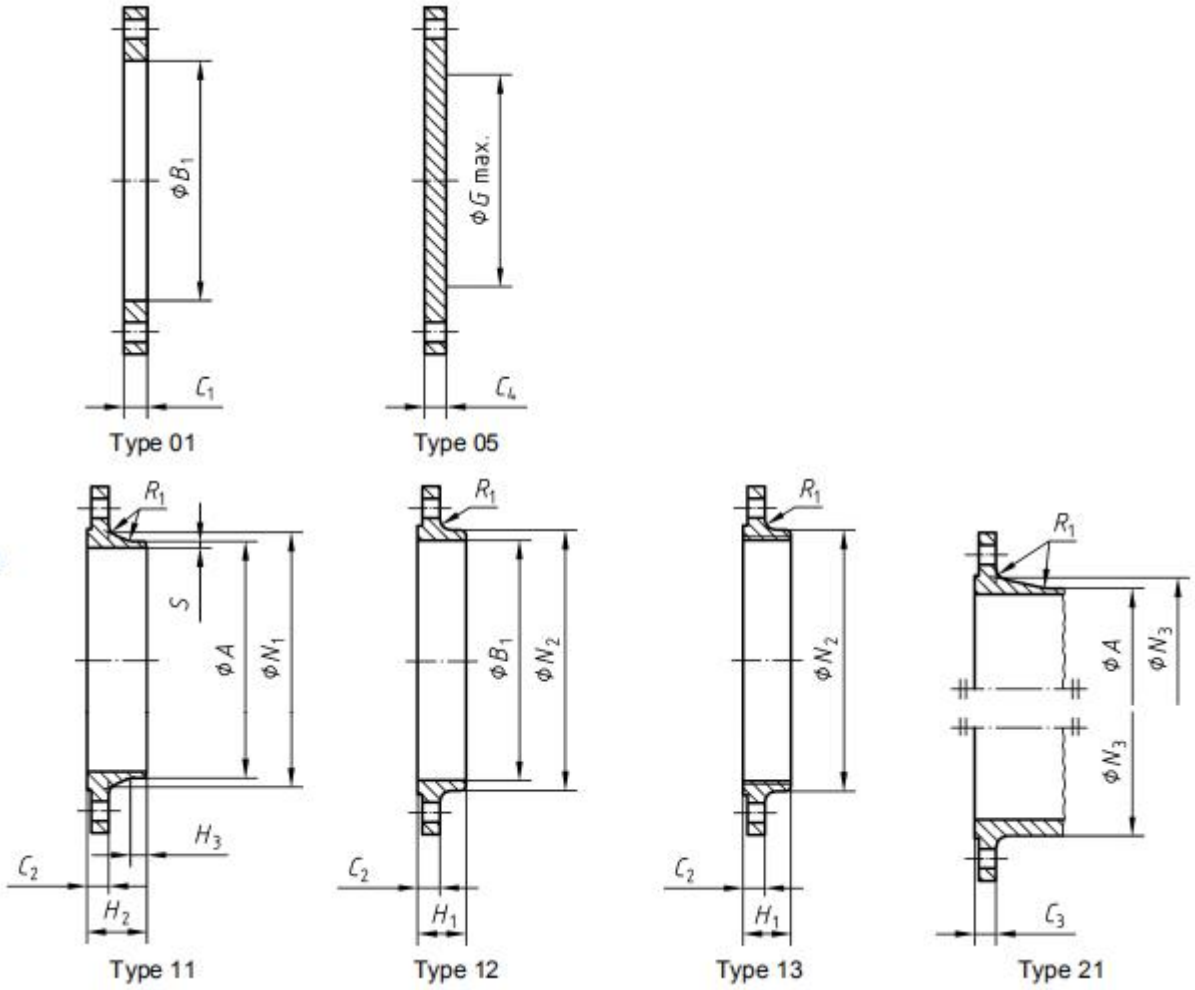
[b] Only mating dimensions fixed, see Annex J.

[c] Use is limited up to DN 600.

[d] To be specified by the purchaser.



This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.
Refer to the column "Bolting Number" in Table 16 for the actual number.



NOTE 1 Dimensions N_1, N_2 and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

NOTE 2 For dimensions G_{max} refer to NOTE 1 of 5.6.1.

Figure 11 — Dimensions of PN 63 flanges

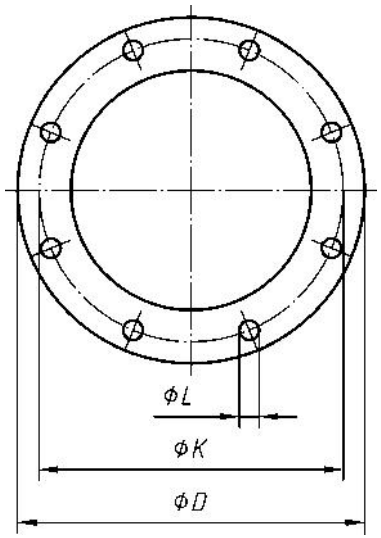
Table 16 — Dimensions of PN 63 flanges

Dimensions in millimetres

DN	Mating dimensions					Outside diameter of neck	Bore diameters	Flange thickness				Diameter of shoulder	Length			Neck diameters			Corner radii	Neck thickness (see 5.6.1)
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting																
	D	*K*	*L*	Number	Size	*A*	*B1*	C1	*C2*	*C3*	*C4*	*Gmax*	H1	H2	H3	N1	N2	N3	*R1*	*S*
	Flange type																			
	01, 05, 11, 12, 13, 21					11 21 a	01 12	01	11 12 13	21	05	05	12 13	11	11	11	12 13	21	11 12 13 21	11
10	100	70	14	4	M12	17.2	18.0	20	20	20	20	-	28	45	6	32	40	40	4	See Annex A
15	105	75	14	4	M12	21.3	22.0	20	20	20	20	-	28	45	6	34	43	45	4	
20	130	90	18	4	M16	26.9	27.5	22	22	22	22	-	30	48	8	42	52	50	4	
25	140	100	18	4	M16	33.7	34.5	24	24	24	24	-	32	58	8	52	60	61	4	
32	155	110	22	4	M20	42.4	43.5	24	24	26	24	-	32	60	8	62	68	68	6	
40	170	125	22	4	M20	48.3	49.5	26	26	28	26	-	34	62	10	70	80	82	6	
50	180	135	22	4	M20	60.3	61.5	26	26	26	26	-	36	62	10	82	90	90	6	
65	205	160	22	8	M20	76.1	77.5	26	26	26	26	45	40	68	12	98	112	105	6	
80	215	170	22	8	M20	88.9	90.5	30	28	28	28	60	44	72	12	112	125	122	8	
100	250	200	26	8	M24	114.3	116.0	32	30	30	30	80	52	78	12	138	152	146	8	
125	295	240	30	8	M27	139.7	141.5	34	34	34	34	105	56	88	12	168	185	177	8	
150	345	280	33	8	M30	168.3	170.5	36	36	36	36	130	60	95	12	202	215	204	10	
200	415	345	36	12	M33	219.1	221.5	48	42	42	42	180	-	110	16	256	-	264	10	
250	470	400	36	12	M33	273.0	276.5	55	46	46	46	220	-	125	18	316	-	32	12	
300	530	460	36	16	M33	323.9	327.5	65	52	52	52	270	-	140	18	372	-	378	12	
350	600	525	39	16	M36	355.6	359.5	72	56	56	56	310	-	150	20	420	-	434	12	
400	670	585	42	16	M39	406.4	411.0	80	6	60	60	360	-	160	20	475	-	490	12	
500	b																			
600																				
700																				
800																				
900																				
1000																				
1200																				

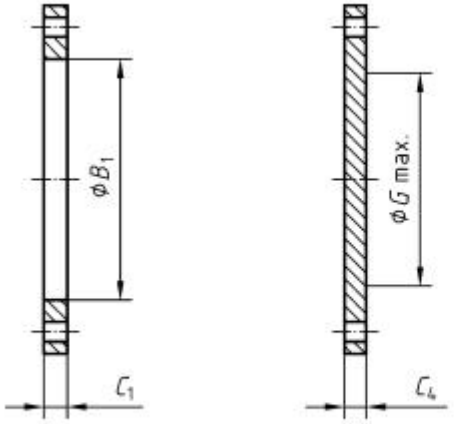
a For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

[b] Only mating dimensions fixed, see Annex J.

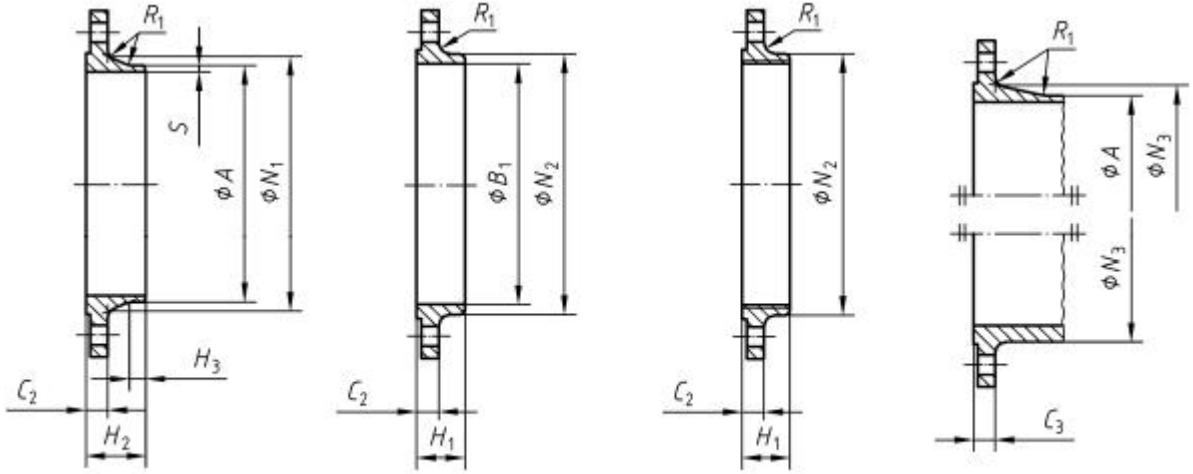


This diagram illustrates the arrangement but not necessarily the correct number of bolt holes.

Refer to the column "Bolting Number" in Table 17 for the actual number.



Type 01 Type 05



Type 11 Type 12 Type 13 Type 21

NOTE 1 Dimensions N_1, N and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

NOTE 2 For dimensions G_{max} refer to NOTE 1 of 5.6.1.

Figure 12 — Dimensions of PN 100 flanges

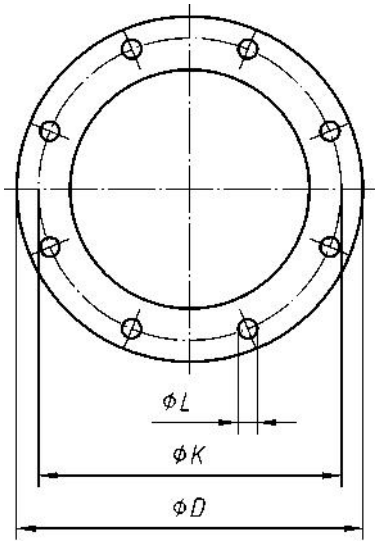
Table 17 — Dimensions of PN 100 flanges

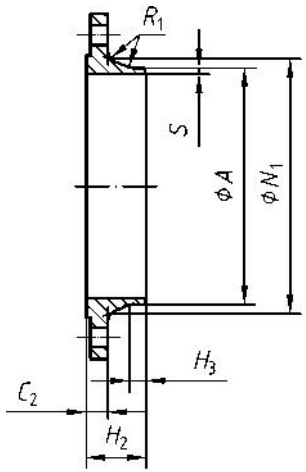
Dimensions in millimetres

DN	Mating dimensions					Outside diameter of neck	Bore diameter	Flange thickness				Diameter of shoulder	Length			Neck diameters			Corner radii	Wall thickness (see 5.6.1)
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting																
	D	*K*	*L*	Number	Size	*A*	*B1*	C1	*C2*	*C3*	*C4*	*G* max	H1	H2	H3	N1	N2	N3	*Ri*	*S*
	Flange type																			
	01, 05, 11, 12, 13, 21					11 21[a]	01 12	01	11 12 13	21	05	05	12 13	11	11	11	12 13	21	11 12 13 21	11
10	100	70	14	4	M12	17,2	18,0	20	20	20	20	—	28	45	6	32	40	40	4	See Annex A
15	105	75	14	4	M12	21,3	22,0	20	20	20	20	—	28	45	6	34	43	45	4	
20	130	90	18	4	M16	26,9	27,5	22	22	22	22	—	30	48	8	42	52	50	4	
25	140	100	18	4	M16	33,7	34,5	24	24	24	24	—	32	58	8	52	60	61	4	
32	155	110	22	4	M20	42,4	43,5	24	24	26	24	—	32	60	8	62	68	68	6	
40	170	125	22	4	M20	48,3	49,5	26	26	28	26	—	34	62	10	70	80	82	6	
50	195	145	26	4	M24	60,3	61,5	28	28	30	28	—	36	68	10	90	95	96	6	
65	220	170	26	8	M24	76,1	77,5	30	30	34	30	45	40	76	12	108	118	118	6	
80	230	180	26	8	M24	88,9	90,5	34	32	36	32	60	44	78	12	120	130	128	8	
100	265	210	30	8	M27	114,3	116,0	36	36	40	36	80	52	90	12	150	158	150	8	
125	315	250	33	8	M30	139,7	141,5	42	40	40	40	105	56	105	12	180	188	185	8	
150	355	290	33	12	M30	168,3	170,5	48	44	44	44	130	60	115	12	210	225	216	10	
200	430	360	36	12	M33	219,1	221,5	60	52	52	52	180	—	130	16	278	—	278	10	
250	505	430	39	12	M36	273,0	276,5	72	60	60	60	210	—	157	18	340	—	340	12	
300	585	500	42	16	M39	323,9	327,5	84	68	68	68	260	—	170	18	400	—	407	12	
350	655	560	48	16	M45	355,6	359,5	95	74	74	74	300	—	189	20	460	—	460	12	
400	[b]																			
500																				

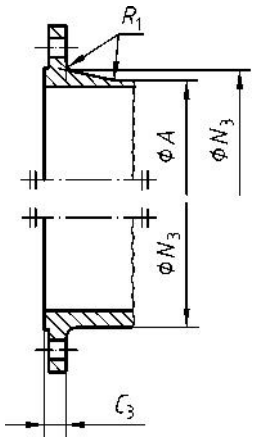
[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

[b] Only mating dimensions fixed, see Annex J.





Type 11



Type 21

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

Refer to the column "Bolting Number" in Table 18 for the actual number.

NOTE Dimensions N_1 and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

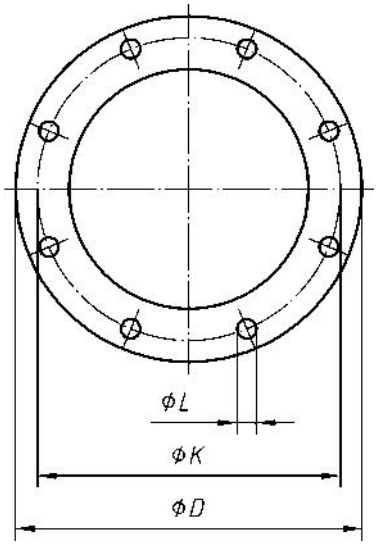
Figure 13 — Dimensions of PN 160 flanges

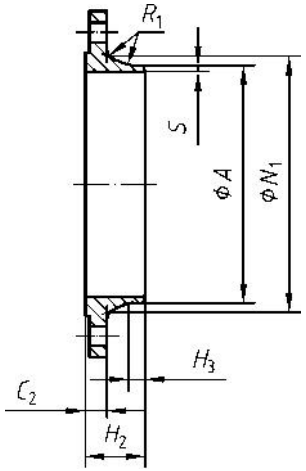
Table 18 — Dimensions of PN 160 flanges

Dimensions in millimetres

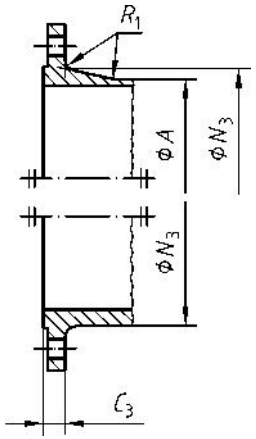
DN	Mating dimensions					Outside diameter of neck	Flange thickness		Length		Neck diameters		Corner radii		Wall thickness (see 5.6.1)
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting											
	D	*K*	*L*	Number	Size	*A*	*C2*	*C*3	H2	H3	N1	N3	*R1*		*S*
	Flange type														
	11, 21					11 21 [a]	11	21	11	11	11	21	11	21	11
10	100	70	14	4	M12	17,2	20	20	45	6	32	40	4	4	2,0
15	105	75	14	4	M12	21,3	20	20	45	6	34	45	4	4	2,0
25	140	100	18	4	M16	33,7	24	24	58	8	52	61	4	4	2,9
40	170	125	22	4	M20	48,3	28	28	64	10	70	82	6	4	3,6
50	195	145	26	4	M24	60,3	30	30	75	10	90	96	6	4	4,0
65	220	170	26	8	M24	76,1	34	34	82	12	108	118	6	5	5,0
80	230	180	26	8	M24	88,9	36	36	86	12	120	128	8	5	6,3
100	265	210	30	8	M27	114,3	40	40	100	12	150	150	8	5	8,0
125	315	250	33	8	M30	139,7	44	44	115	14	180	184	8	6	10,0
150	355	290	33	12	M30	168,3	50	50	128	14	210	224	10	6	12,5
200	430	360	36	12	M33	219,1	60	60	140	16	278	288	10	8	16,0
250	515	430	42	12	M39	273,0	68	68	155	18	340	346	12	8	20,0
300	585	500	42	16	M39	323,9	78	78	175	18	400	414	12	10	22,2

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.





Type 11



Type 21

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

Refer to the column "Bolting Number" in Table 19 for the actual number.

NOTE Dimensions N_1 and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

Figure 14 — Dimensions of PN 250 flanges

Table 19 — Dimensions of PN 250 flanges

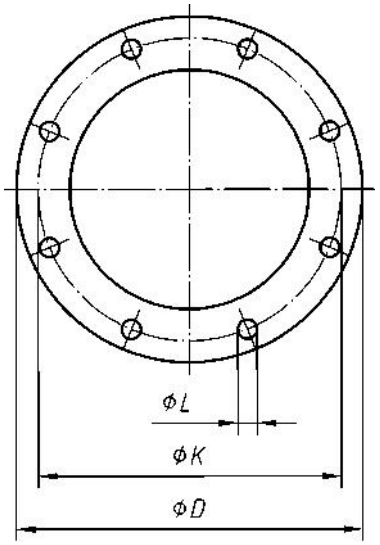
Dimensions in millimetres

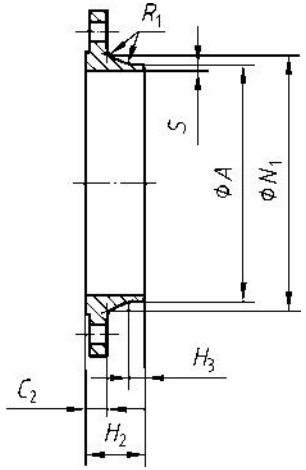
DN	Mating dimensions					Outside diameter of neck *A*	Flange thickness		Length		Neck diameters		Corner radii *R1*		Wall thickness (see 5.6.1) *S*
	Outside diameter *D*	Diameter of bolt circle *K*	Diameter of bolt hole *L*	Bolting			*C2*	*C*3	H2	H3	N1	N3			
				Number	Size										
	Flange type														
	11, 21					11 21 [a]	11	21	11	11	11	21	11	21	11
10 [b, c]	125	85	18	4	M16	—	—	24	—	—	—	46	—	4	—
15	130	90	18	4	M16	21,3	26	26	60	6	48	52	4	4	2,6
25	150	105	22	4	M20	33,7	28	28	65	8	60	63	4	4	3,6
40	185	135	26	4	M24	48,3	34	34	80	10	84	90	6	4	5,0
50	200	150	26	8	M24	60,3	38	38	85	10	95	102	6	5	6,3
65	230	180	26	8	M24	76,1	42	42	95	12	124	125	6	5	8,0
80	255	200	30	8	M27	101,6	46	46	102	12	136	142	8	6	11,0
100	300	235	33	8	M30	127,0	54	54	120	14	164	168	8	6	14,2
125	340	275	33	12	M30	152,4	60	60	140	16	200	207	8	6	16,0
150	390	320	36	12	M33	177,8	68	68	160	18	240	246	10	8	17,5
200	485	400	42	12	M39	244,5	82	82	190	25	305	314	10	8	25,0
250	585	490	48	16	M45	298,5	100	100	215	30	385	394	12	10	32,0
300 [b]	690	590	52	16	M48	—	—	120	—	—	—	480	—	10	—

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

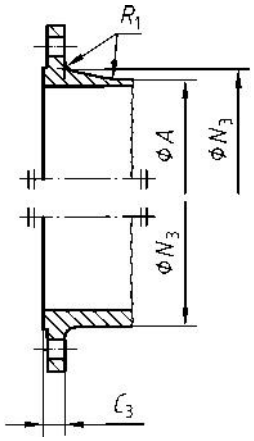
[b] For flanges type 21.

[c] For flanges type 11 use flanges PN 320.





Type 11



Type 21

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

Refer to the column "Bolting Number" in Table 20 for the actual number.

NOTE Dimensions *N1* and *N* are measured at the intersection of the hub draft angle and the back face of the flange.

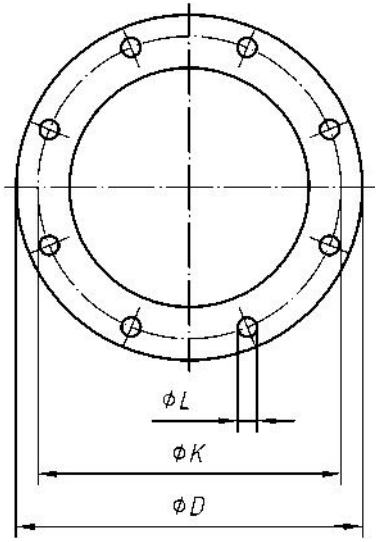
Figure 15 — Dimensions of PN 320 flanges

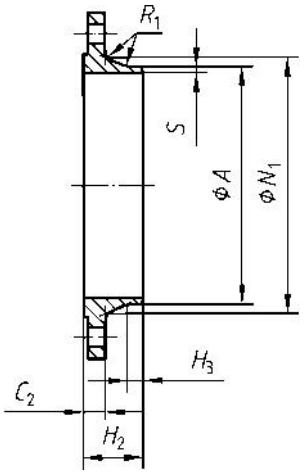
Table 20 — Dimensions of PN 320 flanges

Dimensions in millimetres

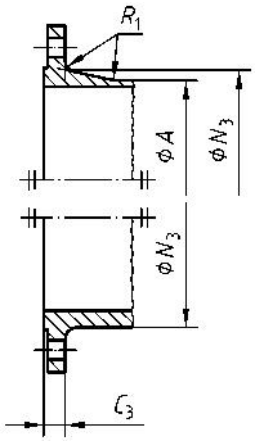
DN	Mating dimensions					Outside diameter of neck *A*	Flange thickness		Length		Neck diameters		Corner radii *R1*		Wall thickness (see 5.6.1) *S*
	Outside diameter *D*	Diameter of bolt circle *K*	Diameter of bolt hole *L*	Bolting			*C2*	*C*3	H2	H3	N1	N3			
				Number	Size										
	Flange type														
	11, 21					11 21 [a]	11	21	11	11	11	21	11	21	11
10	125	85	18	4	M16	17,2	24	24	58	6	44	46	4	4	2,6
15	130	90	18	4	M16	21,3	26	26	60	6	48	52	4	4	3,2
25	160	115	22	4	M20	33,7	34	34	78	8	68	72	4	4	5,0
40	195	145	26	4	M24	48,3	38	38	88	10	92	96	6	5	6,3
50	210	160	26	8	M24	63,5	42	42	100	10	106	110	6	5	8,0
65	255	200	30	8	M27	88,9	51	51	120	12	138	137	6	6	11,0
80	275	220	30	8	M27	101,6	55	55	130	14	156	160	8	6	12,5
100	335	265	36	8	M33	133,0	65	65	145	16	186	190	8	8	16,0
125	380	310	36	12	M33	168,3	75	75	175	20	230	235	8	8	20,0
150	425	350	39	12	M36	193,7	84	84	195	25	265	266	10	10	25,0
200	525	440	42	16	M39	244,5	103	103	235	30	345	350	10	10	30,0
250	640	540	52	16	M48	323,9	125	125	300	40	428	432	12	10	40,0

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.





Type 11



Type 21

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

Refer to the column "Bolting Number" in Table 21 for the actual number.

NOTE Dimensions N_1, and N_3 are measured at the intersection of the hub draft angle and the back face of the flange.

Figure 16 — Dimensions of PN 400 flanges

Table 21 — Dimensions of PN 400 flanges

Dimensions in millimetres

DN	Mating dimensions					Outside diameter of neck	Flange thickness		Length		Neck diameters		Corner radii		Wall thickness (see 5.6.1)
	Outside diameter	Diameter of bolt circle	Diameter of bolt hole	Bolting											
	D	*K*	*L*	Number	Size	*A*	*C2*	*C*3	H2	H3	N1	N3	R_1		*S*
	Flange type														
	11, 21					11 21 [a]	11	21	11	11	11	21	11	21	11
10	125	85	18	4	M16	17,2	28	28	65	8	48	48	4	4	3,6
15	145	100	22	4	M20	26,9	30	30	68	8	56	57	4	4	5,0
25	180	130	26	4	M24	42,4	38	38	90	10	82	81	4	5	7,1
40	220	165	30	4	M27	60,3	48	48	110	12	106	105	6	5	10,0
50	235	180	30	8	M27	76,1	52	52	120	15	120	120	6	6	12,5
65	290	225	33	8	M30	101,6	64	64	135	18	158	158	6	6	16,0
80	305	240	33	8	M30	114,3	68	68	150	20	174	174	8	8	17,5
100	370	295	39	8	M36	139,7	80	80	175	25	216	216	8	8	22,2
125	415	340	39	12	M36	193,7	92	92	200	30	258	259	8	10	30,0
150	475	390	42	12	M39	219,1	105	105	225	35	302	302	10	10	35,0
200	585	490	48	16	M45	273,0	130	130	280	40	388	388	10	10	40,0

[a] For flanges type 21 the outside hub diameter approximately corresponds to the outside pipe diameter.

Table 22 — Tolerances

Dimension	Flange Type	Size	Tolerance mm	
Outside diameter of neck A	11, 21, 34	≤DN 125	$^{+3,0}_{0}$	
		> DN 125 < DN 1200	$^{+4,5}_{0}$	
		> DN 1200	$^{+6,0}_{0}$	
	35, 36, 37	≤DN 150	± 0,75 % [a], min. ± 0,3 mm	
		> DN 150	± 1 % [a], max ± 3,0 mm	
Bore diameter $B1,B2,B3$	01, 02, 04, 12, 32	≤ DN 100	$^{+0,5}_{0}$	
		> DN 100 ≤ DN 400	$^{+1,0}_{0}$	
		> DN 400 ≤DN 600	$^{+1,5}_{0}$	
		> DN 600	$^{+3,0}_{0}$	
Wall thickness s [c]	11, 34[b]		machined neck (both faces)	neck one face machined or unmachined
		≤ DN 100	$^{+1,0}_{0}$	$^{+2,0}_{0}$
		> DN 100 ≤DN 400	$^{+1,5}_{0}$	$^{+2,5}_{0}$
		> DN 400	$^{+2,0}_{0}$	$^{+3,5}_{0}$
	35	S ≤8	$^{+15\%}_{-10\%}$	
		S > 8	$^{+15\%}_{-5\%}$	
	36, 37	≤DN 600	$^{-12.5\%\ a}_{+15\%}$	
		> DN 600	$^{-0.5mm\ a}_{+15\%}$	
Bevelled wall thickness s_p	35, 36, 37	S ≤6	$^{+1,0}_{0}$	
		S > 6	$^{+2,0}_{0}$	
Outside diameter D	21	≤DN 250	± 4,0	
		> DN 250 ≤ DN 500	± 5,0	
		> DN 500 ≤ DN 800	± 6,0	
		> DN 800 ≤ DN 1200	± 7,0	
		> DN 1200 ≤ DN 1600	± 8,0	
		> DN 1600 ≤ DN 2000	± 10,0	
	All other types	≤ DN 150	± 2,0	
		> DN 150 ≤ DN 500	± 3,0	
		> DN 500 ≤ DN 1200	± 5,0	
		> DN 1200 ≤ DN 1800	± 7,0	
		> DN 1800	± 10,0	

Table 22 *(continued)*

Dimension	Flange Type	Size	Tolerance mm
Length through hub *Hi, H2, H3, H4, H5*	11, 12, 13, 34, 35, 36, 37	≤ DN 80	+ 1,5
		> DN 80 ≤DN 250	± 2,0
		> DN 250	± 3,0
Neck diameter *N1,N2,N3*	11, 21, 34	≤DN 50	0 -2,0
		> DN 50 ≤DN 150	0 -4,0
		> DN 150 ≤ DN 300	0 -6,0
		> DN 300 ≤ DN 600	0 -8,0
		> DN 600 ≤ DN 4000	0 -10,0
	12, 13	≤ DN 50	+ 1,0 0
		> DN 50 ≤ DN 150	+ 2,0 0
		> DN 150 ≤ DN 300	+ 4,0 0
		> DN 300 ≤DN 600	+ 8,0 0
		> DN 600≤ DN 1200	+ 12,0 0
		> DN 1200 ≤ DN 1800	+ 16,0 0
		> DN 1800	+ 20,0 0
Collar thickness F	35 (machined on both faces)	≤ 18 mm thickness	± 1,0 mm
		> 18 mm≤ 50 mm thickness	± 1,5 mm
	36 (machined on front face only or un-machined)	< 18 mm thickness	± 10 %
	37 (un-machined)	< 5 mm thickness	± 0,20 mm
Flange thickness G, G, C_3, C4	All types (machined on both faces)	< 18 mm thickness	+ 1,0 −1,3
		> 18 mm < 50 mm thickness	± 1,5
		> 50 mm thickness	± 2,0
	All types (machined on front face only) Type 02 and 04 (un-machined)	≤18 mm thickness	+ 2,0 -1,3
		> 18 mm ≤50 mm thickness	+ 4,0 -1,5
		> 50 mm thickness	+ 7,0 -2,0
Collar thickness F	32, 34		
Facing diameter *d1*	All types	≤DN 250	+ 2,0 -1,0
		> DN 250	+ 3,0 -1,0

Table 22 *(concluded)*

Dimension		Flange type	Size		Tolerance mm
Facing height *f1*		All types (facing type B, D, F and G)	≤ DN 32	2 mm	0 -1
			> DN 32 to DN 250	3 mm	0 -2
			> DN 250 to DN 500	4 mm	0 -3
			> DN 500	5 mm	0 -4
Facing height *f2*		All types (facing types C, E and G	All DN		+ 0,5 0
Facing height *f3*		All types (facing types D and F)	All DN		+ 0,5 0
		All types (facing type H)	All DN		+ 0,2 0
Facing height *f4*		All types (facing type H)	All DN		+ 0,5 0
Facing	*W*	All types	All DN		+ 0,5 0
	X				0 -0,5
	Y				+ 0,5 0
	Z				0 -0,5
Diameter of bolt circle *K*		All types	Bolt sizes M10 to M24		± 1,0
			Bolt sizes M27 to M45		+ 1,5
Centre-to-centre of adjacent bolt holes		All types	Bolt sizes M10 to M24		± 1,0
			Bolt sizes M27 to M45		± 1,5
Eccentricity of machined facing diameters		All types	≤DN 65		1,0
			> DN 65		2,0
Parallelism between bolting bearing surfaces and flange jointing faces		All types (machined bearing surfaces)	All DN		1°
		All types (un-machined bearing surfaces)			2°

[a] Tolerance in % from the outside diameter or respectively from the wall thickness.

[b] Bore tolerance not applicable.

[c] Preparation of ends see Annex A.

Table 23 — Corner radii R_1 and hub radius R_2 after back facing

Flange size	R_1 min. [a] mm	R_1 max. [a] mm	R_2 min. mm
Up to and including DN 50	3	5	1,6
Over DN 50 and up to including DN 350	3	6	2,4
Over DN 350	5	8	3,2

[a] Dimensions *R1* are valid for types 33 to 37.
Dimensions *R1* for other types 11, 12, 13 and 21, see Tables 10 to 21.

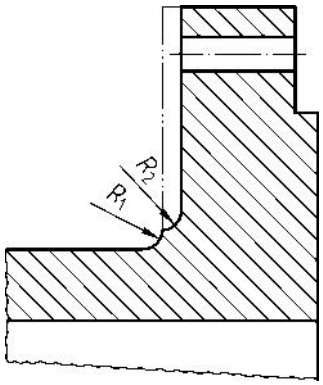


Figure 17 — Minimum hub radius after back facing

Annex A

(normative)

Wall thickness and end preparation

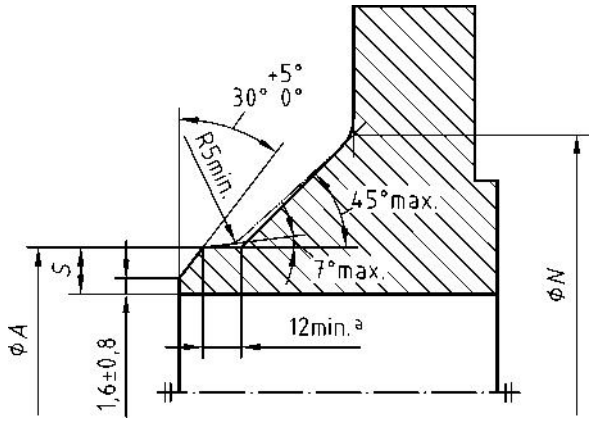
A.1 Weld-end preparation for flanges types 11 and 34

Unless otherwise specified, for flanges in accordance with this European Standard the welding end connections given in Figures A.1 to A.3 shall be used. Additional types of welding ends are specified in EN ISO 9692-2 and ex ample of designs in EN 1708-1 and may be used by agreement between the component or pressure equipment manufacturer and the flange manufacturer.

Wall thickness $S \leqslant 3$ mm: Flanges/collars may be delivered with square cut ends.

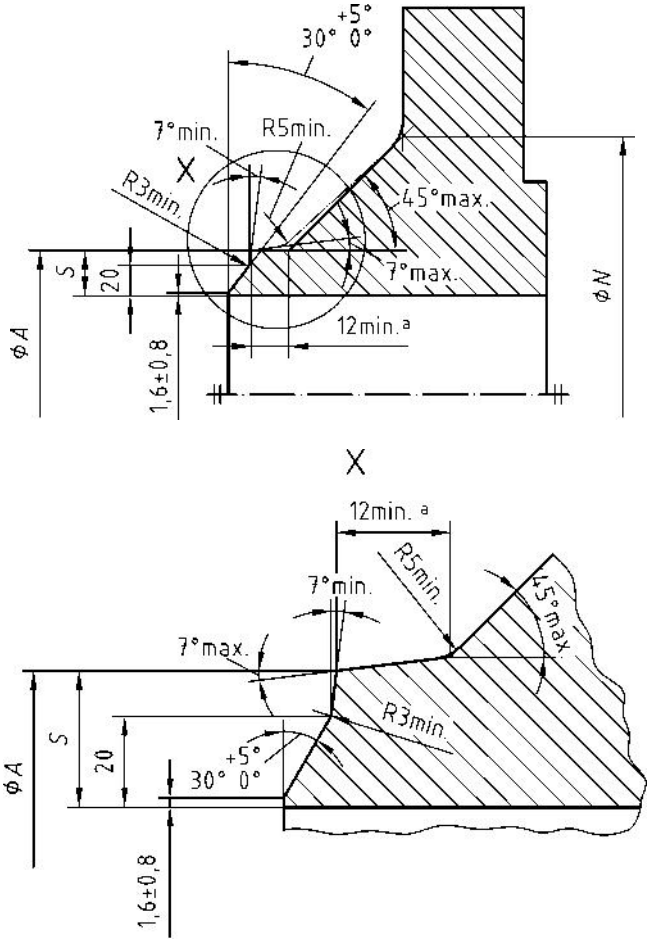
Wall thickness $3 < S < 22$: Bevelled ends with an angle of $30^{\circ}{}^{+5^{\circ}}_{-0^{\circ}}$ and root face of (1,6 ± 0,8) mm.

If flange wall thickness (S) > pipe wall thickness (T), the inner diameter shall be chamfered with an angle of $15^{\circ}{}^{+5^{\circ}}_{-0^{\circ}}$ to match (see Figure A.3).



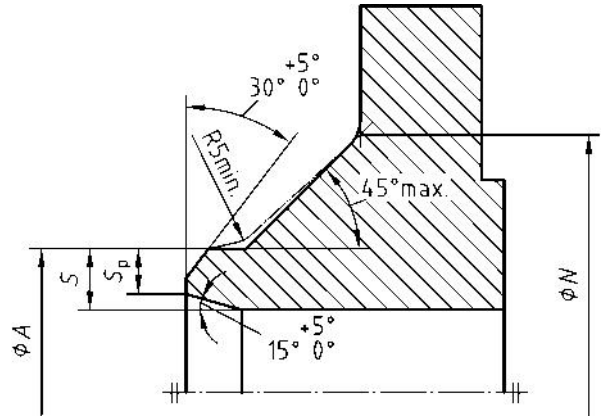
[a] 6 min. for < DN 200, see Tables 10 to 21 / length H_3.

Figure A.1 — Welding end connection for wall thickness *S* up to 22 mm



[a] 6 min. for ≤ DN 200, see Tables 10 to 21 / length H_3.

Figure A.2 — Welding end connection for wall thickness S ≥22 mm



S Flange wall thickness

Sp Reduced flange wall thickness

Figure A.3 — Permissible bevel design for unequal wall thickness

NOTE 1 For flanges required to connect to non-austenitic steel pipe of nominal wall thickness less than 4,8 mm, the welding ends should be finished to a slight chamfer or be square, at the option of the flange manufacturer, if nothing else has been agreed between flange manufacturer and purchaser or pressure equipment manufacturer.

NOTE 2 For flanges required to connect to austenitic stainless steel pipe of nominal wall thickness 3,2 mm or less, the welding ends should be square cut ends.

NOTE 3 The mating wall thickness of the flange (S_P) shall match to the pipe wall thickness（T）.

Table A.1 — Wall thickness for type 11

Ø A	PN 2,5		PN 6		PN 10		PN 16		PN 25		PN 40		PN 63		PN 100	
	S	*Sp*	*S*	*Sp*	*S*	*Sp*	*S*	*Sp*	*S*	*Sp*	*S*	*Sp*	*S*	*Sp*	*S*	*Sp*
17,2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21,3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3,2	2
26,9	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,6	2,3	3,2	2,3
33,7	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	3,6	2,6
42,4	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,9	2,6	3,6	2,9
48,3	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,6	2,9	2,9	3,6	3,2
60,3	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	4	3,2	4	3,6
76,1	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	2,9	4	3,6	4	4
88,9	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2	4,5	4	5	5
114,3	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	4,5	4,5	5,6	5,6
139,7	4	4	4	4	4	4	4	4	4	4	4	4	5,6	5,6	6,3	6,3
168,3	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	4,5	6,3	6,3	8	8
219,1	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	7,1	7,1	8,8	8,8
273	6,3	6,3	6,3	6,3	6,3	6,3	6,3	6,3	7,1	7,1	7,1	7,1	8,8	8,8	10	10
323,9	7,1	7,1	7,1	7,1	7,1	7,1	7,1	7,1	8	8	8	8	11	10	12,5	12,5
355,6	7,1	7,1	7,1	7,1	7,1	7,1	8	8	8	8	8,8	8,8	12,5	10	14,2	14,2
406,4	7,1	7,1	7,1	7,1	7,1	7,1	8	8	8,8	8,8	11	11	14,2	11	16	16
457	7,1	7,1	7,1	7,1	7,1	7,1	8	8	8,8	8,8	12,5	12,5				
508	7,1	7,1	7,1	7,1	7,1	7,1	8	8	10	10	14,2	14,2				
610	7,1	7,1	7,1	7,1	8	7,1	10	8,8	11	11	16	16				
711	7,1	7,1	8	7,1	8,8	8	10	8,8	14,2	12,5						
813	7,1	7,1	8	7,1	8,8	8	12,5	10	16	14,2						
914	7,1	7,1	8	7,1	12,5	10	12,5	10	17,5	16						
1 016	7,1	7,1	8	7,1	12,5	10	12,5	10	20	17,5						
1 219	8	7,1	8,8	8	12,5	11	14,2	12,5								
1 422	8	7,1	8,8	8	14,2	12,5	16	14,2								
1 626	8,8	8	10	9	16	14,2	17,5	16								
1 829	10	10	11	10	17,5	16	20	17,5								
2 032	11	10	12,5	11	17,5	16	22	20								
2 235	11	10	14	12,5	20	18										
2 438	11	10	15	14,2	22,2	20										
2 620	11	10	16	14,2	25	22,2										
2 820	11	10	17	16	25	22,2										
3 020	11	10	20	16	32	24										
3 220	11	10	20	16												
3 420	11	10	22	17,5												
3 620	11	10	22	17,5												
3 820	11	10														
4 020	11	10														

NOTE *Sp* valves shall match those given in EN 10220 respectively EN ISO 1127.

A.2 Weld-end preparation for type 35

Dimensions see Table A.2

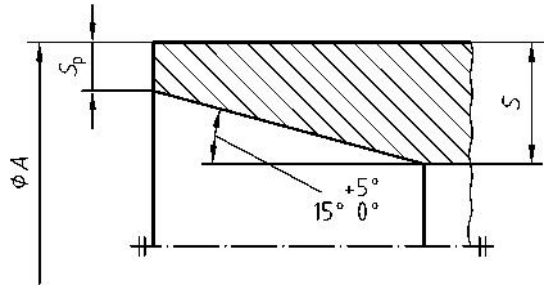


Figure A.4 — Chamfer A for type 35

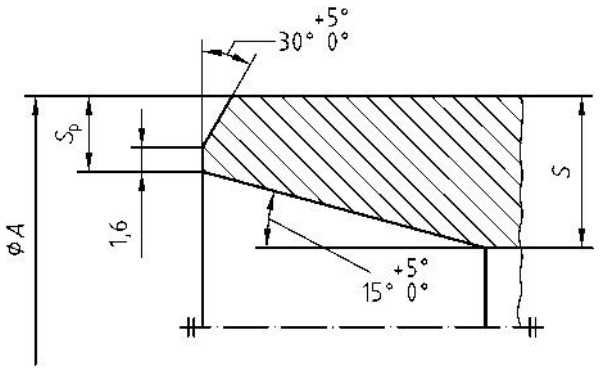


Figure A.5 — Chamfer B for type 35

Table A.2 — Wall thickness for type 35

Ø A	PN 2,5		PN 6		PN 10		PN 16		PN 25		PN 40		Chamfer
	s	*Sp*	*s*	*Sp*	*s*	*Sp*	*s*	*Sp*	*s*	*Sp*	*s*	*Sp*	
17,2	3	2	3	2	3	2	3	2	3	2	3	2	A
21,3	3	2	3	2	3	2	3	2	3	2	3	2	
26,9	3	2	3	2	3	2	3	2	3	2	3	2	
33,7	3	2	3	2	3	2	3	2	3	2	3	2	
42,4	3	2	3	2	3	2	3	2	3	2	3	2	
48,3	3	2	3	2	3	2	3	2	3	2	3	2	
60,3	3	2	3	2	3	2	3	2	4	2,6	4	2,6	
76,1	4	2	4	2	4	2	4	2	5	2,6	5	2,6	
88,9	4	2	4	2	4	2	4	2	6	2,6	6	2,6	
114,3	4	2	4	2	4	2	4	2	6	3,2	6	3,2	
139,7	5	2	5	2	5	2	5	2	6	3,2	6	3,2	
168,3	6	2	6	2	6	2	6	2	8	3,2	8	4	B
219,1	6	2,6	6	2,6	6	2,6	6	2,6	8	3,2	10	5	
273	8	3,2	8	3,2	8	3,2	8	3,2	10	5	12	6,3	
323,9	8	3,2	8	3,2	8	3,2	10	4	10	6,3	12	8	
355,6	8	3,2	8	3,2	8	3,2	10	4	12	6,3	14	8	
406,4	8	3,2	8	3,2	8	3,2	12	5	14	8	16	10	
457	8	3,6	8	3,6	8	3,6	12	5	15	8			
508	8	4	8	4	8	4	12	6,3	16	10			
610	8	5	8	5	10	5	12	8	18	10			
711	8	5	8	5	10	6,3	14	8	20	14,2			
813	10	6,3	10	6,3	12	6,3	16	10	20	14,2			
914	10	6,3	10	6,3	12	8	18	10					
1 016	12	8	12	8	12	8	18	10					
1 219	14	10	14	10	16	10							

A.3 Weld end preparation for types

Dimensions see Table A.3.

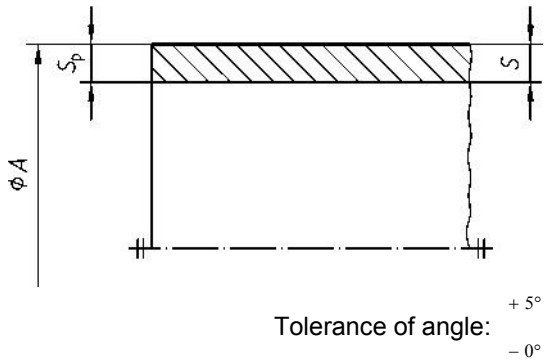


Figure A.6 — Chamfer A for types 36 and 37

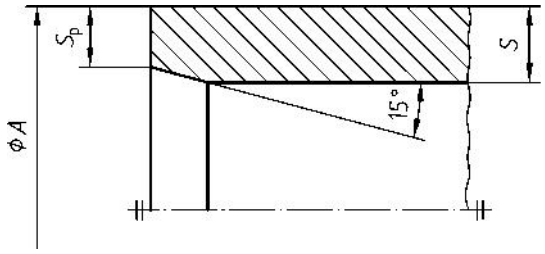


Figure A.7 — Chamfer B for types 36 and 37

Table A.3 — Wall thickness for types 36 and 37

Ø A	PN 2,5 to PN 10				PN 16				Chamfer
	Type 36		Type 37		Type 36		Type 37		
	S	*Sp*	*S*	*Sp*	*S*	*Sp*	*S*	*Sp*	
17,2	2	2	2	2	2	2	2	2	**A**
21,3	2	2	2	2	2	2	2	2	
26,9	2,6	2,6	2	2	2,6	2,6	2	2	
33,7	2,6	2,6	2	2	2,6	2,6	2	2	
42,4	3,2	3,2	2	2	3,2	3,2	2	2	
48,3	3,2	3,2	2	2	3,2	3,2	2	2	
60,3	3,2	3,2	2	2	3,2	3,2	2	2	
76,1	3,2	3,2	2	2	3,2	3,2	2	2	
88,9	3,2	3,2	2	2	3,2	3,2	3,2	3,2	
114,3	3,2	3,2	3,2	3,2	3,2	3,2	3,2	3,2	
139,7	4	3,2	3,2	3,2	4	3,2	3,5	3,2	**B**
168,3	5	3,2	3,5	3,2	5	3,2	4,5	3,2	
219,1	5	3,2	4,5	3,2	6	3,2	5,6	3,2	
273	8	3,2			10	3,2			
323,9	8	3,2			10	4[b]			
355,6	8	3,2			10	4[b]			
406,4	8	3,2			10	4[b]			
457	8[a]	3,2[a]							
508[a]	8[a]	3,2[a]							

[a] These values are valid only for PN 2,5 and PN 6.
[b] Like chamfer B for Type 35.

Annex B

Approximate masses of flanges and collars

Tables C.1 to C.12 give calculated masses of flanges and collars, which may be used for guidance only.

These calculated masses are based on nominal dimensions given in Tables 10 to 21, and on densities of 7,85 g/cm3 for steel materials.

The actual masses may vary from the calculated masses due to dimensional variations within the permitted tolerances given in Table 22.

Table C.1 — Masses of flanges PN 2,5

Masses in kilograms

DN	Type 01	Type 05	Type 11	Type 35	Type 36	Type 37
10 to 1 000	Use masses of flanges PN 6/Table C.2					
1 200	—	574	104	56,3	—	—
1 400	—	—	133	—	—	—
1 600	—	—	188	—	—	—
1 800	—	—	215	—	—	—
2 000	—	—	260	—	—	—
2 200	—	—	332	—	—	—
2 400	—	—	392	—	—	—
2 600	—	—	497	—	—	—
2 800	—	—	668	—	—	—
3 000	—	—	772	—	—	—
3 200	—	—	869	—	—	—
3 400	—	—	988	—	—	—
3 600	—	—	1 156	—	—	—
3 800	—	—	1 309	—	—	—
4 000	—	—	1 441	—	—	—

Table C.2 — Masses of flanges PN 6

Masses in kilograms

DN	Type 01	Type 02	Type 05	Type 11	Type 12	Type 32	Type 35	Type 36	Type 37
10	0,356	0,345	0,380	0,353	0,326	0,056	0,08	0,05	0,02
15	0,402	0,388	0,438	0,408	0,373	0,069	0,09	0,06	0,03
20	0,592	0,568	0,657	0,621	0,584	0,108	0,17	0,10	0,06
25	0,719	0,688	0,821	0,762	0,729	0,149	0,26	0,15	0,08
32	1,16	1,12	1,18	1,11	1,04	0,185	0,36	0,26	0,10
40	1,35	1,29	1,39	1,26	1,20	0,244	0,45	0,31	0,13
50	1,48	1,42	1,62	1,43	1,34	0,319	0,53	0,36	0,18
65	1,86	1,76	2,14	1,77	1,83	0,451	0,70	0,47	0,24
80	2,95	2,84	3,43	2,88	2,75	0,606	1,0	0,57	0,42
100	3,26	3,10	4,22	3,41	3,01	0,729	1,3	0,73	0,49
125	4,31	4,12	6,10	4,65	4,30	1,00	1,9	1,20	0,62
150	4,76	4,53	7,51	5,50	4,63	1,01	2,4	1,40	0,71
200	6,88	6,51	12,3	8,60	6,97	1,73	3,9	2,03	1,10
250	8,92	8,32	18,5	11,7	9,13	2,32	5,8	2,65	—
300	11,9	11,1	25,5	15,3	12,4	2,88	6,8	3,12	—
350	16,8	15,9	31,8	20,3	—	4,77	9,5	4,00	—
400	19,8	18,8	38,5	23,1	—	5,83	11,6	4,73	—
450	24,6	23,3	51,2	27,0	—	7,02	15,0	5,30	—
500	26,4	24,9	60,1	30,8	—	8,30	15,9	6,10	—
600	34,8	33,0	103	44,0	—	9,34	23,0	—	—
700	—	—	178	53,7	—	—	30,9	—	—
800	—	—	252	64,4	—	—	41,5	—	—
900	—	—	336	79,2	—	—	50,0	—	—
1 000	—	—	435	98,6	—	—	58,9	—	—
1 200	—	—	717	152	—	—	93,2	—	—
1 400	—	—	1 094	246	—	—	—	—	—
1 600	—	—	1 545	309	—	—	—	—	—
1 800	—	—	2 131	400	—	—	—	—	—
2 000	—	—	2 862	516	—	—	—	—	—
2 200	—	—	—	645	—	—	—	—	—
2 400	—	—	—	786	—	—	—	—	—
2 600	—	—	—	1 021	—	—	—	—	—
2 800	—	—	—	1 256	—	—	—	—	—
3 000	—	—	—	1 404	—	—	—	—	—
3 200	—	—	—	1 617	—				
3 400	—	—	—	1 877	—				
3 600	—	—	—	2 366	—				

Table C.3 — Masses of flanges PN 10

Masses in kilograms

DN	Type 01	Type 02	Type 04	Type 05	Type 11	Type 12	Type 32	Type 34	Type 35	Type 36	Type 37
10	0,604	0,591	0,549	0,722	0,678	0,646	0,094	0,148	0,08	0,05	0,02
15	0,670	0,654	0,606	0,813	0,768	0,722	0,114	0,189	0,09	0,06	0,03
20	0,936	0,909	0,836	1,14	1,09	1,04	0,225	0,340	0,17	0,10	0,06
25	1,11	1,08	0,990	1,38	1,30	1,25	0,296	0,444	0,26	0,15	0,08
32	1,82	1,77	1,65	2,03	1,91	1,81	0,362	0,572	0,36	0,26	0,10
40	2,08	2,02	1,85	2,35	2,15	2,06	0,457	0,734	0,45	0,31	0,13
50	2,73	2,52	2,34	2,88	2,53	2,39	0,653	0,974	0,53	0,36	0,18
65	3,16[a]	3,05 [a]	2,76 [a]	3,51[a]	3,03 [a]	2,97 [a]	0,876	1,29	0,70	0,47	0,24
80	3,60	3,48	3,17	4,61	3,92	3,78	1,07	1,67	1,0	0,57	0,42
100	4,39	4,20	3,78	5,65	4,62	4,38	1,28	2,12	1,3	0,73	0,49
125	5,41	5,21	4,57	8,13	6,30	6,07	1,70	2,88	1,9	1,20	0,62
150	7,14	6,89	6,22	10,5	7,81	7,24	1,96	3,46	2,4	1,40	0,71
200	9,27	8,87	7,90	16,5	11,6	10,1	2,81	5,49	3,9	2,03	1,10
250	11,8	11,2	9,99	24,1	15,8	12,8	3,52	7,53	5,8	2,65	_
300	13,6	12,8	11,1	30,8	18,3	14,5	4,02	9,11	6,8	3,12	_
350	20,4	19,4	14,7	39,6	25,3	22,7	7,55	14,1	9,5	4,00	_
400	27,5	26,4	20,5	49,4	30,6	28,0	9,38	17,8	11,6	4,73	_
450	33,6	32,2	25,5	63,0	35,1	32,3	10,3	19,6	15,0	_	_
500	40,2	38,5	30,7	75,2	40,5	38,7	12,6	23,7	15,9	_	_
600	54,5	52,2	43,0	124	52,9	48,9	14,3	28,9	23,0	_	_
700		79,4	_	183	75,8	_	_	_	30,9	_	_
800		112	_	297	102	_	_	_	41,5	_	_
900	_	135	_	374	121	_	_	_	50,0	_	_
1 000	_	180	_	492	161	_	_	_	58,9	_	_
1 200	_	278	_	842	258	_	_	_	93,2	_	_
1 400	_	_	_	_	371	_	_	_	_	_	_
1 600	_	_	_	_	547	_	_	_	_	_	_
1 800	_	_	_	_	691	_	_	_	_	_	_
2 000	_	_	_	_	830	_	_	_	_	_	_
2 200	_	_	_	_	1 073	_	_	_	_	_	_
2 400	_	_	_	_	1 329	_	_	_	_	_	_
2 600	_	_	_	_	1 574	_	_	_	_	_	_
2 800	_	_	_	_	1 987	_	_	_	_	_	_
3 000	_	_	_	_	2 476	_	_	_	_	_	_

[a] With 8 bolt holes.

Table C.4 — Masses of flanges PN 16

Masses in kilograms

DN	Type 01	Type 02	Type 04	Type 05	Type 11	Type 12	Type 32	Type 34	Type 35	Type 36	Type 37
10	0,604	0,591	0,549	0,722	0,678	0,646	0,094	0,148	0,08	0,05	0,02
15	0,670	0,654	0,606	0,813	0,768	0,722	0,114	0,189	0,09	0,06	0,03
20	0,936	0,909	0,836	1,14	1,09	1,04	0,225	0,340	0,17	0,10	0,06
25	1,11	1,08	0,990	1,38	1,30	1,25	0,296	0,444	0,26	0,15	0,08
32	1,82	1,77	1,65	2,03	1,91	1,81	0,362	0,572	0,36	0,26	0,10
40	2,08	2,02	1,85	2,35	2,15	2,06	0,457	0,734	0,45	0,31	0,13
50	2,73	2,52	2,34	2,88	2,53	2,39	0,653	0,974	0,53	0,36	0,18
65	3,16[a]	3,05 [a]	2,76 [a]	3,51 [a]	3,03 [a]	2,97[a]	0,876	1,29	0,70	0,47	0,24
80	3,60	3,48	3,17	4,61	3,92	3,78	1,07	1,67	1,0	0,57	0,42
100	4,39	4,20	3,78	5,65	4,62	4,38	1,28	2,12	1,3	0,73	0,49
125	5,41	5,21	4,57	8,13	6,30	6,07	1,70	2,88	1,9	1,20	0,62
150	7,14	6,89	6,22	10,5	7,81	7,24	1,96	3,46	2,4	1,40	0,71
200	9,73	9,31	8,37	16,2	11,5	9,80	2,81	5,55	3,9	2,03	1,10
250	14,2	13,5	12,4	25,0	16,7	13,6	3,52	7,71	5,8	—	—
300	19,0	18,0	16,3	35,1	22,1	17,2	5,27	11,4	9,5	—	—
350	28,2	27,0	21,5	48,0	32,8	27,9	10,1	19,2	15,2	—	—
400	35,9	34,6	27,1	63,5	41,1	35,7	12,3	23,7	18,7	—	—
450	46,1	44,6	36,7	96,6	50,6	45,0	16,5	28,2	24,4	—	—
500	64,0	62,0	51,1	133	66,2	60,4	21,4	35,5	29,1	—	—
600	102	98,8	78,3	226	104	94,0	28,7	47,9	40,3	—	—
700	—	107	—	285	96,5	—	—	—	45,2	—	—
800	—	152	—	388	122	—	—	—	59,9	—	—
900	—	184	—	483	155	—	—	—	75,6	—	—
1 000	—	257	—	640	233	—	—	—	106,46	—	—
1 200	—	—	—	—	390	—	—	—	—	—	—
1 400	—	—	—	—	495	—	—	—	—	—	—
1 600	—	—	—	—	760	—	—	—	—	—	—
1 800	—	—	—	—	929	—	—	—	—	—	—
2 000	—	—	—	—	1 185	—	—	—	—	—	—

[a] With 8 bolt holes.

Table C.5 — Masses of flanges PN 25

Masses in kilograms

DN	Type 01	Type 02	Type 04	Type 05	Type 11	Type 12	Type 32	Type 34	Type 35
200	14,3	13,8	11,6	22,5	17,1	14,9	4,52	9,07	6,6
250	20,1	19,4	17,0	33,5	24,3	20,9	5,73	12,7	10,0
300	26,6	25,5	22,0	46,3	31,8	27,3	8,42	18,0	15,3
350	41,8	40,5	32,1	68,1	48,8	45,1	14,5	27,8	20,8
400	57,6	56,1	44,5	89,7	63,3	57,7	18,0	36,3	28,6
450	69,8	67,8	54,2	130	76,0	69,6	21,0	40,9	34,4
500	87,0	84,6	65,9	159	97,0	87,0	26,8	55,7	45,8
600	127	124	98,4	278	121	111	34,1	70,5	61,0
700		188	_	_	155	_	_	_	_
800		259	_	_	205	_	_	_	_
900	_	_	_	_	249	_	_	_	_
1 000			—	—	338	—	—	—	—

Table C.6 — Masses of flanges PN 40

Masses in kilograms

DN	Type 01	Type 02	Type 04	Type 05	Type 11	Type 12	Type 32	Type 34	Type 35
10	0,604	0,591	0,549	0,722	0,678	0,646	0,094	0,148	0,08
15	0,670	0,654	0,606	0,813	0,768	0,722	0,114	0,189	0,09
20	0,936	0,909	0,836	1,14	1,09	1,04	0,225	0,340	0,17
25	1,11	1,08	0,990	1,38	1,30	1,25	0,296	0,444	0,26
32	1,82	1,77	1,65	2,03	1,91	1,81	0,362	0,572	0,36
40	2,08	2,02	1,85	2,35	2,15	2,06	0,457	0,734	0,45
50	2,73	2,65	2,47	3,20	2,85	2,74	0,653	1,02	0,69
65	3,48	3,36	3,04	4,29	3,68	3,65	0,876	1,36	1,1
80	4,32	4,18	3,61	5,54	4,78	4,59	1,20	1,90	1,6
100	6,07	5,87	5,18	7,60	6,46	6,10	1,58	2,77	2,4
125	8,19	7,95	6,89	10,8	8,86	8,22	2,08	3,78	3,2
150	10,3	9,97	8,69	14,6	11,7	10,6	2,73	5,25	4,6
200	17,9	17,4	14,9	28,8	21,0	18,3	5,55	10,2	8,8
250	29,3	28,4	23,8	44,4	34,2	28,3	7,87	16,4	14,4
300	45,1	43,6	36,0	64,2	47,6	40,4	12,8	25,4	20,7
350	66,7	64,9	50,4	89,5	69,3	58,8	19,3	37,8	30,7
400	97,1	95,1	75,5	127	98	82,1	30,4	56,4	45,4
450	—	—	—	154	105	86,2	28,4	56,4	—
500	_	—	—	188	130	105	35,3	72,9	—
600	—	—	—	331	209	172	53,3	106,000	—

Table C.7 — Masses of flanges PN 63

Masses in kilograms

DN	Type 01	Type 05	Type 11	Type 12
50	4,99	4,52	4,51	4,20
65	4,73	5,69	5,58	5,30
80	5,90	6,89	6,68	6,25
100	8,05	10,0	9,27	8,81
125	11,7	15,9	14,5	13,6
150	16,9	23,3	21,4	19,5
200	30,5	39,2	34,1	
250	42,1	56,7	48,3	
300	59,1	81,2	67,5	_
350	88,7	113	97,8	_
400	121	152	129	

Table C.8 — Masses of flanges PN 100

Masses in kilograms

DN	Type 01	Type 05	Type 11	Type 12
10	1,00	1,04	1,09	1,07
15	1,10	1,16	1,20	1,17
20	1,86	1,97	2,02	1,96
25	2,37	2,54	2,63	2,49
32	2,79	3,07	3,20	2,95
40	3,58	3,97	4,07	3,80
50	4,99	5,64	5,82	5,28
65	6,33	7,44	7,57	6,84
80	7,72	8,85	8,82	7,94
100	10,3	13,3	13,1	11,5
125	17,2	21,3	21,0	17,9
150	23,6	29,4	28,3	23,8
200	42,9	52,7	50,2	—
250	69,0	85,4	81,4	—
300	104	128	118	—
350	150	175	169	—
400	—	—	—	—
500	—	—	—	—

Table C.9 — Masses of flanges PN 160

Masses in kilograms

DN	Type 11
10	1,10
15	1,20
25	2,64
40	4,42
50	6,38
65	8,75
80	10,3
100	15,3
125	24,4
150	34,4
200	60,7
250	97,6
300	140

Table C.10 — Masses of flanges PN 250

Masses in kilograms

DN	Type 11
10	—
15	2,51
25	3,58
40	6,72
50	8,22
65	12,8
80	16,5
100	27,2
125	39,0
150	59,6
200	110
250	190
300	—

Table C.11 — Masses of flanges PN 320

Masses in kilograms

DN	Type 11
10	2,14
15	2,53
25	5,18
40	8,65
50	10,7
65	19,5
80	25,2
100	42,5
125	63,6
150	91,5
200	172
250	312

Table C.12 — Masses of flanges PN 400

Masses in kilograms

DN	Type 11
10	2,55
15	3,62
25	7,45
40	14,1
50	16,7
65	31,6
80	38,4
100	67,3
125	94,5
150	145
200	270