

FLANGE TABLES

HEATING & VENTILATING INDUSTRY - BS10 & BS1560 (ANSI B16.5)

	BS10 Table D					BS10 Table E					BS10 Table F				
In	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts
	Dia. In	Thick In	PCD In	No. of Holes		Dia. In	Thick In	PCD In	No. of Holes		Dia. In	Thick In	PCD In	No. of Holes	
1/2	3 3/4	3/16	2 5/8	4	M12.25	3 3/4	1/4	2 5/8	4	M12.30	3 3/4	3/8	2 5/8	4	M12.40
3/4	4	3/16	2 7/8	4	M12.25	4	1/4	2 7/8	4	M12.30	4	3/8	2 7/8	4	M12.40
1	4 1/2	3/16	3 1/4	4	M12.25	4 1/2	9/32	3 1/4	4	M12.30	4 3/4	3/8	3 7/16	4	M16.45
11/4	4 3/4	1/4	3 7/16	4	M12.30	4 3/4	5/16	3 7/16	4	M12.40	5 1/4	1/2	3 7/8	4	M16.45
11/2	5 1/4	1/4	3 7/8	4	M12.30	5 1/4	11/32	3 7/8	4	M12.40	5 1/2	1/2	4 1/8	4	M16.50
2	6	5/16	4 1/2	4	M16.40	6	3/8	4 1/2	4	M16.45	6 1/2	5/8	5	4	M16.55
21/2	6 1/2	5/16	5	4	M16.40	6 1/2	13/32	5	4	M16.45	7 1/4	5/8	5 3/4	8	M16.55
3	7 1/4	3/8	5 3/4	4	M16.45	7 1/4	7/16	5 3/4	4	M16.45	8	5/8	6 1/2	8	M16.55
4	8 1/2	3/8	7	4	M16.45	8 1/2	1/2	7	8	M16.50	9	3/4	7 1/2	8	M16.65
5	10	1/2	8 1/4	8	M16.50	10	9/16	8 1/4	8	M16.50	11	7/8	9 1/4	8	M20.70
6	11	1/2	9 1/4	8	M16.50	11	11/16	9 1/4	8	M20.65	12	7/8	10 1/4	12	M20.70
7	12	1/2	10 1/4	8	M16.50	12	3/4	10 1/4	8	M20.65	13 1/4	7/8	11 1/2	12	M20.70
8	13 1/4	1/2	11 1/2	8	M16.50	13 3/4	3/4	11 1/2	8	M20.65	14 1/2	1	12 3/4	12	M20.75
9	14 1/2	5/8	12 3/4	8	M16.55	14 1/2	13/16	12 3/4	12	M20.70	16	1 1/8	14	12	M22.80
10	16	5/8	14	8	M20.55	16	7/8	14	12	M20.70	17	1 1/8	15	12	M22.80
12	18	3/4	16	12	M20.65	18	1	16	12	M22.80	19 1/4	1 1/4	17 1/4	16	M22.90
14	20 3/4	7/8	18 1/2	12	M22.70	20 3/4	1 1/8	18 1/2	12	M22.80	21 3/4	1 3/8	19 1/2	16	M24.100
15	21 3/4	7/8	19 1/2	12	M22.70	21 3/4	1 1/4	19 1/2	12	M22.90	22 3/4	1 1/2	20 1/2	16	M24.105
16	22 3/4	7/8	20 1/2	12	M22.70	22 3/4	1 1/4	20 1/2	12	M22.90	24	1 5/8	21 3/4	20	M24.110
18	25 1/4	1	23	12	M22.75	25 1/4	1 3/8	23	16	M22.100	26 1/2	1 3/4	24	20	M27.120
20	27 3/4	1 1/8	25 1/4	16	M22.80	27 3/4	1 1/2	25 1/4	16	M22.105	29	2	26 1/2	24	M27.130
24	32 1/2	1 1/4	29 3/4	16	M24.90	32 1/2	1 7/8	29 3/4	16	M27.120	33 1/2	2 1/4	30 3/4	24	M30.150

	BS10 Table H					BS1560 (ANSI B16.5) - Class 150					BS1560 (ANSI B16.5) - Class 300				
In	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts
	Dia. In	Thick In	PCD In	No. of Holes		Dia. In	Thick In	PCD In	No. of Holes		Dia. In	Thick In	PCD In	No. of Holes	
1/2	4 1/2	1/2	3 1/4	4	M16.50	3 1/2	7/16	2 3/8	4	M12.45	3 3/4	9/16	2 5/8	4	M12.50
3/4	4 1/2	1/2	3 1/4	4	M16.50	3 7/8	1/2	2 3/4	4	M12.50	4 5/8	5/8	3 1/4	4	M16.65
1	4 3/4	9/16	3 7/16	4	M16.50	4 1/4	9/16	3 1/8	4	M12.50	4 7/8	11/16	3 1/2	4	M16.65
11/4	5 1/4	11/16	3 7/8	4	M16.55	4 5/8	5/8	3 1/2	4	M12.55	5 1/4	3/4	3 7/8	4	M16.70
11/2	5 1/2	11/16	4 1/8	4	M16.55	5	11/16	3 7/8	4	M12.55	6 1/8	13/16	4 1/2	4	M20.75
2	6 1/2	3/4	5	4	M16.55	6	3/4	4 3/4	4	M16.70	6 1/2	7/8	5	8	M16.75
21/2	7 1/4	3/4	5 3/4	8	M16.65	7	7/8	5 1/2	4	M16.75	7 1/2	1	5 7/8	8	M20.80
3	8	7/8	6 1/2	8	M16.70	7 1/2	15/16	6	4	M16.75	8 1/4	1 1/8	6 5/8	8	M20.90
4	9	1	7 1/2	8	M16.75	9	15/16	7 1/2	8	M16.75	10	1 1/4	7 7/8	8	M20.95
5	11	1 1/8	9 1/4	8	M20.80	10	15/16	8 1/22	8	M20.80	11	1 3/8	9 1/4	8	M20.100
6	12	1 1/8	10 1/4	12	M20.80	11	1	9 1/2	8	M20.80	12 1/2	1 7/16	10 5/8	12	M20.105
7	13 1/4	1 1/4	11 1/2	12	M20.90	-	-	-	-	-	-	-	-	-	-
8	14 1/2	1 1/4	12 3/8	12	M20.90	13 1/2	1 1/8	11 3/4	8	M20.90	15	1 5/8	13	12	M22.105
9	16	1 3/8	14	12	M22.100	-	-	-	-	-	-	-	-	-	-
10	17	1 3/8	15	12	M22.100	16	1 3/16	14 1/4	12	M22.95	17 1/2	1 7/8	15 1/4	16	M24.120
12	19 1/4	1 5/8	17 1/4	16	M22.105	19	1 1/4	17	12	M22.100	20 1/2	2	17 3/4	16	M27.130
14	21 3/4	1 7/8	19 1/2	16	M24.120	21	1 3/8	18 3/4	12	M24.105	23	2 1/8	20 1/4	20	M27.140
15	22 3/4	2	20 1/2	16	M24.130	-	-	-	-	-	-	-	-	-	-
16	24	2 1/8	21 3/4	20	M24.140	23 1/2	1 7/16	21 1/4	16	M24.105	25 1/2	2 1/4	22 1/2	20	M30.150
18	26 1/2	2 3/8	24	20	M27.150	25	1 9/16	22 3/4	16	M27.110	28	2 3/8	24 3/4	24	M30.150
20	29	2 5/8	26 1/2	24	M27.170	27 1/2	1 11/16	25	20	M27.120	30 1/2	2 1/2	27	24	M30.160
24	33 1/2	3	30 3/4	24	M30.200	32	1 7/8	29 1/2	20	M30.120	36	2 3/4	32	24	M36.180

Temperature (°C) Pressure Ratings						
Temperature	BS10 Imperial PSI				BS1560 (ANSI B16.5) PSI	
	D	E	F	H	150	300
-10°C to 100°C	100	200	300	500	240	700
200°C	100	200	300	500	180	655
250°C	95	185	280	465	-	-
300°C	80	155	235	395	130	555
350°C	65	130	195	320	-	-
400°C	50	100	150	250	100	425

- Bolt lengths are approximate for flange - flange duty assuming one 1/16" gasket and one bolt washer
- Flange thicknesses shown are the greater thickness for that rating
- BS10 are available as forged bossed or flat plate flanges as standard
- BS1560 (ANSI B16.5) are normally forged flanges
- BS4504 (metric) are available as forged, bossed or plate flanges as standard

FLANGE TABLES

HEATING AND VENTILATING INDUSTRY - BS4504

Flange Tables

NOMINAL BORE	BS4504 - Table 6					BS4504 - Table 10					BS4504 - Table 16				
	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts
	Dia. mm	Thick mm	PCD mm	No. of Holes		Dia. mm	Thick mm	PCD mm	No. of Holes		Dia. mm	Thick mm	PCD mm	No. of Holes	
15	80	12	55	4	M10.45	95	14	65	4	M12.50	95	14	65	4	M12.50
20	90	14	65	4	M10.50	105	16	75	4	M12.55	105	16	75	4	M12.55
25	100	14	75	4	M10.50	115	16	85	4	M12.55	115	16	85	4	M12.55
32	120	16	90	4	M12.55	140	16	100	4	M16.55	140	16	100	4	M16.55
40	130	16	100	4	M12.55	150	16	110	4	M16.55	150	16	110	4	M16.55
50	140	16	110	4	M12.55	165	18	125	4	M16.65	165	18	125	4	M16.65
65	160	16	130	4	M12.55	185	18	145	4	M16.65	185	18	145	4	M16.65
80	190	18	150	4	M16.65	200	20	160	8	M16.70	200	20	160	8	M16.70
100	210	18	170	4	M16.65	220	20	180	8	M16.70	220	20	180	8	M16.70
125	240	20	200	8	M16.70	250	22	210	8	M16.70	250	22	210	8	M16.70
150	265	20	225	8	M16.70	285	22	240	8	M20.70	285	22	240	8	M20.70
175	-	-	-	-	-	315	24	270	8	M20.75	315	24	270	8	M20.75
200	320	22	280	8	M16.70	340	24	295	8	M20.75	340	24	295	12	M20.75
250	375	24	335	12	M16.70	395	26	350	12	M20.80	405	26	355	12	M24.80
300	440	24	395	12	M20.70	445	26	400	12	M20.80	460	28	410	12	M24.80
350	490	26	445	12	M20.80	505	28	460	16	M20.80	520	32	470	16	M24.90
400	540	28	495	16	M20.80	565	32	515	16	M24.90	580	36	525	16	M27.100
450	595	30	550	16	M20.90	615	36	565	20	M24.105	640	40	585	20	M27.120
500	645	30	600	20	M20.90	670	38	620	20	M24.105	715	44	650	20	M30.125
600	755	32	705	20	M24.90	780	42	725	20	M27.120	840	52	770	20	M33.140

NOMINAL BORE	BS4504 - Table 25					BS4504 - Table 40					BS4504 - Table 64				
	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts	Flange Dimensions				Dia. & Length of Bolts
	Dia. mm	Thick mm	PCD mm	No. of Holes		Dia. mm	Thick mm	PCD mm	No. of Holes		Dia. mm	Thick mm	PCD mm	No. of Holes	
15	95	16	65	4	M12.55	95	16	65	4	M12.55	105	20	75	4	M12.70
20	105	18	75	4	M12.65	105	18	75	4	M12.65	130	22	90	4	M16.70
25	115	18	85	4	M12.65	115	18	85	4	M12.65	140	24	100	4	M16.75
32	140	18	100	4	M16.65	140	18	100	4	M16.65	155	24	110	4	M20.75
40	150	20	110	4	M16.70	150	20	110	4	M16.70	170	26	125	4	M20.80
50	165	20	125	4	M16.70	165	20	125	4	M16.70	180	26	135	4	M20.80
65	185	22	145	8	M16.70	185	22	145	8	M16.70	205	26	160	8	M20.80
80	200	24	160	8	M16.75	200	24	160	8	M16.75	215	30	170	8	M20.90
100	235	26	190	8	M20.80	235	26	190	8	M20.80	250	32	200	8	M24.90
125	270	28	220	8	M24.80	270	28	220	8	M24.80	295	34	240	8	M27.100
150	300	30	250	8	M24.90	300	30	250	8	M24.90	345	36	280	8	M30.105
175	330	28	280	12	M24.80	350	32	295	12	M27.90	375	40	310	12	M30.120
200	360	30	310	12	M24.90	375	34	320	12	M27.90	415	46	345	12	M33.130
250	425	40	370	12	M27.90	450	42	385	12	M30.120	470	54	400	12	M33.150
300	485	38	430	16	M27.110	515	50	450	16	M30.140	530	62	460	16	M33.160
350	555	42	490	16	M30.125	580	55	510	16	M33.150	600	72	525	16	M39.180
400	620	46	550	16	M33.140	660	64	585	16	M36.160	670	78	585	16	M39.200
450	670	52	600	20	M33.140	685	68	610	20	M36.170	-	-	-	-	-
500	730	58	660	20	M33.155	755	72	670	20	M39.180	-	-	-	-	-
600	845	66	770	20	M36.165	-	-	-	-	-	-	-	-	-	-

Hex Round Hex (HRH) Bolts to BS4190			
Standard Bolt Sizes			
1/2"	M12	1"	M24
5/8"	M16	1 1/4"	M30
3/4"	M20		

Metric BS4504 Specification Standard Flange Types		
	Old Specification	New Specification
Weld Neck	2	111
Slip-on Plate	3	101
Screwed Bossed	4	113
Slip-on Bossed	5	112
Blank Plate	8	105
Example: 100mm BS4504 Table 16		

Temperature	Temperature (°C) Pressure Ratings					
	BS4504 Metric Bar					
	6	10	16	25	40	64
-10°C to 100°C	6	10	16	25	40	64
200°C	4.8	8	12.8	20	32	50
250°C	4.2	7	11.2	17.5	28	45
300°C	3.6	6	9.5	15	24	40
350°C	-	-	-	-	-	-
400°C	-	-	-	-	-	-

FLANGE TABLES

WATER & CONSTRUCTION INDUSTRIES

FWB Stocks pre-packed flange sets comprising EPDM gaskets supplied with bolts and nuts in a variety of coatings: Rilsan, Sheraplex, Zinc-Plated, Galvanised or Self-Colour.

• Bolt lengths are approximate • Table dimensions are designed to connect ductile iron flange to ductile iron flange using 3mm gasket.

NOMINAL SIZE		PN16 Flanges							
	DN	O/D of Flange mm	Total Flange Thickness mm	Flange Thickness Exc. Raised Face mm	Bolt Hole Details			Bolt Size*	
					PCD mm	No.	Dia. mm	Dia.	Length mm
	80	200	19.0	16.0	160	8	19	M16	65
	100	220	19.0	16.0	180	8	19	M16	65
	150	285	19.0	16.0	240	8	23	M20	70
	200	340	20.0	17.0	295	12	23	M20	70
	250	400	22.0	19.0	355	12	28	M24	90
	300	455	24.5	20.5	410	12	28	M24	90
	350	520	26.5	22.5	470	16	28	M24	90
400	580	28.0	24.0	525	16	31	M27	100	
450	640	30.0	26.0	585	20	31	M27	100	
500	715	31.5	27.5	650	20	34	M30	110	
600	840	36.0	31.0	770	20	37	M33	120	

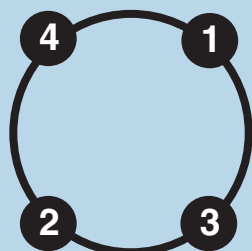
* Mild Steel Grade 4.6 BS4190

NOMINAL SIZE		PN16 Flanged Joints - Approx. Bolting Torques using 3mm Thick 80 IRHD Rubber Gaskets			
	DN	Approx. Bolting Torque Nm			
		To Seal @ 10 Bar	To Seal @ 16 Bar	To Seal @ 10 Bar*	To Seal @ 25 Bar*
	80	70	70	75	75
	100	75	80	80	80
	150	115	120	125	135
	200	110	115	120	130
	250	155	165	175	180
	300	165	180	190	210
	350	160	175	185	200
	400	200	220	235	270
	450	195	215	230	260
500	240	270	295	345	
600	305	365	425	505	

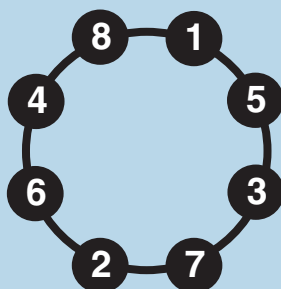
* NOTE: The need to seal a flanged joint at pressures greater than the flange PN rating is only for site hydrostatic test purposes. Flanged joints should not be operated at these higher values.

Spanner Sizes for Bolts and Nuts Used with Flanged Joints						
Bolt Sizes mm	M16	M20	M24	M27	M30	M33
Spanner Size (mm across flats)	24	30	36	41	46	50

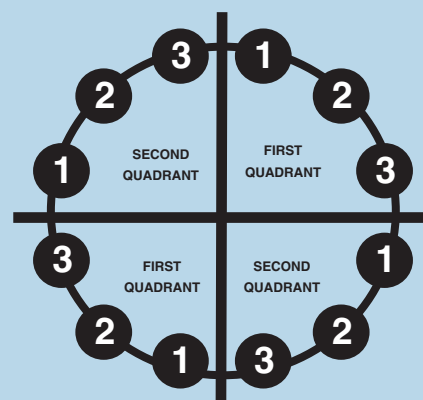
Bolt Tightening Sequence



4 Bolts



8 Bolts



12 Bolts or More