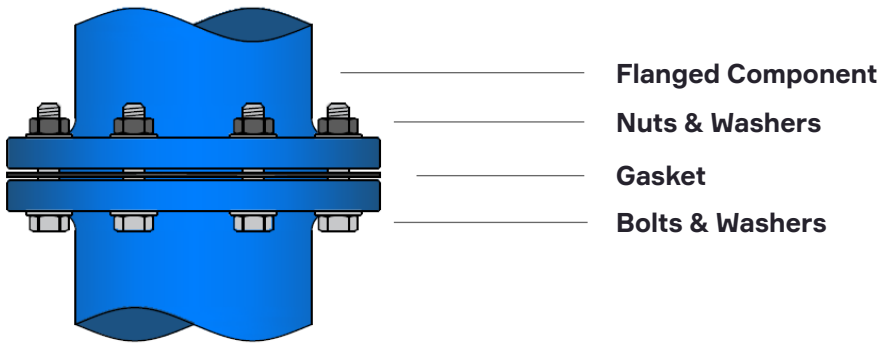


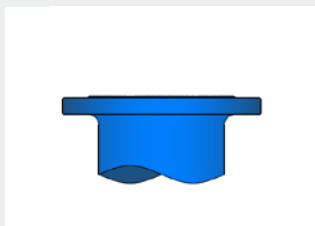
FLANGE ASSEMBLY

FLANGE TO FLANGE ASSEMBLY COMPONENTS



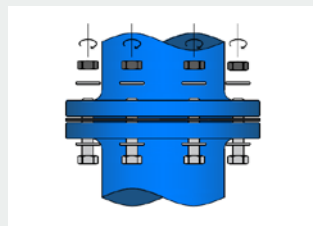
STEP 1.

Ensure flange faces are clean with no score marks or debris that could affect sealing. Place the gasket on the flange and ensure the holes are evenly aligned.



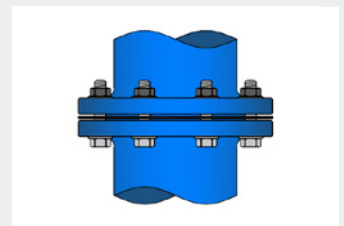
STEP 2.

Align the flanges and gasket evenly. Insert the bolts and washers through the flanges and gasket. Place a washer and nut on each bolt from the other side. Ensure all bolting is clean. Insert 4 bolt sets at approximately 90 degrees apart and finger tighten and ensure correct alignment of flanged joint. Once aligned, insert remaining bolting and finger tighten.

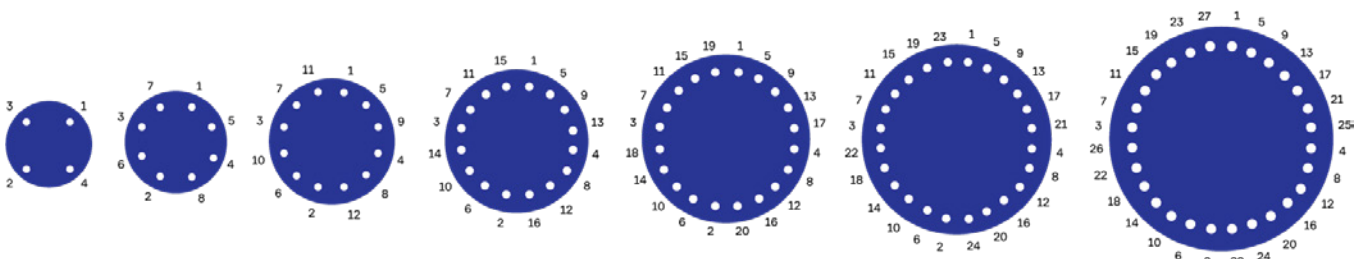


STEP 3.

Tighten the nuts and bolts as per the standard tightening sequence (refer to the diagrams below). Recommended tightening in four steps 20%, 50%, 75% & 100% of recommended tightening torque.



TYPICAL FLANGE BOLT TIGHTENING SEQUENCE



ESTIMATED TIGHTENING TORQUE VALUES STANDARD PRESSURE FLANGES AS 4087 FIGURE B5 PN16

NOMINAL SIZE (DN)	BOLT SIZE	NUMBER OF BOLTS	SUGGESTED LENGTH OF BOLTS (mm)	BOLT TENSION (kN)	ESTIMATED TORQUES (Nm)		
					LIGHTLY OILED "GSB"	WELL LUBRICATED "GSB"	WELL LUBRICATED "SSB"
80	M16	4	65	20	70	40	65
100	M16	4	75	20	70	55	65
150	M16	8	75	20	70	40	65
200	M16	8	75	20	70	55	65
225	M16	8	75	25	90	60	80
250	M20	8	90	35	160	85	140
300	M20	12	100	35	160	85	140
375	M24	12	100	50	270	150	240
450	M24	12	120	55	290	190	270
500	M24	16	120	55	290	185	270
600	M27	16	130	70	420	270	380
750	M30	20	140	80	530	360	480

Grade 4.6 galvanised steel bolts (GSB) and nuts or Grade 316 Class 50 stainless steel bolts (SSB) and nuts with full face gasket - 3mm EPDM gasket

ESTIMATED TIGHTENING TORQUE VALUES HIGH PRESSURE FLANGES AS 4087 FIGURE B6 PN35

NOMINAL SIZE (DN)	BOLT SIZE	NUMBER OF BOLTS	SUGGESTED LENGTH OF STUDS (mm)	STUD TENSION (kN)	ESTIMATED TORQUES (Nm)		
					LIGHTLY OILED "GSS"	WELL LUBRICATED "GSS"	WELL LUBRICATED "SSS"
80	M16	8	110	50	180	70	70
100	M16	8	110	50	180	70	70
150	M20	12	130	80	350	70	70
200	M20	12	130	80	350	70	70
225	M24	12	150	115	610	90	90
250	M24	12	150	115	610	160	160
300	M24	16	150	115	610	160	160
375	M27	16	170	150	900	270	270
450	M30	20	190	180	1190	290	290
500	M30	24	190	180	1190	290	290
600	M33	24	210	230	1670	420	420
750	M33	28	210	230	1670	530	530

Grade 8.8 galvanised steel studs (GSS) and nuts or Grade 316 Class 70 stainless steel studs (SSS) and nuts with full face gasket - 1.5mm fibre gasket

NOTES

- The above assembly torques are based on ductile iron flange to flange jointing.
- "Lightly oiled" Refers to the application of a good quality lubricating oil and is the usual as received condition of fasteners.
- "Well lubricated" Refers to the application of molybdenum disulphide grease or Loctite 771 equivalent antiseize compound.
- Recommended tightening in four steps 20%, 50%, 75% & 100% of recommended tightening torque.
- These guidelines are also applicable for dismantling joint and adaptable flange fittings during flange to flange jointing.
- The above tables are based on requirements of WSA-109. Refer to WSA-109 for additional requirements.