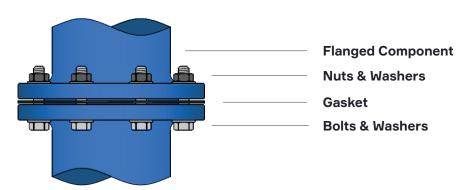
FLANGE ASSEMBLY



FLANGE TO FLANGE ASSEMBLY COMPONENTS



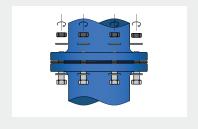
STEP 1.

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.

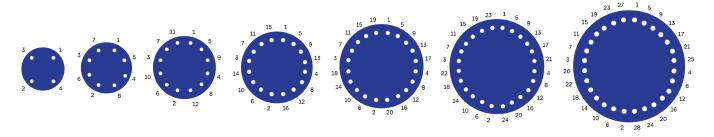


STEP 3.

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

| | | | | | ESTIMATED TORQUES (Nm) | | |
|----------------------|--------------|--------------------|--------------------------------------|---------------------|------------------------|-----------------------|-----------------------|
| NOMINAL SIZE (DN) | BOLT SIZE | NUMBER OF BOLTS | SUGGESTED LENGTH OF BOLTS (mm) | BOLTTENSION (kN) | 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

| | | | | | ESTIMATED TORQUES (Nm) | | |
|----------------------|--------------|--------------------|--------------------------------------|----------------------|------------------------|-----------------------|-----------------------|
| NOMINAL SIZE (DN) | BOLT SIZE | NUMBER OF BOLTS | SUGGESTED LENGTH OF STUDS (mm) | STUD TENSION (kN) | 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 |

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

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.