

8.2.2 Flange joints

Connections to such components as pumps or valves are normally made by means of flange joints. The elements of the flange joint used in plastic pipe construction are the stub flange, backing ring, gasket and bolts with washers (possibly lock washers) and hex nuts. Flange joints can be either backing ring connections or blind flange joints. A blind flange joint is usually used to seal the end of a pipe. The fixed flange variant is generally ruled out due to higher costs. A backing ring connection is, in most cases, the substantially less expensive variant whenever a direct comparison is made, and therefore fixed flange joints are only of limited significance in the choice of flange joints.

The backing rings used as connecting elements in the plastic pipe construction are constructed from metal materials (e.g. steel, aluminium), fibre glass reinforced plastic or a combination of plastic and metal. The ease of assembly involved in their use and especially the higher operating reliability give backing ring connections definite advantages over fixed flange joints.

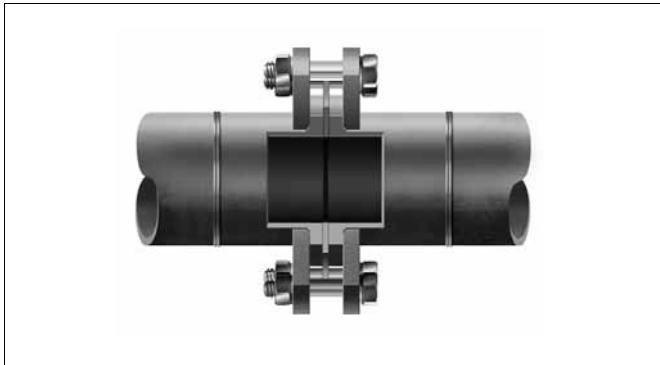


Figure 8.2 Flange joint

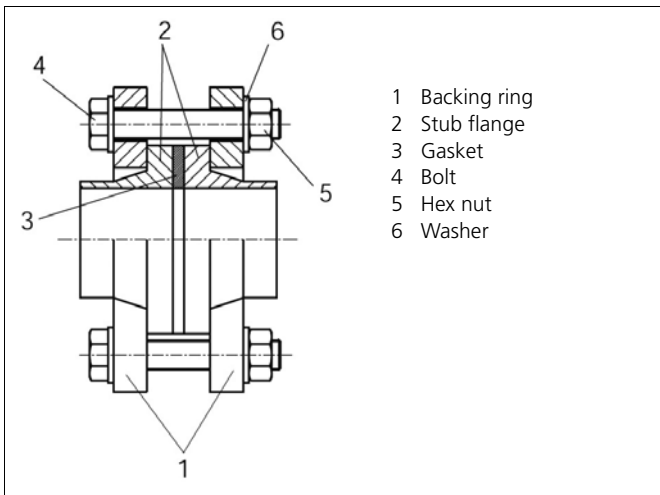


Figure 8.3 Cross-section of a flange joint

The gasket, nearly always in the form of a flat ring gasket, is available in various material and material qualities. Use is often made of gaskets composed of elastomers or elastomer compounds, such as neoprene, hypalon or viton. Hard gaskets have proven to be less suited or even unsuitable on account of their limited formability. The use of elastomer flat gaskets without steel inlays frequently results in leakage at higher internal pressures (e.g. during pressure testing). It is therefore recommended for use to be made of armoured gaskets with a convex cross-section. Their use is especially advisable when the internal pressure (operating pressure) comes close to the pipe's pressure rating.

An additional improvement in the level of sealing is obtained when the inside of the gasket has the form of an O-ring. O-rings, double chamber gaskets, etc. are to be used in cases involving high internal pressures, especially when vacuums are involved as well. Gasket sizes are to be chosen so that the inside pipe diameter is not reduced by any excess gasket material, or that fissures can occur allowing fluid to penetrate the seal (with risk of sedimentation in the fissure!). During assembly, care must also be taken to ensure that the bolts are tightened evenly and the gasket and sealing surfaces are clean. Table 8.1 shows the standard values for the bolt torques in flange joints.

Standard bolt torques in flange joints of thermoplastic pipes (DVS 2210 Part 1)

d _e (mm)	DN (mm)	Bolt tightening torque (Nm)		
		Flat ring gasket (p _{acc} ≤ 10 bar)	Profile gasket (p _{acc} ≤ 16 bar)	O-ring gasket (p _{acc} ≤ 16 bar)
20	15	15	10	10
25	20	15	15	15
32	25	15	15	15
40	32	20	15	15
50	40	30	15	15
63	50	35	20	20
75	65	40	20	20
90	80	40	20	20
110	100	40	20	20
125	100	40	20	20
140	125	50	30	30
160	150	60	40	35
180	150	60	40	35
200	200	70 ⁽¹⁾	50	40
225	200	70 ⁽¹⁾	50	40
250	250	80 ⁽¹⁾	55	50
280	250	80 ⁽¹⁾	55	50
315	300	100 ⁽¹⁾	60	55
355	350	100 ⁽¹⁾	70	60
400	400	120 ⁽¹⁾	80	65
450	500	190 ⁽¹⁾	90	70
500	500	190 ⁽¹⁾	90	70
560	600	220 ⁽¹⁾	100	80
630	600	220 ⁽¹⁾	100	80

⁽¹⁾ for p_{acc} ≤ 6 bar

Table 8.1 Bolt tightening torques for flat, profile and O-ring gaskets