Mechanical joints on plastic piping

Flanges

Flanges are available for all plastic piping systems. They are particularly useful for a number of applications, including:-

- temporary or de-mountable installations
- for connections between dissimilar materials
- for connection to flanged equipment such as tanks or pumps and valves
- when installation conditions will not allow other jointing methods

Installing Flanges

When installing flanges, care should be taken to ensure that the alignment and fit of the pipe spool is accurate so as to eliminate stress. Flange connections must never be used to adjust or correct misalignment in any piping system. In addition, checks should be made to ensure that there is dimensional compatibility between mating flanges, particularly if dissimilar materials are being joined. Before the bolts are tightened, the flange faces to be assembled should be aligned parallel to each other. There should be a sufficient gap to allow the gasket to be inserted, but the gap should not be excessive as the forces created by tightening the bolts could cause undue stress in the flange.

Take care to choose the correct bolt length, ensuring that the screw thread will finish flush with the nut after tightening. Washers should be used on both the nut and the bolt to prevent damage to the flange, and the threads should be lubricated to permit easy running during assembly. All bolts should initially be hand tightened before being fully tightened. The preferred method for tightening the flange bolts is to use a torque wrench set to the correct value for the flange type that is being used. Bolts are then tightened gradually and diametrically, until the joining force is uniform across the entire sealing area. The following diagram shows the correct sequence for tightening flange bolts.

Bolt Tightening Sequence

Suggested Bolt Torques

Flange Nominal Diameter		Torque (ft/lb)
1/2" - 11/2"	12mm - 40mm	10 -15
2" - 4"	50mm - 100mm	20 - 30
6" - 8"	150mm - 200mm	33 - 50
10"	250mm	53 - 75
12"	300mm	80 - 110

Points to remember with flanges:

- Ensure that the required working pressure of the system is not compromised because of a flange pressure rating that is lower than the rest of the piping
- The use of backing rings or flanges with high pressure drillings can only be permitted if the safe working limit of the system is not exceeded
- Do not over-tighten bolts
- Use washers on both flanges to be connected
- Never use a flange to correct misalignment between pipes
- Tighten bolts following the correct sequence until uniformly tight

Mechanical joints on plastic piping

Gaskets

Select the correct flange gasket material to suit the fluid being handled, as well as the operating temperature and pressure. Common materials include EPDM and FPM elastomers. These are available as both stub flange and full face type gaskets. Special versions of expanded PTFE gaskets are also available for use with thermoplastic flanges. Ideally suited to aggressive chemicals, high temperatures and especially high purity applications, these new gaskets have helped in providing effective sealing solutions in highly demanding applications.

Full face gaskets are designed to match the bolt pattern of the flange, and are available in all flange patterns and types. The bolt holes in the gasket can be an aid to installation, as they help locate the gasket securely and accurately in the sealing area. Stub flange gaskets are intended to fit across the "inner bolt circle diameter" of the flange, and care should be exercised to ensure that the gasket is correctly dimensioned to suit the flange pattern being used.