

# Installing plastic pipes

## Basic principles of heat fusion welding



Polypropylene, Polyethylene, PVDF and ECTFE piping systems may not be joined together using solvent cements or adhesives. The welding process requires a heat source to melt the surfaces of the items to be joined together. Once melted, the items are brought together under pressure and the subsequent cooling bonds the material together with a joint equal to or exceeding the strength of the pipe itself.

There are three methods of joining in common use: socket fusion welding, butt fusion welding and electro-fusion welding. For applications handling high purity fluids, infra-red (IR) fusion welding is an additional method that involves no direct contact between the surfaces to be joined and the heat source.

Socket fusion welding uses pipes and socket ended fittings. Heating takes place by contact with a heating socket and bush, then the items are brought together either by hand or mechanically. The welding machines may be hand held or bench mounted. This method is ideal for small size piping in sizes up to 63mm, but may be used for sizes up to 110mm.

Butt fusion welding uses pipes and spigot ended fittings. Heating takes place by contact with a flat heater plate before the items are brought together mechanically. There are no hand held tools for this process - all butt-welding machines are either bench mounted or suitable for field installation. Butt fusion welding is an economical method of joining, and may be used in all sizes, giving reliable results.

Infra-red (IR) fusion welding is based on the butt-welding method described above, except that there is no contact between the surfaces to be joined and the heater plate. This minimises the risk of contamination for high purity applications.

Electro-fusion welding also uses pipes and spigot ended fittings, however the heat source for the fusion is provided by an external socket that contains wires that are energised to generate heat to melt the materials. This method is especially useful for complex piping layouts in confined spaces, or when joining is needed in a remote location, where the use of other welding equipment may be difficult because of access or weight. Electro-fusion couplings are available in sizes from 20mm to 450mm (depending on the material).

