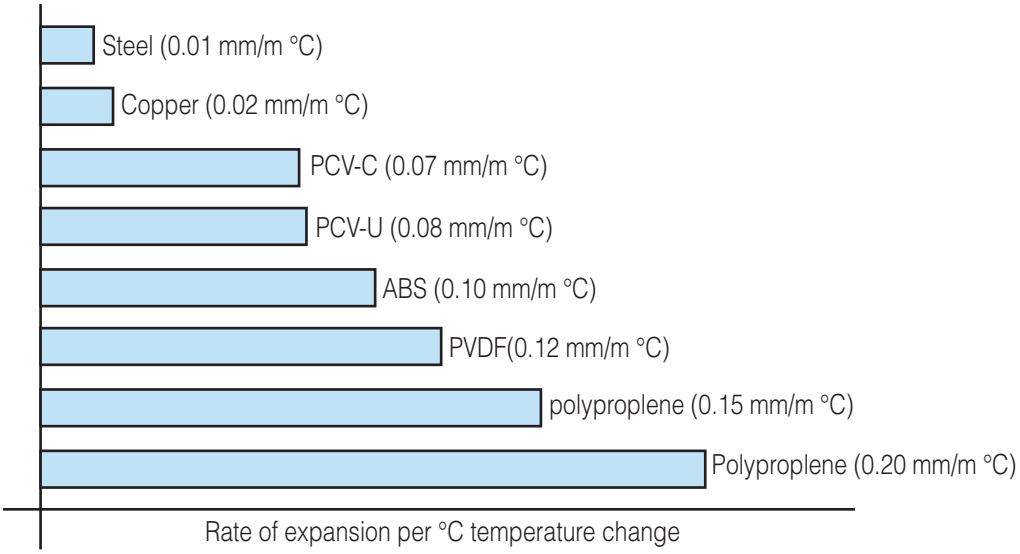
Thermal expansion and contraction

Plastic piping is subject to thermal expansion and contraction that is several times of steel. Then installed above ground and subjected to varying temperatures, this movement to be allowed for so that stress on the material and unsightly of the pipe work can be avoided.

Comparison of thermal expansion rates by material



Generally, when installing plastic piping systems that have pipe runs that exceed 30 meters and a temperature variation of over 17°C, then provision should be made for thermal expansion or contraction. The temperature at the time of installation should also be considered. A system may run indoors with, for example, an ambient and fluid temperature ranging from 18° C to 24°C, however if it was installed in winter during the construction of the building when ambient temperatures were less than 5°C, then a temperature change of at least 19°C needs to be considered.

Although plastic have the capacity to absorb some of the stresses that may be placed on the system, expansion and contraction can create problems if it is not adequately planned for, Some examples of more critical situations include:
When pipe contraction can result in the pull-out of the pipe from a mechanical fitting; when movement can create excessive thrust or bending moment on fittings; when repeat movement on the same point can induce stress fatigue; or when pipe expansion creates excessive sagging.

Therefore, once calculated, provision for thermal movement must be incorporated into the system. In many cases, changes, with the help of minimum straight lengths, if this not possible, compensation or expansion loops will need to be incorporated into of minimum design. Mechanical compensators, such as bellows or piston-type expansion joints may also be considered.