

Water supply pipe operating temperatures

Polyethylene is a thermoplastic material and the strength of the material changes with excessive temperature changes. The documented design operating pressures are quoted for the pipe strength at 20°C.

In the UK the normal ground temperature is not expected to exceed 10°C all year round, and with the material design temperature being 20°C, no consideration of the effect of temperature on hoop strength (i.e. operating pressure) is required. The pipe will remain flexible and the maximum operating pressure rating is unaffected.

It is only where the pipe is installed in ducts, tunnels or warmer climates where consideration of the thermal effects is required. Where the operating temperature of the pipe is above 20°C for sustained periods, then the maximum pressure rating of the pipeline must be reduced if a 50 year minimum life expectancy is to be maintained.

The table below details the corrected pressure ratings for Polyethylene pipes operated at elevated temperatures above 20°C, the de rating factor used to calculate the recommended pressure ratings quoted below is a reduction in pressure of 1.3% per degree Celsius for each degree above 20°C, which follows WRc guidelines.

	20°C	25°C	30°C	35°C	40°C
PE100 SDR11	16 BAR	14.9	13.9	12.8	11.8
PE100 SDR17	10 BAR	9.3	8.7	8.0	7.4
PE100 SDR21	8 BAR	7.5	6.9	6.4	5.9
PE80 SDR11	12.5 BAR	11.7	10.9	10	9.2

For Temperature data within the temperatures quoted Interpolation is permitted.

When jointing polyethylene pipelines, the controlled jointing process of both electro-fusion and butt fusion see the temperature of the polyethylene elevated to between 200 - 240°C or greater. Thermal stabilisers in the material safeguard against degradation of the material at these temperatures.