
Maximal Pipe Temperatur during grouting

The safety factor for HDPE pipes should be used as follows:

For 50 years 2.0

For Short time 1.5

According to our tests, the pipe temperature in summer will be up temperature 80° C.

Calculation example for a SDR 17, Pipe 225x12.8:

An internal pressure of 6 bar (87 psi) results in a tensile stress of Sigma = 4.97 N / mm² at 23°C

At 80°C and short term use of 10 hours, the maximum tolerable Sigma is 5.3 N/mm², equivalent to a safety factor of about 1.06.

At 50°C and short term use of 10 hours, according to German Norm DIN 8075

σ_{max} (Sigma max) is 8.1 N/mm², which results a safety factor of:

$$\frac{\sigma_{\max}}{\sigma_{\text{standard}}} = \frac{8.1 \frac{N}{mm^2}}{4.97 \frac{N}{mm^2}} = 1.62 > 1.5$$

The result of 1.62 is higher than the required short time safety factor of 1.5.

More than the theoretical result, we confirm that our pipes can be grouted with 8 bar (116 psi) hydraulic pressure with a maximum outside pipe temperature of 50°C (before grouting) successfully and without reduced long-term properties.

Recommendations:

- For hot ambient temperatures, we recommend pipes to should be grouted in the morning or in the evening not to exceed more than 50°C surface temperature.
- Check increase of outer pipe circumference during grouting not to exceed 2%.
- Injection pressure to check with manometer not to exceed 6-7 bar (87-101 psi).
- Use injection grout with maximum 0.3% volume shrinkage.
- Use special half clamps of 0.5 m length fixed with 2-3 clamps on the top of last grouted pipe section prior to start next grouting step to avoid re-pressure of liquid into the gap between pipe ID and grout.
- Do not grout more than 25-30 meters of stay pipe in one step.