

Aquatherm Technical Bulletin

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Surge Pressure Allowance

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Polypropylene piping materials are inherently fatigue-resistant and can often accommodate cyclic pressures exceeding the long-term pressure rating of the piping system.

There are two types of surge effects to be considered. The first is a more gradual, intentional recurring surge, such as when a VFD-controlled pump is started and stopped. The second is a sudden, unexpected surge due to an abnormal operation event such as fire demand, sudden start/stop system breaks. These can be greatly magnified when there is entrapped air in the piping, such that the calculated surge pressure may underestimate the actual surge event.

For domestic hot water systems, the sum of the positive surge pressure and static system pressure shall not exceed the pressure rating of the piping¹. The positive surge pressure caused by normal operation of system components shall not exceed 30 psi (0.2 MPa). A negative surge pressure shall not exceed 50% of the static pressure in the piping during full flow conditions.

For domestic cold water and mechanical/industrial systems operating at or below 140°F (60°C), the sum of the positive recurring surge pressure and static system pressure shall not exceed 150% of the pressure rating of the piping. The sum of the positive abnormal surge pressure and static system pressure shall not exceed 200% of the pressure rating of the piping.

For mechanical/industrial systems operating above 140°F (60°C), the sum of the positive recurring surge pressure and static system pressure shall not exceed the pressure rating of the piping. The sum of the positive abnormal surge pressure and static system pressure shall not exceed 150% of the pressure rating of the piping.

¹ DIN 1988-200, Codes of practice for drinking water installations – Part 200: Installation Type A (closed system)