

Aquatherm Technical Bulletin

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Aquatherm Piping for Compressed Gas Systems (air and inert gases) And Using Compressed Gas for Pressure Testing

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Warning - Failure of a compressed gas (air or inert gas) system can be extremely violent and dangerous. In a compressed gaseous media test or piping system, energy is applied to compress the gaseous media in addition to pressurizing the system. If failure occurs, both energies can be suddenly released and can be extremely violent compared to failure during leak testing or system operation with an incompressible liquid testing media.

Aquatherm recommends that thermoplastics piping intended for the transport of compressed air or other compressed gases should be installed by burial, encasement in shatter resistant material, or other appropriate means, to prevent or minimize the possibility of mechanical damage. The piping must also be protected from other sources of degradation such as ultraviolet light (UV) exposure, chemical effects, temperature and oxidation.

Thermoplastic piping that fails from mechanical impact by shattering or whipping can be hazardous to personnel. The potential safety hazard posed by failure must take into consideration the nature of the material, internal pressure, pipe size, and the nature of the gas.

Safety is of paramount importance when conducting pressurized gaseous media leak tests because testing results include no leaks, leaks, sudden violent rupture, or catastrophic failure.

Systems that contain lower pressure rated or non-pressure-rated components that cannot be isolated or removed from exposure to test pressure, or where temporary caps or closures are not practical, are not suitable for testing in accordance with Aquatherm requirements.

Always take precautions to eliminate hazards to persons near lines pressurized with compressed gas.

System restraints - Temporary or permanent structural measures or devices that restrict, guide, prevent, or safely limit disjoining and movement of the piping system and piping components while the system is under pressure during testing or service conditions. Restraint may include backfill, anchors, thrust blocks, external clamps and tie rods (joint restraints), pipe guides, etc.

When testing with compressed gas:

- 1) For the entire duration of the procedure and any subsequent retesting, including filling, initial pressurization, time at test pressure, and de-pressurization, only authorized persons that are conducting the test or inspecting the piping section being tested are allowed in the proximity of the section under test.

- 2) For the entire duration of the procedure, the test section and the work area around the test section and equipment shall be supervised or secured with barricades and warnings so that unauthorized persons are kept a safe distance away.
- 3) Failure may result in sudden, violent, uncontrolled, and dangerous movement of system piping, or components, or parts of components.
- 4) Restraint against Movement and Exposure of Connections, Joints and Seals—Take measures to ensure that all parts of the section under test are structurally restrained as noted above. Defective or improperly secured temporary end closures or mechanical end caps shall not be used.
- 5) When connections, joints and seals are to be exposed for observation during the test, use restraint methods to control movement in the event of joint or connection separation, giving due consideration to restraining thrust forces. In particular, pipes connected to restrained joints that derive their stability from the interaction of the pipe and soil shall be backfilled prior to testing.
- 6) Pipe connected to connections, joints and seals that are exposed for leakage observation shall be restrained. The unrestrained exposed pipe distance to the side of the exposed connection, joint or seal shall not exceed the greater of 5 pipe diameters or 3 ft. (1 m)
- 7) When properly made, heat fusion joints in polypropylene¹ pipe are structurally comparable to the parent PP pipe material and do not leak. Leakage at a fusion joint indicates a structurally deficient joint having the imminent potential for complete separation. If leakage is observed at a fusion joint, move away immediately, and depressurize the test section.

Revisions:

1. Revised 7 May 2017