

Recommendations for the prevention of corrosion of carbon steel, stainless steel, and copper systems after pressure testing when the system is not going into immediate use:

Introduction:

When metallic systems are pressure tested using water as a test media and subsequently drained down, this can affect the longevity of that system if precautions are not undertaken. Certain chemical processes rely on the flow of water to achieve a protective patina on the interior of the tube and fittings, stagnant areas can increase the potential for localised corrosion.

Carbon Steel:

Due to the potential for corrosion, and perforation of carbon steel tube and fittings it is recommended that systems that have been hydrostatically pressure tested are fully drained down and blown out with dry air. Alternatively if this is impracticable, the system should be left 'wet', and flushed at regular intervals prior to being commissioned taking into account any precautions against freezing. Another alternative is to add a suitable concentration of commercial anti-corrosion chemical to the system prior to pressure testing.

Stainless Steel:

Stainless steel is more noble than carbon steel, and the potential for corrosion is not as great however it is recommended that these systems are treated as carbon steel systems with regard to pressure testing, and post pressure testing as shown above.

Copper and Copper Alloy:

Systems containing copper tube with copper and copper alloy fittings generally have a high resistance to corrosion, however it is recommended when systems that have been hydrostatically pressure tested are fully drained down and blown out with dry air. Alternatively if this is impracticable, the system should be left 'wet', and flushed at regular intervals prior to being commissioned to reduce carbon film cold water pitting, taking into account any precautions against freezing. This is of importance in new build housing when properties are not occupied for extended periods of time.

General Comments for All Systems:

The use of commercial anti-corrosion chemicals is not to be used on potable water systems, due to the nature of these chemicals.

Hydrostatic test pressures are generally 1.5 times the working pressure, and should be applied slowly to the system.

Regard should be taken of the potential of Legionella in systems with stagnant water.

All the above systems can be tested pneumatically, but the air must be clean, dry, and oil free (oil can have deleterious effects on EPDM seals in certain types of fittings, such as press and push fit). Care must also be taken with regards to pneumatic test pressures, 3.0 bar should be sufficient for most systems as air is more searching than water. Higher pressures are potentially dangerous due to the stored energy in compressed air/gas systems – HSE guidance should be observed.

If commercial leak detector aerosols are used to detect leaks, it is recommended the residue is washed off with clean, warm water.

References:

Carbon film cold water pitting of copper tube published by Stanger Materials Science.

Pressure testing piping systems published by Copper Development Association.

BS EN 806 Specification for installations inside buildings conveying water for human consumption.

BS 8558 Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages.

BS 6700 Design, testing and maintenance of services supplying water for domestic use within buildings and their cartilages. (Withdrawn, but a useful reference document).

L8 Legionnaires' Disease published by HSE Books.

HSG 274 part 2 Legionnaires' Disease: Technical Guidance published by HSE Books.

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