

Pressure Testing of Carbon Steel Systems

The following recommendations apply concerning the testing of XPress Carbon and Tectite Carbon systems.

Due to the potential for corrosion and perforation of carbon steel tube and fitting systems left partially drained for extended periods following hydraulic testing. It is recommended that XPress Carbon and Tectite Carbon systems be air/nitrogen tested.

If hydraulic testing must be undertaken then the following should be considered.

1. The test water should contain anti-corrosion chemicals with the intention that post testing the system shall be left completely full of the test water (suitable protection against freezing will also have to be considered).
2. If leaving the system full of water is not practical then every effort shall be made to fully drain and dry the pipe work by purging with dry air.

Regarding the air/nitrogen testing of pipe work with XPress Carbon crimped fittings or Tectite Carbon push fittings the following points will need to be considered.

1. The air should be clean, dry and free from oil. Excessive oil carry over in compressed air may be detrimental to the EPDM seals. This is not a problem with nitrogen.
2. Air is many times more searching than water. Hence, if the purpose of the air test is only leak detection, then 0.5 bar pressure will be more than sufficient. Higher pressures can in fact mask sealing issues that would be revealed by low-pressure tests.
3. The need for higher test pressures to prove the mechanical integrity of the joints brings with it serious safety issues. Testing for such a failure mode with high-pressure air/nitrogen is potentially very dangerous as the energy stored in 5 bar air/nitrogen, when released suddenly, could lead to damage to equipment or more seriously, injury to personnel. HSE issue guidelines for such testing should be strictly adhered to.
4. It is therefore; recommended that an initial low-pressure test at 0.5 bar is carried out, having put the necessary safety measures in place, to enable any leaks to be found. Significantly leaking, un-pressed or damaged joints shall be replaced, but those with low leakage rates should be identified for close inspection during the high-pressure test. The full loading of the o rings often resolves small leaks identified during the 0.5 bar test. When satisfied that the system is sound and having put the necessary safety measures in place a 1.5x working pressure test can be carried out as per the Copper Development Association (CDA) Guideline document 'Pressure Testing Piping Systems'. Leaking joints at this stage should be identified and marked for replacement. The system pressure should then be reduced to 0.5 bar again to confirm that no persistent low-pressure leaks are present.