Piping Leak Testing Guidelines

INTRODUCTION:

Pressure testing is often required prior to system startup, with several test methods available. Asahi/America, Inc. has developed the following guideline. This guideline is not intended to be a comprehensive procedure or a replacement for understanding local requirements. Please consult the EOR or AHJ for specific project requirements.

*** Pressure testing can be dangerous. Safety precautions must be taken per local jurisdiction and testing standards.***

Prior to pressure testing, visual inspection of at least 5% of joints must be performed. The joints inspected should represent every welding operators work. The owner and examiner shall agree upon the quantity of joints to be inspected as to satisfy the examiner that the system conforms to the specifications and are free of defects.

Random examination of the assembly of threaded, bolted, and other mechanical joints as well as joint alignment, pipe hangers, and supports should also be performed to satisfy the examiner in an agreed upon quantity with the owner.

Expansion joints and components such as bellows must be secured or isolated from the system. Gauges and instruments that do not meet the pressure requirements must also be isolated or removed.

Test media should be water unless there is a possibility of damage due to freezing or to adverse effects of water on the piping or the process. The test liquid should be of appropriate safety and quality so that the environment, system, test equipment, and disposal (if necessary) are not adversely affected.

Test records should be kept which include all the pertinent information of the test, including but not limited to: date, time, piping system being tested, test procedure, test media, test pressure, media temperature, pipe wall temperature, ambient temperature throughout the test, examination personnel and their qualifications, pressure change, results of inspection.

RECOMMENDED TEST METHODS:

DVS 2210-1 Supplement 2 Industrial Piping Made of Thermoplastics Design and Execution Above-ground Pipe Systems Recommendations for the Internal Pressure and Leak Tests

ASME B31.3 Process Piping Code, Chapter VII Nonmetallic Piping and Piping Lined with Nonmetals. Section A345 Testing

ASME NM.1 ASME Standards for Nonmetallic Pressure Piping Systems, Chapter 6 Inspection, Examination, and Testing. Section 6-3.

ASTM F2164 Standard Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure.

	DVS 2210-1	ASME B31.3	ASME NM.1	ASTM F2164
Duration	3hr<300ft>6hr (prelim) 3hr<300ft>6hr (main)	10 minutes	>1 hr	4hr (initial) >1 hr (main)
Test Pressure	*dependent on short term strength	>1.5x Design Pressure <1.5x Material Strength	>1.25x Design Pressure <1.5x Design Pressure	<1.5x Design Pressure
Leak Inspection (every joint)	3x (preliminary test) 2x (main test)	1x	1x	1x (after initial 1hr test)
Pressure Stability[1]	PE: -14.5psi/hr (prelim) PE: -7.25psi/hr (main)	N/A	N/A	PE: 5% test pressure

1) Guidance exists for PE material. As further information is developed, the standards will be updated.

Note: The test duration of ASME B31.3 allows the test pressure to be greater than 1.5x the design pressure whereas other standards have a precaution to limit the test pressure to 1.5x the design pressure.

SPECIAL CIRCUMSTANCES: (*Consult Asahi/America for further information.)*

An initial pneumatic leak test may be conducted utilizing compressed air or inert gas if the pressure is limited to 7.25psi.

An initial service test for ASME Category D fluids (nontoxic, nonflammable, not dangerous to human tissue, etc.) can be used instead of a hydrostatic test when following ASME guidelines if the owner chooses.

When testing double contained piping the visual requirement may be waived for leak inspection of simultaneously welded systems. The owner shall agree to any special requirements.

Piping designed for compressed air or gas may be pneumatically tested >1.1x the design pressure and <1.5x the design pressure or 90% of the pressure that would produce stress in excess of the yield strength at the test temperature.

SUMMARY:

It is impossible to meet all four test standards. The engineer and owner must decide upon appropriate requirements for the project. Please consult Asahi/America for further recommendations.