Fluid Sealing Association

STANDARD

FSA-PSJ-701-19

PIPING SYSTEMS
NON-METALLIC EXPANSION JOINT
HYDROTESTING AND VACUUM TESTING

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FORWARD

Prior to application of this standard to installations that require conformity with the European Union ***Pressure Equipment Directive (PED) 2014/68/EU)*** the reader must determine guidance as to the requirements of the ***PED***. Procedures shown in this document are not intended, nor do they necessarily, meet the requirements of the ***PED.***

For a complete list of FSA publications, please contact:

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FLUID SEALING ASSOCIATION STANDARD
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PIPING SYSTEMS NON-METALLIC EXPANSION JOINT HYDROTESTING AND VACUUM TESTING

1. SCOPE

1.1 Application:

This specification covers the hydrotesting and/or vacuum testing of non-metallic flanged expansion joints. The purpose of the testing is to prove the expansion joint meets a standard pressure/vacuum or a pressure/vacuum as requested by a customer purchase order or specification. For definition of terms used in this specification, refer to the Technical Handbook, Expansion Joints – Piping Technical Handbook, 8.0 Edition.

1.2 Safety - Hazardous Materials:

While the materials, methods, applications and processes described or referenced in this standard may involve the use of hazardous materials, this standard does not address the hazards which may be involved in such use. It is the sole responsibility of the user/tester to ensure familiarity with the safe and proper use of any hazardous materials and test procedure, and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS

2.1 Fluid Sealing Association:

Technical Handbook, Expansion Joints – Piping Technical Handbook, 8.0 Edition, Fluid Sealing Association, Expansion Joint Division. Application for copies should be addressed to:

Fluid Sealing Association
Expansion Joint Division
994 Old Eagle School Road, Suite 1019
Wayne, PA 19087-1866

2.2 American Society of Testing Materials (ASTM):

ASTM D-380	Standard Test Methods for Rubber Hose
ASTM D-412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension

ASTM D-413	Standard Test Methods for Rubber Property - Adhesion to Flexible Substrate
ASTM D-471	Standard Test Methods for Rubber Property - Effect of Liquids
ASTM D-1415	Standard Test Methods for Rubber Property - International Hardness
ASTM D-2240	Standard Test Methods for Rubber Property - Durometer Hardness
ASTM F-1123	Standard Specification for Non-Metallic Expansion Joints

Application for copies should be addressed to:

ASTM International
100 Barr Harbor Drive
Conshohocken, PA 19428-2959

3. GENERAL REQUIREMENTS

3.1 Preparation:

3.1.1 Tests to be Performed

Determine the types of tests required by the order or specification. If the expansion joint is to receive both hydrotest and vacuum test, perform the vacuum test first.

3.1.2 Test Fixtures/Apparatus/Gauges/Materials

3.1.2.1 The test fixture shall consist of end plates, which will be bolted or affixed to the end of the expansion joint, so as to allow the testing of the expansion joint without leakage. This is normally done by bolting plates to the expansion joint flanges. Hydraulic presses may also be used eliminating the need for end plates.

3.1.2.2 The test fixture shall be restrained by control rods with or without compression sleeves (compression sleeves are required for vacuum testing only) or a hydraulic press with compression stops so as to restrain the expansion joint from either compressing or elongating during testing.

3.1.2.3 The gauges used in the testing shall be indicating pressure or vacuum gauges. The gauges shall be calibrated at intervals not to exceed twelve (12) months. The gauges shall be positioned

in such a location as to be readable by both the personnel controlling the pressurization and the test administrator.

3.1.2.4 The hydrotest and vacuum pump should be of size capable of maintaining the pressure and vacuum required by the order
or specification.

3.1.2.5 The hydrotest medium shall be water. The use of gases, such as air, nitrogen or carbon dioxide, should be avoided or special precautions taken for safety reasons.

3.1.2.6 The typical hydrotest and vacuum testing setup is shown in figures 1 and 2 attached.

3.1.3 Test Temperature

The tests should be conducted at ambient temperatures. For hydrotest the medium should not be greater than 120^0 F (49^0 C).
Tests may be conducted at other temperatures; however, special precautions should be taken not to subject the expansion joint to over pressurization at elevated temperatures.

3.1.4 Test Pressure/Vacuum

The tests shall be performed at pressures and vacuums as specified by the order or specification. The standard hydrotest is to be performed at a pressure 1.5 times the maximum operating pressure of the expansion joint. The vacuum test pressure is not to exceed below 26 inches Hg (880 mbar).

4. TEST PROCEDURES

4.1 Vacuum Testing

The vacuum test should be done prior to the hydrotest, when both tests are to be performed, to protect the vacuum pump from water contamination.

4.1.1 Connection

Connect the vacuum line to the test fixture. Close or plug the relief holes in the fixture, vent if needed. Open the valve between the expansion joint and vacuum pump.

4.1.2 Test

Slowly increase the vacuum while inspecting for leaks. A portable ultrasonic detector may be used in this detection process. Should leakage be detected, re-tighten the flange bolts and begin the test again. Once the test vacuum has been reached (the order or specification vacuum but not more than 1.0 times the design vacuum of the expansion joint), the test should be run for 10 minutes with the expansion joint isolated from the vacuum pump.**4.1.3** Acceptance

The expansion joint has passed the test when the test has been performed in accordance with 4.1.2 without discernable vacuum decay or loss of structural integrity.

4.1.4 Documentation

The results of the test should be recorded on an expansion joint testing form. A typical form is shown in Figure 3.

4.1.5 Post Test Procedure

After the expansion joint has been removed from the test fixture, the expansion joint should be inspected for damage resulting from the test. Special attention to tube delamination should be made.

4.2 **Hydrotesting**

4.2.1 Connection

Connect the water line to the test fixture. Open the vent ports in the fixture. Open the valve between the water supply/accumulator and the expansion joint. Allow the water to flow until the expansion joint is completely full of water and all air is expelled. When the expansion joint is full of water, close or plug the vent valve.

4.2.2 Test

Slowly increase the pressure while inspecting for leaks. Should leakage be detected, re-tighten the flange bolts and begin the test again. Once the test pressure has been reached (the order or specification pressure but not more than 1.5 times the pressure of the expansion joint), the test should begin and run for 10 minutes with the expansion joint isolated from the water source.

4.2.3 Acceptance

The expansion joint has passed the test when the test has been performed in accordance with 4.2.2 without visible leakage, discernable pressure decay or loss of structural integrity.

4.2.4 Documentation

The results of the test should be recorded on an expansion joint testing form. A typical form is shown in Figure 3.

4.2.5 Post Test Procedure

After the joint has been removed from the test fixture and dried, the expansion joint should be inspected for damage resulting from the test.

5. QUALITY ASSURANCE

5.1 Responsibility

The Quality Assurance Department is responsible for running or monitoring the hydrotest and/or vacuum test.

5.2 Record Maintenance

Records of the testing should be retained by the Quality Assurance Department in addition to those records submitted with the order.

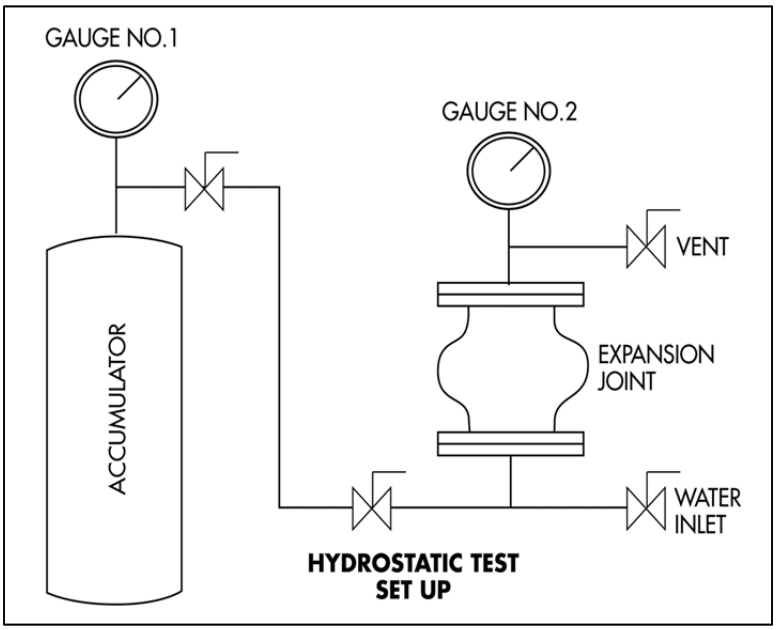

FIGURE 1.

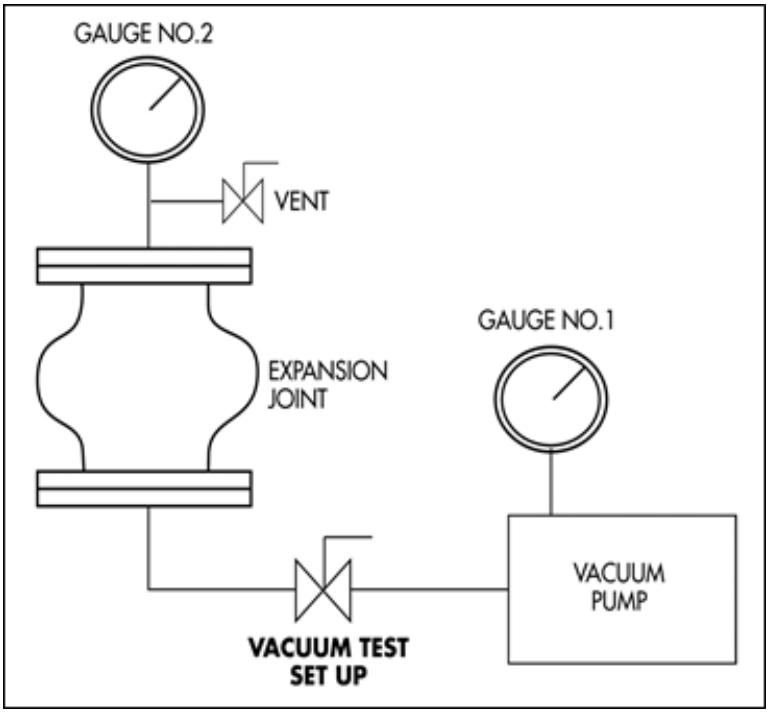

FIGURE 2.

(COMPANY NAME)	HYDROSTATIC TEST REPORT	Date: Page:
Customer:		**Sales Order No:**
Customer P.O.:		**Spec. Req'ts:**

Unit I.D.	Drawing	Tag #	Serial # Range	Gauge	Pressure	Time at Pressure	Accept	Reject	Date/ Inspector

Traveler Operation No./Remarks:

The above listed items were tested in accordance with FSA Standard FSA-PSJ- _____ and are acceptable to referenced specification requirements.

QUALITY ASSURANCE MANAGER

FIGURE 3.