



Standard Specification for Non-Metallic Expansion Joints¹

This standard is issued under the fixed designation F1123; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification provides the minimum requirements for construction, materials, performance, and dimensional requirements of arch-type non-metallic expansion joints.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only: mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 The following safety hazards caveat pertains only to the test method described in this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[A395/A395M Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures](#)

[D1418 Practice for Rubber and Rubber Latices—Nomenclature](#)

2.2 *Federal Standard:*³

[Code of Federal Regulations, Title 30, Chapter I, Mine Safety and Health Administration](#)

2.3 *ANSI Standards:*⁴

[B16.1 Cast Iron Pipe Flanges and Flanged Fittings](#)

[B16.5 Steel Pipe Flanges and Flanged Fittings](#)

[B16.24 Bronze Flanges and Flanged Fittings](#)

3. Terminology

3.1 *Definitions:*

3.1.1 *floating metallic flange type*—expansion joint having the tube, fabric plies, and cover brought up from the joint body to form a bead.

NOTE 1—This bead is molded into a groove in the metallic flange. Retaining rings are not required with this design.

3.1.2 *integral rubber flange type*—expansion joint having the tube, fabric plies, and cover brought up from the joint body to form a rubber flange.

NOTE 2—Additional plies or other reinforcement may be used in the flange to meet service conditions. Retaining rings must be used with this design.

3.1.3 *maximum allowable working pressure (MAWP)*—manufacturer's recommended maximum continuous operating pressure (lb/in.^2 (Pa)).

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401-20401, <http://www.access.gpo.gov>.

⁴ Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10016-5990-10036, <http://www.ansi.org>.

3.1.4 non-metallic flanged expansion joint—flexible connector fabricated from natural or synthetic rubber and fabrics, usually with metal reinforcement, to isolate vibration and noise and provide stress relief in piping systems caused by thermal changes and other system movements.

3.1 Definitions:

3.1.1 floating metallic flange type—expansion joint having the tube, fabric plies, and cover brought up from the joint body to form a bead.

3.1.1.1 Discussion—

This bead is molded into a groove in the metallic flange. Retaining rings are not required with this design.

3.1.2 integral rubber flange type—expansion joint having the tube, fabric plies, and cover brought up from the joint body to form a rubber flange.

3.1.2.1 Discussion—

Additional plies or other reinforcement may be used in the flange to meet service conditions. Retaining rings must be used with this design.

3.1.3 maximum allowable working pressure (MAWP)—manufacturer’s recommended maximum continuous operating pressure (lb/in.² (Pa)).

3.1.4 non-metallic flanged expansion joint—flexible connector fabricated from natural or synthetic rubber and fabrics, usually with metal reinforcement, to isolate vibration and noise and provide stress relief in piping systems caused by thermal changes and other system movements.

4. Ordering Information

4.1 Orders for products under this specification shall include the following information:

4.1.1 Inside diameter of connecting pipes (joint ID).

4.1.2 Face-to-face dimension that is the flange-to-flange dimension into which the expansion joint is to be installed.

4.1.3 Maximum and minimum operating pressure in pounds-force per square inch gage (pascals).

4.1.4 Maximum and minimum operating temperature in °F (°C).

4.1.5 Flange drilling in accordance with the appendix titled “Common Flange Dimension/Drilling Chart” of the *Technical Handbook on Rubber Expansion Joints and Flexible Pipe Connectors*⁵ (herein referred to as the *Technical Handbook*) or in accordance with special customer requirements.

4.1.6 Fluid to be handled.

4.1.7 This ASTM specification designation.

4.1.8 Movement data requirements (including shock or vibratory excursions if applicable).

4.1.9 Design certification burst test if required (see 9.1).

4.1.10 Hydrostatic or special tests if required (see 9.2).

4.1.11 Certification of expansion joint if required (see Section 12).

4.1.12 Certified detailed drawing of the expansion joint if required (see 12.2).

5. Materials and Manufacture

5.1 Expansion joints shall be fabricated with an elastomeric tube reinforced with multiple plies of woven cloth or tire cord covered with synthetic rubber. The inner tube shall be a natural rubber, synthetic rubber, or blend of synthetic rubber that meets the requirements of this specification. The woven cloth or tire cord shall be nylon, polyester, fiberglass, or aramid. Cotton is not acceptable. The reinforcing fabric shall be impregnated with a compatible friction stock. Additional reinforcement to the fabric may be provided in the body of the expansion joint and may be solid metal rings or wire imbedded in the synthetic rubber. Tensile properties of the wire, if used, shall be as given in 5.2. Body rings, if used, must be welded before being installed in the expansion joint body. Welds must be 100 % penetration.

5.1.1 The list of elastomers used in expansion joints and rubber pipe in accordance with the *Technical Handbook*⁵ lists acceptable natural rubber and synthetic elastomers for construction of non-metallic expansion joints.

5.2 Reinforcing wire shall have properties that allow the expansion joints to meet the requirements of this specification.

5.3 All expansion joints shall be manufactured with a cover of Hypalon or Neoprene (Chloroprene), in accordance with Practice D1418. This cover material must consist of 100 % Hypalon or Chloroprene (not blended with any other elastomer) plus normal

⁵ The *Technical Handbook on Rubber Expansion Joints and Flexible Pipe Connections* is available from Fluid Sealing Association, 2017 Walnut St., Philadelphia, PA 19103.