

FSA Publishes the 8th Edition of the Piping Expansion Joints Handbook

By **Marty Rogin**

FSA Member, The Metraflex Co.

The Sealing Sense column on expansion joints fundamentals in the January 2017 issue of *Pumps & Systems* concluded the five-part “Back to Basics” series presented by the Fluid Sealing Association (FSA). This month’s column focuses on a new technical resource that thoroughly explains the performance, design and variations of expansion joints.

The Piping Expansion Joint Division recently completed revisions for the 8th edition of the *Piping Handbook*, now called the *Piping Expansion Joints Technical Handbook*. The revised handbook includes a contemporary format with new three-dimensional graphics (see Figure 1). The technical content has been expanded and revised to reflect a wider variety of expansion joints and to make the handbook more relevant to the user.

The handbook provides up-to-date compilations of construction standards and guides for specifying and purchasing non-metallic expansion joints and flexible pipe connectors. It is based on the latest information concerning research, design and application of rubber (elastomer) expansion joints by engineers associated with the FSA’s Non-Metallic Expansion Joint Division member companies.

The publication is intended to be a reference for engineers who design and install piping systems.

This handbook is not intended to serve as a manual for design of piping systems. Its purpose is to provide guidance on design and selection of material and proper installation procedures. It has been widely used in customer inquiries as a reference for expansion joint design and performance standards.

The definitions section has been expanded to include more items relevant to the industry. The definitions are now consistent with the *Ducting Expansion Joint Handbook* and other publications.

Expansion Joint Types

There are several types of expansion joints, and several variations of these joints are available. While previous versions of the handbook described the basic types of expansion joints, several common variations were missing. These are part of the 8th edition, which includes sections on hinged, universal, pressure-balanced and gimballed arrangements (see Figure 2).

The Piping Expansion Joint Committee decided that these joints deserved a new chapter. Another common expansion joint, the molded spherical type, previously did not have a section.

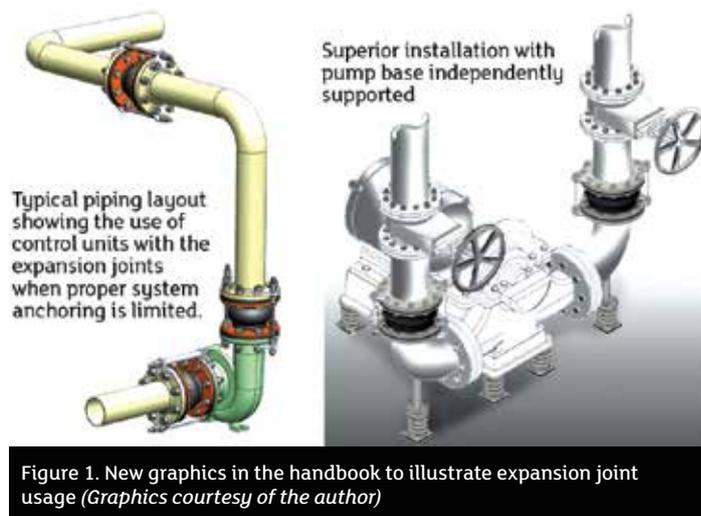
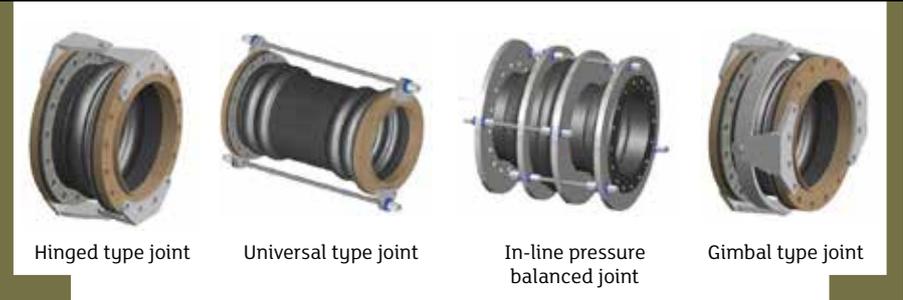


Figure 1. New graphics in the handbook to illustrate expansion joint usage (Graphics courtesy of the author)

- **Hinged joints:** Hinged type rubber expansion joints are designed to permit angular rotation in one plane. The arrangement consists of a pair of hinge plates connected with pins and attached to the expansion joints’ external or internal hardware.
- **Universal joints:** Universal type rubber expansion joints are designed to permit extension, compression, lateral and angular movements. The arrangement consists of two rubber expansion joints connected by a center spool with restraint hardware.
- **Pressure balanced:** Pressure balanced type rubber expansion joints are designed to absorb compression, as well as lateral and angular movements, while restraining the pressure thrust force. The arrangement consists of two or three rubber expansion joints and interconnecting hardware.

Figure 2. Expansion joint types



- *Gimballed joints:* Gimballed type rubber expansion joints are designed to permit angular rotation in multiple planes. The arrangement consists of two pairs of hinge plates connected with pins to a common gimballed ring and attached to the expansion joints' external or internal hardware.

FSA Standards

Rubber expansion joints are not covered in any meaningful detail in any of the pipe codes or American Society of Mechanical Engineers (ASME) Boiler and

Pressure Vessel Code (BPVC). The FSA standards are the only comprehensive standards addressing rubber expansion joint specifications, performance assessment and use.

Three FSA standards have been included in the 8th edition:

- *FSA-PSJ-701-06 Non-Metallic Expansion Joint Hydrotesting and Vacuum Testing:* This standard covers the hydro testing and vacuum testing of non-metallic flanged expansion joints. The purpose of the testing is to verify that the expansion

joint meets a standard performance or a customer-specified performance.

- *FSA-PSJ-702-15 Rubber Flanged Non-Metallic Expansion Joint Installation, Maintenance, and Storage:* This specification covers the installation, maintenance and storage of rubber flanged non-metallic expansion joints. The purpose of the standard is to ensure the proper handling of expansion joints. The bolt torque values listed in this standard were updated after review and verification.
- *FSA-PSJ-703-11 Guidelines for Elastomers Used in Piping Systems Non-Metallic Piping Joints:* This guideline provides the typical properties of elastomers most frequently used for tube and cover compounds in the manufacture of piping expansion joints for a wide range of applications.

NO MATTER THE APPLICATION, WE BUILD PUMPS THAT DELIVER SOLUTIONS.



Since 1970, Thompson Pump has provided high quality, heavy-duty pumps for sales and rentals to the Construction and Municipal markets. With automatic priming, up to 4-inch solids handling, and built tough for the most rugged applications, we are the industry leader in high head/high-volume applications. Whether it's site preparation, wellpoint or sock dewatering, sewer bypass, or other construction applications, our pumps provide the quality, performance and reliability to get the job done—every time.



Visit us at CONEXPO
Booth C30078
Call 888.348.1465
ThompsonPump.com



Circle 160 on card or visit psfreeinfo.com.



TITAN
TITAN FLOW CONTROL, INC.

PROTECT YOUR PUMPS AND YOUR PEACE OF MIND.

CHECK VALVES • STRAINERS FABRICATED PRODUCTS

LEAD Pb FREE

Y Type Strainer
Epoxy Coated • 2" - 24"

Your pump system is important. Protect your investment with *affordable, high quality* products from Titan Flow Control.

Titan Flow Control offers a variety of pipeline products that are essential to the efficient operation of pump systems.

Dual Disc Check Valve
NSF Approved Coating • 2" - 42"

NSF Approved Coated Products are Available for Quick Shipment

www.titanfci.com or call 910.735.0000

Circle 135 on card or visit psfreeinfo.com.



BJM PUMPS

FAHRENHEIT PUMPS

DESIGNED FOR HIGH TEMPERATURE & HIGH ENDURANCE APPLICATIONS

AVAILABLE PUMP MODELS:

- ▶ SHREDDER
- ▶ SLURRY
- ▶ VORTEX
- ▶ HIGH HEAD

AVAILABLE IN CAST IRON OR 316 STAINLESS STEEL

UP TO 200° FAHRENHEIT

bjmpumps.com

THE RIGHT PUMP FOR TOUGH JOBS

Circle 128 on card or visit psfreeinfo.com.

The three standards are available as standalone documents; however, the authors of the *Piping Expansion Joint Handbook* decided to incorporate these standards to consolidate all information, and raise awareness of the standards.

The standards and the technical handbook are freely available from the FSA website: fluidsealing.com/expansion-joints/expansion-joints-publications/.

The committee's goal of completing the revisions before the end of 2016 could not have been accomplished without extensive cooperation from all members in person and online.

The revised handbook is the result of the contributions of several committee members who dedicated many hours to the project.

The committee acknowledged Rob Coffee and Gary Eiseman for leading the project, and Henri Azibert for coordinating the meetings.

For more information about expansion joints, visit the FSA product locator at fluidsealing.com/product-locator, or contact a manufacturer. ■

Next Month: Safety Always a Primary Concern

We invite your suggestions for article topics as well as questions on sealing issues so we can better respond to the needs of the industry. Please direct your suggestions and questions to sealingsensequestions@fluidsealing.com.



Marty Rogin, PE, is the engineering manager at Metraflex. His 29 years in the field has taken him from the edge of space to the bedrock of our infrastructure systems, and several places between. He holds an M.S. in Engineering Mechanics from the University of Wisconsin and B.S. in Aerospace Engineering from the University of Colorado.

