

## Install Smarter to Extend Expansion Joint Life

Flexibility and plenty of room for movement ensure successful, reliable sealing.

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The criteria for expansion joint selection for fluid piping applications focuses on the expansion joint's quality, durability and capabilities. To ensure that the rubber expansion joint's installation provides optimal service life, operators and maintenance personnel must consider specific conditions and take a systematic approach.

Piping systems require some degree of flexibility. Inadequate flexibility can lead to a catastrophic, potentially life-threatening system failure, making flexibility an important consideration when selecting an expansion joint.

### Joint Selection

Rubber expansion joints, which have all-directional movement

capability, provide maximum flexibility based on the system requirements. Rubber expansion joints are designed to handle axial, bidirectional lateral, angular and torsional movements of a piping system.

This movement may be caused by thermal growth or piping misalignment during the construction stage. Rubber expansion joints can

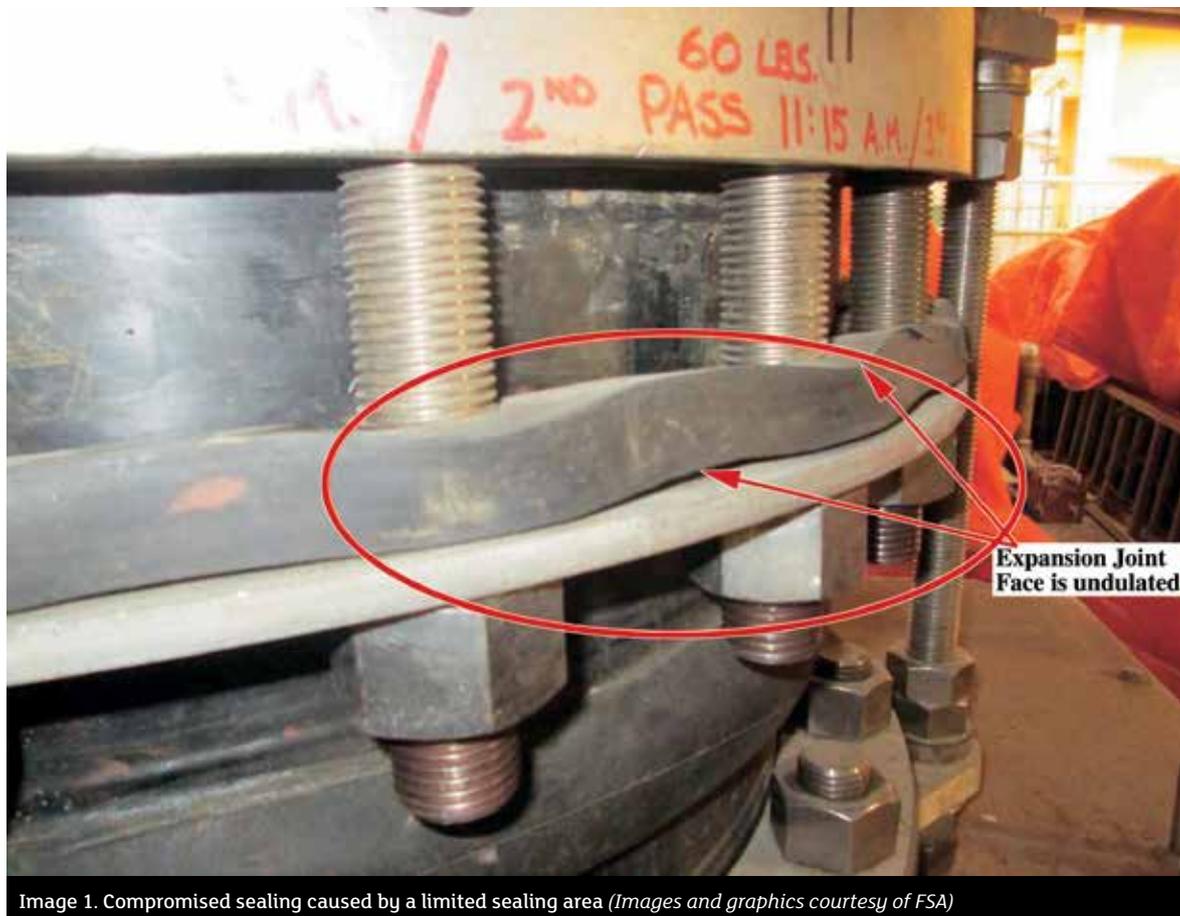


Image 1. Compromised sealing caused by a limited sealing area (Images and graphics courtesy of FSA)

also absorb vibration that occurs with fluid-borne noise or mechanical equipment rotation.

The rubber expansion joint in a fluid piping system provides these benefits in the smallest space possible, keeping the piping system's size and overall footprint at a minimum.

Alternatives, including large pipe loops or metal expansion joints, cannot provide this space-limiting benefit.

With the advent of piping systems that use more high-density polyethylene (HDPE) pipe or installations with lug-style butterfly or wafer check valves, operators must be mindful that rubber expansion joints seal better against full-face flanges (preferably flat-face flanges).

For these reasons, reliability of the rubber expansion joint in the piping system is key. When selecting a rubber expansion joint, personnel should review piping and equipment attachments.

### Joint Installation

Sealing spool-type rubber expansion joints against HDPE pipe with metal flange adapters or pump flanges with lug-style connections can create sealing issues because the sealing area of the joint is reduced significantly. This sealing difficulty can also be amplified when the rubber expansion joint is installed in an offset condition.

When installing rubber expansion joints against HDPE (see Image 1), leakage during operation or surge conditions and failure of the rubber element against the leading edge of the HDPE pipe can occur.

Installing a rubber expansion joint to a full-face flange



Image 2. Effective sealing with a full-face flange

(preferably flat-face) ensures that the seal functions effectively during normal operation and during pressure surges.

Connecting spherical-type expansion joints to butterfly valves and/or wafer check valves can cause damage or premature failure of the expansion joints. The recommended installation of an expansion joint would be against flat-face flanges when possible.

A butterfly valve disc may contact the inside diameter of the mating expansion joint body as it opens, rubbing or cutting into the rubber element and potentially causing premature failure. The reduced sealing surfaces of butterfly or wafer check valves, when used in conjunction with beaded-end, spherical-type expansion joints, can cause leakage or failure during surge conditions.

For this reason, one or more spacer flanges should be placed between the expansion joint and the adjoining equipment that

might affect the performance of the rubber expansion joint.

Expansion joint installations are not always straightforward, so plant personnel should consider each application as it relates to the seal.

Rubber expansion joints that are installed against full-face flanges (see Image 2) and away from adjacent equipment are more reliable and more tolerant of misalignment, variable operation or pressure surge conditions that may occur in fluid piping systems. **P&S**

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