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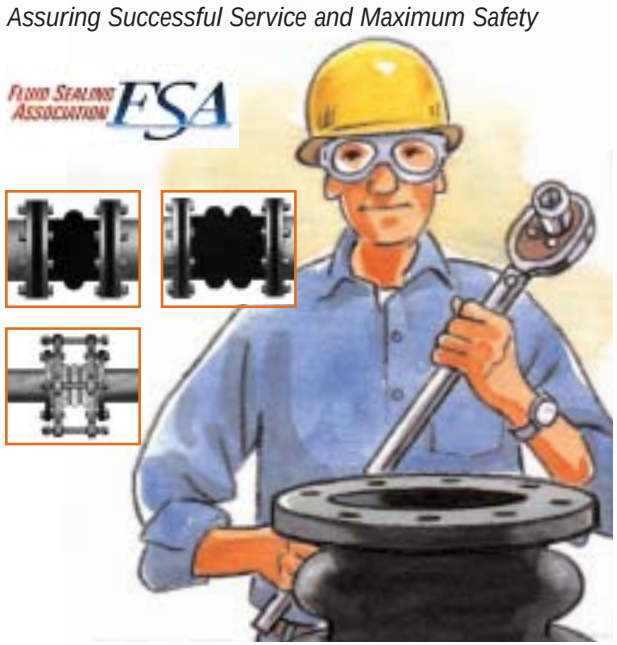
Non-Metallic Piping Expansion Joint Installation Procedures

Assuring Successful Service and Maximum Safety



A Guide to Effective Installation of Non-Metallic Expansion Joints

Effective operation of non-metallic expansion joints depends on proper installation of all components of a well-designed piping system. This document provides guidance to maintenance operators and engineers to ensure the installation of an expansion joint meets or exceeds system requirements. It is intended to complement other plant-approved installation procedures.

NOTE: This guide presents typical Non-Metallic expansion joint installations. Contact manufacturer for specific details.

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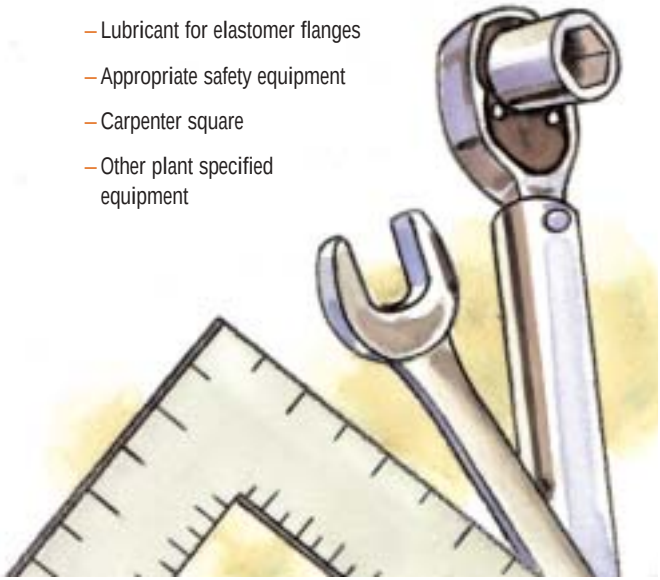
Tools Required

Specific tools are required for installation of expansion joints. Additionally, always use standard safety equipment and follow good safety practices. Acquire the following equipment prior to installation:

- Calibrated torque wrench
- Tape measure
- Lubricant for elastomer flanges
- Appropriate safety equipment
- Carpenter square
- Other plant specified equipment



1 Review, examine and clean

Confirm system operating requirements: pressure/vacuum, temperature, vibration, and movements.

Review anchors, supports, and alignment guides to assure they meet system requirements:

- Assure anchors and guides can withstand expansion joint pressure thrusts and spring rates.
- Add control units and compression sleeves when piping is not properly anchored.

Examine expansion joint including exterior, interior, and flange faces for cuts and gouges.

Examine pipe flange faces for roughness and damage.

Remove all foreign material and debris.

Replace any components found to be defective.
If in doubt, contact manufacturer.

2 Align flanges

Position pipe flange faces to ensure axes are aligned to within 1/8 inch without using excessive force.

Use of an offset joint may be required when piping does not align properly. Consult manufacturer.

3 Install expansion joint

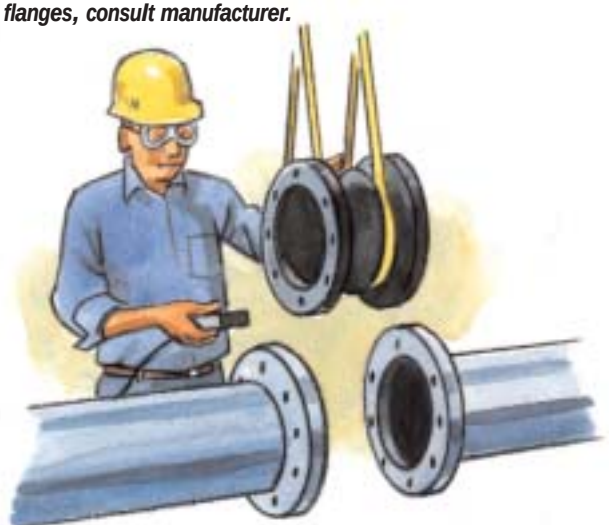
Assure expansion joint matches the specified size, material, and capabilities for the application.

If required, apply a thin layer of non-petroleum based lubricant, such as soapy water to the flanges.

Carefully install the expansion joint to assure no damage occurs, and align bolt holes.

Support the expansion joint until bolted in place.

Spacer gaskets may be required with raised face pipe flanges, consult manufacturer.



4 Install and tighten bolts

Step 1 – Insert bolts with washers through retaining rings on the arched side of the expansion joint and then through to the mating flanges in a cross pattern.

Step 2 – Attach and tighten nuts (with washers) until hand tight.

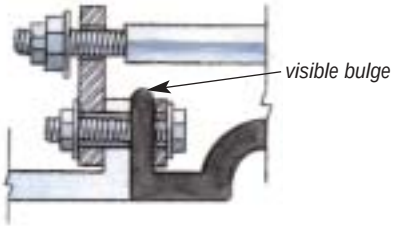
Step 3 – Torque each bolt to full torque with the cross-bolt pattern until the outside edge of the expansion joint flange bulges slightly.

When control units are required install gusset plates on the outboard side of the mating flange. Insert rods through the outside hole in the plate.

Note: The number and distribution of control rods must meet manufacturer approved or design specified minimums. FSA Technical Handbook minimums shall apply if not specified otherwise.

When required, install a compression sleeve while the control rod is inserted into the gusset plate.

Place the nuts and the metal and/or elastomer washers on the control rods. Lock the nuts at the locations specified by the manufacturer.



5a Bolt torque –

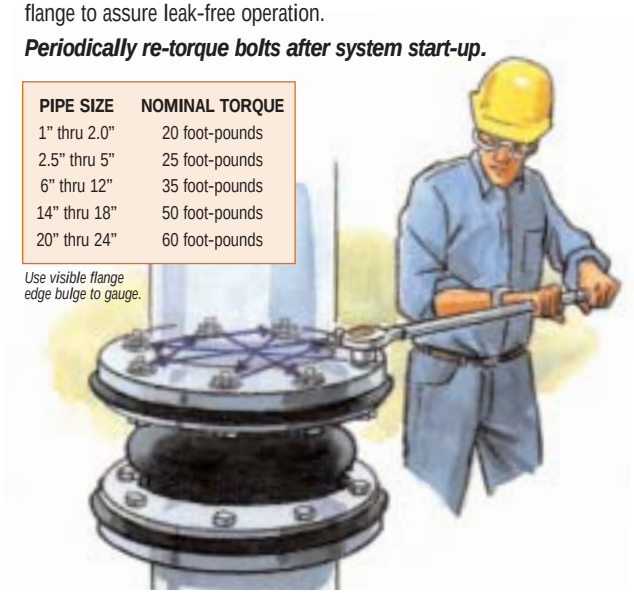
Joints with full-faced elastomer flanges

Tighten bolts in two to three successive steps with a cross-bolt tightening pattern to the nominal torque shown on the table below.

Tighten bolts so expansion joint flange outside edge bulges slightly between the retaining rings and the mating flange to assure leak-free operation.

Periodically re-torque bolts after system start-up.

PIPE SIZE	NOMINAL TORQUE
1" thru 2.0"	20 foot-pounds
2.5" thru 5"	25 foot-pounds
6" thru 12"	35 foot-pounds
14" thru 18"	50 foot-pounds
20" thru 24"	60 foot-pounds



Use visible flange edge bulge to gauge.

5b Bolt torque –

Joints with beaded-ends (spherical designs) or PTFE Bellows type

Tighten bolts in two to three successive steps with a cross-bolt tightening pattern to the nominal torque shown on the table below to assure leak-free operation.

Note: Never tighten to the point of metal-to-metal contact between the joint and mating flanges. Over-tightening can cause deformation of the expansion joint sealing bead and premature failure.

Periodically re-torque bolts after system start-up.

PIPE SIZE	NOMINAL TORQUE
1" thru 2.0"	10 foot-pounds
2.5" thru 5"	15 foot-pounds
6" thru 12"	25 foot-pounds
14" thru 18"	40 foot-pounds
20" thru 24"	50 foot-pounds

6 Maintenance and storage

Inspect the expansion joint periodically to confirm satisfactory installation and operation and remove any debris on and around the expansion joint.

Periodically re-torque bolts.

Apply plant-approved maintenance procedures as required.

When welding near the expansion joint, cover with a blanket or other protective device to prevent damage.

Storage: Expansion joints should be stored in a relatively dry, dark, cool warehouse location. Storage near ozone producing equipment should be avoided. Store flange face down evenly supported on a pallet or wooden platform. Do not store other heavy items on top of an expansion joint. A minimum five-year shelf-life may be expected with ideal conditions. If storage must be outdoors, the expansion joint should be placed on a wooden platform above possible water line and covered with a tarpaulin. It should not be in contact with the ground.

For further details on piping expansion joint installation, please refer to the FSA Technical Handbook – Non-Metallic Expansion Joints and Flexible Pipe Connectors available from the Fluid Sealing Association.