# Installation Instructions

## Fabric Expansion Joint Handling and Installation

**1. Handling and Installation**
Expansion joints, whether ordered assembled, unassembled or as components, must be packaged to arrive at the jobsite in good condition. Immediately after receipt at the jobsite, the purchaser should verify that all parts shown on the packing slip have been received undamaged. All expansion joint manufacturers provide detailed instructions with each shipment and these instructions should be reviewed before installation. To insure proper performance and service life it is important to prevent damage by careful handling and by supporting the expansion joint during installation.

**(a)** Unpack the expansion joint carefully without banging, dropping, striking or dragging the expansion joint on the floor.

**(b)** Verify the flow direction marked on the expansion joint or flow liners. The expansion joint should be installed with the flow arrows pointing in the direction of flow. If marking is not visible, install the expansion joint with liner gap on the downstream side.

**(c)** Large and heavy expansion joints must be supported during the installation and should be installed with appropriate lifting equipment such as cranes or pulleys.

**(d)** Do not lift expansion joints by attaching the lifting device directly to the flexible element. The expansion joint should rest on a supporting base, to which lifting tackles can be attached.

**(e)** Expansion joints which have been pre-assembled by the manufacturer must be lifted by the lifting points and not by their shipping straps unless the manufacturer has specifically combined the two.

**(f)** Any protective covering must not be removed until installation is complete.

**(g)** Protect the expansion joint from welding sparks and sharp objects.

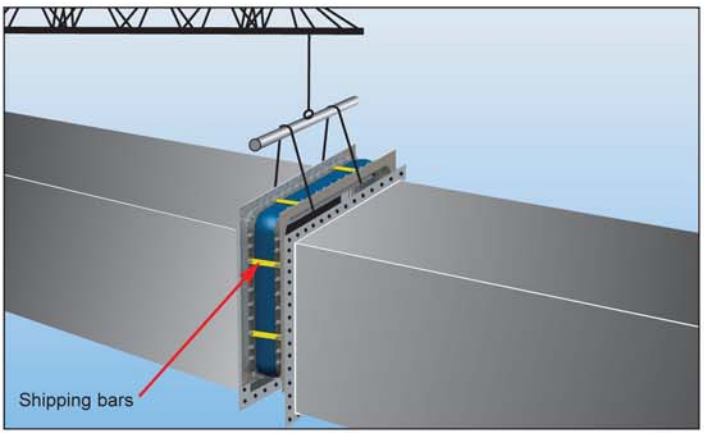
**(h)** All back-up bars, including their bolts and nuts, must be in place and hand-tightened first before tightening further.

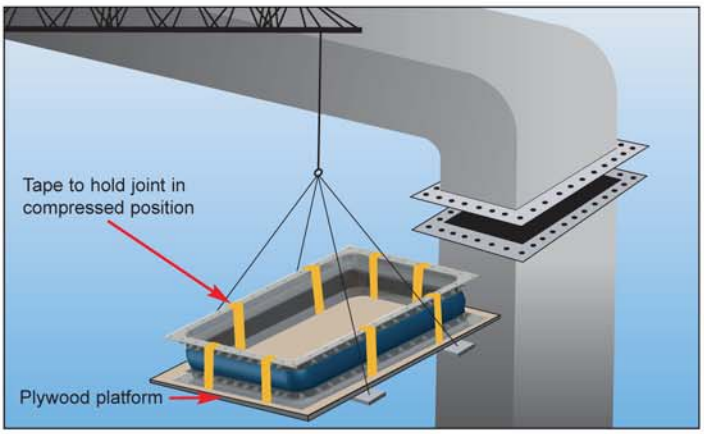
**(i)** Bolt loading requirements depend on the type of expansion joint, bolt dimensions, bolt lubrication, bolt distance, etc. Please see bolt loading guide (Table A)

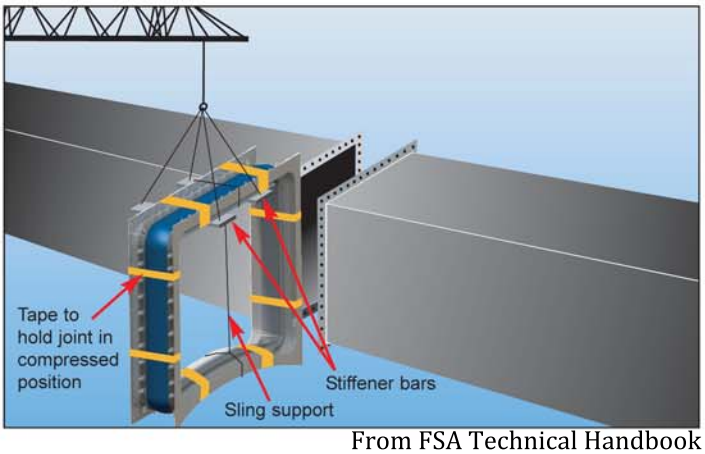
**(j)** Do not remove the shipping bars until after the expansion joint is installed. The intent of shipping bars is to hold the expansion joint in its installation position.

**(k)** Never walk or place scaffolding on top of the expansion joint.

**(l)** The holes in the expansion joint flange should never be used as a lug to lift the expansion joint.




From FSA Technical Handbook

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## 2. Pre-Installation Verifications

### 2.1. General Verifications

**(a)** Confirm expansion joint location and verify the part number and tag number against the installation drawings.

**(b)** The breach opening and ducting should be checked for proper alignment. The opening should not exceed the following tolerances; Axial +1/4" (6mm), -1/2" (13mm); Lateral 1/2 (13mm)". If the breach opening exceeds these tolerances then the expansion joint manufacturer must be consulted.

**(c)** Verify that the system anchors, supports and guides, are in accordance with the piping/ducting system drawings. Any field variance from planed installation may affect the expansion joint parameters and reduce life expectancy.

### 2.2. Duct Mating Flange Verifications

**(a)** Verify that the mating flanges or expansion joint attachment area of the ductwork must be smooth, clean, flat, and parallel.

**(b)** Verify that the mating flanges are in a good condition and are fully and continuously welded and free of sharp edges, burrs etc.

**(c)** Verify that the mating flange dimensions and holes and clamp bars are correct.

### 2.3. Expansion Joint Frame Verifications

**(a)** Verify that the expansion joint frame flanges are in good condition, flat, fully welded and free of sharp edges burrs, etc.

**(b)** Verify the expansion joint frame flange dimensions (inside dimensions, bolt holes, face-to-face, flange straightness and parallelism).

**(c)** All welded areas must be ground smooth at attachment points.

### 2.4. Duct Work and Expansion Joint Verifications

**(a)** The area around the ductwork must be cleared of any sharp objects and protrusions. If not removable they should be marked for avoidance.

**(b)** The expansion joint and components should be kept packaged until installation.

**(c)** Verify all edges that might touch the flexible materials of the expansion joint have a radius.

**(d)** If any handling devices such as crane hooks or fork lifts are utilized in handling the expansion joints, the contact surface must be protected by cushioning materials.

**(e)** Internal baffles (flow liners) must be in good order and in the correct orientation.

**(f)** Verify that bolting will not damage the outer layers of the expansion joint during operation.

**(g)** If welding or burning operations are being performed in the vicinity of the exposed expansion joint, fabric welding blankets or other protective covering must be used to protect the flexible element. These covers must be removed before system start-up.

## 3. Installation

**(a)** It is important that the expansion joints be installed at the proper face-to-face dimension as specified by the manufacturer. Never extend, compress or laterally distort expansion joints past the breach opening tolerances to compensate for dimensional errors without obtaining written approval from the manufacturer.

**(b)** When an expansion joint must be pre-compressed or laterally preset, follow the manufacturer's detailed instructions for installation.

**(c)** All expansion joints provided with baffles (flow liners) should have flow arrows or other suitable means of assisting the installer to properly orient the expansion joint to flow direction.

**(d)** Care must be taken to assure that back-up bars mate up with a 1/16" (1.5mm) to 1/8" (3mm) gap between bar ends.

**(e)** Installers must follow the manufacturer's bolt installation and torque recommendations. If impact tools are used then they must have torque limiting devices properly set before use.

**(f)** Do not install insulation over the expansion joint or mounting area unless it is in accordance with the manufacturer's instructions.

**(g)** In areas where coal or sulfur dust can collect on the expansion joint outer cover, protective shields may be required. Coal or sulfur dust can cause spontaneous combustion, resulting in burning outer covers of expansion joints. Consult the expansion joint manufacturer for details and requirements for a shield.

**(h)** The installation parameters of the manufacturer is critical to the service of the product and should be checked carefully by the installer.

# Installation Instructions

### 3.1. Bolted Flange

**(a)** Verify that the expansion joints' internal liner does not interfere with expansion joints' mating flange ID.

**(b)** Install gasket between the expansion joint and mating flanges which are compatible with system flow pressure, temperature and chemical composition.

**(c)** Care should be taken during the flange bolt-up to avoid damaging the flexible element close to the flange.

**(d)** All backing bars, including their bolts and nuts, must be in place and hand tightened before torquing them with a wrench or power tool.

**(e)** The bolt threads should be lubricated before installing the nuts to facilitate installation and provide proper clamping force.

**(f)** Recommended bolt torque is given in the table below for $MoS_2$ lubricated bolting. These values will provide an equivalent flange loading of 435 psi (3 MPa).

**(g)** Ensure that the duct breach cavity is free of all debris.

### 3.2. Welded Flange

The non-metallic expansion joints' metallic frame may be welded against the ducting mating flange to provide zero leakage seal between flanges. The following special measures should be taken before and during the welding of the non-metallic expansion joint flanges.

**(a)** Protect the flexible element of the expansion joint with fire proof blankets during welding of the expansion joint or in its adjacent area. Welding splatter, scratches, or abrasion of the flexible element could cause premature failure.

**(b)** Welding of the expansion joint frame to the ducting mating flange could generate sufficient heat which will damage the flexible element.

### 3.3. Tolerances

The flexible nature of the non-metallic expansion joint reduces the need for very tight manufacturing tolerances. However, it is necessary to maintain the following tolerances for the expansion joint and their connection to ducts or other equipment. Axial +1/4" (6mm), -1/2" (13mm); Lateral 1/2" (13mm).

**Table A: Bolt Loading Guide**

| Imperial (inches) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Width of Clamp Bar | 1.5 | | 2 | | 2.5 | | 3 | |
| Thickness of Clamp Bar | 0.25 | 0.375 | 0.25 | 0.375 | 0.375 | 0.5 | 0.375 | 0.5 |
| Bolt Spacing | 4 | | 4 - 6 | | 4 - 6 | | 4 - 6 | |
| Bolts | 0.375 | 0.5 | 0.5 | 0.625 | 0.625 | 0.75 | 0.625 | 0.75 |
| Recommended Tightening Torque (ft.lbs): | | | | | | | | |
| Loading for Fabric Expansion Joint | 36 | 59 | 74 | 88 | 85 | 103 | 96 | 118 |
| Loading for Elastomeric Expansion | 31 | 44 | 55 | 66 | 66 | 81 | 74 | 92 |

| Metric (mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Width of Clamp Bar | 50 | | 60 | | 70 | | 80 | |
| Thickness of Clamp Bar | 8 | 10 | 10 | 12 | 10 | 12 | 12 | |
| Bolt Spacing | 100 | | 100 | | 120 | | 120 | |
| Bolts | M12 | M16 | M16 | M20 | M16 | M20 | M16 | M20 |
| Recommended Tightening Torque (Nm): | | | | | | | | |
| Loading for Fabric Expansion Joint | 60 | 80 | 100 | 120 | 115 | 140 | 130 | 160 |
| Loading for Elastomeric Expansion | 50 | 65 | 75 | 90 | 90 | 110 | 100 | 125 |