



## **Expansion Joint Installation - Typical**

### **Handling and Installation**

Expansion joints, whether ordered assembled, unassembled or as components, must be packaged to arrive at the jobsite in good condition. The purchaser should, immediately upon receipt at the jobsite, verify that all parts shown on the packing slip have been received undamaged. All 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 knocking, dropping, striking or dragging the expansion joint on the floor.
- (b) Verify the flow direction marked on the expansion joint or inner 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 (un-welded between the liner and the flange) on the downstream side.
- (c) Large and heavy expansion joints must be supported during the installation and should be installed with proper 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 such as plywood or skid, to which lifting tackles can be attached.
- (e) Expansion joints which have been pre-assembled by the factory must be lifted by the lifting points and not by their shipping straps (unless otherwise noted).
- (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 clamp bars, including their bolts and nuts, must be in place and hand-tightened before torquing to spec.
- (i) 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.
- (j) Never walk or place scaffolding on top of the expansion joint.
- (k) The holes in the expansion joint flange should never be used as a lug to lift the expansion joint.

### **Pre-Installation**

#### **General**

- (a) Confirm fabric expansion joint location and verify the part number and tag number against the installation drawings.
- (b) Verify the piping/ducting system dimensions and alignment to comply with the industry standard tolerances. Contact the factory if the piping/ducting lines are misaligned or offset more than 1/4". The expansion joints are not designed to absorb unspecified offset or misalignment and such a condition could cause premature expansion joint failure.
- (c) Verify the system anchors, supports and guides are in accordance with the piping/ducting system drawings. Any field variance from planned installation may affect the expansion joint movement parameters and reduce life expectancy.



### **Duct Mating Flange**

- (a) Verify that the mating flanges or expansion joint attachment area of the ductwork is smooth, clean, flat, parallel and aligned correctly.
- (b) Verify that the mating flanges are in a good condition and are fully welded and free of sharp edges, burrs etc.
- (c) Verify that the mating flange dimensions, holes and clamp bars are correct.

### **Expansion Joint Flange**

- (a) Verify the expansion joint flanges are in good condition, flat, fully welded and free of sharp edges burrs, etc.
- (b) Verify the expansion joint flange dimensions: inside dimensions, bolt holes, face to face, flange straightness and parallelism.
- (c) All welded areas must be ground smooth at attachment points.

### **Duct Work and Expansion Joint**

- (a) The area around the ductwork must be cleared of any sharp objects and protrusions. If not removable they should be tagged for avoidance.
- (b) The expansion joint and components should be kept packaged until immediately before installation.
- (c) Verify that the clamp bar edges which might touch the flexible materials of the expansion joint are rounded and ground smooth.
- (d) If any handling devices such as crane hooks or forklifts are utilized in handling the expansion joints, the contact surface must be protected.
- (e) Where installed, internal flow sleeves 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.



### **Installation**

- (a) It is important that the expansion joints be installed at the proper face-to-face dimension as specified. Never extend, compress or laterally distort expansion joints to compensate for dimensional errors without obtaining written approval.
- (b) When an expansion joint must be pre-compressed or laterally preset, follow the drawing for installation.
- (c) All expansion joints provided with liners (baffles) 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 bar ends butt up against each other without overlapping or allowing large space between ends.
- (e) 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 drawings.
- (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 factory for details and requirements for a shield.

### **Bolted Flange**

- (a) Verify that the expansion joints' internal liner does not interfere with expansion joint.
- (b) If required, install gasket between 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 using wrenches or power tools.

### **Welded Flange**

- (a) 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.
- (b) 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.
- (c) Welding of the expansion joint frame to the ducting mating flange could generate sufficient heat which will damage the flexible element, especially when it is made from elastomeric materials such: EPDM, Viton, Buna or Natural Rubber.
- (d) It is recommended to protect the flexible element from the heat generated by the welding by removing the nuts, washers and backing bars which secure the flexible element on the side of the welding. Remove the bolts or pull the flexible element from the studs and fold back the flexible element away from the welding area. It is not necessary to remove the gasket or pillow insulation from the expansion joint frame prior to welding.
- (e) After welded area has cooled, fold back the flexible element over the expansion joint metallic frame and install the backing bars and secure them by tightening the nuts to specs.



### **Commissioning**

It is recommended to have a factory representative provide a "Final Walk Down" inspection of the installation prior to system start-up. This inspection should consist of verifying installed dimensions, bolt torques, and general condition of installation.

### **Post Commissioning Inspection**

When the expansion joint is heated (such as during plant start up), the expansion joint components will settle. Therefore, expansion joint bolts should be re-tightened to spec as soon as possible after start up and not later than at the first shut down.

Like any other component in an industrial plant, an expansion joint requires supervision to ensure maximum reliability. Expansion joints should be regarded as wearing parts, meaning those parts which need to be replaced at regular intervals. Costly shut downs and emergency situations can often be avoided by replacing wearing parts in a timely fashion.

Although non-metallic expansion joints do not require actual maintenance, they should be inspected regularly for signs of damage. The first sign of damage will be visible on the surface of the flexible element. The coating may start to discolor or peel, depending on the type of damage (thermal or chemical). If any of these signs appear, contact the factory immediately.

- (a) Inspect the entire piping/ducting system to comply with the design drawings and instructions. Check that misalignment and offsets do not exceed installation tolerances.
- (b) Verify the expansion joint location, installed face to face and flow directions.
- (c) Verify if the expansion joint shipping bars were removed after installation.
- (d) Ensure that all bolts and flanges are tightened correctly.
- (e) Inspect the surface of the flexible element and make sure that is free of defects or damages or surface debris.
- (f) Ensure there are no obstructions around the expansion joint which could prevent air flow and cause overheating of the flexible element.