

Industrial Metal Expansion Joints

Safety notes

Safe installation, operation and maintenance procedures must be established for this equipment based on the procedures of the site and environment in which it operates. These procedures must be in place before installation, operation and maintenance occurs.

Prior to starting any procedure check health and safety requirements with the person responsible for the area and ensure all required precautions, PPE and permissions are in place.

The following list of potential risks is not exhaustive; all those working with the equipment must take the necessary steps and advice to ensure safety:

- Pressurised equipment
- Hazardous fluids
- High temperatures
- Unrestrained piping and equipment
- Handling and lifting

General precautions

Cleaning agents, soaps and solvents may contain chlorides, caustics, or sulfides and can cause stress corrosion which appears only after a bellows is put into service.

Wire brushes, steel wool and other abrasives should not be used on the bellows element.

Hydrostatic test pressure should not exceed 1.5 times the rated working pressure unless the expansion joint was specifically designed for this test pressure.

Some types of insulation leach chlorides when wet. Only chloride free insulation materials should be used for insulating an expansion joint.

Piping system

The piping system must be adequately assessed and the appropriate guides and anchors installed.

The expansion joint works as a part of the overall system and will only provide the expected performance if the system is correctly installed as a whole.

Unrestrained expansion joints will exert a pressure force on the piping and equipment they are connected to. This force can be very large and could cause extensive damage and pose serious safety risks if not considered in the design and installation.

Restrained expansion joints will be supplied with tie rods, hinges or gimbals – these items must be left in place on the expansion joint in operation.



Unrestrained Axial



Restrained – Tied



Restrained – Hinged

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Pre-installation checks and precautions

FlexEJ Expansion Joints are fully inspected at the factory and are packaged to arrive at the job site in good condition. Please, immediately upon receipt at the job site, verify that there is no freight damage: ie. dents, broken hardware, loose shipping bars, etc.

Because the bellows expansion joint is required to absorb thermal and/or mechanical movements, the bellows element must be constructed of a relatively thin material. This requires special installation precautions. The following steps should be taken prior to installation of the expansion joint into the pipeline or duct.

The opening into which the expansion joint will be installed should be examined to verify that the opening for which the expansion joint was designed does not exceed the installation tolerances designated by the designer and/or purchaser. If the opening exceeds the tolerance, notify FlexEJ at once for a disposition.

The attachment edges of the pipe or duct should be smooth, clean, and parallel to each other.

The area around the expansion joint should be cleared of any sharp objects or protrusions. If not removable, they should be noted so they can be avoided.

Expansion joints provided with lifting lugs should be lifted only by the designated lifting lugs. **Shipping bars (painted yellow) are not designed to be lifting devices. Never use a chain or any other handling devices directly on the bellows element or bellows cover.** For expansion joints not provided with lifting lugs (typically less than 200 Kgs) the best lifting method should be evaluated at the time of installation.

The shipping bars are installed on an expansion joint to maintain shipping length and give the expansion joint stability during transit and installation. **Do not remove the shipping bars until the installation is complete.**

Do not use bellows to correct for misalignment of piping unless this has been considered in the design of the expansion joint.

Anchors must be designed for the test pressure thrust loads.

Check orientation

Hinged expansion joints must be installed in the correct axial rotation so that the expansion joint can move in the intended direction. Hinges will only allow movement in one plane.

Tied universal lateral expansion joints can be rotated to position the tie bars to best suit local installation clearances.

Installation

When installing an expansion joint the following precautions must be taken:

Remove any protective covering from the ends of expansion joint. Plywood covers may have been used to protect flanges or weld ends. Check inside expansion joint for desiccant bags or any other material.

When a flow liner is installed in the expansion joint, orientate the expansion joint with **flow arrow pointing in direction of flow.**

When using lifting lugs, lift the joint to desired location and position into pipeline or ducting.

Weld End Expansion Joints

Prior to welding cover the bellows element with a chloride free fire retardant cloth. This is to prevent arc strikes, weld splatter, etc. from damaging the bellows element.

Using the proper electrode, weld the expansion joint to adjacent piping.

Flanged End Expansion Joints

Orientate expansion joint flanges so that the bolt holes are aligned with the mating flanges. **Do not force the expansion joint to match the bolt holes of the mating flange.** This causes torsion on the bellows and will severely reduce the bellows capability during operation and may cause premature failure of the expansion joint. It is good practice to leave one pipe flange loose until the expansion joint is installed or to purchase an expansion joint with a flange that will rotate.

Install gaskets and bolt to the required torque recommended by the flange manufacturer.

After installation but prior to the hydro test

Inspect entire system to insure that anchors, guides and pipe supports are installed in strict accordance with piping system drawings.

Expansion joints exert a force equal to the test pressure times the effective area of the bellows during hydro test. Pressure thrust at design pressure may be found on the individual drawings. Refer to EJMA Safety Recommendations.

If the system media is gaseous, check to determine if the piping and/or the expansion joint may require additional temporary supports due to the weight of water during testing.

Remove shipping bars (painted yellow) prior to hydrotesting. Shipping bars are not designed for hydrostatic pressure thrust loads.

Hydrostatically test pipeline and expansion joint. **Only chloride free water should be used for hydrotest** (published reports indicate chloride attack as low as 3 PPM). Water should not be left standing in the bellows.

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