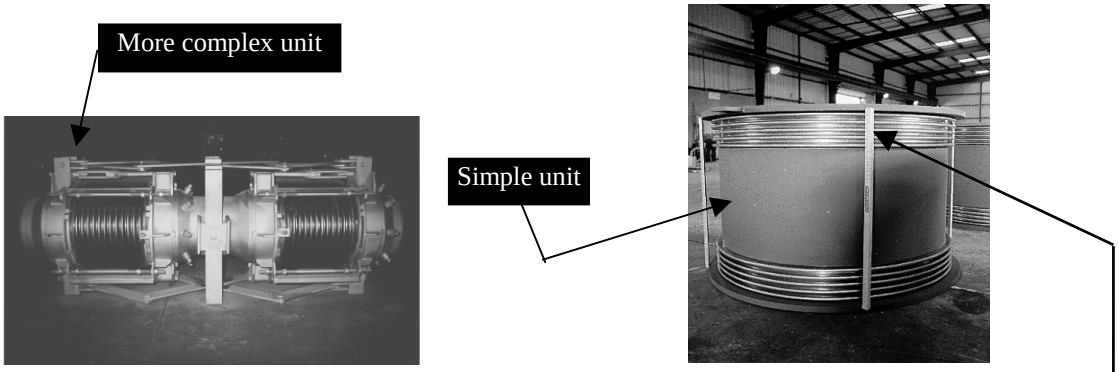
METAL EXPANSION JOINT
INSTALLATION AND HANDLING INSTRUCTIONS

Metal Expansion Joints come in many configurations- from simple to highly complex. This document covers generic applications. For detailed information, we recommend that you contact EJS directly and inquire about your specific installation.



- Units are packaged on skids or crated for transportation. Do not remove the unit(s) from packaging until you are ready to install. The unit(s) should be stored in a **clean, dry** area. **Long term** storage should be done under controlled atmosphere.
- Unpack the units carefully. The **bellows** portion of the expansion joint is **easily damaged** and **cannot** usually be repaired.
- Inspect the units directly after unpacking has been completed. Report any damage immediately to your Engineering/Inspection Department for correct disposition. **EJS will accept no liability for damage after this point.**
- **Do not remove** the shipping bars, which are normally painted yellow and marked "**Remove after Installation but prior to system start up**".
- Shipping bars can be of various types, i.e. "horseshoe", "channel" and "angle". On Hinged and Gimbal type joints, the hinge plates are locked at the hinge point. All shipping bars will be marked with yellow paint with removal information on them.
- The intent of shipping bars is to hold the unit at its **installation position**. Before attempting to fit the unit into the system, **ensure the mating equipment is aligned correctly**. The expansion joint **should not be used for field alignment!** It was never designed to do so. **Resulting damage to the expansion joint can be catastrophic**.

Expansion Joint Systems, Inc.
10035 Prospect Avenue, Suite 202, Santee, CA 92071 (619) 562-6083 Fax (619) 562-0636
E-mail: tech@ejsus.com Website: www.ejsus.com
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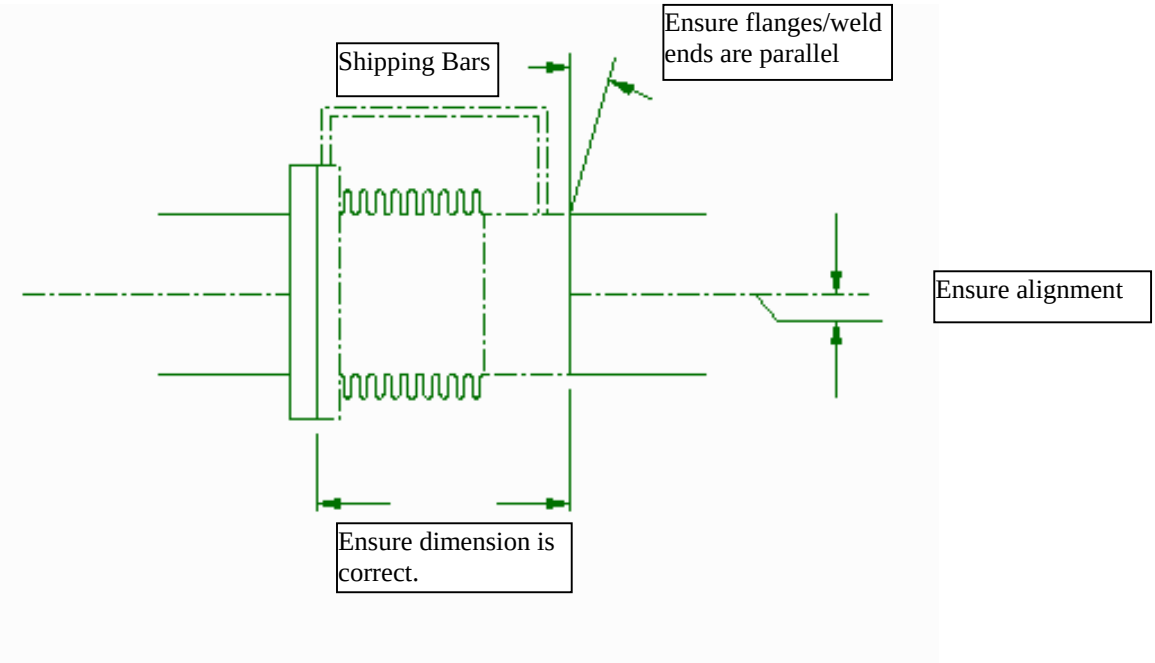
- **Do not lift the expansion joint by the shipping bars**. Lift at the lift points provided or by the clevis pins attached. If the lift point clevis pins are not apparent, use correct industry practice to lift and position the joint safely. Bellows can be damaged easily with chains and improper procedures.



- If the expansion joint is fitted with internal liners, ensure **flow direction** is correct. The **Open end** of liner should be towards the **downstream side**. **Flow arrows** are shown on the exterior of the unit. Occasionally, the liner may be marked with the flow direction.

- Some expansion joints are fitted with permanent covers. These **should not** be removed unless necessary for installation. If covers have to be removed, ensure they are re-fitted as soon as possible.

- Installation/Construction covers are removed **before the system is started.** They can be left in place while construction is continuing around the expansion joint. Removing the construction covers should be done carefully. Simple metal straps around the cover retain these covers. Cut through the strap and remove the cover and plastic wrap under the cover.

- **Any convolution distortion** should be reported to EJS at the earliest opportunity. Due to the complexity of some designs and design considerations, some bellows may be very thin. These types of bellows may not have convolutions that are evenly spaced or have equal pitch. If in doubt please call EJS.

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- **Any field alteration** to the expansion joint will void the warranty. If an expansion joint has been designed for field alignment it will be stipulated on the drawing. Find a copy of the drawing before installing the expansion joint. Field adjusted expansion joints usually come with supplemental instructions.

➢ **Flanged Units**

- Care should be taken to ensure that mating flanges are **correctly aligned**. Torsion loads imposed on an expansion joint due to bolt-hole misalignment or other causes can lead to reduced cycle life and in some extreme cases, catastrophic failure.

- Ensure liners will **clear the inside diameter** of the mating flange and pipe.

- When bolting the joint, care should be taken not to damage the outside diameter of the end convolutions which may be very close to the flange. Test fit the wrench to ensure when you are pulling the unit tight the wrench is not touching the bellows.

➢ **Weld End Units**

- **Always** protect the bellows element from **weld spatter**. Cover the bellows with suitable high temperature cloth or insulation. **Never strike an arc** on the bellows. **Weld spatter on the bellows will void any warranty**.

- Care should be taken when welding the unit not to cause an out of round condition due to weld shrinkage.

- **Seal off the open end of liner. Use duct tape or other suitable material.** After welding inside the unit, remove all pieces of weld rod and spatter which could penetrate the bellows during operation.

- **BELLOWS ARE HIGHLY SUSCEPTIBLE TO DAMAGE.**
- **DENTS, SCRATCHES, WELD SPATTER AND MECHANICAL DAMAGE ARE NOT ACCEPTABLE.**
- **TREAT THE BELLOWS LIKE IT WAS A PIECE OF FINE PORCELAIN.**

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Hinged Joints. (Tied Universal Joints with only two Tie Rods)

- **Hinged Joints are only designed to move in one plane**. Ensure the hinge pins are in the correct plane. Extra care should be taken with Tied Units that only have two Tie Rods. These units may have been designed to accept angulation in one plane. The orientation of the tie rods and hinges is of the utmost importance. Install the hinge pins **normal** to direction of movement.

➢ **Cold Set/Sprung (preset) units**

- If the unit has been factory pre-set, or if the unit is going to be pre-set in the field, ensure the offset is toward the direction from which the thermal growth occurs.

➢ **Unrestrained Expansion Joints**

- Joints that do not have Tie Rods, Hinges or Pressure Balanced Assemblies exert Pressure Thrust onto the system. Ensure all anchor guides and equipment can withstand the Pressure Thrust. Apply the pressure **gradually** and ensure the length of the joint does not increase.

➢ **Restrained/Pressure Balanced Expansion Joints**

- Restrained (Tied) or Pressure Balanced Expansion Joints are designed to absorb the pressure thrust within the expansion joint. Do not remove the tie rods or hinge pins. Without the tie rods the unit will not function correctly.

It is impossible for EJS to cover all the requirements and methods of installing expansion joints in this document. We will be happy to answer any question you may have. Please call EJS at anytime.

When the installation is complete remove the shipping bars. Check all anchors, guides and pipe supports and then apply test pressure to system. If the test pressure is greater than 1.5 x the design pressure of the expansion joint, contact EJS **prior to applying pressure**. ***

During testing there should be little to no movement of the bellows or piping. If movement occurs, immediately lower the pressure and re-check the installation. Never test a system with air or other gases when an expansion joint is installed unless consulting EJS.

*** DO NOT TEST OR OPERATE BELOW THE MINIMUM DESIGN METAL TEMPERATURE.

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SUPPLEMENTAL INSTALLATION INSTRUCTIONS FOR

RECTANGULAR/CIRCULAR STEAM CONDENSER/ TURBINE JOINTS

- **Landing Bars** should be used to accommodate any misalignment from the Turbine to the Condenser. Moving the bellows to accommodate any such misalignment will be detrimental to the life of the unit.
- **Avoid** painting the bellows area of the expansion joint. Some types of paint can cause **stress corrosion cracking**.
- During initial start up of the system under vacuum conditions, monitor the bellows and ensure that they do not start to deflect inwards. Shut the system down immediately if this occurs and contact EJS.
- Ensure the bellows area is covered during any welding operations above the bellows area. Weld spatter on the bellows can cause pre-mature failure or vacuum leaks.
- In some instances the shipping bars are fitted internally, ensure they are removed before system start up.
- Monitor the bellows center spool for flow-induced vibration during start up.

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