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SHIPPING, STORAGE, INSTALLATION & MAINTENANCE FOR FLEXTECH METALLIC EXPANSION JOINTS

PRIOR TO INSTALLATION

1. Inspect for damage during shipment i.e. dents, broken hardware, loose shipping bars.
2. Shipping bars are installed on all expansion joints to maintain shipping strength and give the expansion joint stability during transit and installation. DO NOT REMOVE SHIPPING BARS UNTIL THE INSTALLATION IS COMPLETE.
3. Expansion joints rated for axial compression only are shipped in fully extended position (maximum overall length). This length must not be exceeded under any circumstances.
4. Expansion joints rated for axial extension and possibly axial compression are factory positioned and any extension or compression of bellows length must be within design conditions.
5. Verify that the opening for which the expansion joint was designed does not exceed the installation length of the expansion joint: make the piping system fit the expansion joint.
6. Some pre-compression of the expansion joint will be necessary:
    a. Whenever the installation temperature is appreciably above the minimum temperature to which the pipeline will be subjected.
    b. Applications involving a cold media – this will require the expansion joint to b pre-compressed by the amount of the pipeline extension. The expansion joints should be pre-compressed 1/8" per 100 feet of (carbon steel) pipe between anchors for each 10ºF difference between installation and minimum temperature. Where more precise instructions are required, consult the EJMA standards or Flextech sales department at 1-800-830-3539 or 1-604-576-3100.
7. To compress expansion joints, break the tack weld of shipping bars at one end only. Using plates at each end with full threaded rod and nuts, draw in expansion joints as required, and discard all shipping bars.
8. For a weld end expansion joint, the pipe ends must be clean, smooth, and parallel to each other.
9. For a flanged expansion joint, it is good practice to leave one pipe flange loose until the expansion joint has been fitted into position. Make any necessary adjustment to the loose pipe flange prior to welding.
10. SHIPPING BARS (PAINTED YELLOW) ARE NOT DESIGNED TO BE LIFTING DEVISED, NEVER USE A CHAIN OR ANY OTHER HANDLING DEVICE DIRECTLY ON THE BELLOWS ELEMENT OR BELLOWS COVER.

INSTALLATION

1. Remove any protective cover from the ends of expansion joint.
2. Check inside of expansion joint for desiccant bags or other foreign material.
3. Remove any foreign material that may become lodged between the corrugations. For proper operation of the expansion joint, all foreign material must be removed before it is put into service.
4. When and internal flow liner is installed in the expansion joint, orient the expansion joint with FLOW ARROW POINTING IN DIRECTION OF FLOW.
5. Install single van stone sleeves pointing in direction of flow. Be sure to install proper gasket between sleeve and mating flange.
6. With telescoping liner, install unit so that smallest I.E. liner is pointing in the direction of the flow.
7. Weld End Expansion Joints:
    a. PRIOR TO WELDING, COVER BELLOWS ELEMENT WITH A CHLORIDE FREE FIRE RETARDANT CLOTH, to prevent damage to the bellows from weld spatter and arc strikes
    b. Using proper electrode, weld the expansion joint to adjacent piping.
    DO NOT UTILIZE EXPANSION JOINT TO CORRECT FOR MISALIGNMENT OF PIPING UNLESS THIS HAS BEEN CONSIDERED IN THE DESIGN

8. Flange Expansion Joint:
    a. Orient expansion joint flanges, so the bolt holes are aligned with the mating flanges. DO NOT FORCE EXPANSION JOINTS TO MATCH THE BOLT HOLES OF THE MATING FLANGE. This caused torsion on the bellows and will severely reduce the bellows capacity during operation and may cause premature failure of the expansion joint.
    b. Vanstone flanges may be secured to the bellows with shipping straps. Remove these straps.
    c. Install gaskets and bolt to the required torque recommended by the flange manufacturer. CAUTION: DO NOT USE GRAPHITE IMPREGNATED GASKETS IN CONTACT WITH STAINLESS STEEL.

AFTER INSTALLATION, BUT PRIOR TO HYDROTEST

1. Be sure all anchors, guides and pipe supports are secure and in accordance with piping systems drawings, prior to hydrotest. A pipe guide spacing chart is provided to aid in this check.
2. ANCHORS MUST BE DESIGNED FOR ALL FORCE INCLUSIVE OF THE TEST PRESSURE THRUST LOADS. Expansion joints exert a force equal to the test pressure times the effective area of the bellows. Unless the expansion joint is supplied with hardware capable of restraining this load (i.e. tie rods, gimbals, hinges, etc.) the anchor system must be adequately designed. Test pressure thrust = (1.5 x Rated Design Pressure x Bellows Thrust Area).
3. If the system is not designed for liquid flow media, check to determine if the piping and/or expansion joint may require additional temporary support due to the weight of the water during hydro testing.
4. REMOVE SHIPPING BARS (PAINTED YELLOW OR TAGGED “REMOVE AFTER INSTALLATION”) PRIOR TO HYDRO TESTING. SHIPPING BARS ARE NOT DESIGNED FOR HYDROSTATIC PRESSURE THRUST LOADS.
5. When hydro testing, USE ONLY CHLORIDE-FREE WATER (attack may occur with chloride contents as low as 3 PPM).
6. Hydrotest pressure (non shock) is not to exceed 1.5 times the design pressure.

PIPE GUIDE SPACING

1. Only one expansion joint shall be used between each pair of anchors. Piping must be straight; where pipe line changes direction, and anchor must be installed.
2. Flextech recommends that for single Control Flex, Free Flex, Mid and High Corr expansion joints, the first guide be located within four (4) pipe diameters from the expansion joint and the second guide be located within fourteen (14) pipe diameters from the first guide. Intermediate guide spacing shall be in accordance with Flextech guide bulletins or reference EJMA Standards. See page 5, which provides information on proper intermediate pipe guide spacing.
3. Flextech recommends that for externally pressurized joints and expansion compensators the first guide be located within twelve (12) pipe diameters from the expansion joint. The remaining guides follow intermediate guide spacing as shown on chart on page 6.
4. PIPE HANGERS ARE NOT ADEQUATE GUIDES, BUT ARE NECESSARY IN ADDITION TO GUIDES FOR PIPE SUPPORT.
5. PIPE ALIGNMENT GUIDES ARE NOT TO BE USED AS PIPE HANGERS OR SUPPORTS.

SPECIAL CONSIDERATION FOR EACH MODEL

1. FREE FLEXING (FSF, FSW)
   If the amount of required pre-compression is less than 1/16” per corrugation for 3” to 5” sized units and 1/8” per corrugation for 6” or larger sized units, then pre-compression of the expansion joint will not be required. (Reference Not #6 Prior to Installation)

2. CONTROLS FLEXING (CSF, CSW) WITH REMOVABLE SPACERS
   CAUTION: On flanged Control-Flexing expansion joints do not stretch the expansion joint as you tighten the bolts. This may cause excessive tension in the shipping rods that can lead to breakage of the control ring casting. After installation, remove the shipping restraints as follows: Flextech 3” 4” and 5” Control Flexing Expansion Joints are provided with guide rods (See Figure K). These are permanent guides that must remain on the expansion joint in order for it to function properly. Only the spacers are to be removed. To remove spacers:

    a. Loosen, BUT DO REMOVE, the grip nuts on both ends of each guide rod, back the nuts off to within one turn of the end.
    b. Remove and discard all spacers, DO NOT RE-TIGHTEN THE NUTS OF THE GUIDE ROD.

c. When the expansion joint is shipped in pre-compressed position there will be a spacer located between the grip nut washer and the neck ring. Remove and discard these spacers also.

NOTE: Guide rods on the size maintains stability under pressure and must remain in place al all times.

Flextech's 6" and larger Control Flexing Expansion Joints do not have guide rods, only shipping rods. These serve simply to hold the spacers in place (See Figure J). These shipping rods as well as all spacers must be removed after installation, before the line is put into operation. All removable spacers must be removed before and expansion joint is put into service. After the spacers are removed, care must be exercised to make sure the proper installation length is maintained until all anchors are in place. Other considerations to be considered same as above.

3. EXTERNALLY PRESSURIZED AND EXPANSION COMPENSATORS (EPJ, ECC, ECS) liners and covers are integral parts of these units. The liners in this design do not require any installation, and allow for bi-directional flow. In a vertical installation, these units must be installed so that the traveling nipple (the end which is easily compressed) faces down. Remove shipping bars prior to hydro-test.
4. MID CORR, HIGH CORR (FB11, FB26)
   Be careful not to dent or get weld spatter on the corrugations of the bellows.

GENERAL PRECAUTIONS

1. Some types on insulation leach chlorides when wet. Only chloride free insulation materials should be used for insulation and expansion joint.
2. Wire brushes, steel wool, and abrasives should not be used on the bellows element.
3. Solvents, soaps and cleaning agents may contain chlorides and can cause stress corrosion which appears only after a bellows is put into service. If it becomes necessary to clean the bellows for any reason use only isopropyl alcohol and clean, soft rags.
4. Do not use a bellows that is dented or damaged.
5. Do not attempt any mechanical or welding repair to bellows.
6. If uncertain about the proper use or installation of this expansion joint, contact Flextech at 1-800-830-3539 for assistance.

SPECIAL INSTRUCTIONS

Special expansion joints (those having tie rods, limit rods, hinges, etc.) will require the following instructions in addition to those already outlined.

1. Some expansion joints have lifting lugs located at each end of the expansion joint. This facilitates easy loading, unloading and installation of the expansion joint into the piping systems. These lugs are marked "LIFT HERE". Expansion joints must not be lifted by the tie rod systems. Lifting lugs will remain permanently attached.
2. All expansion joints should be lifted out of the top of the crates via the lifting lugs or by placing a metal hook through flange bolt holes. Do not attach chains or lifting devices around the bellows element.
3. Metal bellows – type expansion joints have been designed to absorb specifies amount of movement by flexing of the thin-gauge bellows. If proper care is not exercised in the installation of the expansion joint, cycle life and pressure capacity could be reduced, leading to premature failure and damage to the piping system.
4. The opening into which the expansion joint will be installed should be examined to verify that it does not exceed the installation tolerances designed by the designer and/or purchaser. THE EXPANSION JOINTS SHOULD NEVER BE EXTENDED OR COMPRESSED IN ORDER TO MAKE UP FOR DEFICIENCIES IN LENGTH, NOR SHOULD THEY BE OFFSET TO ACCOMMODATE MISALIGNED PIPES. Doing so may severely reduce the service life of the bellows. If the opening exceeds the tolerance, notify Flextech at once at Phone 1-800-830-3539 or 1-604-576-3100 Fax 1-504-576-3101
5. 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.
6. Operating conditions must be within the limits specified on the name plate.
7. Shipping restraints have been welded into place before leaving the factory in order to ensure installation at the correct length and alignment. These must be removed after installation of the expansion joints and before testing or pressurizing the systems.
8. SHIPPING BARS (PAINTED YELLOW) OR TAGGED "REMOVE AFTER INSTALLATION" ARE NOT DESIGNED TO BE LIFTING DEVICES. NEVER USE A CHAIN OR ANY OTHER HANDLING DEVICES DIRECTLY ON THE BELLOWS ELEMENT OR BELLOWS COVER.
9. Tie rods or control rods are designed to:
   a. limit axial travel
   b. absorb the pressure thrust in the event of a main anchor failure or

c. to absorb the pressure thrust for systems designed for lateral motion where no anchors are provided.

These rods are preset at the factory and can restrict travel if used incorrectly. The system design should be carefully reviewed for correct use of these rods. IF ANY RODS AND/OR NUTS ARE TO BE LOOSENED OR REMOVED (I.E. TO FACILITATE INSTALLATION) CARE MUST BE TAKEN TO RESET ALL DIMENSIONAL SETTINGS OF RODS AND/OR NUTS BEFORE SHIPPING BARS ARE REMOVED.

10. Flow liners or sleeves have been designed on some units. A flow arrow has been incorporated on these expansion joints to indicated the direction of flow. The expansion joint must be installed as indicated.

The following recommendations are included to avoid the most common errors that occur during installation. When in doubt about the installation, contact Flextech at 660-885-8899 for clarification before attempting to install the expansion joints.

DO'S…

Do… Inspect for damage during shipping such as: dents, broken hardware, water marks on carton etc.

Do… Store in a clean, dry area where it will not be exposed to heavy traffic or damaging environment.

Do… Use only designated lifting lugs when provided.

Do… Make the piping system fit the expansion joint. By stretching, compressing, or offsetting the expansion joint to fit the piping, the expansion joint may be over stressed when the system is in service.

Do… Leave one flange loose on the adjacent piping when possible, until the expansion joint has been fitted into position. Make necessary adjustments of this loose flange before welding.

Do… Install the expansion joint with the arrow pointing in the direction of flow.

Do… Remove all shipping devices after the installation is complete and before any pressure test of the fully installed system.

Do… Remove any foreign material that may have become lodged between the convolution.

Do… Refer to the proper guide spacing and anchoring recommendations.

DON'TS…

Don't… Drop or strike expansion joint.

Don't… Remove the shipping bars until the installation is complete.

Don't… Remove any moisture-absorbing desiccant bags or protective coatings until ready for installation.

Don't… Use hanger lugs or shipping bars as lifting lugs.

Don't… Use chains or any lifting device directly on the bellows cover.

Don't… Allow weld spatter to hit unprotected bellows.

Don't… Use cleaning agents which contain chlorides.

Don't… Force or rotate one end of an expansion joint for alignment of bolt holes. Bellows are not capable of absorbing torsion.

Don't… Hydro pressure test or evacuate the system before proper installation of all guides and anchors.

Don't… Use shipping bars to restrain the pressure thrust during testing.

Don't… Use pipe hangers as guides.

Don't… Exceed the manufacturers rated test pressure of the expansion joint.

FLEXTECH WARRANTY IS VOID UNLESS THE ABOVE INSTRUCTIONS ARE FOLLOWED