

UNASSEMBLED FABRIC EXPANSION JOINT INSTALLATION INSTRUCTIONS

Please read entire document prior to beginning Expansion Joint Installation. The recommendations in this document are to be used as a guide. Please use these instructions in conjunction with the approved drawing provided by U.S. Bellows. The approved drawing should be considered the governing document.

1. RECEIVING AND STORAGE

Follow U.S. Bellows Receiving and Storage Instructions located at the end of this document.

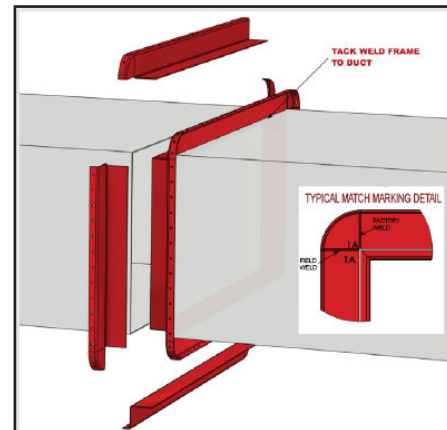
2. PRE-INSTALLATION CHECKS

- Confirm dimensional data per U.S. Bellows' approved drawing.
- Confirm duct/duct flanges are in good condition.
- Confirm duct/duct flanges are lined up correctly (ensure that lateral displacement and angular movement do not exceed agreed specifications).
- Prior to installing the expansion joint frames, the opening into which the expansion joint will be installed must be inspected to verify that the openings is in accordance with design tolerances. The expansion joint is not designed to accommodate installation misalignment, unless clearly specified as a design requirement.
- Make available the following tools/equipment to simplify the installation:
 - Suitable/safe scaffolding
 - Lifting equipment (fork lift, crane, hoist)
 - Drill
 - Come along
 - Rope
 - Pry Bar

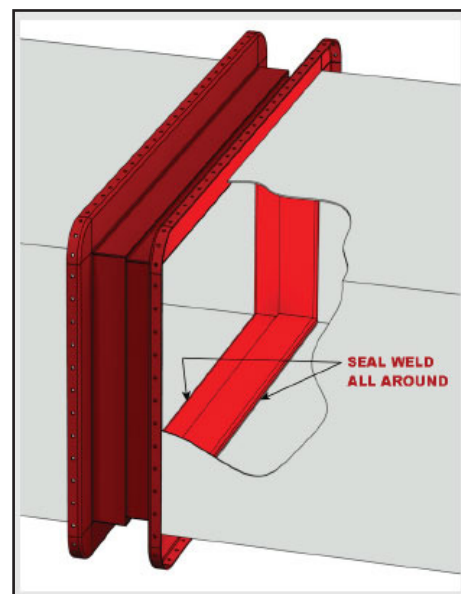
3. EXPANSION JOINT INSTALLATION

- Using the U.S. Bellows drawing, organize the parts per drawing information and "match markings" on parts.
- Clean duct/flange surface and prepare for welding.

- Tack weld frame segments into place. If the expansion joint has a liner, make certain that the flow arrow of the expansion joint/liner is in the proper system flow direction. If liner ships loose, install frames first to allow seal weld access.



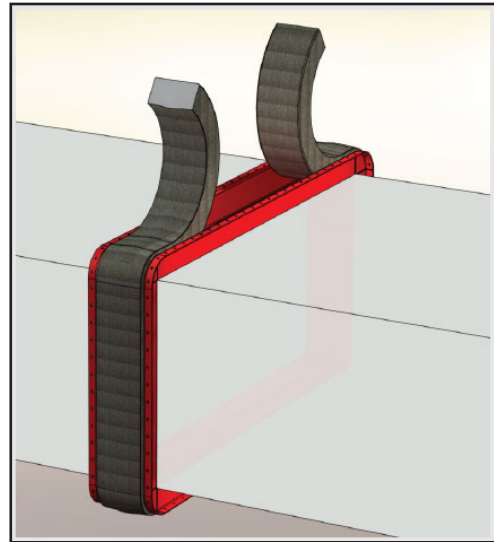
- Seal weld frames.
- Install accumulation barrier/insulation pillow -- if required.



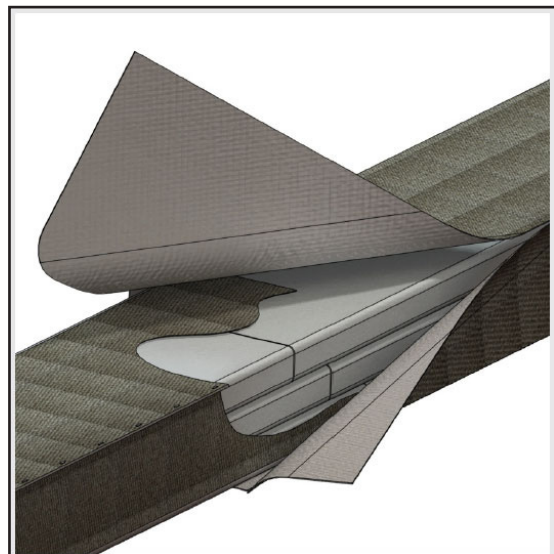
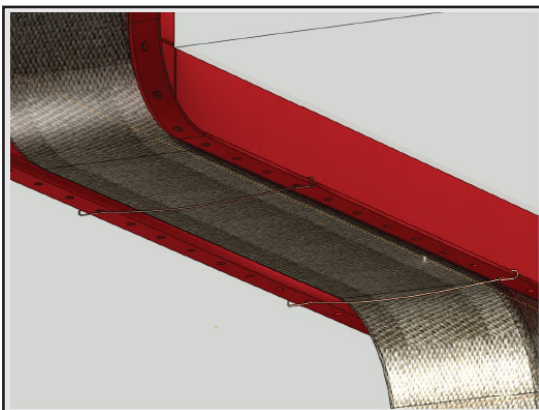
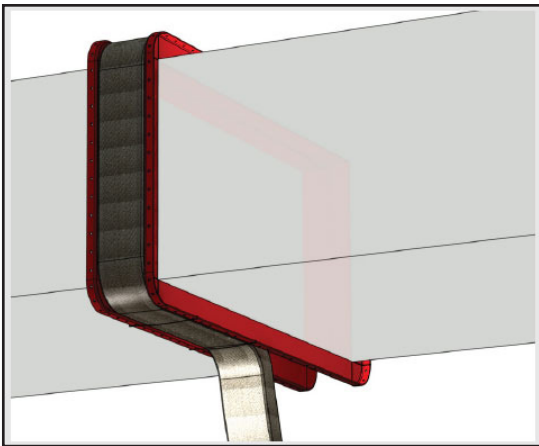
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4. ACCUMULATION BARRIERS OR INSULATION PILLOWS -- IF REQUIRED

Accumulation Barriers are typically designed to fill the entire cavity of the expansion joint. Wrap the accumulation barrier around the duct/expansion joint. Pack the accumulation barrier into the cavity of the expansion joint. The liner will prevent the barrier from falling into the duct. Use thread or wire to tie across the breach opening to support accumulation barrier during installation. Remove thread or wire prior to installing the fabric belt element.



While splicing or joining the ends of the barrier, "stagger" the overlaps of the materials to prevent thickness build-up.

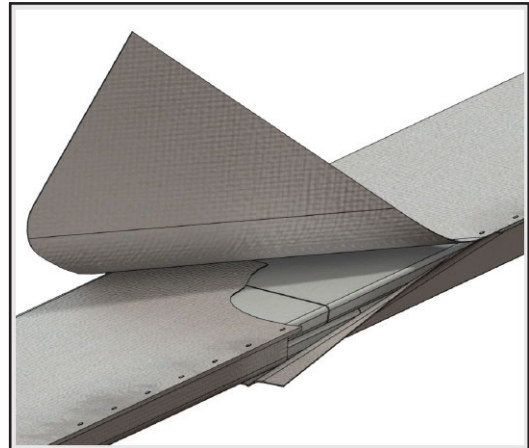
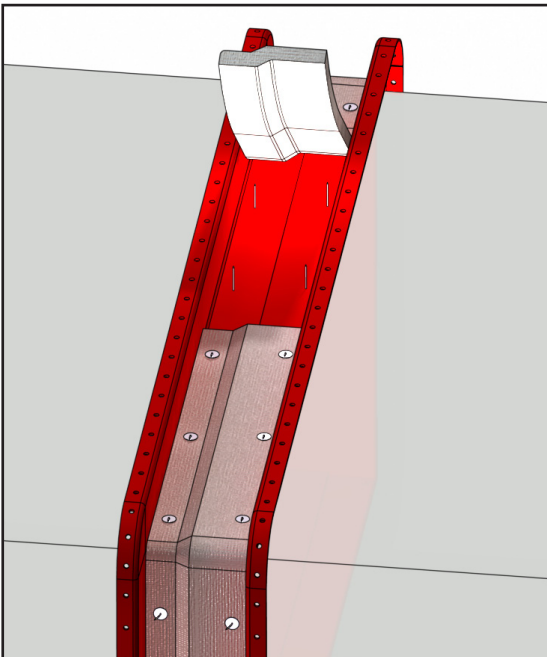


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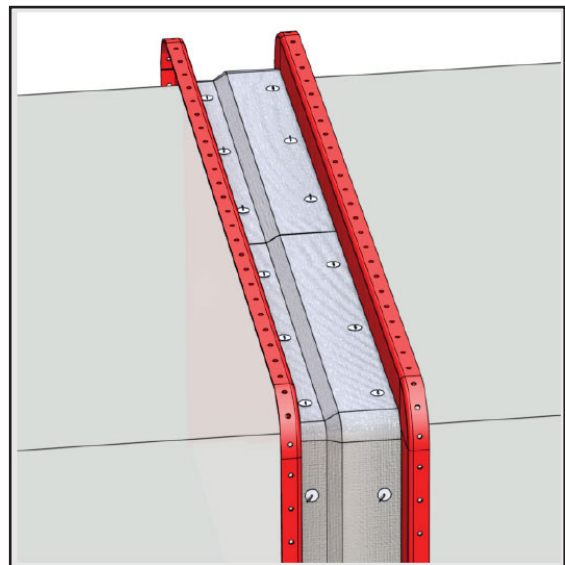
5. ACCUMULATION BARRIERS OR INSULATION PILLOWS -- IF REQUIRED

Insulation pillows are typically designed to prevent high temperatures from contacting the fabric belt material; therefore it is critical to attach the pillow in place. There are multiple ways to attach the pillow. Follow U.S. Bellows drawing for details. Pinning the pillow to the liner (as shown) or the frame are common methods of attachment.

While splicing or joining the ends of the barrier, "stagger" the overlaps of the materials to prevent thickness build-up.



INSULATION PILLOW installation complete.



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6. GASKET -- IF REQUIRED

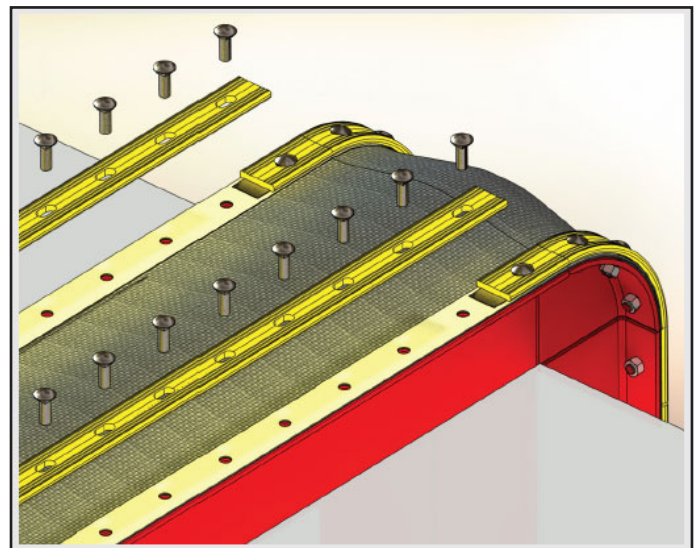
Typically, Fluoroelastomer materials do not require gasket material, while Fluoroplastic materials do.

U.S. Bellows offers many unique fabric expansion joint belt designs. When required, gasket material is chosen based on application requirements such as temperature, pressure, ease of installation, etc. The U.S. Bellows drawing will indicate where/when gasket material is required.

Single Ply Fluoroplastic Belt less than 600 degrees F.
Expanded PTFE gasket tape is installed on the frame.
Place the gasket on the "cavity" side of the belt attachment bolt hole.

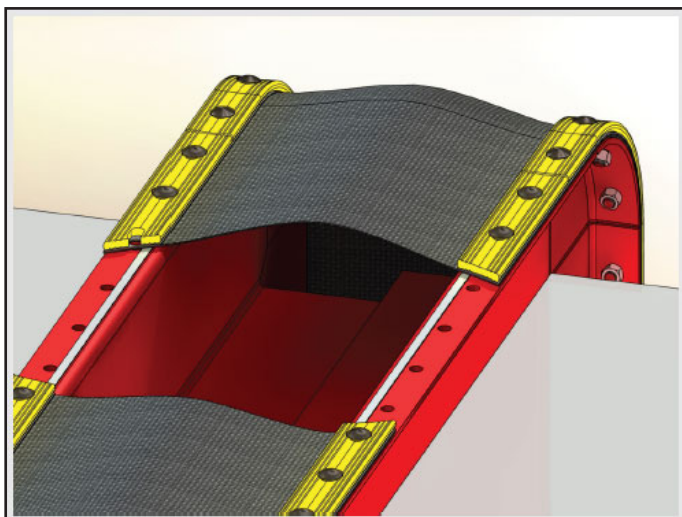
Composite Fluoroplastic Belt Greater than 600 degrees F.

High temperature fiberglass material is used in high temperature applications. Some FLEXXCEL composite belts are shipped with the fiberglass gasket attached to the belt as a cuff. Other FLEXXCEL composite belts are shipped with the fiberglass gasket loose. In high temperature applications, the fiberglass gasket should be installed on the belt attachment flange and under the back up bar.



Single Ply Fluoroplastic Belt less than 600 degrees F.

Expanded PTFE gasket tape is installed on the frame.
Place the gasket on the "cavity" side of the belt attachment bolt hole.



SHIMS

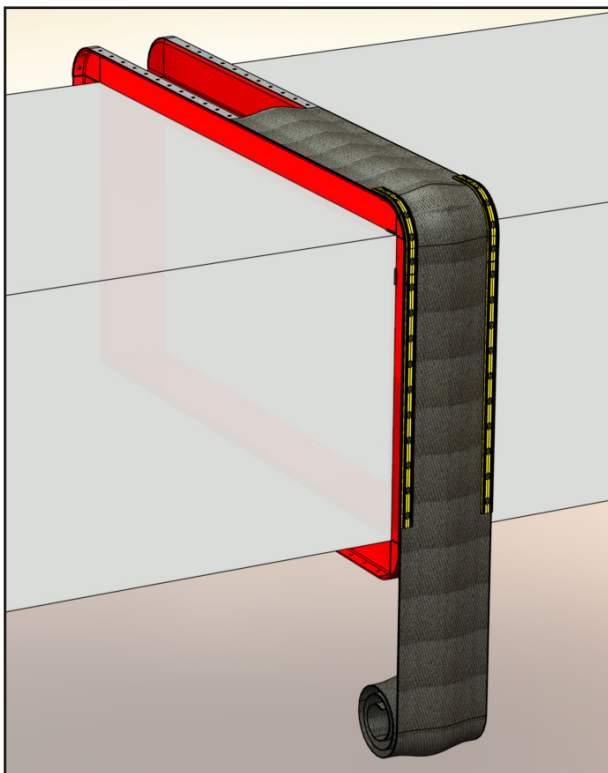
Where two lengths of back-up-bar come together, place a shim under the back-up-bars, spanning the gap. The gap in back-up-bars should not exceed 1/4".



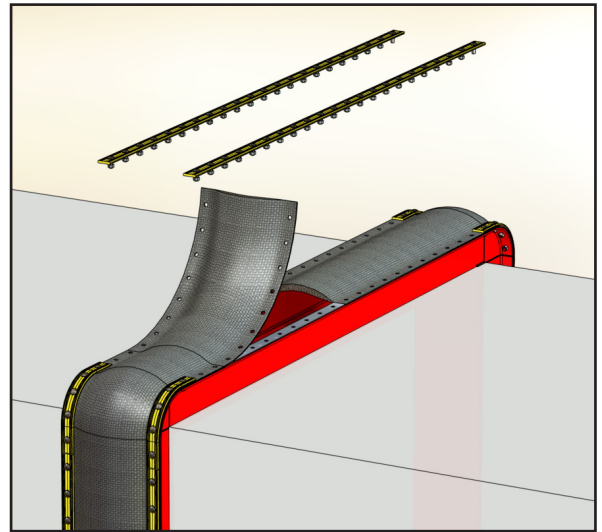
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7. FABRIC BELT - with factory punched holes

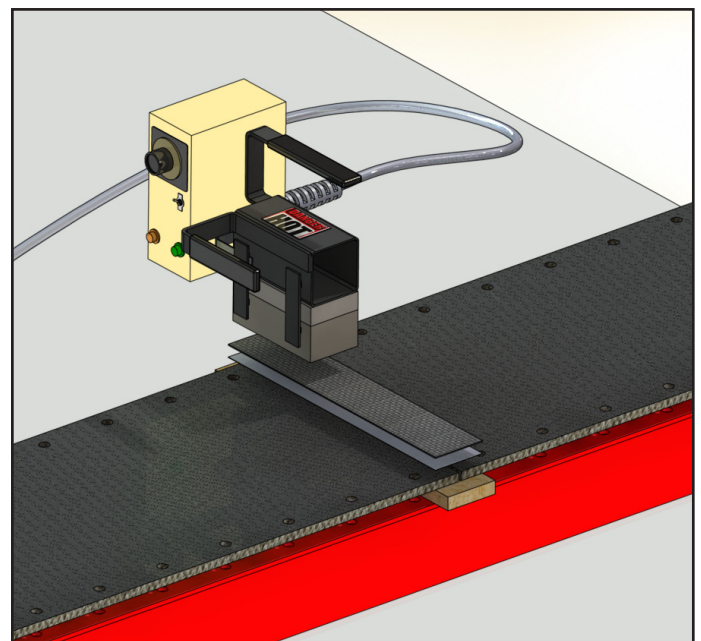
If the fabric belt is shipped **with factory punched holes**, begin installation of one end of the belt at the top of the duct in the center. Leave this area of the belt unattached, as later this will be where the belt splice is performed. Use clamps to position the belt. Be sure to line up the "corner holes" (if rectangle) first, and then begin installing the back-up-bars and bolts, starting in the corner.



At this point, only hand tighten bolts to assure proper fit up around 2/3 of the joint (If the holes do not align, contact U.S. Bellows for advice -- do not drill additional holes or modify existing holes). Install approximately 2/3 of the belt and back-up-bars, leaving an open area available to perform the belt splice. Tighten the bolts snugly.



Perform belt splice. Splice techniques vary -- based on the fabric belt construction. Follow U.S. bellows splicing procedures for your specific belt requirements. U.S. Bellows recommends that an ensureAsplice test splice be performed prior to actual splice.



After splice is complete, install remaining back-up-bars. Tighten all bolts to 45 Ft. Lbs.

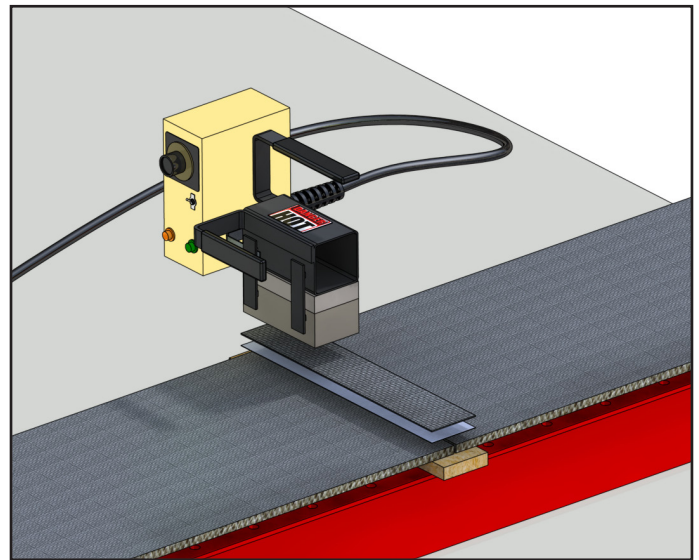
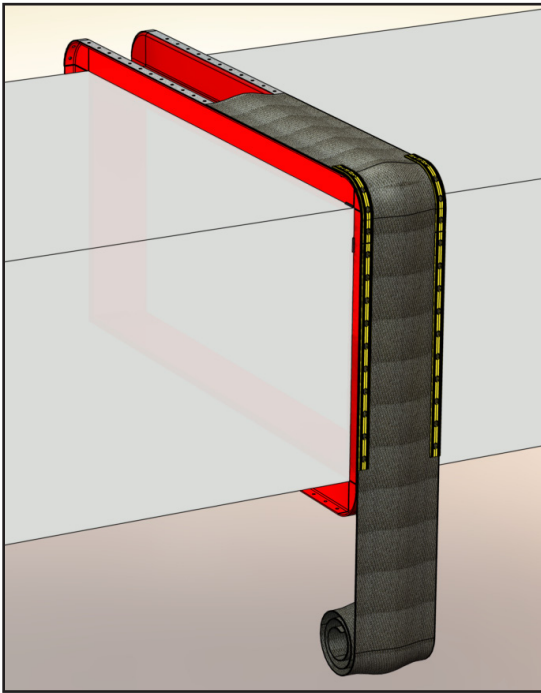


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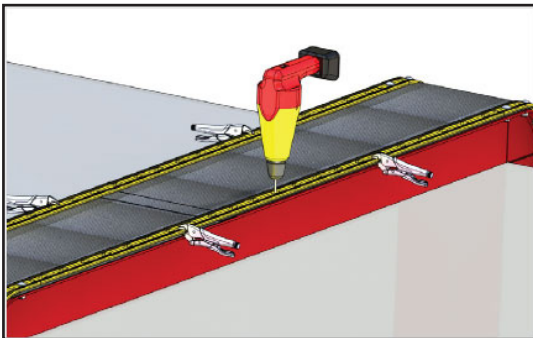
8. FABRIC BELT -- without factory punched holes

If the fabric belt is shipped without factory punched holes, begin installation of one end of the belt at the top of the duct in the center.

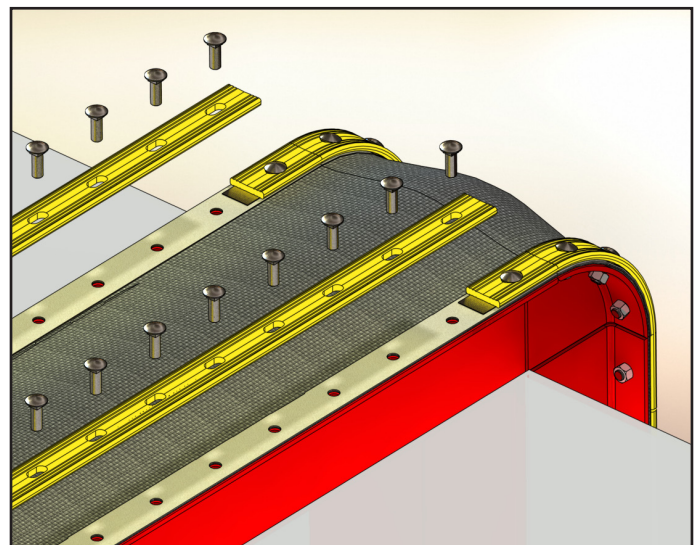
Perform belt splice. Splice techniques vary -- based on the fabric belt construction. Follow U.S. Bellows splicing procedures for your specific belt requirements. U.S. Bellows recommends that an ensureAsplice test splice be performed prior to actual splice.



After splice is complete, install remaining back-up-bars. Tighten all bolts to 45 Ft. Lbs.



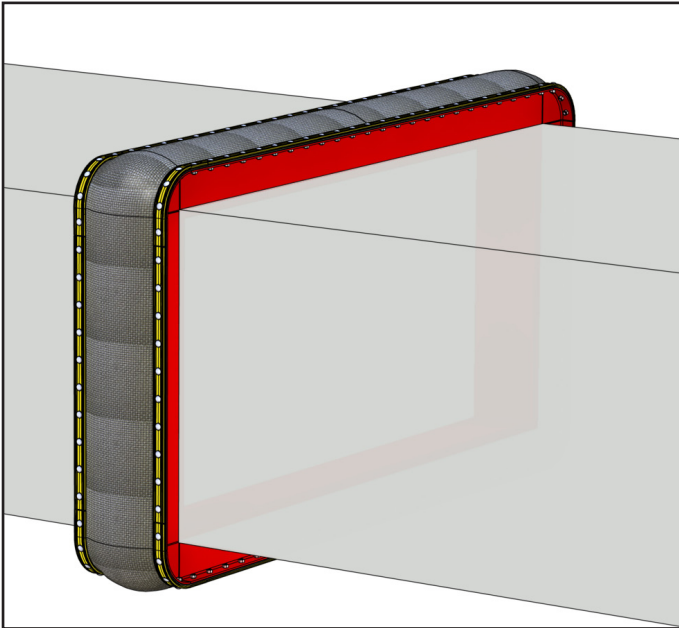
Leave this area of the belt unattached, as later this will be where the belt splice is performed. Use clamps to position the belt and also clamp back-up-bars in place. Using the back-up-bar and frame holes as a guide, drill holes in the belt. At this point, only hand tighten the bolts to assure proper fit up around 2/3 of the joint. Install approximately 2/3 of the belt and back-up-bars, leaving an open area available to perform the belt splice. Tighten bolts snugly.



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9. INSTALLATION COMPLETE

Properly installed expansion joint

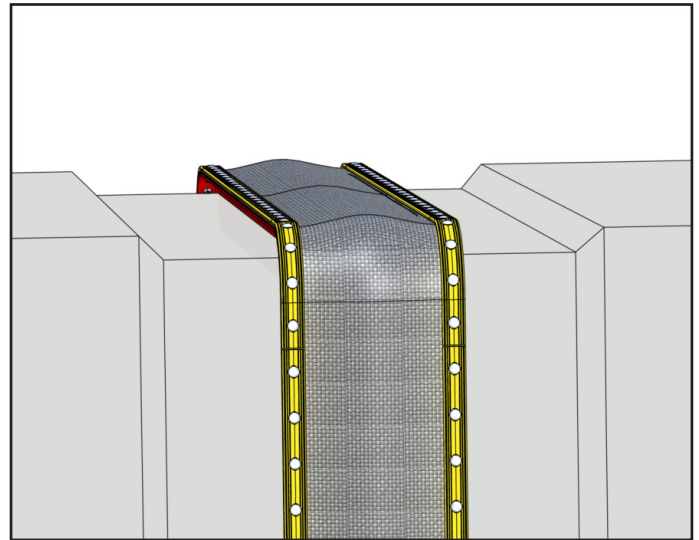


PRE-START UP INSPECTION

- Verify all nuts and bolts are tightened correctly
- Check for surface damage on the fabric belt
- Remove all debris from expansion joint -- i.e. loose nuts & bolts, loose shims, tools, etc.
- Remove any obstructions near the expansion joint which may prevent proper air flow and cause over-heating.
- Verify shipping bars have been removed.

PROPERLY INSTALLED EXTERNAL INSULATION

- Do not insulate over the fabric expansion joint unless specified by the U.S. Bellows drawing (see below for acceptable duct insulation design). In general, the external insulation should allow access to the belt for inspection and replacement. In high temperature applications, insulation should be designed to allow thermal convection in the area of the belt attachment. In applications where the temperature is near the dew point of the gas, the design should minimize cold spots which could lead to corrosion.



FABRIC EXPANSION JOINT RECEIVING AND STORAGE INSTRUCTIONS

UNLOADING AND RECEIVING INSPECTION

It is the purchaser's or receiver's responsibility to witness the unloading of the expansion joints and receiving inspection to see if there is visual damage to the pallet, box or crate (shipping container) in which the expansion joints were shipped. Any such damage is to be noted on the trucker's acknowledgement of receipt of the shipment. Failure to note visual damage to the shipping container can prevent recovery from the shipping company for damage in transit and such unreported damage becomes the responsibility of the purchasing or receiving entity.

If visual damage to the container is apparent, the trucker's acknowledgement of receipt must be clearly noted as such. The container should be opened and if the contents have been damaged, they should be photographed along with the container. Large expansion joint assemblies may be shipped without a pallet or container of any kind. Under all circumstances, any shipping damage must be immediately reported to Customer Service at U.S. Bellows, 6 U.S. Bellows, (855) 591-0906 and the photographs emailed to sales@usbellows.com. U.S. Bellows will analyze the damage and provide further instructions.

STORAGE

Expansion Joints should be stored in a clean and dry environment. However, as a minimum, expansion joints must be stored so that water does not penetrate any closed container. Expansion joints shipped on pallets or shipped without a pallet may be stored out of doors, however it is extremely important that flow liners be in a downward position. Expansion joints with overlapping flow liners should be covered to prevent water from accumulating in the liner.

INSTALLATION

Follow ALL U.S. Bellows Installation Instructions provided. Contact U.S. Bellows if Installation Instructions are lost.

SHIPPING BARS AND / OR INTERNAL SHIPPING RESTRAINTS

Shipping bars and / or Internal shipping restraints will be painted yellow and marked "Remove after Installation".

DO NOT REMOVE THE SHIPPING BARS OR INTERNAL RESTRAINTS UNTIL THE EXPANSION JOINT HAS BEEN COMPLETELY INSTALLED.

All assembled expansion joints are shipped to specified "Pre-set" installation dimensions and it is important that the expansion joints are installed accordingly. The "Pre-set" can be Axial (compression or extension), or Lateral, or Angular, or any combination thereof. Expansion Joints will be shipped "Pre-set" in accordance with approved drawing requirements. If the shipping bars are removed prior to completion of installation by bolting or welding, the expansion joint may "move to a neutral position" and will not function as designed and can cause premature or immediate expansion joint failure. For Installation Questions or Clarifications Phone (855) 591-0906 and Refer to the Job Number.

