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## Storage

Storage environment and time can be important factors in the condition and performance of a fabric expansion joint. Degradation from mildew, adhesion itself and compression set can occur if reasonable care is not exercised during storage. The elastomers used in Holz Rubber expansion joints exhibit excellent resistance to these various forms of attack however, recommended storage practices must be observed and an awareness of deviations must be maintained. After prolonged storage (over one year), inspection by Holz Rubber Co., field service engineer can assure that performance will not be used when long-term field storage is anticipated for a spare expansion joints.

### A.1 Length of Storage

The Storage warranty periods is specified by Holz Rubber Co., based upon the expansion joint style. Notify Holz Rubber Co. for mandatory inspection if storage periods exceeds 12 months. Inspection should be made at least 60 days before anticipated installation date.

Notify Holz Rubber Co., regardless of storage time, if any unusual appearances are noticed when unpacking or installing the expansion joints.

### A.2 Indoor Storage Recommendation

Store joints in their original shipping containers.

Protect from physical damage and abuse.

Expansion joints should not be stored near electrical equipment that may generate ozone.

Store in an area where the temperature will not exceed 150\* F (65\* C).

Store in cool, dry areas to help prevent mildew.

The ideal storage, temperature for the expansion joints is 50\* to 70\*F (10\* to 20\*C) with a maximum limit of 175\* F (80\*C). Expansion joints should not be stored near sources of heat such as radiators and base heaters. The minimum temperature for fluoroelastomeric fabric's is 32\* (0\* C) at time of installation.

## Installation

The following procedural guidelines will aid in the installation of Holz Rubber Co. expansion joints. These installation procedures may have to be modified for conditions at the jobsite or because of expansion joint size. No matter what the condition, however, it is always important to prevent damage by careful handling and supporting expansion joints during installation.

### B.1 Expansion Joint Data

Style	Cover Material	Continuous Max. Temp	Baffle Required	Bolt Torque
300	EPDM/Chlorobutyl	300		

\* Not required if gas has no particulate matter.

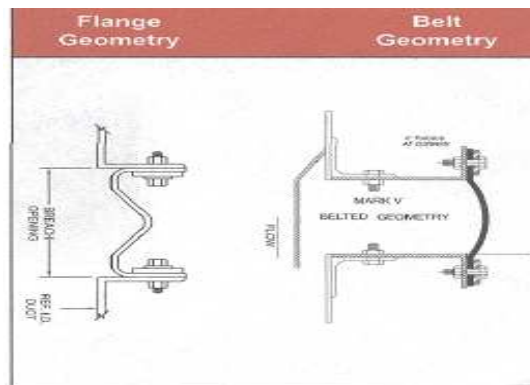
\*\* Ambient air and radiant heat from external heat source should not exceed 300\*F

\*\*\* Ambient air and radiant heat from external heat source should not exceed 400\*F.

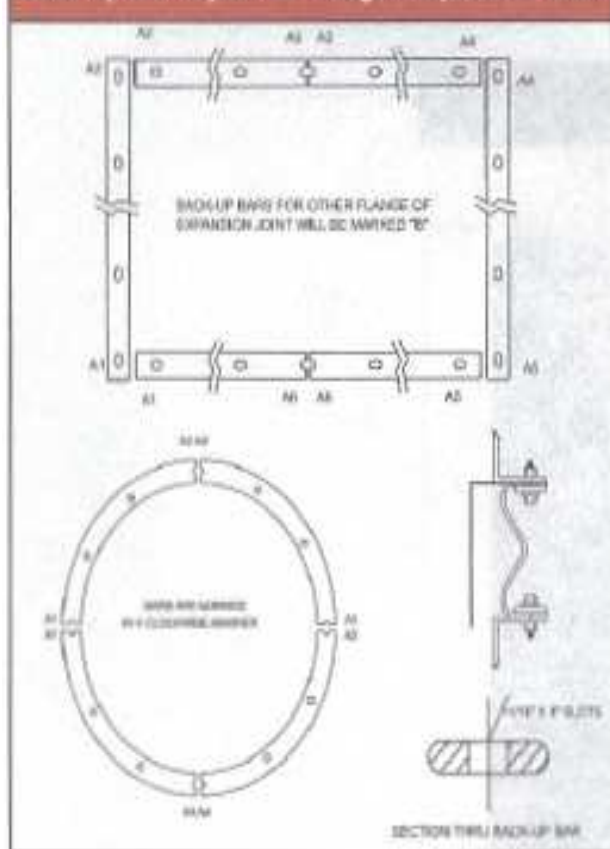
NOTE: Low Temp & High Temp expansion joints can be externally insulated if desired. 300\*F and 400\*F expansion joint torque as given is for 4-in. bolt spacing. For 6-in. bolt spacing. The torque is 55 ft/lb.

### B.2 Requirement

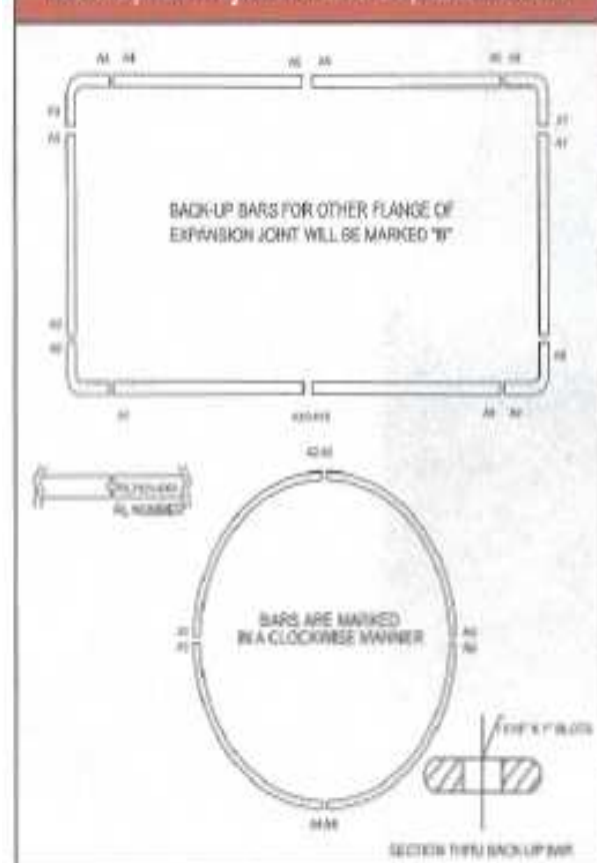
Holz Rubber Co., offers, as standard, two geometric styles of expansion joints. They are the flange type and the belt type. See illustration below. Pre-erection requirements and installation sequences and instructions are basically the same for both styles. The minor differences are called to your attention



### Back-up Bar Layout for Flanged Expansion Joint



### Back-up Bar Layout for Belt Expansion Joint



### B.3 Bolting Orientation

Bolting orientation is critical

On all flanged-style Expansion joints, bolts must be *installed* so they extend *away* from the breach opening and back-up bars. If this is not done, the bolts can damage the expansion joint.

On High Temperature Modified belt-style expansion joints, the bolts should point up through the back-up bars. This allows for better High Temp and Low Temp heat dissipation and longer expansion joint service life. On Low Temperature belt-style expansion joints, bolt orientation is not critical, so that the bolting orientation can be based on ease of installation

### B.4 Pre-Erection Requirements

Breach opening should be checked for misalignment and flange-to-flange dimensions. If flanges are misaligned or exceed breach *opening* shown in the drawings, contact Holz Rubber Co., for consultation immediately, Breach opening tolerance: Axial + 1/4 in. Lateral + 1/2 in.

Flanges for ductwork should be smooth, uniform and flat. Field welds should be ground smooth on faces of flanges.

Clear working area of sharp objects and protrusions. Keep the fabric expansion joint and its parts packaged until installation. When handling the packaged expansion joint, care should be taken not to damage the contents.

Baffles and back-up bars are bundled according to an identification number. When handling, moving or storing, care should be taken not to unpack the bundles or mix member of the bundles.

During welding, precaution should be taken to avoid splatter or slag contact with the expansion joint. Shields or protective blankets should be used. Be sure to remove them when welding is completed., or damaged to the expansion joint may occur during operation. .

### B.5 Unpacking & Identification

Each expansion joint is identified with Holz Rubber Co., part number.

All accessory items are tagged with the part number of their respective expansion joint. In addition Holz Rubber Co., expansion joints and accessories are identified in accordance with the purchaser's requirements.

Obtain back-up bar and baffle drawings for your particular contract. Drawings are supplied by Holz Rubber Co., or the equipment supplier. Identify back-up bar and baffle by part number marked on all back-up bars and on all baffle members. Sets will be marked with matching letters, either A or B. The "A" series will identify one frame (bars for one flange of expansion joint). The "B Series will identify the opposite frame. Sequential expansion joint frames of the same part number will be marked C & D, E & F. See the drawing for details.

Back-up bars supplied by Holz Rubber Co., Normally come in 10-ft. (3m) maximum lengths for ease of handling. Adjoining ends should have no more a 1/8 in. gap. Overlapping of bars is not permitted and they must be trimmed to fit properly. A gap over 1/8 in. (3) can be corrected by placing a stainless steel shim under the bar gap.

## B.6 Flanged and Belt Expansion Joint Installation

These installation requirements may have to be modified for conditions at the jobsite or because of expansion joint size. No matter what the condition, however, it is always important to prevent damage by careful handling and by supporting expansion joints during installation. The sketches illustrate flanged expansion joints. Belt installation is similar.

The fabric expansion joint (and pillow when required) is manufactured with sufficient recompression to allow for duct movement and installation tolerance. If the belt is too loose or too tight, the expansion joint may be damaged. If there is any doubt contact Holz Rubber Co.

## B.7 Installation In Vertical Duct (Expansion Joint in Horizontal Position)

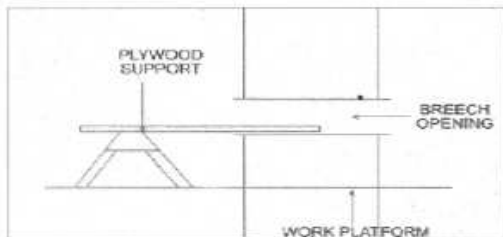
**B.7.1** Breach opening should be checked for misalignment and flange-to-flange dimension. If the flanges are misaligned or exceed the breach opening shown in the drawings, contact Holz Rubber for consultation immediately. Normal tolerance: Axial + 1/4 in., - 1/2 in. Lateral + 1/2 in.

**B.7.2** Flanges of ductwork area of sharp objects and protrusions.

**B.7.4** Place baffles inside of ductwork if part of installation do not weld.

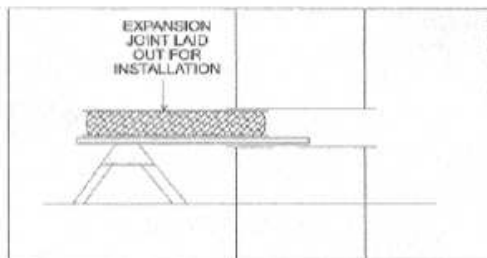
**B.7.5** Build platform of 3/4-in. plywood or other suitable material near ductwork breach. This must be moveable and sufficiently large to lay out expansion joint in approximate installed shape.

**B.7.6** Transport expansion joint to area of installation in its shipping container if possible. If not, expansion joint should be lifted with rope or rubber slings in folded, tied conditions



**B.7** Remove from container, unfolds and lay out the expansion joint in approximate installed position. Exercise care to prevent the expansion joint from coming into contact with sharp objects.

**B.7.8** Inspect the expansion joint thoroughly for damage, both inside and outside. Notify Holz Rubber Co. of any damage for evaluation/recommendation.

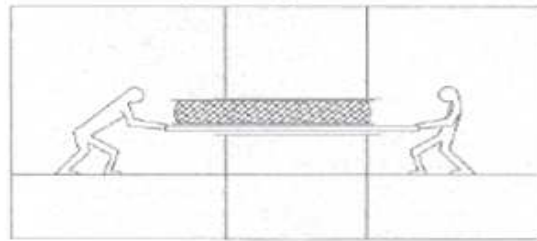


**B.7.9** Compress expansion joints by squeezing together (flange to flange). Tie down with tape in several places to hold compression. Total compressed dimension must be less than the breach opening to allow for clearance during position of the expansion joint in breach opening.

**B.7.10** Using sufficient help, slide plywood with expansion joint into breach opening.

**B.7.11** Continuing to use plywood or other support, place expansion joint in approximate position in relation to flanges. Cut tapes holding joint in compression..

**B.7.12** Position back-up bars over upper flange areas of expansion joint, lining up holes at corners. Make sure joint is properly centered. Install several positioning bolts.



**B.7.13** Bolt back-up bars and expansion joint to upper duct flanges. Bolts on flanged expansion joints are to be inserted with the head of the bolt next to the back-up bar and with the nut next to the duct flange. Reverse bolts for belt joints. If insulating washers are specified, make sure they are installed. They are required for the successful operation of the expansion joint data section B.1

**B.7.14** Remove plywood support from under expansion joint. Leaving the opposite flange in position against the mounting frame.

**B.7.15** Repeat steps for B.7.12 and B.7.13

**B.7.16** Weld baffles into place (see instruction on baffles), if baffles are part of the installation

## B.8 Installation in Horizontal Duct (Expansion Joint in Vertical Position)

**B.8.1** Breach opening should be checked for misalignment and flange-to-flange dimension. If the flanges are misaligned or exceed the breach opening shown in the drawing contact Holz Rubber Co. for consultation immediately. Normal tolerance is: Axial + 1/4 in. (6), - 1/2 in. (13); Lateral + 1/2 in. (13).

**B.8.2** Flanges of ductwork should be smooth, uniform and parallel.

**B.8.3** Clear working area of sharp objects and protrusions.

**B.8.4** Place baffles inside ductwork if part of installation (see instruction on baffles). Do not weld.

**B.8.5** Prepare an open work area to lay out the expansion joint. Area should be adjacent to duct opening or, if necessary, on the ground at the site.

**B.8.6** Transport expansion joint to area of installation in its shipping container if possible. If not, the expansion joint should be lifted with rope or rubber slings in folded, tied condition.

**B.8.7** Remove from container, unfold and lay out the expansion joint in approximate installed position. Exercise care to prevent the expansion joint from coming into contact with sharp objects.

**B.8.8** Inspect the expansion joint thoroughly for any damage, both inside and outside. Notify Holz Rubber Co., of any damage for evaluation/assistance.

**B.8.9** Lash a stiffener bar (wood, steel, or other suitable material) to inside of top expansion joint with nylon tape or rope. This is to aid in hoisting and positioning of joint in breach opening.

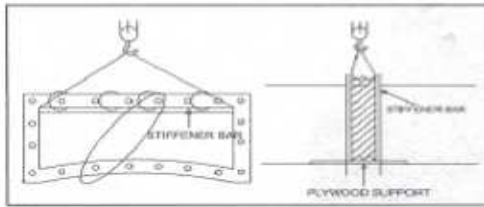
**B.8.10** Compress the expansion joint by squeezing together (flange to flange). Tie down the expansion joint with tape in several places to hold compression. Total compressed dimension must be less than the breach opening to allow for clearance during positioning of the expansion joint in breach opening. **IMPORTANT**– Tie the center bottom of joint to top for support to prevent overloading of corners on large heavy expansion joints.

**B.8.11** Hoist the expansion joint to duct opening and position joint between flanges using rope guides.

**B.8.12** Place a sheet of plywood at bottom of duct opening for support of the expansion joint during installation.

**B.8.14** Position back-up bars over upper flange areas of expansion joint, lining up holes at corners. Make sure the expansion joint is properly centered. Install severely positioning bolts.

**B.8.15** Remove stiffener support.



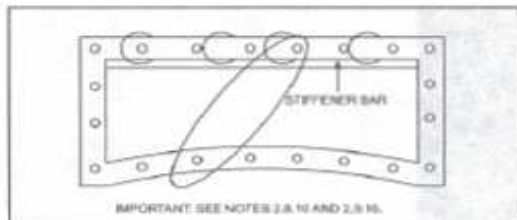
**B.8.16** Bolt back-up bars and expansion joint to upper duct flanges. Bolts on flanged expansion joints are to be inserted with the head the bolt next to the back-up bar and with the nut next to the duct flange. Reverse bolts for belt joints. If insulating washers are specified, make sure they are installed. They are required for the successful operation of the expansion joint. Torque bolts to recommendations in expansion joint data Section B.1

**B.8.17** Remove bottom support

**B.8.18** Bolt the expansion joint to bottom duct flanges.

**B.8.19** Weld baffles into place where required (see installation instruction on baffles).

**B.9** Alternate Method of Installation in Horizontal Duct (Steps B.9.1 to B.9.8 same as B.8.1 to B.8.8)



**B.9.9** Fit back-up bars to both expansion joints flanges insert every 4th or 5th bolt and applying nuts to hold back-up bars in place. Lash a stiffener bar (wood, steel or suitable material) to top of expansion joint with nylon strapping tape. This is to aid in hoisting and positioning of joint in breach opening.

**B.9.10** Before lifting to position, compress expansion joints by squeezing together (flange to flange). After compressing 2 to 3 inches (50 to 75mm), tape in compressed configuration with nylon strapping tape. **IMPORTANT**– Tie the center bottom of the joint to the top for support to prevent overloading of corners on the large, heavy expansion joints.

**B.9.11** Hoist prepared joint to duct opening and position between ducting flanges. Install several positioning bolts to top side of one ducting flange, removing previously inserted bolts as required.

**B.9.12** Install several positioning bolts to sides and bottom of same ducting flange.

**B.9.13** Cut tapes holding joint in compression. Also cut tape holding bottom of joint to top. Remove top support.

**B.9.14** Complete bolting around the one flange and bolt the opposite flange in the same manner (see bolt torque recommendation expansion joint data **Section 2.1**)

**B.9.15** Weld baffles into place where required.

**B.10** Installation of Expansion joints with Field Splice.

**B.10.1** Breach opening should be checked for misalignment and flange-to flange dimension. If the flanges are misalignment or exceed the breach opening shown in the drawings, contact Holz Rubber immediately for consultation.

**B.10.2** Ductwork flanges should be smooth, uniform and parallel.

**B.10.3** Clear working area of sharp objects and protrusions.

**B.10.4** Prepare an open work area to lay out the expansion joint. Area should be adjacent to duct opening or if necessary, on the ground at the site.

**B.10.5** Transport the expansion joint to area of installation in its shipping container if possible. If not, expansion joint should be lifted with rope or rubber slings, in folded, tied condition.

**B.10.6** Remove from container, unfold and lay out the expansion joint in approximate installed position. Exercise care to prevent the expansion joint from coming into contact with sharp objects.

**B.10.7** Inspect the expansion joint thoroughly for any possible damage, both inside and outside. Notify Holz Rubber of any damage for evaluation/assistance.

**B.10.8** The expansion joint is normally spliced at the mid-point of the long side or short side. See Holz Rubber drawing for identification. Find the mid-point of the duct flange on the long side. Start at this point and unfold the expansion joint around the duct., keeping the side marked "outside", to the outside.

**B.10.10** Keep expansion joint supported on a platform while unfolding and positioning. Do not hang expansion joint by the bolt holes, as its weight could tear the holes.

**B.10.11** Locate the corners opposite the splice, Start at either corner and install the lower or upper flange on the back side of the duct. Continue from the corner along the sides and install the back-up bars. **DO NOT INSTALL THE BARS 6 TO 8 FT. ON EITHER SIDE OF THE SPLICE.**

**B.10.12** Compress the expansion joint until the bolt holes along the lower flange align. Install the back-up bars in the



### INSTALLATION OF BAFFLES

Baffles of liner plates are accessory products for our expansion joints. The products are specified by Holz Rubber Co., requested by customers to enhance the operating capabilities of the expansion joints. Refer to the contract drawings for baffle design details. The following are instructions for their installation.

#### C.1 Installation of Baffles

Baffles are specified to protect the expansion joint body from abrasion by particulates in gas stream. Holz Rubber offers an option either to supply the baffles or allow others to supply them. Either case, the baffle design has to be approved by Holz Rubber Co. Refer to Holz Rubber Co., contract drawing for details.

The following are typical sections of various baffle designs. These designs apply in all horizontal ducts and in vertical ducts where the gas flow is downward.

#### C.2 Special Baffle Consideration

In the event our expansion joint is installed in a duct where the gas flow is up, the baffle should be reversed and a deflector plate installed to prevent heavy ash accumulation.

#### C.3 Baffle Installation Procedure

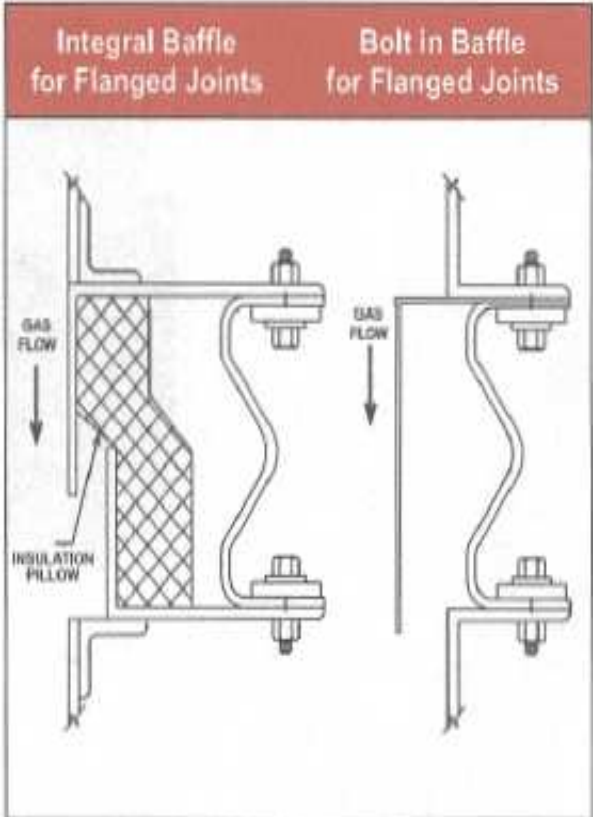
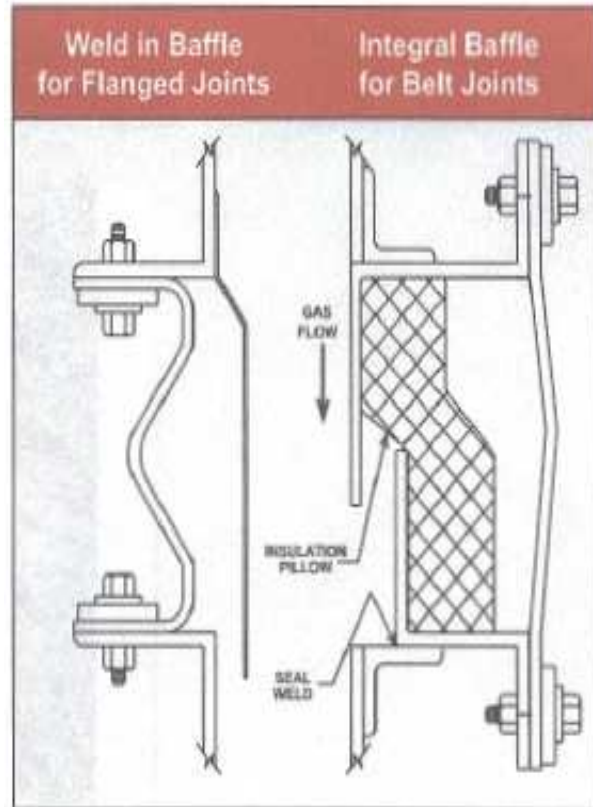
C.3.1 Baffles must be placed inside ductwork at breach opening prior to installation of expansion joint.

C.3.2 If baffles are to be welded, welding should be done after installation of expansion joint, unless the Expansion joint has been prepared for field splicing.

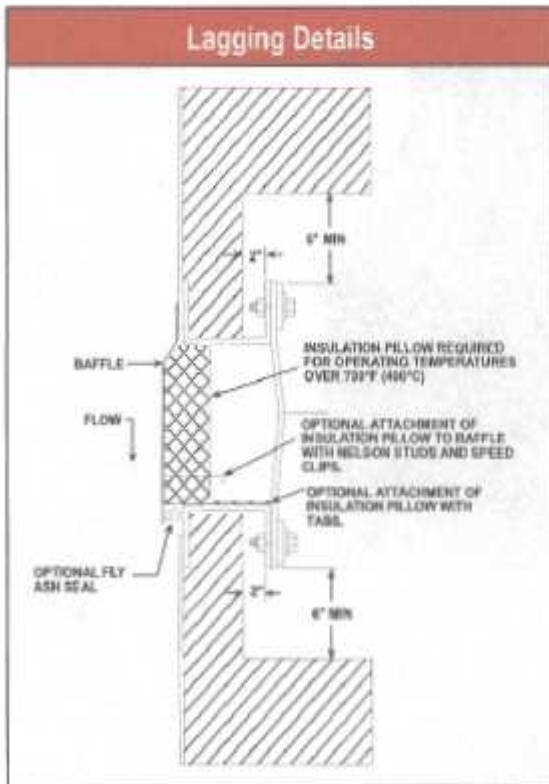
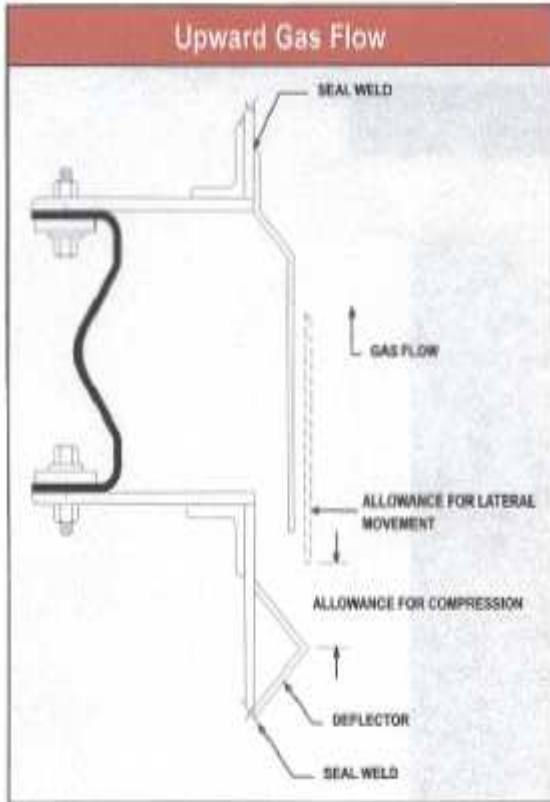
C.3.3 If baffles are to be bolted in, they should be inserted between ductwork flanges and expansion joint flanges. Back-up bars, expansion joint and baffles are then bolted to ductwork.

C.3.4 CAUTION: When welding near expansion joints, always cover splatter. Remove blanket before putting the expansion joint into service.

C.3.5 CAUTION: Install baffle according to contract drawings and gas flow direction.



## INSULATION & LAGGING



D.1 High Temperature insulation pillows and High Temperature expansion joints contain their own insulation. If additional insulation pillow, is needed on insulation is allowed over the outer cover of these style expansion joints. Insulation pillows are normally required for operating temperatures over 750\* F (400\*C)

Insulation pillows are recommended in areas which have, high fly-ash loading to prevent the baffle cavity from becoming full of fly ash and restricting the expansion joint movement. Pillows may be affixed in several different ways. The most common are Nelson studs and speed clips to the baffle or with flange tabs. Refer to Holz Rubber contract drawing for details. Pillows are normally field spliced; refer to Holz Rubber contract drawing for instructions.

Holz Rubber recommends that the insulation should not cover the expansion joint bolts on the duct flange side. Protective cover over the expansion joint (if necessary) must be perforated to allow free air flow over the outside of the expansion joint. Suggested cover is heavy-gauge open or flattened and expanded metal.

If expansion joint is located in area of high outside-heat source or area where there is no air flow over the expansion joint, contact Holz Rubber Co., for installation evaluation.

If expansion joint is located in a pocket where ambient heat can exceed outside cover design temperature, customer must provide fans or other means to lower temperature.

Outside Cover Design Temperatures:

Fluoroelastomer—400\*F (205\*C)

EPDM—300\*F (150\*C).

### D.2 Fly Ash Seals

Holz Rubber can also provide fabric or metal fly ash seals. Refer to Holz Rubber contract drawings for details.

### D.3 Lagging Details

It is not possible to standardize on a lagging detail to suit all situations due to variations in operating temperature, installation design, ambient air, etc. The lagging and insulation detail should be considered a guideline and may have to be adjusted to suite a particular situation.

## INSPECTION & MAINTENANCE

Generally, our Expansion joints are maintenance-free. If the expansion joints are located in an area where fly ash, coal dust or debris might accumulate, inspection to check the accumulation should be implemented as prescribed, below. In order to provide maximum life expectancy for expansion joints, the following inspection and maintenance procedures are recommended.

E.1 Bolting should be torque before start up. Bolting should be re-torque 48 to 72 hours after start-up.

E.2 Fly ash loading inside the expansion joint cavity should be checked monthly.

If ash accumulation appears extensive, unloading can be performed during an outage. If fly ash has become cementations, care should be taken in chipping and breaking so as not to damage joint.

If fly ash proves to be cementations at the first inspection, reduce time between inspections. Solidified ash can cause damage to both the expansion joint and the duct.

This preferred cleaning method—recommended by Holz Rubber engineers—is by vacuuming.

When internal washing of ductwork is necessary. Caution should be taken not to soak Mark V and Mark V modified expansion joint.

E.3 Monthly checking of external fly ash and coals dust accumulation on the outer cover of the expansion joint should be performed.

Remove any accumulation, especially along the back-up bars. Along the lower flange on vertical ducting. Fly ash can be blown off with an air supply or brushed off; care should be taken not to puncture the outer cover.

Coal dust should be removed immediately. An accumulation of coal dust can spontaneously ignite and burn the outer cover of the expansion joint.

Measured should be taken to prevent further coal dust accumulation. Any cover built over the expansion joint should not restrict air circulation or increase ambient air temperature above the outer cover limits.

E.4 Check top area on expansion joints in horizontal ducts for debris that could cut, puncture, or cause high-hear areas by insulating the outer cover.

E.5 Monthly visual inspection of the joint cover should be instituted. Looks for signs of:

- Tears or punctures, Contact Holz Rubber for advice and assistance
  - Corner tears due to movement from thermal excursion.
  - Cracking or flaking of the elastomeric outer cover. Usually this is caused by excessive heat.
  - Loose bolting
  - Warped or cracked mounting frames.
- Pay particular attention to welds.

E.6 Should joint replacement be necessary, retain back-up bars. Check breach opening to insure proper face-to-face dimension. Any question concerning Expansion joint performance or condition, please refer to Holz Rubber for advice or assistance.

E.7 The expansion joint should be shielded from weld splatter or metal-cutting debris. If welding shields or blankets are used, be sure to remove them from the expansion joint when the work is completed.

E.8 The expansion joint should be protected from falling objects or punctures when working near or above an expansion joint.

E.9 External heat sources or heat cavities that can increase the surface temperature of the expansion joint beyond its capabilities should be avoided or shielded. Following a three- to six-month operating period, measurements of the actual duct movements should be made. If measurements vary from original design criteria, consult Holz Rubber Co.











