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NON-METALLIC EXPANSION JOINTS

(Note: the recommendations set forth in this manual are generalities and are intended to cover only the most commonly constructed expansion joints. Due to the extreme number of variables that determine the proper design of an expansion joint, the installer must follow the certified drawing depicting the expansion joint supplied to ensure proper installation. The certified drawing (latest revision) is the governing document for installation and supercedes any recommendations and/or instructions set forth in this manual. It is the installation personnel's responsibility to read and fully understand all aspects of this manual and to acquire the latest revision of the applicable certified drawing before beginning any installation. Should any questions arise during an installation the contractor should contact the factory immediately!. Furthermore, this manual does not relieve the installation personnel from observing good, industry recognized, workmanship practices.

INSTALLATION, OPERATION & MAINTENANCE GUIDELINES

Installation & Maintenance Manual – Revisions

Revisions						
Rev	Page	Section	Description	Date	QA	ENG
0			Original Issue	2.8.01	GCP	RPS

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1.0 Introduction

The following procedures are guidelines that will aid in the installation of PAPCO expansion joints. These installation procedures may have to be modified due to conditions at the job site or because of the physical size of the expansion joint. However, no matter what the conditions it is always important to prevent damage from careless handling and to keep expansion joints supported during installation. The installation contractor/personnel must refer to the latest revision of the specific expansion joint's certified drawing to use in conjunction with this manual. The data contained on the certified drawing will at all times supercede any recommendations set forth herein. PAPCO Industries will bear no responsibility for expansion joints installed in a fashion contrary to the latest revision of the certified drawing.

2.0 Delivery Inspection

PAPCO Industries takes great care when preparing a load of expansion joints for shipment. However, due to the harsh nature of overland transport and to factors outside PAPCO's control, goods may be damaged during shipment.

It is if the utmost importance to document any damage and notify PAPCO immediately. PAPCO cannot be held responsible for shipping damage unless reported within 24 hours of receipt. For all shipments that are FOB Shipping Point, a claim must be initiated with the carrier directly by the consignee.

3.0 Pre-Installation Checks

Before commencing with installation the contractor shall check the following items:

1. Check expansion joint design against the latest revision of the certified drawing.

2. Confirm that the dimensions of duct flanges are correct and according to specification. Especially important are: breech gap opening (duct), installed face-face (joint), and bolting dimensions (joint/ duct).

3. Ensure that the duct flanges and joint flanges are lined-up properly. Make sure to check that the duct flanges are not laterally pre-set unless specified as such. Any unaccounted for lateral pre-set in the ductwork may result in damage to the expansion joint.

4. Ensure proper orientation of the expansion joint with regard to gas flow direction. In all cases the contractor should refer to the latest revision of the certified drawing for guidance.

5. When used, the installation contractor must ensure proper orientation of the baffle liners (aka flow liners) with regards to gas flow direction. In all cases the contractor should refer to the latest revision of the certified drawing for guidance.

6. External insulation (unless otherwise shown on the latest revision of the certified drawing) shall be cut back at least 2" from the expansion joint frame.

WARNING: Please contact PAPCO immediately if any discrepancies are noted and never, install damaged components.

4.0 Job-Site Storage:

For the purpose of this manual it is assumed that the expansion joints are now at the point of installation and will be stored for only a short period of time. For long term storage instruction please contact PAPCO.

1. The environment and manner in which an expansion joint is stored directly affects the performance of that joint. Certain industrial and natural atmospheres can be detrimental to some materials used in the construction of expansion joints leading to premature failure. Disregard for proper storage practice will invalidate the warranty.

2. Inspection of a stored expansion joint and its components should be made at least 45 days prior to the anticipated installation. If during inspection you notice something out of the ordinary or suspect that the expansion joint is damaged contact PAPCO immediately.

3. Store expansion joints in their original shipping containers.

4. Protect from physical damage and abuse.

5. If the expansion joints must be stored outdoors, then store them at least one foot above the ground in a dry area where flooding will not occur. Cover the containers or expansion joints with a tarpaulin or heavy plastic to protect the containers from the weather, humidity and the dampness from the ground.

6. Store in an area where the temperature will not exceed 150°F. Store in a cool, dry area to help prevent mildew.

7. The ideal storage temperature range for the expansion joints is 50–70°F, with a maximum limit of 150°F. Expansion joints should not be stored near sources of heat such as radiators or base heaters. The minimum temperature for fluoroelastomer (FKM) flexible elements is 32°F at time of installation.

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

5.0 Handling:

To ensure trouble free installation and to preserve the reliability and working life of the expansion joint, the following instructions must be observed.

1. For handling purposes, unpacked expansion joint components (i.e. flexible elements & pillows) must be placed on a secure base such as a pallet or platform and must be protected during any site transportation.

2. The attachment points of the lifting equipment must be on the base (pallet).

3. When possible use several persons for carrying components.

4. Do not drag expansion joint flexible elements or pillows along the ground, other equipment, sharp objects, and/or protrusions.

5. Do not attach lifting devises directly to the Expansion Joint Belt or Pillow. (Doing so will result in damage to the component).

6. Ensure components are installed in the correct sequence.

7. Large and heavy expansion joints must be supported during installation and should be installed with appropriate lifting equipment.

8. Expansion joints must never be lifted by attaching the lifting device directly to the flexible element. All non-metallic components (i.e. flexible elements & pillow) should rest on a supporting base. Any lifting lugs or tackles should be attached to the base only.

9. The holes in the expansion joint should never be used for lifting.

10. Assembled expansion joints should never be lifted by their shipping bars.

11. Shipping bars should not be removed until installation is completed, but must be removed prior to plant start up or system test.

12. Protect expansion joint from welding sparks and sharp objects. Never walk on or place equipment on the expansion joint.

6.0 Installation of Unassembled Expansion Joints:

6.1 General Guidelines

Regardless of the type of expansion joint purchased (Composite or Single Layer, U-Shape or Flat) the critical part is the fabric flexible element. It is essential that a good deal of care is taken when handling the expansion joint. Always support the expansion joint adequately and never drag or otherwise pull the joint over other objects. Because of the many variables often encountered in the field, you may have to be a little creative¾ flexible, but within reason.

The expansion joint is manufactured to accommodate a specified amount of movement in the duct system; therefore, it will allow for duct movement and a small amount of mis-alignment. Do not over-stretch or over-compress the flexible element, as this may cause damage. Any questions should be directed to the factory.

Try to place the expansion joint near the work area in its original shipping container. If this is not possible, use care in transporting the joint to the work area. Protect the flexible element if it must be hoisted into place. *(See Handling – Section5.0*)

Breech openings should be checked for misalignment and face-to-face dimensions. If flanges are mis-aligned or exceed the breech opening shown in the certified drawing, contact PAPCO immediately.

Breech opening tolerance should not exceed ±1/8" in all directions.

Duct flanges, or the attachment point of expansion joint to the ductwork, must be smooth, clean and parallel.

The area around the ductwork must be cleared of any sharp objects and protrusions that could damage the expansion joint. If not removable, they should be marked for avoidance.

The expansion joint must be kept packaged until immediately prior to installation. If any handling devices such as crane hooks or forklifts are utilized in handling the expansion joint, the contact surface must be protected by soft cushioning materials.

If welding or burning operations are being performed in the vicinity of exposed expansion joints, fabric welding blankets or other protective covering must be used. These covers must be removed before system start-up.

Do not insulate over or up to any expansion joint without first consulting with PAPCO. PAPCO will not be held responsible for the performance of the expansion joint if it is externally insulated without prior knowledge.

Backing bars should not overlap; they should abut each other. A gap over 1/4” can be corrected by placing a shim under the bars, spanning the gap.

If the expansion joints are shipped “OPEN” requiring field splicing, consult Addendum 1 or 2 of this manual or PAPCO for specific splicing instructions, or contact PAPCO to schedule a field factory technician to perform the field splice.

6.2 Fly-Ash Seals

Fly Ash Seals are fabric membrane that span between the baffle plate (flow liners) and frame. The Fly Ash Seal prevent fine particulate from filling the cavity that is formed between the expansion joint frame halves. *(Note: These instructions should be used in conjunction with the latest revision of PAPCO’s certified drawings.)*

Required Tools: The following tolls are needed for installation (not supplied by PAPCO):

a. Utility knife
b. Tape measure
c. Instrument to cut _” x 1” backing bars
d. Wrench

Required Hardware: The following parts and hardware, provided by PAPCO[1], are needed for installation:

a. Fly Ash Seal material, vermiculite coated fiber glass cloth

b. _" x 1" pre-punched backing bars.

c. 3/8" flat washers

d. 3/8" Acorn nuts

Procedure: Fly Ash Seal material is precut to the required width for the intended service. Therefore, do not trim along the edges.

a. Start the installation of the Fly Ash Seal Material at the approximate mid point of any side of the expansion joint. Pull the material tight over the tops of pre-installed studs. Center of the studs should be positioned approximately _" from the edge of the material. Using a utility knife slit material parallel to the edge at the top of each stud and slit the material against the metal surface.

b. Continue slitting and pushing the material over the studs around the perimeter of the expansion joint. Pleating of the material will be necessary when going around the baffle corners. As a result, wrinkles can be expected to develop. This is normal!

c. When ends meet, fold several times to form an approximate 8" – 12" overlap. Slit through overlap and push over studs as described above.

d. Position backing bars over studs and fasten using washer and acorn nuts as depicted on PAPCO's aforementioned drawings. All backing bars are provided in a single length, field cut as necessary to completely secure Fly Ash Seal.

6.3 Insulation Pillows:

The Installation Contractor should observe good workmanship practices and industry recognized general installation procedures. Make sure that pillow is laid out on a smooth, clean surface. At no point should the pillow be dragged over the ground or other equipment. It is vital to the pillows proper operation that there are no rips or tears in the outer cover. Final assembly must be in accordance with the latest revision of the certified drawing.

It is essential that the insulation pillow is kept dry during installation and until the flexible element (belt) is installed. Among other things the flexible element acts as a weatherproof cover for the pillow. (Take care that water does not enter the expansion joint and saturate the pillow from inside the ducting).

Insulating pillows are used to reduce the temperature that the flexible element is exposed to in high temperature applications, and also to prevent fly ash build-up in the cavity of the expansion joint. A common method of installing insulating pillows is the use of welded pins with speed washers, or integral tabs.

[1] Please consult you purchase order contract for PAPCO's scope of supply.

In order to secure the insulation/accumulation pillow using weld pins, the pins must be welded no more than 6" (unless otherwise shown in the latest revision of the certified drawing) apart on center starting in the corner. Please refer to the certified drawing to determine the pin's distance from the flexible element's mounting surface. The weld pins shall be securely welded to ensure proper functionality and durability. After welding several pins, or on a separate test plate securely weld a pin and test the weld integrity by repeatedly bending the pin. At no point should the pin break off at the weld during this test.

Push pillow onto pins making sure that the pins are penetrating the matting and not just the fiberglass outer over. Pillows should be penetrated approximately 1" or more from the top edge. This value is subject to the specific design of the expansion joint, the installer must check with the factory for further instruction. To ensure that the insulation pillow performs as intended, it should be compressed against the side wall of the expansion joint to the fullest extent possible.

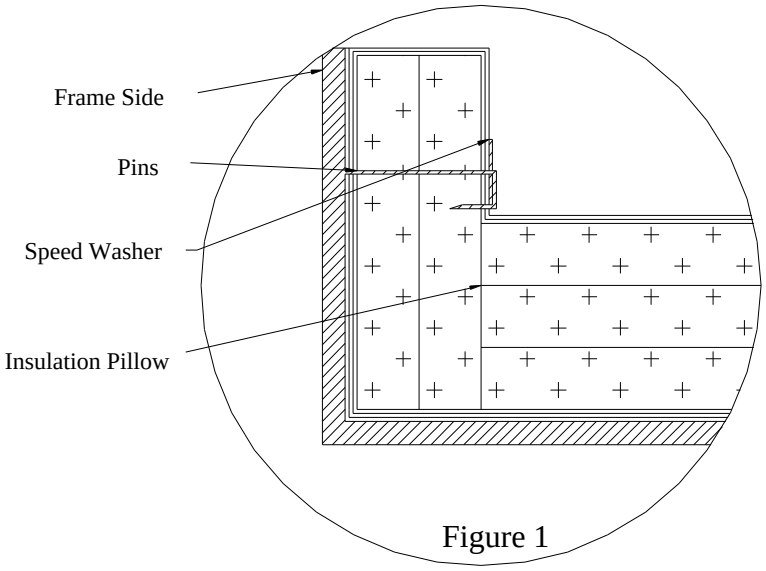


Figure 1

Speed washers must fully pushed onto the pins to secure the pillow. The speed washers must be pushed onto the pins and compressed against the pillow to the farthest extent possible. Papco recommends the use of a small hammer to 'tap' down the speed washers. The pins must be bent back over itself and away from the belt. The tip of the pin shall then be bent back into the pillow (see figure 1). Care must be exercised during bending as pins have nail like ends and can cause injury. The use of pliers or other such hand tools should be used to minimize the chance of injury.

If the insulation pillow has integral flanges, (a.ka. tabbed pillow) wrap the pillow around the frame and secure the flanges to the frame using suitable clamps that will support and secure the pillow adequately while awaiting the installation of the flexible element and backing bars.

6.4 Flexible Element (Belt):

After installing the pillow and fly-ash seal, it is now time to install the Flexible Element otherwise know as the Belt. The belt may be draped over the expansion joint frame ensuring the splice is in a

convenient place or as specified in the latest revision of the certified print. In most cases it is preferable to have the splice along the top horizontal span of the expansion joint. If this is not feasible the next most desirable spot is along the vertical sides of the joint with the least favored spot being on the bottom requiring an overhead splice. In most cases, to assist the installer in positioning, the flexible element is marked at the factory to indicate the corner locations..

The flexible element should be secured to the frame using suitable clamping devises set at appropriate intervals so as to distribute the weight of the belt. Never support the belt at the ends only or with any device that may scratch or cut the belt in anyway.

6.5 Backing-Bars

All backing bars, including all fasteners, must be in place and hand tight prior to final tightening. At this point, it will be possible to adjust the expansion joint flexible element and backing bars to ensure best fit. Backing bars should not overlap; they should abut each other. A gap over 1/4" can be corrected by placing a shim under the adjacent bars, spanning the gap.

7.0 Installation of Pre-Assembled Expansion Joints

7.1 General Guidelines

Before installation carefully review Section 6.0 (Installation of Unassembled Expansion Joints)

Use the lifting lugs (if provided) on a pre-assembled frame to hoist the joint into place.

The expansion joint may need to be compressed in order for it to be installed in the breech gap opening. The compressed dimensions must be less than the breech gap opening to allow for clearance during installation. Pre-assembled joints are not normally pre-compressed at the factory. Shipping bars are used to hold a preassembled expansion joint at the face-to-face specified in the certif8ied drawing.

IMPORTANT: SHIPPING BARS MUST BE REMOVED AFTER INSTALLATION

Some PAPCO pre-assembled expansion joint frames have several holes with seal welded nuts on the inside for fit up bolts. Once in place, the frame may be welded to the mating flange or duct. Consult the latest revision of the certified drawing to determine the specified method of attaching the expansion joint into the ductwork.

At all times, protect the flexible element, especially if welding in the area.

8.0 Fasteners:

Recommended Torque Values	
Composite-type expansion joints	50 ft.-lbs.
Elastomeric-type joints	35 ft.-lbs.

It is important that the proper bolting procedure should be followed!
For U-shaped (flanged) style expansion joints, bolts must be installed so that they extend away from the breech opening and backing bars. The bolt head should be against the backing bar. If installed in the reverse, the bolt'sthreads may damage the expansion joint.

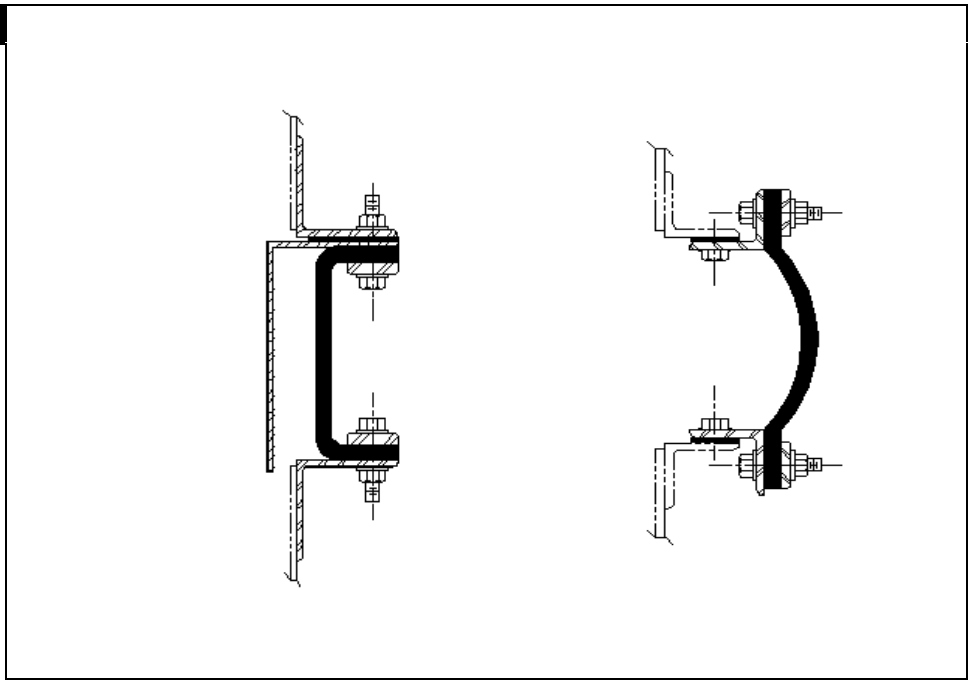
For high temperature flat belt designs (400°F or greater), the bolts should point up through the backing bars. This allows for better heat dissipation and thereby longer life.

For low temperature flat belt joints (Papco Series 300SL and Series 400SL), the bolt orientation is not critical; therefore, use the method that best facilitates installation or as shown on the drawing.

(NOTE: THE RECOMMENDATIONS ABOVE COVERING PROPER BOLT ORIENTATION ARE GENERALITIES. DUE TO THE EXTREME NUMBER OF VARIABLES THAT DETERMINE THE PROPER DESIGN OF AN EXPANSION JOINT, CONSULT THE CERTIFIED DRAWINGSOF THE EXPANSION JOINT SUPPLIED TO DETERMINE PROPER BOLT ORIENTATION.)

FIGURE 1

Examples of Proper Bolt Placement



9.0 Gaskets:

In most instances the flexible element (belt) will act as the sealing gasket and no additional gasket will be required. However, gaskets are required for all metal-to-metal surfaces, unless welds are employed, and for single layer Texflex™ expansion joints.

PAPCO normally includes Teflon® coated fiberglass bolt hole gaskets with our single layer Texflex™ 500 SL expansion joints.

Note: Non-Metallic flue duct expansion joints are designed to be as leak-tight as practical. When an unusual amount of liquid is present within the ducting, or leakage requirements are specified, special caulking or gasket materials can be used when attaching the flexible element to attain desired results. Unless otherwise specified, minor leakage detectable by soap bubble solution, is considered normal and acceptable. High temperature composite expansion joints should not be considered "leak tight" or "zero leakage".

It is important to note, to avoid installation delays, that PAPCO may not have been chosen to supply the gasket or hardware for a bolted in assembled expansion joint. The installer should review the expansion joint's certified drawing for scope of supply.

10.0 External Duct Insulation:

Normally, external duct installation is the responsibility of a separate vendor/contractor. However, external; duct insulation as a rule should never extend right up to the expansion joint frame or cover the expansion joint. Unless, otherwise agreed upon, duct insulation shall terminate no closer than 2" from the expansion joint frame.

11.0 Splicing:

For splicing information please see the following addendum:

Addendum 1: Splicing Texflex™ Products (500sl,500i,600i,1000i,10001/DP,2000i, 2000i/DP)

Addendum 2: Splicing Elastomeric Products (300sl, 400sl)

12.0 Special Considerations:

12.1 Pre-Set Expansion Joints

If a joint is to be assembled in the field and then preset we recommend that the expansion joint is assembled on the ground then pre-set as a whole assembly. The best method to pre-set a fully assembled expansion joint will vary based on the geometry and size of the joint so please call the factory.

If it is impossible to first assemble the joint then pre-set it prior to installation, the contractor must 1st check and verify the pre-set on the latest revision of the certified drawing and prior to installing the joint's flexible element, and pillow or fly ash seal. Contractor must then carefully install the flexible element and pillow and/or fly ash seal in such a fashion as to replicate the offset. For flexible elements that are supplied "open" (ie un-spliced) please check to verify the location of the splice on the drawing.

12.2 Adjacent Equipment

The installation contractor should take special care to ensure that any adjacent equipment such as Damper Blades or Duct Supports will not interfere with the expansion joint during installation or operation.

13.0 Pre Start-up Check List:

1. Ensure that all bolts are tightened to the proper torque value.

2. Check that misalignment / offsets do not exceed installation tolerances.

3. Make sure that there are no surface defects or damage.

4. Remove any surface debris.

5. Ensure that all shipping bars and protective covers are removed before startup/testing.

6. Ensure that there is clear air-flow around the expansion joint.

7. Check that external duct insulation is terminated at least 2” back from the expansion joint frame. (or in accordance with the certified drawing)

14.0 Operation and Regular Maintenance:

Once installation has been properly completed, and the expansion joint ready for use, nothing further need be done in order to operate the unit.

For most applications, PAPCO expansion joints are maintenance free but should be checked regularly for signs of damage or degradation. The first sign of damage or degradation to an expansion joint is usually visible on the flexible element (belt); look for discoloration, peeling, or rips/tears. Please note that discoloration may also be due to chemical/acid attack. Even before such visible signs present themselves, thermal imaging can be used to identify hot spots and potential problem areas.

When the expansion joint is subject to fly ash laden flue gas, a maintenance schedule should be developed and the joint should be periodically vacuumed.

Regular inspection should include checks for the following:

· Adequate ventilation around the expansion joint.

· Loose or missing fasteners.

· Signs of damage or leakage, such as local staining, cracks in the belt or frame and adjacent metalwork, discoloration, peeling, and rips/tears.

ADDENDUM 1

INSTRUCTIONS FOR FIELD SPLICING

TEXFLEX®
PAPCO Series 500SL / 500i / 1000i / 1000i/DP /2000i / 2000i/DP
NON-METALLIC EXPANSION JOINTS

BELT MATERIALS

The Papco Series 500SL belt consists of a single layer of Texflex® 1400NP, with a 2" wide gasket of Teflon™ coated bolt hole tape on the innermost gas side along each edge. The Papco Series 500i, 1000i, 1000i/DP, 2000i, and 2000i/DP belts each consist of one layer of Texflex® 1400NP and three to five additional layers of other materials. The layer-by-layer construction for each belt from the outermost (ambient) side to the innermost (gas) side is given in the table below:

LAYER	500SL	500I	1000I	1000i/DP	2000I	2000i/DP
1 (outermost)	Texflex® 1400NP with edge gaskets	Teflex® 1400NP	Texflex® 1400NP	Texflex® 1400NP	Texflex® 1400NP	Texflex® 1400NP
2		fiberglass textile insulating ply	fiberglass textile insulating ply	fiberglass textile insulating ply	fiberglass textile insulating ply	fiberglass textile insulating ply
3		0.5" thick fiberglass insulation	1.0" thick fiberglass insulation	0.5" thick fiberglass insulation	1.0" thick ceramic insulation	0.5" thick ceramic insulation
4		fiberglass textile retaining ply with integral cuffing	fiberglass textile retaining ply with integral cuffing	Texflex™ 700GS or Teflon Layer	silica textile retaining ply with fiberglass cuffing attached	Texflex™ 700GS or Teflon Layer
5				0.5" thick fiberglass insulation		0.5" thick ceramic insulation
6 (innermost)				fiberglass textile retaining ply with integral cuffing		silica textile retaining ply with fiberglass cuffing attached

1.0 Selection of Splice Location

The location of the splice should be on top of a horizontal duct and on the most accessible side of a vertical duct. If the splice cannot be on the top, the most accessible side is recommended. Never position the splice on the bottom of a horizontal duct. In this position, an effective splice cannot be guaranteed due to difficulties of working overhead.

2.0 Belt Installation

Place the flexible element on the frame (Read Main Body of Installation, Operation & Maintenance Guidelines Carefully before commencing with installation).

For rectangular joints, bolt down the corners first, then the three sides not containing the splice section. It is preferred to have the splice section on top or on the side of the joint, *not* under the expansion joint. For round expansion joints, begin by bolting on the side of the joint opposite the splice area. Continue to bolt up around the perimeter of the expansion joint making sure to leave enough of the flexible element loose so it may be spliced without too much trouble. As with rectangular joints, splicing on the top or side is preferred.

3.0 Splicing Procedure

You will need a splice kit obtained from PAPCO containing all the tools and materials necessary to perform a splice. To order a splice kit, call 201.767.9051 and ask for sales. For a list of the contents of a PAPCO full splice kit, refer to Addendum 3 of these instructions. If the purchase order only called for a splicing iron, you will need to obtain the other items on your own.

1. Unbolt the flexible element approximately four feet to each side of the splice. The ends of the flexible element should overlap each other by at least 6”(see figure 1). Cut off any excess flexible element and remove staples 24” back from each end (see figure 2)

Figure 1 – 6” Overlap

Figure 2 – Remove Staples

2. Overlap the outer retaining ply and prepare to splice the insulation layers *(Applies to composite joints only, for series 500SL jump to section 5.0)*

    a. Overlap the two ends of the innermost retaining ply/cuffing and staple edges together (see figure 3).

    b. Reduce the main insulating layer to _ its original thickness by simply peeling off material using your fingers. Now, cut back half of each end forming two 'half-thickness' tabs of equal length that can be laid one upon the other to form one layer that matches the original thickness. Spray adhesive on the tabs and overlap fully to form a composite layer of full thickness.

Figure 3 – Retaining Ply

Figure 4 – Overlapping Insulation Layers

3. Prepare and Splice the internal Gas Seal Layer. ***(This section applied to Dew Point Style Joints Only (Series 1000i/DP & 2000i/DP). For all other composite style joints skip to section 4)***

    a. Clean both ends of the splice area thoroughly by wiping away any dirt with a clean *dry* cloth. ***(Use of any solvent or water to clean the splice area will impede the adhesion of the splice.)*** (see figure 5)

    b. Cut a piece of PFA adhesive film 8" wide x (the width of the gas seal layer + 4"). Fold the film in half lengthwise, making a strip of PFA adhesive film 4"wide x (the width of the gas seal layer + 4")

    c. Staple this strip to the edge of the gas seal layer, with 2" hanging past each side and 0.25" past the edge. ***In order to maintain non-permeability make sure that staples are through the outermost edges of the gas seal layer beyond the bolt holes.***

    d. Staple the overlapping gas seal layers along the edges, thereby sandwiching the PFA adhesive film between the layers. ***In order to maintain non-permeability make sure that staples are attached on the outermost edges of the belt and beyond the bolt holes.***

Figure 5 – Gas Seal Layer

Figure 6– Staple Overlapping Gas Seal Layer

e. Position a 0.5”-thick plywood board, upon which a 0.5”-thick single layer of fiberglass insulation has been placed, under the gas seal layer to provide a firm surface against which to press the splicing iron. ***In order to prevent heat dissipation from the splicing iron <u>DO NOT</u> substitute metal plates for this step. You will have virtually <u>NO</u> chance of successfully heating the iron or completing an acceptable splice.*** (See figure 7)

You are now ready to splice the Gas Seal Layer.

f. Place the splicing iron on several layers of fiberglass insulation atop a wooden board. Turn the temperature dial on the iron to 690°F (700°F max) and push the power switch in. The pushbutton power switch along with a green temperature indicator will light when the iron is on. The green temperature indicator light will go out when the iron has reached the set temperature. Please note that during the splicing process the green light may go on; this simply indicates that the temperature of the iron has fallen below the set temperature and heating of the iron’s surface has been resumed, this is normal. ***In order to prevent heat dissipation <u>DO NOT</u> substitute metal plates for this step. You will have virtually <u>NO</u> chance of successfully completing a splice.***

Figure 7 – Position insulation covered plywood board.

Figure 8 – Position iron and press firmly.

g. Once the splicing iron iron is up to temperature, place its surface on the gas seal layer and press firmly in one place for at least three (3) minutes (See figure 8). The first press should be positioned parallel to the belt width, covering the 0.25" of PFA adhesive film extending past the gas seal layer. After three minutes this PFA adhesive film should appear to be melted into the gas seal layer.

h. Using a slight back-and-forth twisting motion, carefully remove the iron from the Texflex™ surface; an abrupt motion may cause the splice to open. Then, while the splice area is still hot, press the area gently but firmly using the wooden pressing block (small piece of a 2x4 is suitable); avoid scrubbing the material's surface with the block, as this may tear the gas seal layer. This helps to achieve a good bond, while at the same time the block draws out some of the heat left by the iron.

i. Repeat this procedure along the entire edge of the gas seal layer, overlapping each preceding pressing by 1". The hot iron should leave a slight mark on the material; use this mark to position the iron for each successive pressing or make a reference line with with a marker.

j. Once you have completed the splice of the Gas Seal Layer, fold over and splice the remaining insulating layer (Repeat Step 2b)

4. Overlap the inner fiberglass cloth layer and prepare the Texflex™ outer cover for splicing.

Figure – 9 Overlap inner fiberglass layer.

5. Splice the Texflex™ Layer *(All belt types).*

a. Clean both ends of the splice area thoroughly by wiping away any dirt with a clean *dry* cloth. ***Use of any solvent or water to clean the splice area will impede the adhesion of the splice.***

b. Cut a piece of PFA adhesive film 8” wide x (the width of the Texflex™ + 4”). Fold the film in half lengthwise, making a strip of PFA adhesive film 4” wide x (the width of the Texflex™ + 4”). (See Figure 10).

c. Staple this strip to the edge of the top Texflex™ layer, with 2” hanging past each side and 0.25” past the edge. ***In order to maintain non-permeability make sure that staples are attached on the outermost edges of the belt and beyond the bolt holes.*** (See Figure 11)

Figure 10 – Position PFA adhesive film

Figure 11 – Staple edges of Texflex™

d. Staple the two layers of Texflex™ along the edges, thereby sandwiching the PFA adhesive film between the layers. ***In order to maintain non-permeability make sure that staples are attached through the outermost edges of the Texflex™ and beyond the bolt holes.***

e. Position a 0.5”-thick plywood board, upon which a 0.5”-thick single layer of fiberglass insulation has been placed, under the Texflex™/PFA layers to provide a firm surface against which to press the iron. ***In order to prevent excessive heat dissipation from the iron <u>DO NOT</u> substitute metal plates for this step. You will have virtually no chance of successfully completing a splice if you use a metal plate.***

Figure 12 – Position insulation covered plywood board.

f. Place the splicing iron on several layers of fiberglass insulation. Turn the temperature dial on the iron to 690°F (700°F max) and push the power switch in. The pushbutton power switch along with a green temperature indicator lamp will light when the iron is on. The green temperature indicator light will go out when the iron has reached the set temperature. Please note that during the splicing process the green light may go on; this simply indicates that the temperature of the iron has fallen below the set temperature and heating of the iron's surface has been resumed, this is normal. ***In order to prevent heat dissipation <u>DO NOT</u> substitute metal plates for this step. You will have virtually <u>NO</u> chance of successfully completing a splice.***

g. Once the splicing iron is up to temperature, place it on the Texflex™ material and press firmly in one place for at least three (3) minutes or five (5) minutes for Texflex™ 2200NP (see figure 13). The first press should be positioned parallel to the belt width, covering the 0.25" of PFA adhesive film extending past the Texflex™. After three minutes or five (5) minutes for Texflex™ 2200NP, this PFA adhesive film should appear to be melted into the Texflex™.

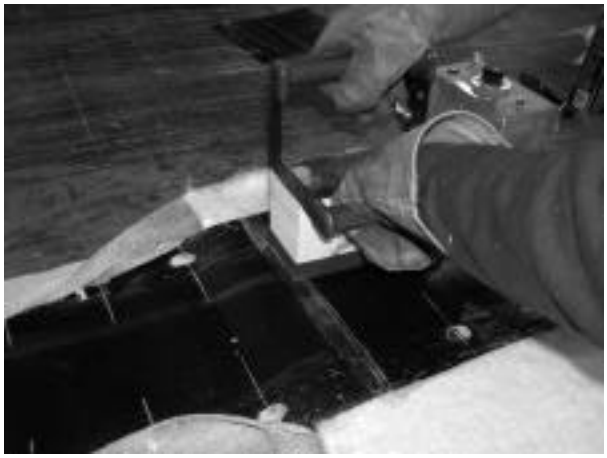


Figure 13 – Position iron and press firmly.

h. Using a slight back-and-forth twisting motion, carefully remove the iron from the Texflex™ surface; an abrupt motion may cause the splice to open. Then, while the splice area is still hot, press the area gently but firmly using the wooden pressing block; avoid scrubbing the Texflex™ surface with the block, as this may tear the Texflex™ . This helps to achieve a good bond, while at the same time the block draws out some of the heat left by the iron. (See figure 14).

i. Repeat this procedure along the entire edge of the Texflex™ material, overlapping each preceding pressing by 1". The hot iron should leave a slight mark on the Texflex™; use this mark to position the iron for each successive pressing or make a reference line with a marker.

Figure 14 – Press Splice with a wooden block.

j. Once the belt has been pressed across its entire width, fold the cuffing back over the side of the belt and secure with spray adhesive. Once dry, further secure the cuffing by pressing staples through the entire belt at the very edges***. (In order to maintain non-permeability make sure that staples are attached on the outermost edges of the belt and beyond the bolt holes).***

Figure 15 – Fold cuffing over edges and secure with glue

Figure 16 – Press staples at edges through the flexible element.

6. The splice is now complete.

Figure 17 – Completed splice of flexible element.

NOTE: If the PFA does not appear melted into the Texflex™ material, poor adhesion is indicated and the splice most likely will not be successful. Contact PAPCO for assistance.

ADDENDUM 2

INSTRUCTIONS FOR COLD SPLICING

FKM & EPDM

PAPCO Series 300SL & 400Sl NON-METALLIC EXPANSION JOINTS

1.0 Preliminary Considerations

Avoid locating the belt splice in the corners or bottom of the expansion joint! Always make the best effort to position the splice so as to have flat work surface, thereby speeding up the splicing procedure.

Carefully review the entire installation manual before proceeding with splicing.

2.0 Surface Preparation

1. Place a 1/4" thick steel plate or 1/2" wooden board on top of the flexible element mounting flanges and under the splice area (see figure 18).

2. Mark and cut the ends of the belt so a 12" overlap will be achieved.

3. The Series 300 SL and 400SL belt is constructed of 5 plies: 3 elastomer and 2 fiberglass. The innermost 2 plies of elastomer and 1 ply of fiberglass must be removed from the outer flap and the identical outermost plies must be removed from the lower flap for a distance of 12".

4. The removal of these plies may be accomplished by first scoring a line using a sharp utility knife across the face of each flap surface 4" back from the edge. Use great care not to cut into the plies, which are to remain. Using a pair of pliers, strip off the material. Repeat this process until all 12" has been removed.

Figure – 18 Score line with utility knife.

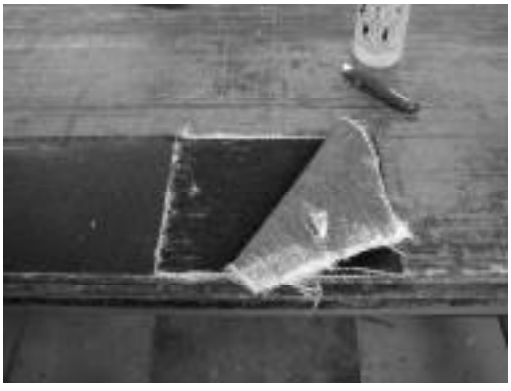


Figure 19 – Strip off layers.

5. At the interface of the upper end and lower flaps on both sides, grind a taper into the elastomer ply for a distance of 1” (see figure 20).

Figure 20 – Grind taper into elastomer ply.

3.0 Application of Cold Splice Cement

1. Mix Cold Splice Cement with hardener in accordance with instructions on side of can. Make sure to do this in a well-ventilated area.

2. Place Cold Splice Cement mixture onto exposed belt area and spread evenly with a brush (see fighre 21).

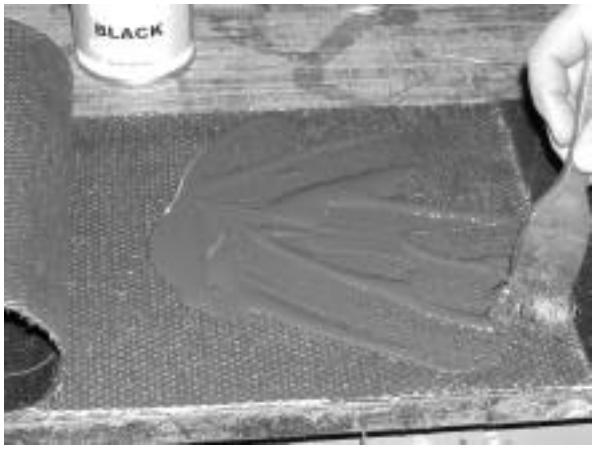


Figure 21 – Evenly spread cold splice cement.

3. Allow this flap to dry and repeat steps 3a and 3b on overlapping flap.

4. Evenly spread another layer of cold splice cement over each flap. Overlap ends and press firmly down to ensure good adhesion. Allow splice to cure for a minimum of 20min.

5. If good adhesion is achieved remove wood board and install backing bars. Your splice is now complete (see figure 22).

Figure 22 – Completed splice of flexible element.

Addendum 3

Splice Kit for Texflex™ Products

STANDARD ITEMS

ITEM	QTY
Splicing Iron	1 each
Pair of Scissors	1 each
Stapler	1 each
Staples	1 box
Fiberglass Insulation, 0.5” thick	2 pieces
PFA Film	1 sheet
Seam Cover Material	1 piece
Wooden Pressing Block	1 each

PRICING

ITEM	PRICE
Splicing Iron	1 each
Pair of Scissors	1 each

Notes:

The 0.5”-thick plywood board mentioned in the field splicing instructions is not included, this item must be cut to size on site.

The splice kit is contained in a reusable locking carrying case. Case is shipped from factory unlocked; keys are located within case.

Addendum 4

Troubleshooting PAPCO Splicing Iron

1.0 Introduction:

PAPCO thoroughly tests each iron before shipment. If your iron is not reaching the required 700°F or if you are not able to achieve a good splice please refer to the following trouble shooting pointers.

2.0 The iron is not reaching the required temperature!

1. Is the iron resting on a metal plate? *A metal plate will act as a heat sink drawing the heat away from the iron. This is the most common cause of an iron not reaching or maintaining the proper temperature.*

2. Have you placed insulation matting under the iron? *Resting the iron on insulation matting will help the iron trap heat and reach the required temperature faster. If you're working in very cold or windy areas you should completely cover the lower half (from handles down) of the iron with insulation matting.*

3. How long have you given the iron to heat up? *PAPCO irons take anywhere from 20min ~ 40min (depending on ambient conditions) to reach 700°F. Please be patient.*

4. Have you checked the Voltage? / Is the fuse is blown? *Lower than expected voltage can cause the fuse to blow and prevent the iron from working properly.*

5. How long is the extension cord you are using? *There is a possibility of a voltage drop across extremely long runs of extension cords. Try to limit extension cord lengths to 50'.*

3.0 The splice is not holding!

1. Have you placed the PFA in between the Texflex™ Layers? *PFA Adhesive film is a clear film that is similar in appearance to cellophane. The splicing procedure melts the PFA and seals the overlapping Texflex™ layers together. Without PFA film splicing is impossible!*

2. How long have you been pressing down on the Iron / Splice Area? *Too long or not long enough can be reasons for a splice not holding. If you are not pressing long enough (3 min. for 1400NP or 5min. SJ2200NP) you are not giving the PFA time enough to completely melt and adhere to the Texflex™. If you press too long you run the risk of overheating the PFA to the point where, in a liquid state, it runs off the splice area and prevents you from achieving adhesion.*