

- 1) The expansion joint will be shipped from the factory with the slip pipe(s) and packing installed.
- 2) Loosen the packing gland bolts enough to permit the slip pipe to move inside the body. (see fig 1)
- 3) Stab the slip pipe fully into the body until it engages the internal stop. Place a reference mark on the slip pipe for future check of proper amount of withdrawal.
- 4) Withdraw the slip pipe to the proper position based upon the following calculations. See step 4a, 4b, 4c or 4d.
- 4a) Expansion joints to accommodate thermal expansion and contraction:

Withdraw the slip pipe to its proper position based on the temperature at the time of installation. The amount of withdrawal is based upon the following formula:

$$\text{Amount of slip pipe withdrawal} = \frac{(\text{Max operating temp} - \text{Installation temp})}{\text{Total temp range}} \times \text{Total axial movement}$$

Example:

Maximum operating temperature	= 120°F
Installation temperature	= 75°F
Minimum operating temperature	= -30°F
Temperature range	= 150°F (120 - -30)
Total axial movement	= 10"

$$(120-75) / 150 \times 10 = 3" \text{ Total slip pipe withdrawal}$$

For 611 single end expansion joint -- withdraw slip pipe 3"

For 612 double end expansion joint -- withdraw slip pipe 1 1/2" each end

- 4b) Expansion joints in stable vertical pipelines to accommodate subsidence of the supporting structure (building, bridge, tank, etc.):
- 4c) Expansion joints in vertical pipelines to accommodate subsidence of the pipeline away from a stable supporting structure (building, bridge, tank, etc.):

Fully withdraw the slip pipe. For Smith-Blair standard expansion joints withdraw 10". Note - Limit rods are recommended for this application as a means of tracking the slip pipe movement.

Fully stab the slip pipe(s) into the body until they contact the internal stop. Note - Limit rods are recommended for this application as a means of tracking the slip pipe movement.

- 4d) Expansion joints to accommodate thermal expansion and contraction plus subsidence of the supporting structure:

Calculate the withdrawal and position the slip pipe based upon the temperature at the time of installation. (See instruction 4a. above.)

Calculate the amount of movement each expansion joint will be required to accommodate due to shortening of the pipeline caused by subsidence of the supporting structure. Withdraw the slip pipe the additional amount required. Total subsidence and shortening of the pipeline should be furnished by the design engineers and geologists. Assign this figure to each expansion joint according to the amount of pipeline it is protecting.

Example:

A pipeline is being laid on a concrete bridge under construction. Calculations per 4a. above show that at installation the slip pipe should be withdrawn 3 inches to accommodate thermal expansion and contraction.

Calculations by the design engineers show that when the concrete bridge deck is poured, subsidence will occur that will require the expansion joint to absorb 2 inches of additional axial movement.

3 inches thermal plus 2 inches subsidence equals 5 inch slip pipe withdrawal.

For 611 single end expansion joint -- withdraw slip pipe 5"

For 612 double end -- withdraw slip pipe 2 1/2" each end

- 5) Tighten the packing gland bolts evenly alternating from side to side to advance the packing gland evenly. Apply only sufficient torque to prevent leakage. Over-tightening can cause premature packing wear. (see fig 2)

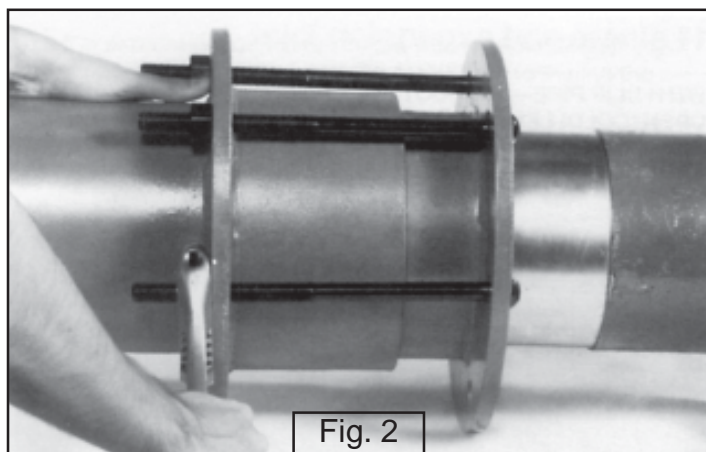


Fig. 2

- 6) Connect the expansion joint into the pipeline by the method provided. Check the reference mark on the slip pipe (Instruction 2) to be sure the slip pipe remains withdrawn the proper distance.

7) If the expansion joint is furnished with a lubricating fitting on the packing chamber, lubricate at this time following the special instructions included.

- 8) Skip this step if limit rods not furnished. (see fig 3) Position the limit adjusting nuts beyond the limit ring as follows:

$$\begin{aligned} \text{Position of limit adjusting nuts} &= \\ &\text{Total axial movement of expansion joint} \\ &\text{- distance of slip pipe withdrawal} \end{aligned}$$

Example:

$$\begin{aligned} \text{Total Axial Movement of Expansion Joint} &= 10'' \\ \text{Withdrawal of Slip Pipe} &= 3'' \\ 10'' - 3'' &= 7'' \text{ Limit rod nut position} \end{aligned}$$

For single end expansion joints -- position limit adjusting nuts 7" beyond limit ring

For double end expansion joints -- position limit adjusting nuts 3 1/2" beyond limit ring each end

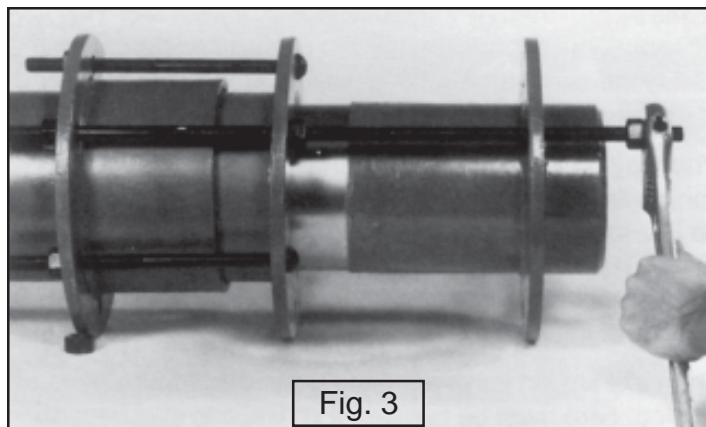


Fig. 3

- 9) Check to ensure that the pipeline adjacent to the expansion joint is properly guided and supported to provide free and concentric movement of the pipe through the packing chamber.

10) For several days after installation, the expansion joint should be inspected and the packing ring adjusted so the packing maintains a seal.

11) Frequency of future inspections and maintenance will depend upon the amount of axial movement, frequency of movement, operating pressure, temperature, type of packing used and proper adjustment of the packing gland.