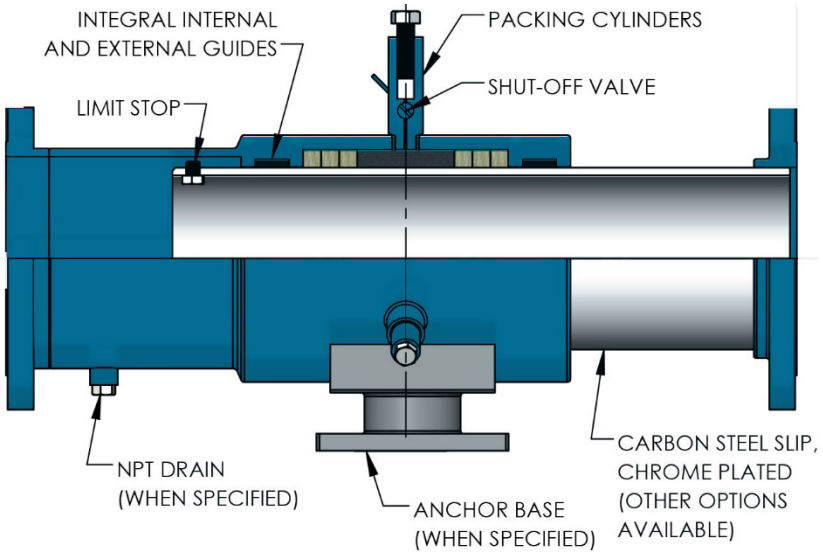




RAM-PACK SLIP TYPE EXPANSION JOINT

Recommended Operating Instructions



The Flexicraft Ram-Pack expansion joint uses packing that includes a “slip” that moves through the packing/packing cylinder to allow repacking when in service. They are designed to accommodate only axial movement, with no lateral movement allowed. All expansion joints are shipped from the factory in the fully open position, for compression only, unless otherwise specified on the order. It is assumed they will be installed at ambient temperature, approximately 70°F.

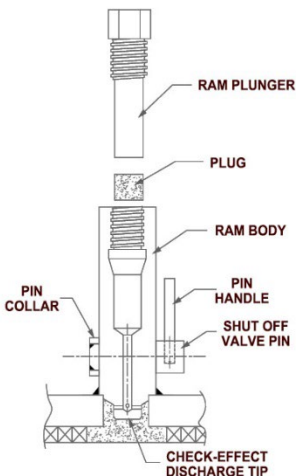
The best procedure for installing the expansion joint is to first install the pipe, pipe supports, hangers, and guides between two main anchors. Then cut the opening for the joint. The slip surface must be carefully protected.

If an anchor base is included, securely align, level and fasten down the base. Do not connect piping to the slip ends at this time.

Note that when the expansion joints are packed at the factory, the packing is pressed into the stuffing box, but most packings will compress further under heat. If any leakage is seen during startup, additional semi-plastic plug packing should be injected uniformly through all rams until the leak stops. The joints should then be watched for leaks. Do not overpack.

Packing Injection

The shut off valve should normally be in the off position during operation, with the pin handle perpendicular to the



RAM WITH SHUT-OFF VALVE

ram packing cylinder. Remove the packing bolt from the ram packing cylinder. Insert one semi-plastic packing plug into the packing cylinder. Reinstall the packing bolt until it is snug against the packing plug. Open the shut off valve and continue to tighten the packing bolt until it bottoms out. Then turn off the shut off valve. Inject packing plugs equally through all ram cylinders.

The procedure may be repeated, and it is suggested to lubricate the ram threads with an anti-seize compound. Do not overpack. No special tools are required.

Packing Removal

The expansion joint is designed to last for years of service without packing removal or replacement. It is recommended that the joint be returned to Flexicraft for reconditioning.

Preventative Maintenance

- 1) **Leak Detection** - After initial installation, the joint should be inspected regularly based on service conditions, number of heat-up cycles, and experience. It is very important that any leakage through the packing be stopped immediately. If the leak is permitted to continue, it may cut channels through both the packing and the slip, requiring not only new packing but also a new slip.
- 2) **Inspection** - Alignment guides, pipe supports, anchors, and the joint itself should be inspected yearly for proper operation. It is recommended that the expansion joint be inspected during the shutdown and start-up cycle at this time.
- 3) **Slip Maintenance** - The slip has a hard, corrosion resistant, highly polished surface which slides and keeps friction at a minimum through the packing. To extend the life of the packing, the slip should be cleaned periodically. Remove any residue, dirt, build-up, etc., from the exposed slip surface using a putty knife, steel wool, or crocus cloth. Care must be used not to scratch or score the slip. The frequency of cleaning will depend on the environment.

Service Conditions

The Flexicraft Ram-Pack expansion joint has been designed for the specific service conditions listed on the purchase order. Changes in pressures, temperatures, material conveyed via the piping etc., can change the optimum packing or joint design from that furnished. Any of the above changes, unless notified and approved by FLEXICRAFT, would void the warranty.

Guiding and Anchoring Specifications

Rigid adherence to alignment and anchoring specifications is a must. Misalignment due to improper guiding can result in failure from uneven packing wear, slip damage, or slip binding. Improper anchoring can result in anchor failure.

The main anchors must react to the force produced by pressure thrust and the friction force in the direction of the pipe axis. The pressure thrust force is the cross sectional effective area of the expansion joint multiplied by the pressure. The friction force is the force required to overcome the friction between the slip and the packing. The friction forces, along with the effective areas, are shown on the joint submittals.

Alignment guides prevent bowing and bending. A good practice is to anchor the body end of the expansion joint and provide pipe alignment guides on the slip side of the joint. But Anchor bases are not required.

Spacing of the guides to prevent bowing and bending with the Ram-Pack slip joints are shown in the table below. Appropriate guides are available from Flexicraft.

Pipe supports, such as hangers, chairs, etc., can be spaced according to the table, included for reference. The maximum spans are specified by the ASME/ANSI Power Piping Code B31.1, and are applicable for horizontal straight runs of pipe without concentrated loads.

PIPE GUIDE & SUPPORT SPACING

PIPE DIA	MAX DISTANCE TO 1ST GUIDE	MAX. DISTANCE BTWN SUBSEQUENT GUIDES				SUPPORT SPACING	
		@ 50 psi	@ 100 psi	@ 150 psi	@ 300 psi	Water	Gas
2"	2' 4"	14'	13'	13'	11'	10'	13'
2-1/2"	2' 11"	19'	18'	17'	15'	11'	14'
3"	3' 6"	24'	22'	21'	18'	12'	15'
4"	4' 1"	31'	29'	26'	22'	14'	17'
5"	4' 8"	40'	36'	33'	27'	16'	18'
6"	5' 10"	49'	43'	39'	32'	17'	21'
8"	9' 4"	65'	56'	50'	40'	19'	24'
10"	11' 8"	83'	71'	63'	49'	22'	27'
12"	14'	100'	85'	74'	57'	23'	30'
14"	16' 4"	103'	87'	76'	59'	25'	32'
16"	18' 8"	115'	95'	83'	64'	27'	35'
18"	21'	126'	104'	90'	68'	28'	37'
20"	23' 4"	137'	112'	97'	73'	30'	39'
24"	28'	158'	127'	109'	81'	32'	42'

Warranty

WARRANTY TERMS

Flexicraft Packed Expansion Joints are sold subject to the mutual agreement that they are warranted by Flexicraft to be free from defects in material and workmanship, but Flexicraft's liability and the buyer's exclusive remedy shall be limited to replacement or repair without charge, at Flexicraft's factory, of any material defects which become apparent within five years of the date of shipment, and which shall be determined to be defective by Flexicraft upon their return to the factory, or at Flexicraft's option to a refund of the purchase price; and that Flexicraft shall have no liability for damages of any kind, direct or indirect, arising from an installation and/or use of any material, and by accepting the material the buyer will assume all liability for any damages, direct or consequential, which may result from its use or misuse.

FIVE YEAR SERVICE GUARANTEE

In addition, Flexicraft guarantees the satisfactory performance of Flexicraft Packed Expansion Joints for a period of five years from the date of shipment, provided, only, that the Expansion Joints are installed, operated, and serviced in accordance with Flexicraft's prescribed standards. Flexicraft will either replace or repair, without charge, at Flexicraft's factory, any Packed Expansion Joint which fails to give five years' service under the above conditions.

FIVE YEAR LEAK-FREE GUARANTEE

In addition, Flexicraft guarantees the satisfactory leak-free performance of Flexicraft Packed Expansion Joints for a period of five years from the date of shipment, provided, only, that the Expansion Joints are installed, operated, and maintained in accordance with Flexicraft's prescribed standards. If leakage occurs and cannot be stopped through the packing after adjustment, Flexicraft will furnish replacement packing at no extra charge within a period of five years from date of shipment.



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