FLEXICRAFT INDUSTREIS

PVC & CPVC Schedule 80
EXPANSION JOINT / REPAIR COUPLING
Installation Instructions

EJ-3A-0508

Expansion Joints allow the telescoping movement of an inner pipe within a firmly mounted outer sleeve to accommodate expansion and contraction in a piping system. Available in a variety of nominal pipe sizes with 6" or 12" maximum travel lengths. Spears® Expansion Joints may also be used as repair couplings.

Read all applicable instructions and procedures thoroughly before starting. Suitability of the intended service application must be determined prior to installation. Expansion Joints require specific positioning on an axial alignment. PVC and CPVC piping systems must be engineered, installed, operated and maintained in accordance with accepted standards and procedures for thermoplastic piping systems. It is absolutely necessary that all personnel associated with the above be properly trained in these procedures before starting.

DETERMINE TRAVEL LENGTH NEEDED

System expansion and contraction are determined from anticipated temperature change in the system from both ambient and internal fluid temperatures.

General Rule of Thumb for All Pipe Diameters

PVC: Allow **3/8"** expansion for every 10°F (5.6°C) change in temperature per 100 feet of pipe.

CPVC: Allow **1/2"** expansion for every 10°F (5.6°C) change in temperature per 100 feet of pipe

For example, a 6" travel expansion joint will accommodate approximately 160°F temperature change in 100 ft. of PVC pipe (16 x 3/8" = 6") or approximately 120°F temperature change in 100 ft. of CPVC pipe (12 x 1/2" = 6").

Approximate Travel Length for Various Changes in System Temperature

Amount of Temperature CHANGE	10°F	30°F	50°F	70°F	90°F	100°F	120°F	140°F	160°F
	6°C	17°C	28°C	39°C	50°C	56°C	67°C	78°C	89°C
PVC length change per 100 ft.	3/8"	1-1/8"	1-7/8"	2-5/8"	3-3/8"	3-3/4"	4-1/2"	5-1/4"	6"
CPVC length change per 100 ft.	1/2"	1-1/2"	2-1/2"	3-1/2"	4-1/2"	5"	6"	7"	8"

(Maximum *material* operating temperature: PVC = 140°F — 60°C CPVC = 180°F — 82°C)

DETERMINING PISTON POSITION AT INSTALLATION

Initial positioning of the Expansion Joint piston depends on the anticipated temperature change in relation to the system temperature at the time of installation. Where temperature changes will not exceed approximately ± 25° F from the system temperature at the time of installation, the Expansion Joint can be installed at the factory preset midpoint. Remove cardboard spacer with tape-tab after installation. If desired, the extended position for installation may be additionally adjusted to specific system and installation parameters using the following calculation:

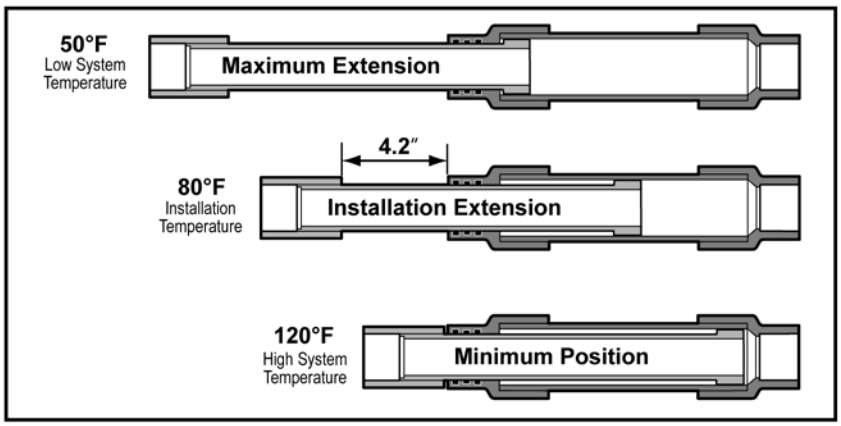
Sample: A straight run of pipe will operate in conditions where the maximum temperature (**T**) will be 120°F, the lowest temperature (**F**) will reach 50°F and the actual temperature (**A**) at installation is 80°F. Calculate as follows:

$$\frac{\mathbf{T - A}}{\mathbf{T - F}} \times \mathbf{E = P} \quad \blacktriangleright \quad \frac{110 - 75}{110 - 60} \times 6'' = P \quad \blacktriangleright \quad \frac{35}{50} \times 6'' = P \quad \blacktriangleright \quad 0.7 \times 6'' = 4.2''$$

Where **T = *Maximum*** temperature the system will experience; **F = *Minimum*** temperature the system will experience.; **A = *Actual*** temperature of the system at the time of installation; **E = *Maximum*** joint extension and **P = *Actual*** piston extension at installation.

This formula works with both English and Metric measurements. Do not mix °F with °C.

INSTALLATION GUIDELINES



Alignment is critical, axial guides should be installed to direct straight movement into expansion joint.

Support & Thrust Block system to prevent binding of unit or system damage during operation.

Protect cylinder shaft from scratches, damage and debris to prevent leaks.

Solvent Cement end connections according to procedures shown at the end of this instruction.

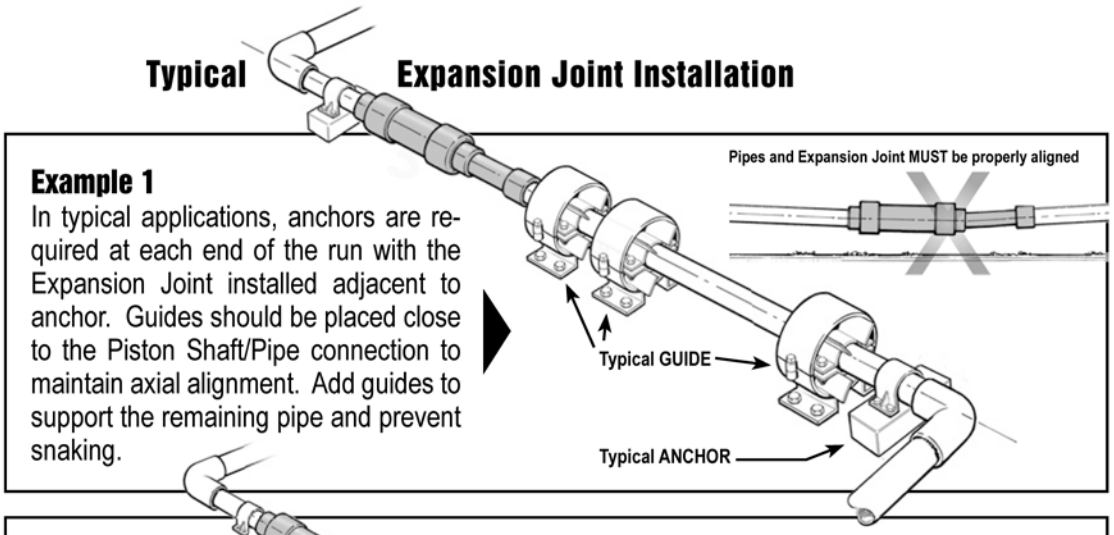
Do Not allow solvent cement to contact cylinder shaft or interior surface. Follow cement manufacturer's instructions for proper application, set and cure time.

Painting - Where painting piping with a white latex paint is used to inhibit sun exposure, do not apply paint to telescoping shaft of the Expansion Joint to prevent possible damage to internal seals.

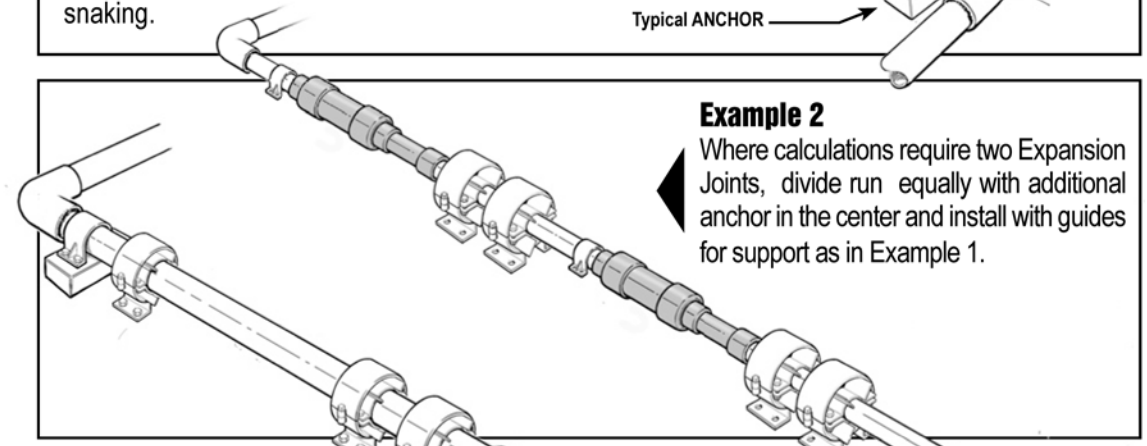
Direct Burial - Expansion Joints and telescoping Shaft must be covered with a suitable shield in direct burial systems to prevent damage from dirt of sediment. Anchoring or thrust blocking and alignment must be maintained.

Anchors, Guide Support & Spacing - Anchors restrain piping at key points in order to direct movement. Guides must be rigidly attached to structure to restrict lateral movement, but must allow free longitudinal movement and support of the piping system. Vertical lines also require adequate support intervals to prevent excessive loading to lower fittings. The Expansion Joint should be positioned at an anchor for support with the first guide near the telescoping shaft connection and a second guide relatively close to the first to aid alignment. Follow standard industry guidelines for pipe support and spacing of guides throughout the run, as recommended by pipe manufacturers.

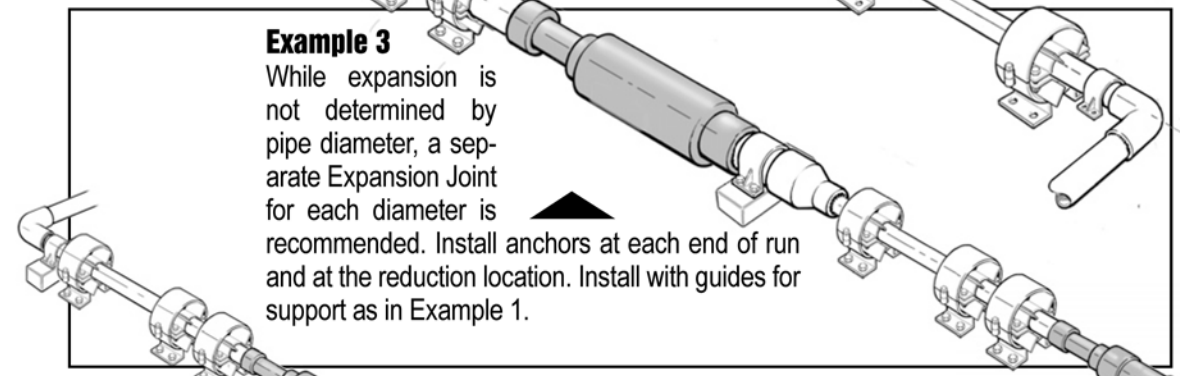
Typical Expansion Joint Installation



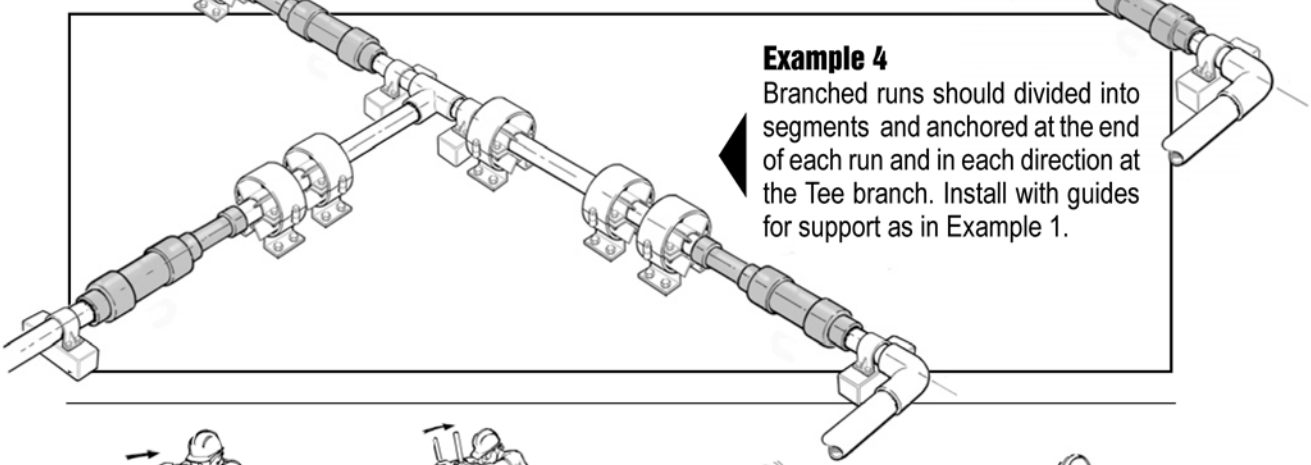
Example 1
In typical applications, anchors are required at each end of the run with the Expansion Joint installed adjacent to anchor. Guides should be placed close to the Piston Shaft/Pipe connection to maintain axial alignment. Add guides to support the remaining pipe and prevent snaking.



Example 2
Where calculations require two Expansion Joints, divide run equally with additional anchor in the center and install with guides for support as in Example 1.



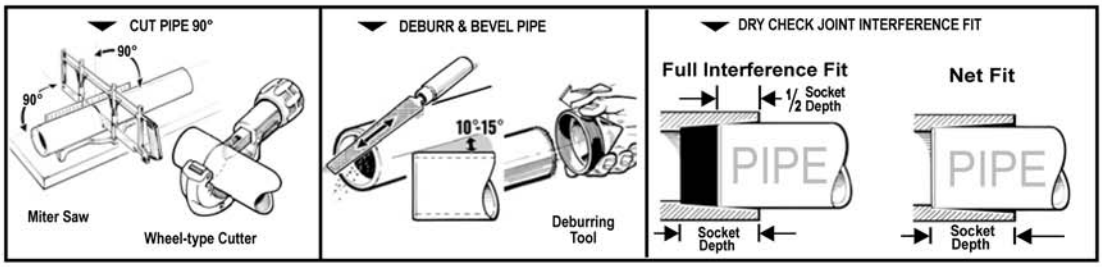
Example 3
While expansion is not determined by pipe diameter, a separate Expansion Joint for each diameter is recommended. Install anchors at each end of run and at the reduction location. Install with guides for support as in Example 1.



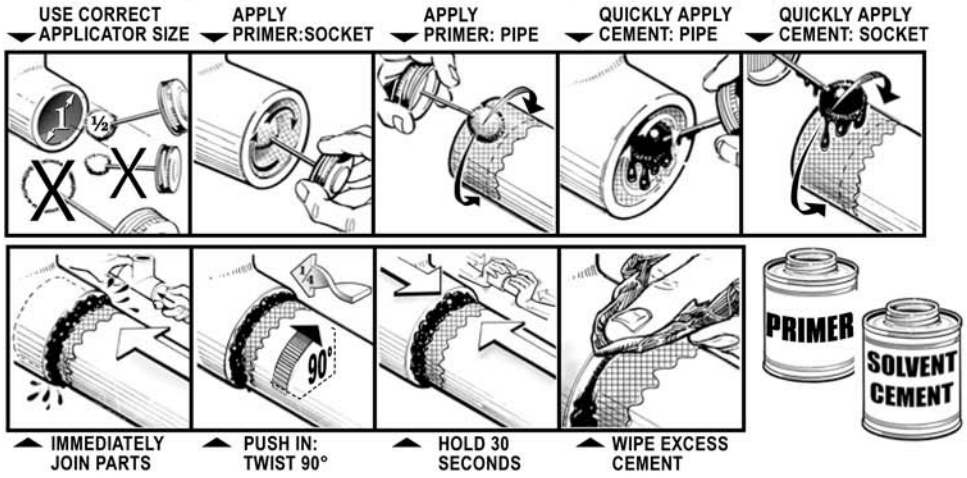
Example 4
Branched runs should divided into segments and anchored at the end of each run and in each direction at the Tee branch. Install with guides for support as in Example 1.

Alternative Methods of Extension for Completing Joint Installation on larger sizes.

SOLVENT CEMENT WELDING PROCEDURES



For best results, installation must be made at temperatures between 40°F (5°C) and 110°F (43°C). All joint components must be inspected for any breaking, chipping, gouging or other visible damage before proceeding. All pipe, fittings and valves must be removed from their packaging or containers and exposed to the installation environment for a minimum of one hour in order to thermally balance all components. All joining components must be clean and dry.



CAUTION: Avoid cement contact with Expansion Joint shaft.

PRECAUTIONS AND WARNINGS

CAUTION: *The system must be designed and installed to avoid stress loads other than the purpose-designed expansion/contraction along the longitudinal [lengthwise] axis of the Expansion Joint. Pipe must be cut and supported so that all stress loads associated with bending or shifting are avoided. Expansion Joint must be supported to maintain axial alignment.*

CAUTION: *BEFORE THE JOINT IS CYCLED, all dirt, sand, grit or other material must be wiped externally from the piston/sleeve and internally flushed from the system. This is to prevent scarring of internal components; e.g., piston sleeve, O-rings, piston bore, etc.*

WARNING: *Systems must not be operated or flushed out at flow velocities greater than 5 feet per second.*

LUBRICATION WARNING: Some Lubricants, including vegetable oils, are known to cause stress cracking in thermoplastic materials. Lubricants are <u>not required</u> for installation of Spears® Expansion Joints.

NOT FOR USE WITH COMPRESSED AIR OR GAS

WARNING: *DO NOT USE COMPRESSED AIR OR GAS TO TEST ANY PVC OR CPVC THERMOPLASTIC PIPING PRODUCT OR SYSTEM, AND DO NOT USE DEVICES PROPELLED BY COMPRESSED AIR OR GAS TO CLEAR SYSTEMS. THESE PRACTICES MAY RESULT IN EXPLOSIVE FRAGMENTATION OF SYSTEM PIPING AND COMPONENTS* ***CAUSING BODILY INJURY OR DEATH.*** *All air must be bled from the system during initial fluid fill. Pressure testing of the system must not be made until all solvent cement joints have properly cured. Initial pressure testing must be made at approximately 10% of the system hydrostatic pressure rating to identify potential problems, prior to testing at higher pressures.*