

Installation Procedure

Application: Series 3500 Externally Pressurized Expansion Joints are designed for applications where the principal motion is axial to the centerline of the expansion joint, and the system includes guides, supports and anchors sufficient to restrain the piping at the service and test conditions. Steam systems must include adequate traps to remove condensate. Liquid systems must include surge compensation.

Operating Conditions: Series 3500 expansion joints are supplied with a tag attached stating the Part Number and Design Pressure. Standard designs are 150 psig and 300 psig, and the test pressures are 225 psig and 450 psig respectively. The design temperature for all standard joints is 500°F. Be certain that the system conditions and test conditions do not exceed the design values.

Movement: The axial travel of the joint is included in the part number as the last digit(s) i.e. P/N 3501-148-4 is designed for 4" axial travel (compression). Consult the purchase specification to confirm the correct part number and location in the system. Refer to Travel Required on Page 5 for the method of calculating pipe expansion or contraction.

Flow Direction and Orientation: The flow direction can be either direction for Series 3500 expansion joints. Be certain that the free end is attached to the pipe that expands on single joints (3501AB & 3502AB) with an anchor base. The drain port must be at the bottom of the joint for horizontal and vertical installations.

Media & Environment: Series 3500 expansion joints are designed for properly maintained steam, hot water and chilled water systems. They can be used for other media that are compatible with the materials of construction. Refer to Material Specifications on Page 7 for the materials used for standard construction. Be certain that the exterior of the expansion joint is not exposed to corrosive substances such as minerals in ground water and road salt.

Guides, Supports, Anchors: Series 3500 expansion joints are designed for applications where the principal movement is axial to the centerline of the expansion joint, and the system includes guides, supports and anchors. Refer to Applications on Pages 3 and 4 for system requirements. Refer to Hyspan Series 9500 Catalog 1004 for pipe guide design information.

Anchor Base: Type 3505 and 3506 dual expansion joints include an intermediate anchor base to ensure that the bellows element on each side of the base absorbs the motion on one side. Refer to intermediate anchor forces in the Anchor Forces section on Page 5 for force required.

Single expansion joints, types 3501 and 3502, are available with an anchor base designed as a main anchor. Refer to main anchor forces in the Anchor Forces section on page 5 for force required. The anchor base height and base pattern for both configurations are given in Table 4, page 7.

CAUTION: The structure attached to the anchor base must be capable of restraining the thrust forces and moments developed by the expansion joint.

Shipping Restraints: External restraints are installed at the factory to insure installation at the correct length and alignment. They are painted yellow and labeled—Shipping Bars, Remove after Installation. Leave these restraints installed until after the installation of the expansion joint is complete—but they must be removed prior to pressure testing. *CAUTION: Shipping Bars are not designed to react the pressure thrust of the expansion joint—they must be removed prior to testing. Normally the shipping restraints are installed by welding—remove by cutting and grinding welds flush.*

Standard expansion joints are factory set for the travel tabulated in this catalog. The principal travel is axial compression (pipe expansion) with allowance for extension if the pipe temperature is reduced below the installation temperature. Refer to the purchase specifications for joints ordered with special settings.

Post Installation Inspection

1. Inspect the expansion joint for damage.
2. Are the Shipping Restraints removed?
3. Is the joint free to move and is the pipe supported and guided to ensure that the pipe motion is axial to the expansion joint?
4. Is the expansion joint installed at the correct location and are the anchors, guides and supports installed in accordance with the system design?
5. Are the guides and supports free to allow the movement of the expansion joint?
6. Is the supporting structure for the anchor adequate to react the forces and moments?

Installation Preset

Series 3500 expansion joints can be ordered from the factory with factory preset; however, if it is necessary to change the travel during installation, the shipping bars must be removed and the length adjusted. The following table is a tabulation of the thermal expansion or contraction for various pipe run lengths corresponding to temperature differences from 70° F.

For example, if the expansion joint is used as a replacement in a system that has not cooled down, and the pipe

temperature is 170°F over a 200 foot run, the joint must be compressed 1.53".

Table 11 Installation Preset

| Temperature Difference °F | Distance Between Anchors – Feet | | | | | |
|------------------------------|---------------------------------|------|------|------|------|------|
| | 50 | 100 | 150 | 200 | 250 | 300 |
| 20 | 0.08 | 0.15 | 0.23 | 0.31 | 0.38 | 0.46 |
| 30 | 0.11 | 0.23 | 0.34 | 0.46 | 0.57 | 0.69 |
| 40 | 0.15 | 0.31 | 0.46 | 0.61 | 0.76 | 0.92 |
| 50 | 0.19 | 0.68 | 0.57 | 0.76 | 0.95 | 1.15 |
| 60 | 0.23 | 0.46 | 0.69 | 0.92 | 1.15 | 1.37 |
| 70 | 0.27 | 0.53 | 0.80 | 1.07 | 1.34 | 1.60 |
| 80 | 0.31 | 0.61 | 0.92 | 1.22 | 1.53 | 1.83 |
| 90 | 0.34 | 0.69 | 1.03 | 1.37 | 1.72 | 2.06 |
| 100 | 0.38 | 0.76 | 1.15 | 1.53 | 1.91 | 2.29 |
| 110 | 0.42 | 0.84 | 1.26 | 1.68 | 2.10 | 2.52 |
| 120 | 0.46 | 0.92 | 1.37 | 1.83 | 2.29 | 2.75 |
| 140 | 0.53 | 1.07 | 1.60 | 2.14 | 2.67 | 3.20 |
| 160 | 0.61 | 1.22 | 1.83 | 2.44 | 3.05 | 3.66 |
| 180 | 0.69 | 1.37 | 2.06 | 2.75 | 3.43 | 4.12 |
| 200 | 0.76 | 1.53 | 2.29 | 3.05 | 3.82 | 4.57 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Field preset is not recommended unless it cannot be avoided. Note that there must be a significant temperature difference to warrant presetting during installation. If presetting is

anticipated, Series 3500 expansion joints can be ordered with threaded adjusting rods factory installed to facilitate presetting.

FIVE YEAR LIMITED WARRANTY

This warranty is given by HYSpan PRECISION PRODUCTS, INC. ("HYSpan") for the benefit of the first purchasers for use of its Series 3500 Externally Pressurized Expansion Joints manufactured by HYSpan to standard catalog construction or standard construction with laminated Alloy 625 bellows. The product is warranted to be free from defects in material and workmanship for a period of five (5) years from the date of shipment by HYSpan in accordance with the following conditions:

1. The design pressure and temperature are not exceeded—including surge and upset conditions.
2. The installation conforms to HYSpan installation instructions and approved practice for anchoring, supporting and guiding, and generally accepted good piping practice.
3. Substances in contact with all internal and external surfaces must be compatible with the materials of construction, including all contaminants. Steam, condensate, and water containing more than 100 parts per million chlorides, are specifically excluded when stainless bellows are used; Alloy 625 bellows construction qualifies.
4. The warranty shall be limited to the replacement by HYSpan of the same model Series 3500 expansion joint, and payment for transportation by the least expensive method. Labor, material and other costs related to the failure or replacement of the expansion joint are not included. HYSpan shall not be liable for damage or delay suffered by the purchaser regardless of whether such damages are general, special or consequential in nature, whether caused by defective material or workmanship, or whether caused by HYSpan's negligence regardless of the degree.
5. The warranty is put in force by receipt at the factory of a completed and executed Warranty Card, which is provided with each expansion joint.
6. The warranty is limited to installations in the United States, Puerto Rico and Canada.

The purchaser shall advise the HYSpan factory of any warranty claim, including the nature of the failure and the serial number of the expansion joint (permanently located adjacent to the lifting lug). HYSpan shall provide return goods authorization and shipping directions to return the failed joint to the factory. A mutually agreeable delivery schedule and method of shipping the replacement shall be established. The purchaser shall furnish a confirming purchase order and is obligated to the current replacement cost of the joint and shipping expense. Upon receipt of the failed product, the cause of failure shall be determined by the factory at no expense to the purchaser. A credit shall be issued by the factory for the replacement cost and least expensive shipping for valid warranty claims. In the event of a dispute, HYSpan shall furnish the failed product to the purchaser or their representative for failure analysis.