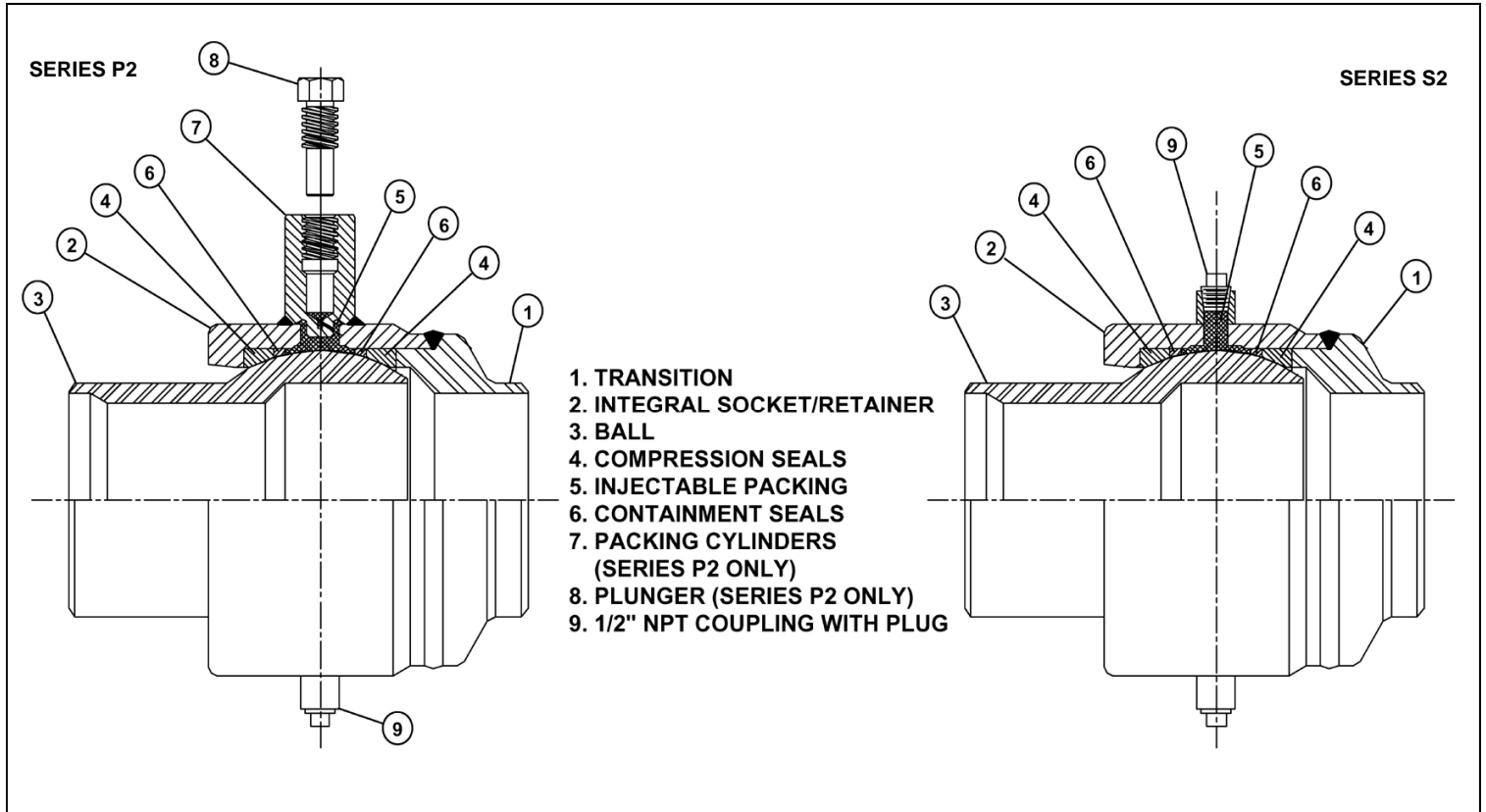




THERMAL PAK P2 & S2 SERIES FLEXIBLE BALL JOINTS

INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS



GENERAL:

1. Prior to installation, verify if the ball joint requires cold positioning.
2. Installation in other than a horizontal attitude should be with the ball nipple facing downward in order to help keep the exposed ball free from contamination. Installation drawings should be reviewed to verify the ball joints are installed in their specified location with proper distance between balls.
3. Three ball joint linkages are not self supporting and must be supported.
4. The ball joint will provide for both angular flex (refer to catalog for amount of angular flex) and 360° rotation.
5. The ball joint may be hydrostatically tested to 1-1/2 times the design pressure. The test pressure must not exceed the rating of the adjoining piping.

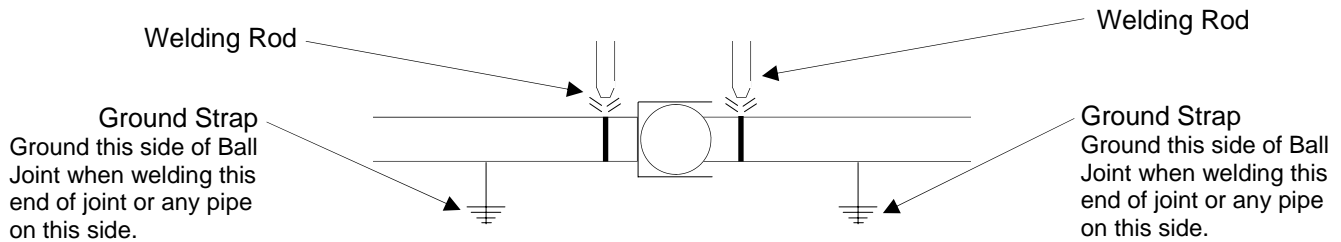
CAUTION: Do not remove the 1/2" pipe plugs from the couplings located radially about the ball joint socket while the ball joint is pressurized. Removal of these plugs while the joint is pressurized could cause bodily harm.



INSTALLATION:

1. The inside of the pipe should be clean of sand, dirt, gravel, scale, etc. as these foreign materials may cause damage to the injectable packing, contaminate the seals and/or damage the plated ball.

CAUTION: Whenever welding on or near the ball joint, the welding ground must be located on the pipe, adjacent to the weld being performed to prevent a welding arc between the ball and socket. (See below.) For the remainder of the piping installation, the ball joint cannot be in the welding ground path. Improper location of the welding ground may result in damage to the chrome plated surface of the ball joint and void the warranty.



2. During welding the exposed portion of the ball should be protected from weld splatter. Upon completion of installation, the protective material between the ball and socket bore should be removed. The exposed area between the ball and socket should be checked to ensure it is free of dirt and foreign debris which may damage the ball joint during operation.
3. Upon completion of the installation the installer should turn over to the owner/operator any spare packing plugs which were furnished.

INITIAL START-UP:

1. Prior to testing or energizing the system, the installer should check that all anchors are secure, and that pipe alignment guides and/or supports are properly located and secured.
2. During the initial energizing of the pipeline, inspect each ball joint to ensure that they are operating properly and no leakage is apparent.
3. A lubricant has been added to the injectable packing at the factory to facilitate hydraulic injection of the packing. This lubricant may run out during the first few weeks of operation and **should not be considered a leak of the flowing media**. To compensate for the slight loss of packing density due to the loss of lubricant, and redistribution of the injectable packing when exposed to heat, a slight leak may develop requiring packing plugs to be injected. Tubes of spare packing plugs (six plugs/tube) are furnished for each ball joint at the time of shipment.
4. For detailed instructions on injecting packing refer to ATS publication ATS-Packing-IOM-2009.
5. Packing plugs are NOT a lubricant. Inject packing plugs ONLY if a leak is apparent. Once the leak has stopped, it may be desirable to add a few additional packing plugs to ensure the leak does not start again when the packing is re-distributed due to exposure to heat; however, **DO NOT** inject more than one (1) or two (2) additional packing plugs per packing cylinder after the leak has been completely contained. Instructions for packing injection are packaged with the tubes of spare packing plugs furnished with each order.
6. The ball joint should be inspected several times during the first two (2) months of continuous operation to ensure no leaks have developed.



ROUTINE MAINTENANCE:

1. The **SERIES P2 & S2** Ball Joints are designed with **integral** socket/retainer **without bolting** and are factory charged with high performance self-lubricating flake graphite injectable packing.
2. **SERIES P2** are designed with type A or B Packing Cylinders, welded in place, to be used for injection of packing plugs under full line pressure in the unlikely event of leakage. The plugged half couplings located radially around the ball joint socket are factory fill connections and are **not to be removed**. Spare packing plugs are furnished for each P2 ball joint.

SERIES S2 are designed with 1/2" plugged half couplings located radially about the joint's socket. To contain leakage, the pipeline **must be depressurized** prior to removing the pipe plugs for the installation of type A threaded packing cylinders that are offered as an option. As a minimum we recommend type A threaded packing cylinders & spare injectable packing be purchased for each coupling location of the largest ball joint being installed. Once the packing cylinders are fully engaged at each coupling location, packing plugs can be injected to contain leakage.

3. When the pipeline is properly aligned, supported and anchored at installation, routine maintenance of the ball joints is **minimal**. Each ball joint should be inspected for leakage on a regular basis determined by previous performance. A record of each inspection should be maintained noting the ball joint, date, leaks noted and the severity of the leak with the number of packing plugs, if any, injected to contain leakage. Any ball joint requiring packing to contain leakage should be re-inspected the following day to verify the leak has stopped.
4. Twice yearly the packing plungers should be removed from the packing cylinder and lubricated with an anti-seize compound or equivalent high temperature lubricant.
5. During any system shutdown, the ball joint should be inspected and cleaned of any buildup of packing material, debris, or water treatment compound. This will assure a more leak-free operation of the joint with less requirements for packing injection.

CAUTION: Packing plugs should only be injected to stop a leak. Any leakage must be stopped as soon as possible by injecting packing plugs. If leaks are allowed to continue wire draw of the packing materials and spherical surfaces of the ball may occur making it difficult and costly to contain leakage if at all. Do not add excessive packing plugs to obtain immediate sealing. Allow two or three hours for packing to adjust.

SAFETY PRECAUTION: The injection of packing into a fully pressurized ball joint is a safe operation when it is accomplished using the procedures and instructions furnished . Personnel doing the packing injection should read and understand the instructions before starting packing injection. ATS offers factory training seminars for maintenance personnel on request. Phone ATS at 1-800-443-9194 for any questions concerning packing injection.



RECOMMENDED SPARE PARTS & ACCESSORIES:

P2 & S2: TUBES OF 6 PACKING PLUGS

SERIES S2: TYPE "A" THREADED PACKING CYLINDERS WITH MATING PLUNGERS

PLUNGERS: CARBON STEEL OR ALUMINUM BRONZE

SAF-T-PACKERS: TYPE GA OR GB

All P2 Ball Joints are shipped with a minimum of two (2) spare packing plugs per cylinder. The plugs are shipped inside the joint and **must** be removed prior to installation. To reduce the packing injection torque ATS can furnish a type GA or GB **SAF-T-PACKER** to safely loosen or remove the impacted packing at the bottom of the packing cylinder.

INSULATION BLANKETS:

LT 450 SS - 450°F Max, indoor/outdoor non-corrosive environments.

MT 550 NN - 550°F Max, wet environments, salt water exposure, best for man hole usage.

MT 800 SGM - 800°F Max, indoor/outdoor non-corrosive environments

OTHER ATS PUBLICATIONS

ATS publications are now available in PDF format by request.

TP2 Thermal Pak Slip-Type Joints	ATS-TP2-IOM-2010
“S” Series Ball Joints	ATS-S-Series-IOM-2010
Solar “S2” Ball Joints	ATS-Solar-IOM-2010
Anchors, Guides & Supports	ATS-G/A/S-IOM-2010
Injection Packing Instructions	ATS-Packing-IOM-2009
SAF-T-PACKER Instructions	ATS-SAF-IOM-2009