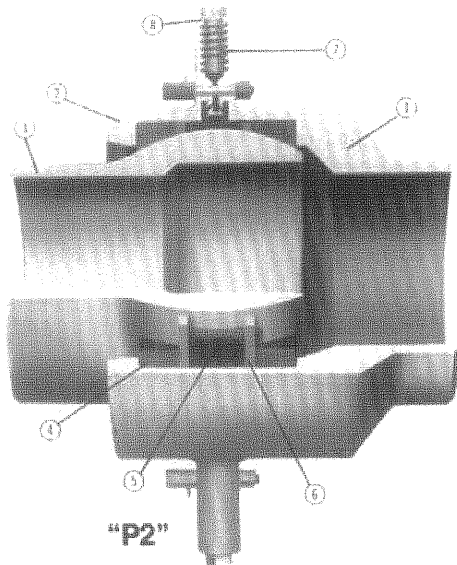


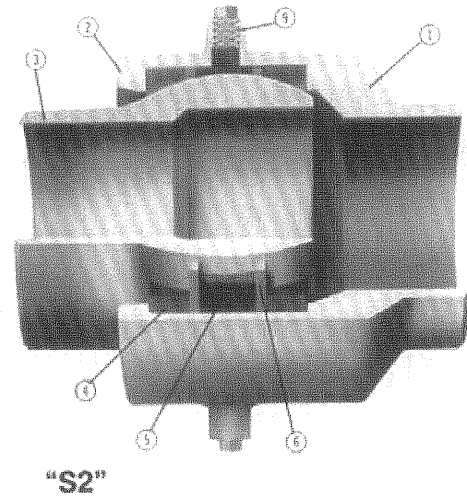


## Thermal Pak Series "P2" and "S2" Flexible Ball Joints 2nd Generation Ball Joints With Injectible Packing

The integral Socket/Retainer design of the 2nd Generation Series "P2" and "S2" Ball Joint eliminates threaded retainer cap or retainer flange with associated bolting. This innovative integral Socket/Retainer can be compared with the integral guide design of the ATS Thermal Pak TP2 Packed Expansion Joint which has been demonstrated to be the most reliable concept for packed expansion joints over the past 40 years.



1. TRANSITION
2. INTEGRAL SOCKET/RETAINER
3. BALL
4. COMPRESSION SEAL
5. INJECTABLE PACKING
6. CONTAINMENT SEALS
7. PACKING CYLINDER (SERIES "P2" ONLY)
8. PLUNGER (SERIES "P2" ONLY)
9. 1/2" COUPLING & PLUG



Series "P2" Ball Joints are furnished with packing cylinders to permit injection of packing under full line pressure to 1000 psig. The Series "P2" Ball Joint above is shown with a Type "B" Packing Cylinder rated at 850 psig (all available types of Packing Cylinders are pictured on Page 11). The plugged half couplings between the packing cylinders (Part 9, not shown) are used for initial factory charging of the injectable packing. The containment seals (Part 6) prevent by-pass of the injectable packing (Part 5) to ensure the required injectable density to contain leakage. Available only with metal compression seals (refer to Field 5, Page 19). There is never a need for a shutdown to contain leakage or replace seals.

The Series "S2" Ball Joint is identical with the Series "P2" except packing cannot be injected under pressure. The system must be depressurized to inject additional packing in the event of leakage. At that time, the plugs at the 1/2" half couplings are removed one at a time and replaced with a threaded Type "A" Packing Cylinder (purchased separately; pictured on Page 11). Once the threaded Type "A" Packing Cylinder is fully engaged at a coupling, packing can be injected. One Packing Cylinder can be used at multiple couplings. Series "S2" Ball Joints have a reduced initial cost and is the only design recommended for pressures over 1000 psig.

### ADVANTAGES OF THE SERIES "P2" and "S2" INTEGRAL SOCKET/RETAINER

Patent No.: 4,671,543

1. a. Eliminates the in-service field error of over-tightening the retainer flange bolting or retainer cap which will greatly increase flex torque values and may result in freezing the ball in its socket.  
b. To contain leakage, it is best to inject additional packing vs. tightening of the retainer flange bolting or threaded cap since packing injection can be controlled to minimize the flex torque value and produces a more positive leak containment method.
2. Eliminates the need for stainless steel bolting when the ball joint is installed in a corrosive environment and/or must handle a corrosive fluid.
3. The profile dimensions are reduced permitting installation in closer quarters.
4. Thermal insulation is accomplished at lower cost

The use of metal "only" seals in the Thermal Pak "P2" and "S2" Ball Joints produces more constant flex torque values for the life of the piping system vs. Ball Joints with pressure-molded compression seals (gaskets). In addition, the breakaway force is considerably less with the metal seals than with the molded seals. This is especially true in hot service where the ball has not moved for long periods of time.

The "Injection of Packing at full line pressure" concept was first introduced to Ball Joints by ATS in 1979. This concept has now been proven in thousands of installations. Where leakage is apparent, it has been field proven that injectable packing will contain the leakage even when the compression seals are worn or wire-drawn. The injectable packing adjusts for wear and fills the void created by wire-drawing; thus the need to replace seals has been eliminated. As it is no longer necessary to replace seals to contain leakage, the integral design of the Thermal Pak Series "P2" and "S2" Ball Joints is the logical design extension to increase reliability and decrease initial and operating costs.