



OIL STATES PIPER VALVE

# Subsea Service Valves



**Piper**<sup>™</sup>



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## Temporary Service Subsea Valves

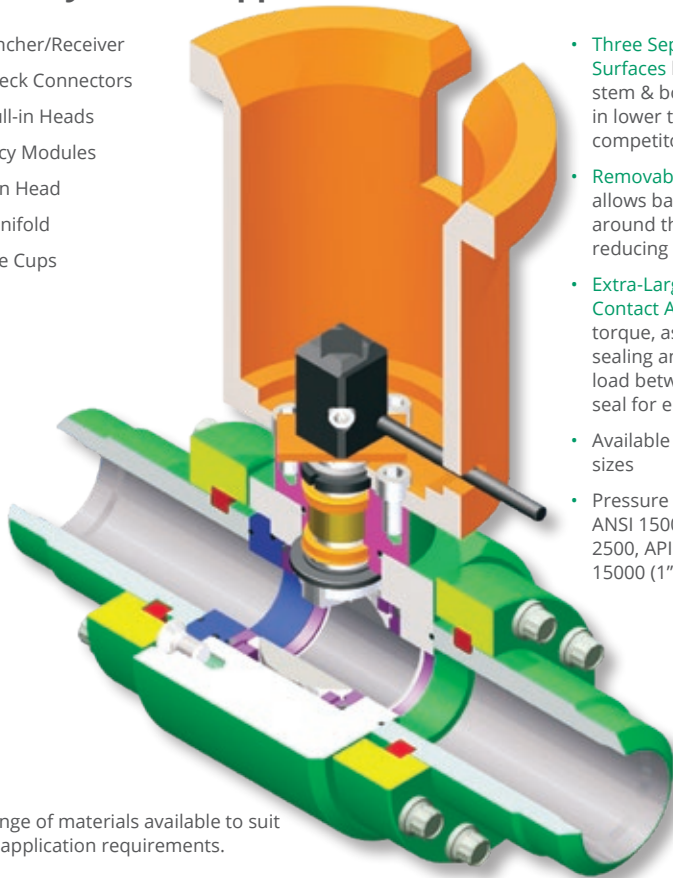
**SUPERIOR PERFORMANCE IN TEMPORARY SUBSEA ENVIRONMENTS**

### History

Oil States Piper Valve began manufacturing compact ball and check valves in 1996. We produced our first subsea valve in 1998. The design was an integral ball/check valve combination to be used in 10,000 feet of water to control the riser booster line on a drill-ship. The valve remained in this drilling fluid service without incident until it was replaced in 2009. Since that time, we have sold thousands of valves that have all been placed in subsea service.

### Temporary Service Applications

- Pig Launcher/Receiver
- Gooseneck Connectors
- Riser Pull-in Heads
- Buoyancy Modules
- Laydown Head
- Test Manifold
- Pressure Cups



- **Three Separate Bearing Surfaces** between the stem & bonnet result in lower torque than competitor's valves.
- **Removable Seat Carriers** allows balanced pressure around the upstream seat, reducing break torque.
- **Extra-Large Ball-to-Seat Contact Area** reduces torque, assures positive sealing and distributes the load between ball and seat seal for enhanced seat life.
- Available in 1" thru 10" sizes
- Pressure Classes include ANSI 1500, API 5000, ANSI 2500, API 10000 & API 15000 (1" & 2")

- Wide range of materials available to suit various application requirements.

### Temporary vs. Permanent Service

Many subsea valve applications have to be designed to remain in submerged service for the anticipated life of the field - which can be as long as 30 years.

These permanent service valves are designed with special features to perform for that period of service. These include corrosion resistant overlays, double metal barrier external seals, and tungsten carbide over-laid ball and seats.

Certain subsea valve applications generally have a relatively short submerged service, from several months up to 5 years.

Temporary service applications include pig launcher/receivers, lay-down heads, test manifolds and others. Oil States Piper Valve's Xylan® coated carbon steel ball and check valves perform exceptionally for this submerged time frame, and are offered as an economical alternative to valves designed for 30 years of service.

### MODULAR SYSTEM DESIGN

- Weld nipple and flanges are separate from the body group, allowing for material flexibility and shipment of weldables in advance. Fabrication of equipment can proceed while body groups are being assembled and tested.
- Available in single ball/single stem, single ball/double stem, double ball/single stem and double ball/double stem configurations.
- Our 2" check valves can bolt directly to our ball valve, reducing overall length.



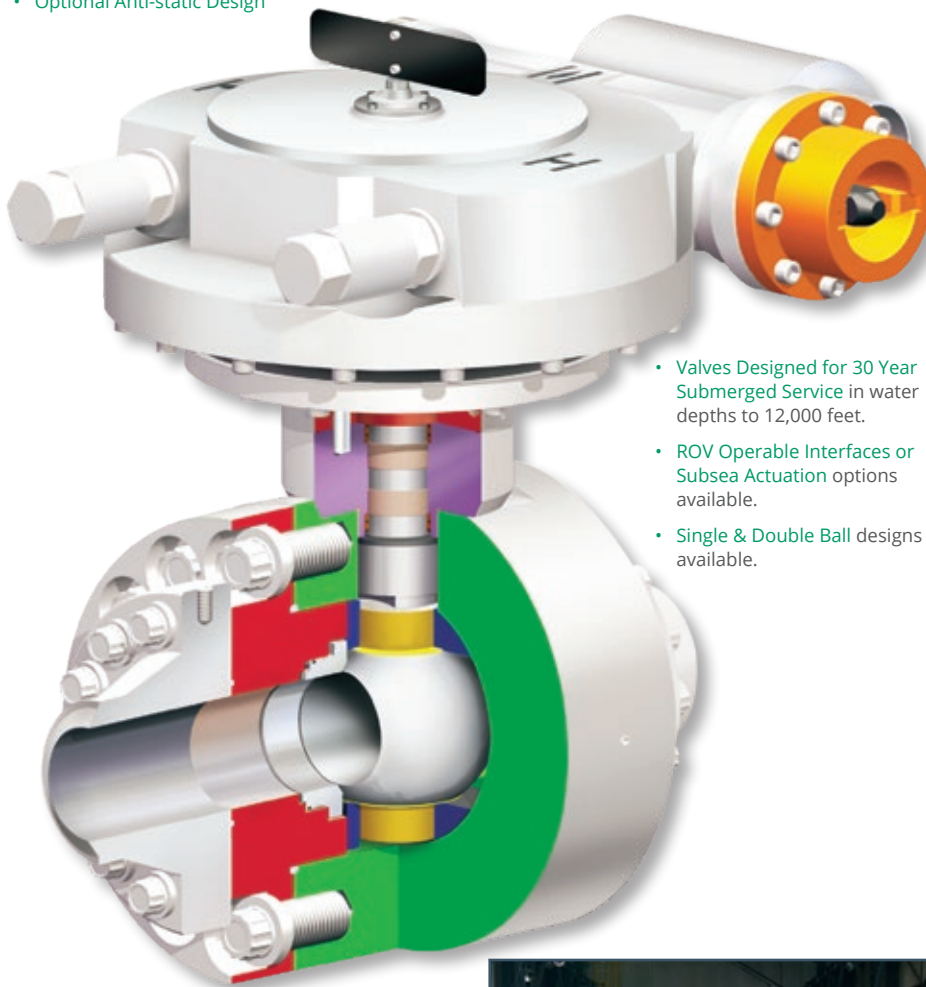


# Permanent Service Subsea Valves

## Designed for 30 Year Submerged Service

Oil States Piper Valve Series MST Permanent Service Subsea Metal-Seated Ball Valves offer the following features:

- Tungsten Carbide Overlay on ball/seat mating surfaces, lapped to each other for positive sealing.
- Internal Trunnion Blocks reduce the size and weight of the valve, and the number of external seals.
- Double Block & Bleed Design for testing seat integrity prior to installation.
- Double Metal Barrier Seals employ Z-ring technology on all external connections.
- Optional Anti-static Design



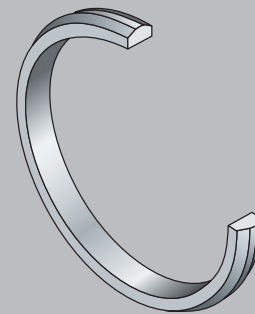
- Valves Designed for 30 Year Submerged Service in water depths to 12,000 feet.
- ROV Operable Interfaces or Subsea Actuation options available.
- Single & Double Ball designs available.

- Eight Separate Bearing Surfaces inside the MST ball valve helps reduce friction, resulting in lower break and operating torque.
- Wave Springs provide uniform pre-load on the seats, assuring reliable low pressure sealing.
- Available In integral ball/check valve combinations.



## Double Metal Barrier Seal Technology

Oil States Piper Valve employs our patented Z-Ring sealing technology on all external connections of our permanent service subsea valves. The ring is designed to deform under the proper bolt torque and allow the two flange faces to fully contact each other. Each flange seal groove and face have a corrosion resistant alloy (CRA) overlay which, when properly made up, will form a metal-to-metal seal between the Z-Ring and the ring grooves, and a second metal-to-metal seal between flange faces.



Z-Ring Sealing Technology





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# Subsea Service Valves

## Series SF Hot Stab Assemblies

QUICK & SECURE CONNECTIONS FOR SUBSEA SERVICE

### Designed for High-Pressure/High-Flow Service

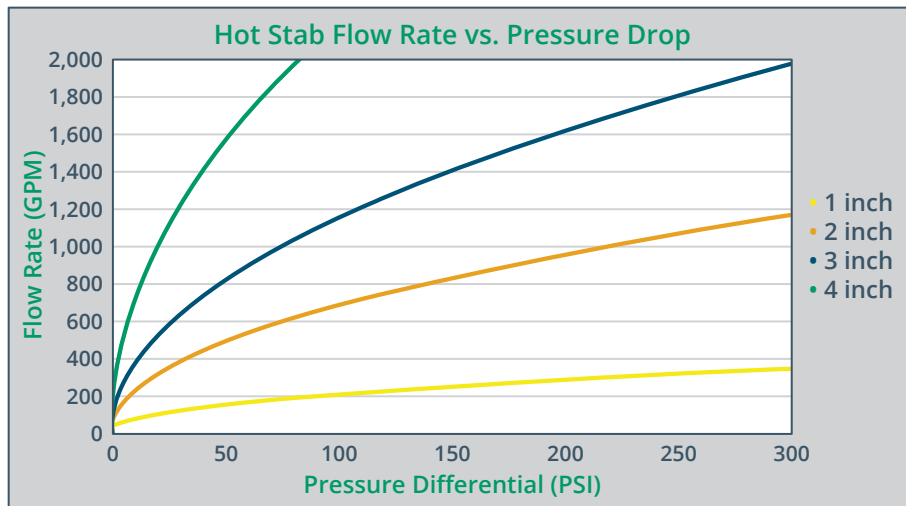
Oil States Piper Valve Series SF High-Pressure Hot Stabs offer the following features:

- **Swivel Flange Weld Connection** eliminates two welds required on competitive products. Weld nipples can be shipped in advance of the hot stab assembly, allowing fabrication of subsea equipment to proceed while manufacturing the assemblies.
- **Swivel Flange Connection** allows for easy removal of the receptacle after decommissioning, for re-use on other subsea equipment.
- **Piper Hot Stab Assemblies** use the same male stab for either single or double sided receptacles.
- **Male Stab Swivel Collar** allows for rotation of the stab handle into the receptacle J-slot without rotating the stab seals.
- **Male Stab Handle** is available in a variety of common subsea designs to meet customer requirements.
- **Receptacle** can easily be converted to single or double sided, by the customer, even in the field.
- Available in sizes 1" thru 4"      • Working pressures of ANSI 2500, API 10000 & API 15000.

### Modular System Hot Stab Design

Oil States Piper Valves' Series "SF" Hot Stab receptacle is comprised of finished machine components that require no fabrication. Our receptacle body is the same for single or double sided configurations, so the customer has the flexibility to make changes to their hot stabs up to the point of deployment. In addition, Oil States Piper Valve receptacles can be easily removed from decommissioned equipment by removing the bolts on the outlet swivel flange connection. A new outlet connection kit can be ordered, and the receptacle can be installed on new subsea equipment.

Our single sided and double sided receptacles use the same male stab, pressure plugs, and dummy stabs so there is no need for additional male stab inventory.



1" 10,000 psi Double Sided Assembly with Debris Cap





# Low-Pressure Hot Stab Assemblies

## Designed for Low-Pressure/High-Flow Service

Oil States Piper Valve Series SF Low-Pressure Hot Stabs offer the following features:

### Service Applications

- Buoyancy Modules for Hybrid Riser Systems
- Suction Piles



## High Performance in an Economical Design

Oil States Piper Valve designed our low-pressure hot stab assembly to be an economic alternative to using high-pressure hot stabs for low-pressure applications.

Features include:

- Receptacle is machined from Stainless Steel casing and outlet connection is cold-extruded to eliminate the weld-let.
- Receptacle liner is available in acetyl or Stainless Steel.
- Screened cage welded to the end of the receptacle allow seawater to enter the receptacle from both the flooding stab and receptacle, reducing flooding time.

Stab assemblies include:

- Flooding Stabs - for initial filling of chambers.
- Male Stabs- for filling chambers with fresh water or nitrogen.
- Pressure Plugs - act as secondary barrier, eliminating one ball valve.
- Dummy Plugs - installed in receptacle to prevent marine growth on sealing surfaces.





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# Subsea Service Valves

## Subsea Check Valves & Double Block & Bleed Valves

OPTIMUM-FLOW TECHNOLOGY SUBSEA SOLUTIONS

### Subsea Check Valves

#### Designed for High-Pressure/High-Flow Service

Oil States Piper Valve Subsea Check Valves offer the following features:

- 30 Year Permanent Service Check Valves are available upon request.
- Piper Subsea Check Valves are a flapper design and are full open under flow, resulting in a piggable check valve.
- Available in sizes Nominal 1" thru 12"
- Working pressures of ANSI 1500, API 3000, ANSI 2500, API 10,000.

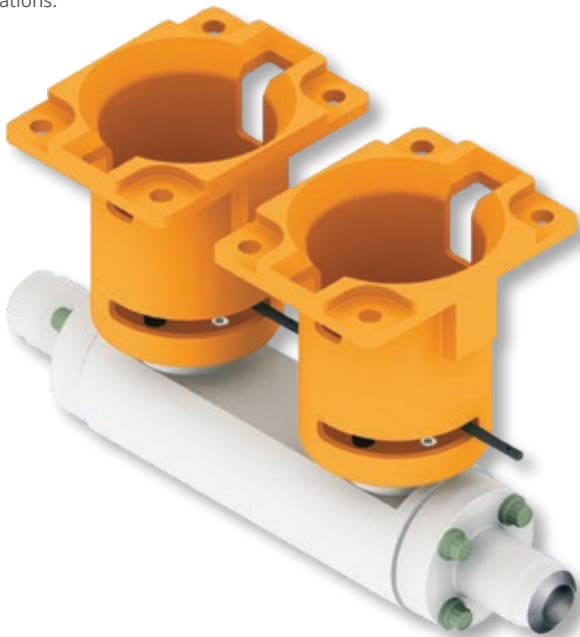


### Double Block & Bleed Valves

#### The Solution for Compact Subsea Double Isolation

Oil States Piper Valve Double Block & Bleed Valves offer the following features:

- Available in Double Ball/Single Stem & Double Ball/Double Stem Configurations. Optional bleed port available upon request.
- Available in all sizes and working pressures as our single ball valves, for both temporary and permanent service applications.





# Quality Commitment

## Product Verification & Testing

Oil States Piper Valve continually strives to improve its products and increase their performance. A direct result of this commitment is product verification that is obtained through stringent testing guidelines of API 6A, API 6D, API 598, API 17D, and others. Piper valves are also subjected to the following performance testing.

- **API 6FA/6FD**  
Specification for Fire Test for Ball Valves and Check Valves.
- **API 6A Appendix F PR2**  
Performance Verification Testing combining both the effects of pressure and temperature.
- **Erosive Flow Testing**  
Consisting of 1,000 Open/Close cycles against a 0.1%, by volume, sand-laden slurry flowing at a velocity of 3 m/s.
- **Hyperbaric Testing (Subsea Applications)**  
100% of Piper's subsea valves are subjected to external pressure equal to 10,000 feet of submerged service and held to prove the valves external pressure integrity.
- **API 6A PSL 3 & 3G, PSL 4**  
Additional material testing, extended hydrostatic and gas testing.



## Piper Certification

- OSI Piper Valve has maintained **ISO 9001** certification since August 2002.
- OSI Piper Valve has also maintained **API Q1** certification with **API 6A** and **6D mono-gramming** licenses since March 2012.



# PIPER OPTIMUM-FLOW TECHNOLOGY



## OIL STATES INDUSTRIES

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