



RISER & DRILLING SYSTEMS

HP Drilling Riser System

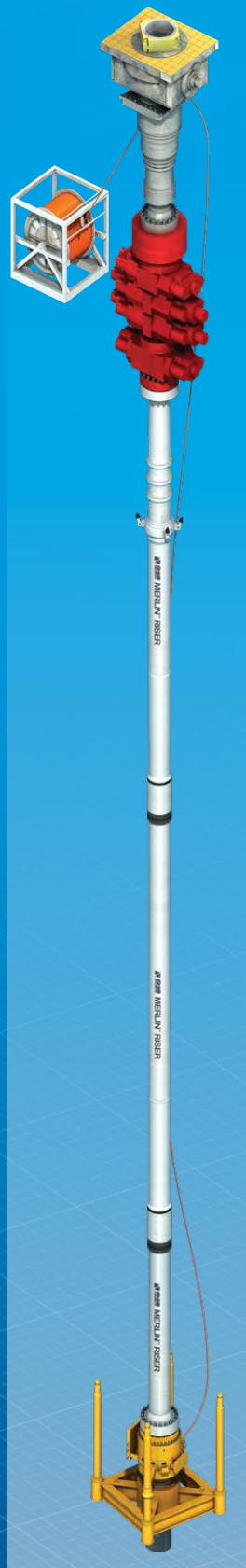
Introduction

Oil States Industries are a world-leading manufacturer of advanced connection systems for offshore tubulars. Our connectors are fast make-up, high-performance connection systems ideal for SCRs, TLPs, tethers, conductors, casing, new and replacement caissons, HP risers, pipelines and jacket piles. We're a proven provider of riser components for deep water, production, drilling and completion risers, and we offer comprehensive riser system design services, completion, drilling, subsea and surface equipment to complement our trusted worldwide field-proven connector technologies.

A high-pressure drilling riser system acts as a conduit between the subsea wellhead and the BOP on the rig surface. The riser system provides not only fluid and pressure containment, but also structural and global integrity. A high-pressure riser system is used to drill wells from a jack-up drilling unit utilising a dry surface BOP and a HP drilling riser, complete with a hydraulic subsea connector to the subsea wellhead.

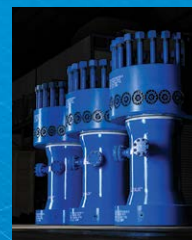
The Oil States HP Drilling Riser consists of the following components:

- **Quick Connections:** are used to interface with the rig surface 18¾" BOP stack.
- **Landing Joint:** provides interface between the BOP and the tension joint. The connections on either end of the tension joints can be designed to be project specific.
- **Tension Joint:** provides the ability to apply tension to the riser system either utilising the existing rig tension system or supplied hydraulic active tension ring.
- **Intermediate Joints:** span between the top of the stress joint and bottom of the tension joint. The connections for the intermediate joint are Oil States proprietary Merlin™ connectors, which

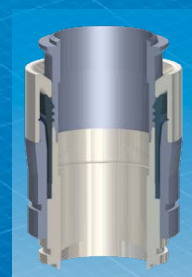


provide high strength and high fatigue tolerance.

- **Stress Joint:** attaches to the top of the subsea connector to provide extra strength at the highly loaded locations or the riser system. The stress joint is manufactured from a tapered forging to accommodate high stresses and a long fatigue life.
- **Hydraulic Connector:** subsea or surface-controlled Oil States LynxGrip™ or Alligator connector mounted on the bottom of the HP stress joint that interfaces with the subsea wellhead head housing.
- **Umbilical & Umbilical Reeler:** The umbilical reeler provides hydraulic fluid to the hydraulic subsea connector to enable remove operation. An HPU issued to control and supply fluid to the umbilical and reeler.
- **BOP / Xmas Tree Surface Connector**
LynxLok™ Connector
The rapid install, 18¾" LynxLok™ BOP connection minimises rig time and eliminates drop risk. Supplied with associated offline test tools.



- **Subsea Wellhead Connectors**
Alligator Connector
Thru rotary subsea hydraulic connector that is compatible with 18¾" standard subsea wellheads and c/w 18¾" 10 ksi and 15 ksi studded adapter. Multiple options on subsea connections are available.



LynxGrip™ Connector

The LynxGrip™ is a standard wellhead connector that latches to a conventional 18¾" profiled wellhead





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LynxGrip™ Operating Capacity Chart

Operating Capacity	LynxGrip™ 15/31	LynxGrip™ 10/20
Bending Load Capacity	3.1x106 ft.lbs.	2.0x106 ft.lbs.
Preload (max 12 pistons x 2000 psi)	2.51x106 lbs.	2.1x106 lbs.
Maximum Tension	1,000 kips	1000 kips
Operation Temperature Range	-20°C to 120°C	-20°C to 120°C
Operating Depth	10,000 ft.	10,000 ft.
No. of Hydraulic Cylinders	12	16
Outside Diameter	51.5 in.	46.88 in.
Weight	13,900 lbs.	11,500 lbs.
Swallow	27.5 in.	27.5 in.
Maximum Bore	18.75 in.	18.75 in.
Maximum Working Pressure	15,000 psi	10,000 psi
Maximum Cylinder Pressure	3,000 psi	3,000 psi

Merlin™ Riser Connector (Merlin™ R)

The Oil States Merlin™ R Connector offers versatility, high strength and high fatigue performance or high-pressure riser applications. The connection was developed to complement the existing Oil States product range and meets industry demands for high-pressure large-bore riser connectors in extreme environments and is available in the following options:

- HPI-5: 5K - 21" bore
- HPI-10: 10K - 20" bore
- HPNI-15: 15K - 19" bore

The non-helical design of the connector teeth means that connector preload is achieved via tooth geometry and is not dependent on torque, removing uncertainty over friction effects during make-up.

Features

- Full bore sizes currently up to 19" at 15,000 psi working pressure
- Reversible and reusable
- High preload design
- Provides four-point integral metal-to-metal sealing
- Non-rotational assembly
- Non-helical tooth profile design
- Ultra high fatigue life and static strength
- Compact, slimline design
- Fast make-up and break out (approx. 5 minutes) using Oil States assembly tooling
- Pressure testing to 22,500 psi internal pressure in accordance with API6A 3 minute and 15 minute holds
- Structural testing, both axial and fatigue
- Non welded option available for sour gas applications
- High torque capacity without rotation, typically in excess of 250,000 ft.lbs.



HPI-10 Merlin™ R Connector

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