Technical Brief

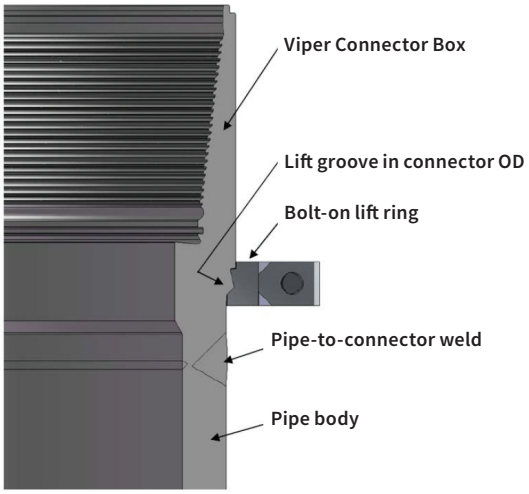
Viper™ Connector

Bolt-on Lift Ring

Viper connectors for diameters 36-inch and larger are designed with a near-flush outer diameter to allow passage through standard rotary tables, mudmats, and temporary guide bases. The reduced external upset also makes the Viper connection more suitable for use in driving and jetting applications. For lifting and handling of these larger Viper connectors, XL Systems supplies various tools that can be installed around the box connector OD.

The most common tool, the bolt-on lift ring, is a temporary lift shoulder designed for lifting and handling with standard elevators. For lifting and handling of these larger Viper connectors, XL Systems supplies various tools that can be installed around the box connector OD. The most common tool, the bolt-on lift ring, is a temporary lift shoulder designed for lifting and handling with standard elevators.

The Viper bolt-on lift ring is a split steel ring that fits into a special profile machined on the OD of the Viper box connector. The illustration to the right shows a cross-section of the lift ring attached to the Viper connector box.



Viper Connector Bolt-on Lift Ring

The circumferential profile machined around the back of the box OD was specially designed to prevent hoop stresses in the lift ring while lifting and handling, which allows the ring to function with little pre-load in the bolts. The generous shoulder width on the lift ring provides sufficient thickness to support multiple full-length joints.

Finite Element Analysis (FEA) was completed on the 36-inch lift ring in order to optimize the groove geometry and establish the preliminary performance ratings. To verify the design and FEA load ratings, physical testing was then performed.

Testing was completed at Versabar, Inc. in Houston, Texas using tension test machines oriented both vertically and horizontally. Each test procedure utilized a 36-inch side door elevator to transfer the load from the hydraulic cylinders to the lift ring. The applied load was incrementally increased and was held at the desired load for ten minutes before releasing. Load cells monitored and recorded the tension applied to the lift ring for each test.

Figure 1: Load Test to 150 Tons

Viper Connector Bolt-on Lift Ring

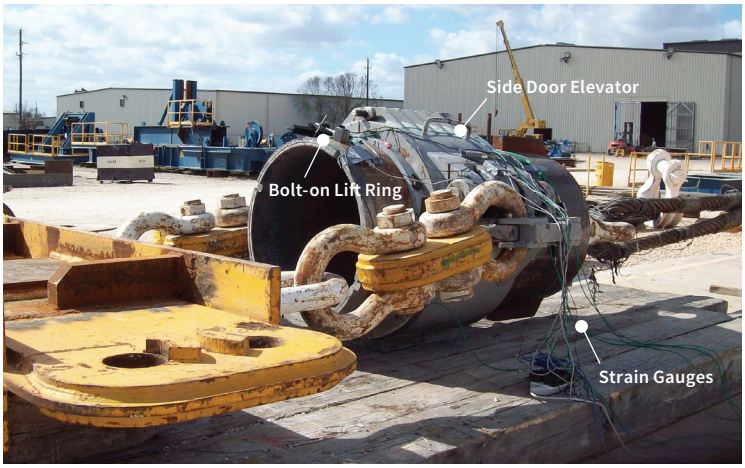


Figure 2: Load Test to 250 Tons

For the first test, the lift ring was tension tested up to 300,000 lbs (150 short tons) without failure, which verified preliminary FEA performance ratings. For the second test, the load was increased to 500,000 pounds (250 short tons). This test was also successful and was stopped due to capacity limitations of the side door elevator.

After each test was completed, the lift ring was removed and visually inspected. No damage to either the connector or the lift ring was observed.

Both FEA and physical testing have confirmed the 150 short tons (300,000 pounds) rating of the 36-inch bolt-on lift ring. This rated capacity is sufficient for safely lifting a combination of four 40-foot 36 x 2.00 joints and four 40-foot 36 x 1.50 joints.

The Viper bolt-on lift ring is rated to 150 short tons and has been successfully tested to 250 short tons.

Figure 3: 36 x 1.50 Viper-3ST Run in Deepwater Brazil

The Viper bolt-on lift ring is lightweight and simply installed by fitting each half around the box OD and into the lift groove and then tightening two bolts. The lift ring is removed from the connector prior to running through the rotary. This is advantageous over bolt-on padeye designs from a clearance standpoint where the base plate remains on the pipe while running. Detailed field service procedures for the Viper bolt-on lift ring are available and can be supplied by XL Systems.

The 36-inch Viper lift ring is field proven in deepwater locations that include Brazil, eastern Canada, and West Africa. It has been successfully run with both side door and horseshoe type elevators. As of early 2010, over 500,000 feet of pipe with Viper connectors have been sold in a variety of applications around the world.

XL Systems
140 Cypress Station Drive, Suite 225
Houston, TX 77090, US

XLTB003

xlsystems@nov.com nov.com/xlsystems