



Standard Subsea Connection Features

All Taper-Lok connectors, designed for subsea applications, are priced and supplied with additional features that aid divers in the installation of the connection. These features are automatically added when we know the connectors are to be used in a subsea environment. The benefits of these additional features have proven to significantly shorten the time required to install a Taper-Lok connection over that taken for ANSI RTJ or API connections. This, in turn, saves in the cost of expensive dive time required for make-up of subsea flanges. Other benefits provide for diver safety during the installation process.

Taper-Lok "CAM-LOK" Seal Ring Retainers

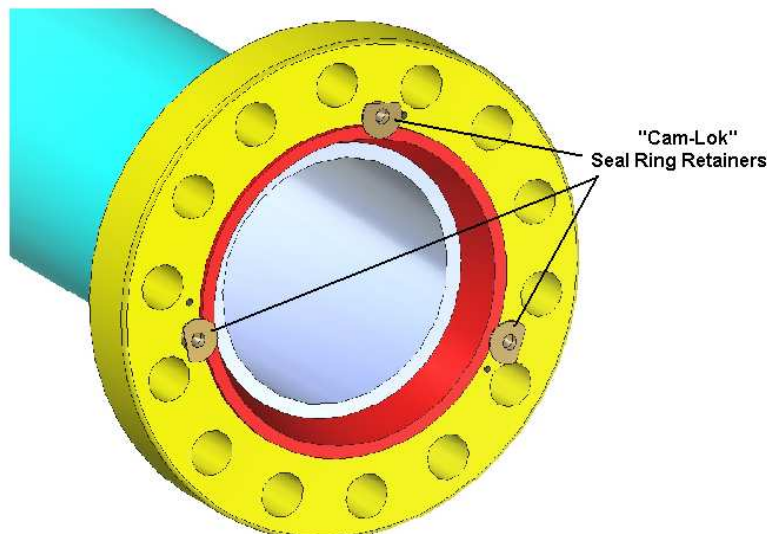
The "Cam-lok" Seal Ring Retainer can only be offered by Taper-Lok. Due to the fact that Taper-Lok Flange faces never touch in the made-up position, the space between the flanges allows for the placement of Cam-Loks to retain the Wide Area Seal Ring during positioning and make-up.

These simple devices:

1. Hold the Wide Area Seal Ring in the proper position during positioning and make-up. Freeing the diver from the worry that a Seal Ring has moved to an improper position. The Seal Ring is held firmly in the proper position.
2. Keep the Seal Ring from falling out of place and landing on the sea floor during make-up.
3. Suppresses the diver's natural reaction to grab for the Seal Ring if it moves out of position during the bringing together of the flanges during make-up, keeping diver's hands and fingers out of the connection.

In most cases, 3 brass Cam-Loks are positioned around the circumference of the Female pocket, held in place by small stainless steel screws. Before make-up, the screw is loosened and the flat side of the Cam-Lok is turned to face the Female pocket. The Seal Ring can then be placed in the Female pocket. The Cam-Loks are rotated 180° and the screws tightened. The lips of the Cam-Loks hold the Seal Ring in the proper position, even if the flange is looking in a downward position. They remain in place after flange installation and do not require removal.

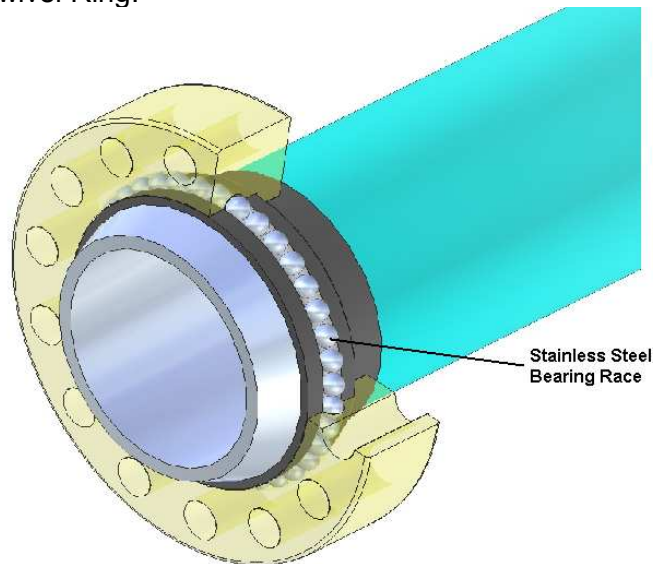
Should a Cam-Lok be bumped by a mating flange during the make-up and broken off, additional threaded holes are provided for the placement of another Cam-Lok.



Taper-Lok Swivel Flange Ball Bearing Races

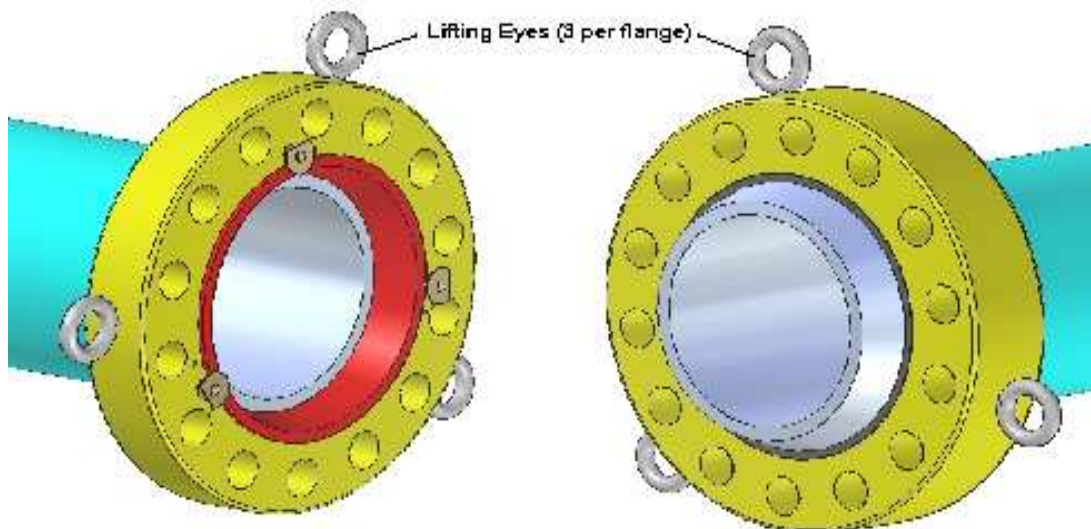
All Taper-Lok Swivel Flanges 12" diameter and larger, designed for subsea applications, are provided with ball bearing races, machined into the swivel portion of the flange and loaded with stainless steel bearings. The bearings allow for easy rotation of the Swivel by divers, during bolt hole alignment. It has been proven that the Swivel can be rotated by hand, even in applications on large diameter flanges such as 48" (Swivel OD 60").

The feature also eliminates the need for a retainer ring to be welded to the backside of the flange to prevent the swivel from sliding onto the pipe. When the ball bearings are loaded into the race, the swivel is locked into place by the bearings, preventing lateral movement of the Swivel Ring.



Taper-Lok Lifting Eyes

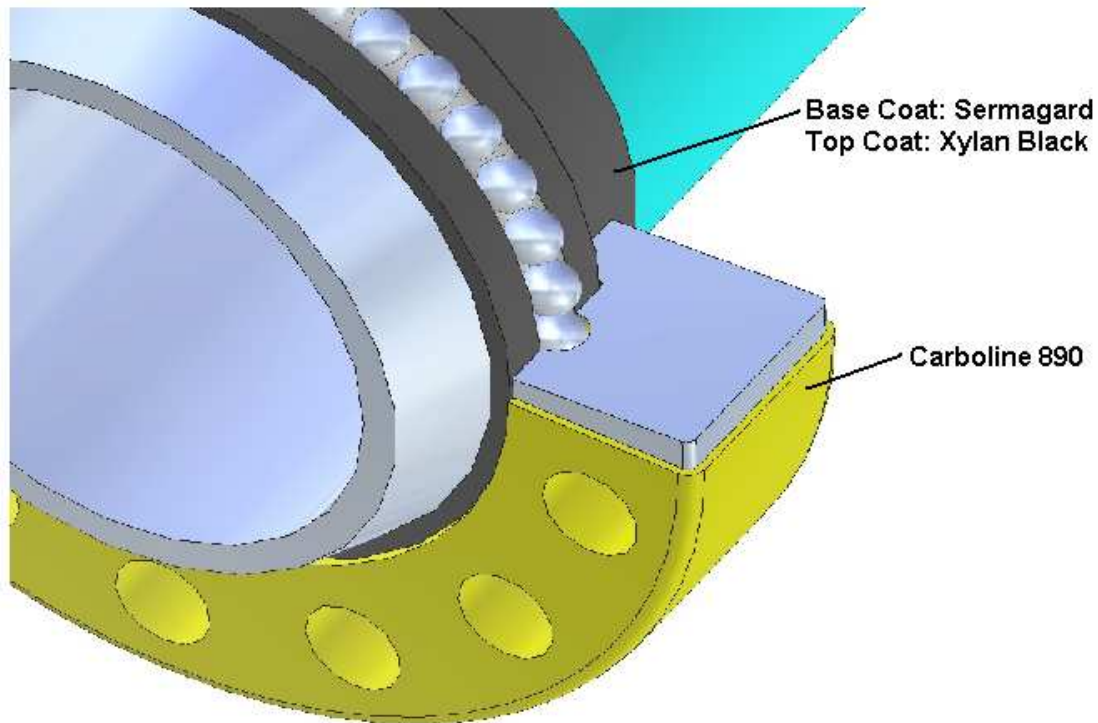
Taper-Lok subsea connections are provided with three (3) lifting eyes. These become valuable tools during both fabrication and installation. We also add this feature for safety reasons, making movement of our flanges into position, during make-up, easier and safer for the diver making the installation.



Taper-Lok Standard Subsea Coating Application

All Taper-Lok Subsea connections are priced to include the application of Carboline 890 (12 mil dry film thickness/2-3 coats/Safety Yellow) to the external surfaces of the connection. Internal mating surfaces of Swivel Flanges and Misalignment Flanges are coated with a combination of Sermagard 1105 (.8-1 mil dry film thickness) for corrosion protection and top coated with Xylan Black (.5-1 mil dry film thickness) for a durable/low friction finish surface. These coatings provide years of corrosion protection in subsea service.

In addition, all corners and edges of any Taper-Lok subsea flange are provided with $\frac{1}{4}$ " radii. This feature allows for applied coatings to "wrap around", providing a uniform coating thickness across the corner, making a Taper-Lok subsea flange less susceptible to holidays due to chipping damage to the coating during transportation, fabrication and installation.



Taper-Lok Standard Subsea Studs and Nuts

All Studs and Nuts provided with Taper-Lok subsea connections are of suitable length for use with Integra or Hydratight subsea bolt tensioner systems. All Nuts are provided 100% Tommy bar holes as a standard.

The standard Stud and Nut coating system applied to Taper-Lok provided bolting is a Base coat of Sermagard 1105 (.8-1 mil dry film thickness) for corrosion protection and top coated with Xylan 1424 Blue (.5-1 mil dry film thickness) for a durable/low friction finish surface making it easier for divers to spin nuts into position during make-up. This added step taken, assures for years of corrosion protection in the subsea environment, which low friction coatings alone cannot offer.

Conclusion

The standard features offered with Taper-Lok Subsea connectors may add a small additional cost to the overall quoted price of the flange, but can save thousands of dollars in installation time and overall performance. In many cases, due to the time saving features and diver aids, the flanges are free in the overall project cost. If saving money in installation costs and overall performance in the field is not a project requirement, please let Taper-Lok know and we will not include these features in our quotation.

For every hour a Taper-Lok connector saves in installation time, the customer can realize an approximate savings of \$5,000.00 off the total project cost.