

Hydraulic Smart Flange (HSF) Connector

Deepwater pipeline and riser repair



Our HSF connector delivers a hydraulically-set, mechanical solution based on the field-proven technology of the Oceaneering[®] Smart Flange Plus Connector.

The HSF is designed to provide a structural connection point subsea. It is an ideal solution in deepwater fields or locations where diver repairs are undesirable or not possible. When actuated, the HSF connector structurally attaches to and seals against the pipe or riser. The HSF is capable of withstanding full pipeline axial, bending, and torsional loads while maintaining full line pressure integrity.

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The HSF may be configured to include an Oceaneering Grayloc® male hub, a flange, or may be connected with another HSF in a double arrangement. HSF connectors can be designed in sizes and pressure ratings to meet customer requirements. The connectors are available in configurations that enable termination to flange connections, Grayloc® hubs, or other customer-specified terminations.

Subsea installation of the HSF is ROV-supported.

- » An ROV uses a hot stab to pressurize the port in the connector to set the gripping and sealing mechanisms on the pipe or riser, driving the seal piston axially to set the main and test seals around the asset
- » The ROV increases the pressure to drive the slip piston axially in the opposite direction from the seal piston to set the gripping mechanism on the pipe or riser
- » Both pistons are locked in their final position by a using series of spring-energized ratcheting locking mechanisms positioned radially inside the connector housing
- » The sealing integrity of the connector is confirmed using the annulus test port feature

Design Parameters

Nominal Pipe Size (NPS): any API Specification 5L pipe, wall thickness, and grade

Service: Standard (i.e. crude oil, natural gas, hydrocarbons, water, or chemical injection, etc.)

Design Pressure Rating and Applicable Dimensions: ASME, MSS, or API

Design Temperature Range: 25°F to 250°F / -4°C to 121°C

Material Specifications

Housing AISI 4140 forging, quenched and tempered

End cap AISI 4140 forging, quenched and tempered

Pistons AISI 4140 forging, quenched and tempered

Slips AISI 8630 case hardened

Seals Viton B, Buna-N, or other elastomeric compounds can be provided for compatibility with pipeline contents or inhibitors

Studs and nuts ASTM A193 Gr. B7 studs and ASTM A194 Gr. 2H heavy hex nuts, all XYLAN coated (i.e. PTFE, dark blue)

External coating Carboline® 890 Marine Epoxy Paint System, safety yellow color

Applicable Design Codes, Standards, and Specifications (latest editions)

PCRS Hydraulic Smart Flange (HSF) Connector Drawings, Bill of Materials (Controlled Copies), and Vendor Supplied Material Test Reports

ISO 9001:2015 Quality Assurance – Quality Control Procedures and PCRS Operating Procedures

Oceaneering Subsea Coating Specification

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 and 2

ASME B31.4, Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids

API 5L, Specification for Line Pipe

API 6A, Specification for Wellhead and Christmas Tree Equipment

API 6H, Specification on End Closures, Connectors and Swivels

API RP 1111, Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines

Certifications

ISO 9001:2015 – World Certification Services Ltd. – Accredited by UKAS Quality Management

Det Norske Veritas (DNV) – per unit basis