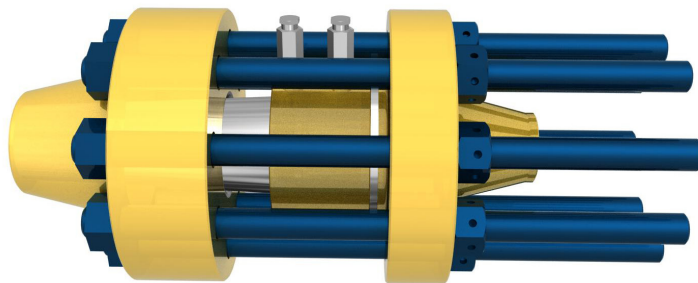


# Metal Smart Flange (MSF)

## Fully mechanical pipe end connector

Our fully mechanical pipe end connector is based on field-proven technology and can be used in subsea and topside applications. The metal smart flange (MSF) connector integrates aspects of the Oceanengineering Smart Flange Plus Connector to provide a complete metal-to-metal seal.



### FEATURES

**Suitable for subsea and topside use**

**Field-proven technology**

**Lightweight and compact design**

# Metal Smart Flange (MSF)

## Fully mechanical pipe end connector

The end connector consists of two components: a mandrel and a modified flange, both of which are designed with respective tapers. The outer diameter of the mandrel taper matches that of the flange inner diameter. The low alloy steel mandrel serves as a gripping mechanism and enables seal integrity testing.

The standard ring type joint (RTJ) groove on the mandrel is designed to make up to any ANSI/ASME flange. The gripping mechanism is designed with specially hardened and circumferentially cut teeth.

The modified flange is designed to ASME B16.5 and B16.47 and MSS SP-44 for ANSI Classes 600 and 900. The flange is also designed to prevent nut rotation during make-up.

The end connector includes a test seal feature to support a seal integrity test once the connector is fully set. The test seal is externally pressure energized.

### Design Parameters

|                          |                                                                       |
|--------------------------|-----------------------------------------------------------------------|
| Nominal pipe size (NPS)  | Any API specification 5L pipe and wall thickness                      |
| Applications             | Crude oil, natural gas, hydrocarbons, water, chemical injection, etc. |
| Design pressure rating   | Up to ANSI Class 2500 and up to API Class 10,000                      |
| Design temperature range | 25° F to 250°F / -4°C to 121°C                                        |
| Design Life              | 25 years                                                              |

### Material Specifications

|                                     |                                                                                                |
|-------------------------------------|------------------------------------------------------------------------------------------------|
| Housing with weld neck flange (RTJ) | ASTM A105, ASTM A694 F60 forging                                                               |
| End cap                             | ASTM A105, ASTM A694 F60 forging                                                               |
| Piston, slip anchor, and cone       | AISI 4140 forging                                                                              |
| Elastomer seals                     | Viton® B or Buna-N                                                                             |
| Studs and nuts                      | ASTM A193 Gr. B7 studs and ASTM A194 Gr. 2H heavy hex nuts, all Xylan coated (i.e. PTFE, blue) |
| External Coating                    | Carboline® CarboGuard 890 marine epoxy paint system, safety yellow color                       |

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

|                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------|
| ASME Boiler & Pressure Vessel Code, Section VIII, Division 1 and 2                                                                              |
| ASME B31.4, Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids                                                           |
| ASME B31.8, Gas Transmission and Distribution Systems                                                                                           |
| ASME B18.2.1, Square and Hex Bolts and Screws Inch Series                                                                                       |
| API 5L, Specification for Line Pipe                                                                                                             |
| API 6A, Specification for Wellhead and Christmas Tree Equipment                                                                                 |
| API 6H, Specification on End Closures, Connectors and Swivels                                                                                   |
| NACE MR0175, Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment                                                        |
| Oceaneering Intervention Engineering (OIE) ISO 9001:2000 Quality Assurance – Quality Control Procedures & Oceaneering PCRS Operating Procedures |

### Certifications

|                                                                                           |
|-------------------------------------------------------------------------------------------|
| Bureau Veritas (BV) Oil & Gas Type Approval Certificate                                   |
| ISO 9001:2015 – World Certification Services Ltd. – Accredited by UKAS Quality Management |