

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Marine Riser Equipment**

with type designation(s)  
**Drilling Riser, 6.0K Subsea FlexJoint Assembly**

Issued to  
**Oil States Industries Inc.**  
**ARLINGTON TX, United States**

is found to comply with  
**DNVGL-OS-E101 – Drilling plant, Edition July 2015**  
**DNVGL-SI-0166 – Verification for compliance with Norwegian shelf regulations, Edition July 2015**

## Application :

**See Page 2**

**Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL when accompanied with a DNV GL Product Certificate (PC).**

Issued at **Houston** on **2014-08-12**

This Certificate is valid until **2019-08-11**.

DNV GL local station: **Houston, Approval CMC**

for **DNV GL**

Approval Engineer: **Mark Miser**

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**Brandon D Caraway**  
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



## Product description

A Marine Drilling Riser FlexJoint is a steel and elastomer assembly having a central through-passage equal to or greater in diameter than the riser bore that may be positioned in the riser string to allow greater angular deflection which reduces local bending stress in the riser string.

## Referenced Standards

[1] API 16F, "Specification for Marine Drilling Riser Equipment", 1<sup>st</sup> Edition

## Application/Limitation

| <u>Design Parameter</u>       | <u>Value</u>                                                                    | <u>(Equivalent)</u> |
|-------------------------------|---------------------------------------------------------------------------------|---------------------|
| Rated Axial Tensile Load      | : 15,569 kN                                                                     | (3,500,000 lbf)     |
| Rated Axial Compressive Load  | : 0 kN                                                                          | (0 lbf)             |
| Rated Working Pressure        | : 41.4 MPa                                                                      | (6,000 psi)         |
| Hydrostatic Test Pressure     | : 62.1 MPa                                                                      | (9,000 psi)         |
| Minimum Design Temperature    | : -20°C                                                                         | (-4°F)              |
| Maximum Design Temperature    | : 230°C for 7 days                                                              | (446°F)             |
|                               | : 25°C for 300 years                                                            | (77°F)              |
| Combined Loading Condition #1 | : 13,345 kN, ±10° Conical Rotation, at 41.4MPa                                  |                     |
|                               | : (3.0 x 10 <sup>6</sup> lbf, ±10° Conical Rotation, at 6,000 psi)              |                     |
| Combined Loading Condition #2 | : 15,569 kN, ±10° Conical Rotation, at 0 MPa                                    |                     |
|                               | : (3.5 x 10 <sup>6</sup> lbf, ±10° Conical Rotation, at 0 psi)                  |                     |
| Hydrotest Condition           | : 0 kN, ±0° Conical Rotation, at 62.1 MPa                                       |                     |
|                               | : (0 lbf, ±0° Conical Rotation, at 9,000 psi)                                   |                     |
| Maximum Flex Angle            | : ±10° Conical Rotation                                                         |                     |
| Service                       | : Well Control System, Marine Drilling Riser Equipment, Sour (H <sub>2</sub> S) |                     |

*Design Limitation Note: Customer supplied Riser Couplings shall be provided with DNV GL Product Certification and may reduce the indicated design limitations.*

## Type Approval documentation

### Tests carried out

For prototype testing as required by API Specification 16F, see DNV GL survey reports ANMUS476PP002832emay20110823D, ANMUS476PP002832jdun20110608A, ANMUS476PP002832jdun20110615A and ANMUS476PP002832wdd6july2011A.

### Marking of product

Marking shall:

1. Be reviewed and approved by the DNV GL local surveyor.
2. Identify and differentiate each production unit <i.e. serial number>.
3. Establish traceability to product design and fabrication documentation.
4. Be in accordance with API 16F (Ref. 1<sup>st</sup> Edition §8.7).

### Periodical assessment

For retention of the Type Approval, DNV GL's surveyor shall perform a survey every second year in accordance with Type Approval Scheme DNVGL-CP-0338, October 2015 Edition.