Certificate No:
TAD00001JR

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Work over Equipment

with type designation(s)
PD16597 - Workover Spool FlexJoint Assembly

Issued to
Oil States Industries, Inc.
Arlington, TX, USA

is found to comply with
DNV-OS-E101 – Drilling facilities, Edition July 2021
DNV statutory interpretations DNV-SI-0166 – Verification for compliance with Norwegian shelf regulations, Edition July 2021

Application :

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

Issued at **Houston** on **2023-05-11**
This Certificate is valid until **2028-05-10**.
DNV local unit: **Certification & Inspection Services**

Approval Engineer: **Mark Miser**

for **DNV**

Meindert van Mierlo
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

A Workover Riser FlexJoint is a steel and elastomer assembly having a central through-passage equal to or greater in diameter than the riser tubing 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] ISO13628-7:2005 “Recommended Practice for Completion / Workover Riser Systems”, 1st Edition
[2] API 16F, “Specification for Marine Drilling Riser Equipment”, 1st Edition

Application/Limitation

Design Parameter	Value	(Equivalent)
Rated Axial Tensile Load	: 228 kN	(51,250 lb_f)
Rated Axial Compressive Load	: 0 kN	(0 lb_f)
Rated Working Pressure	: 34.5 MPa	(5,000 psi)
Hydrostatic Test Pressure	: 51.7 MPa	(7,500 psi)
Minimum Design Temperature	: -8°C	(-17.6°F)
Maximum Design Temperature	: 40°C	(104°F)
Combined Loading Condition #1	: 228 kN, ±5.5° Flex Angle, at 34.5 MPa	
	: (51,250 lb_f, ±5.5° Flex Angle, at 5,000 psi)	
Hydrotest Condition	: 0 kN, ±0° Flex Angle, at 51.7 MPa	
	: (0 lb_f, ±0° Flex Angle, at 7,500 psi)	
Maximum Flex Angle	: ±5.5°	
Service	: Workover and Well Intervention System, Workover Riser Equipment, Sour (H_2S)	

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

Type Approval documentation

Prototype Testing

For prototype testing as required by API Specification 16F, see DNV survey reports ANMUS467PP002832jdun20110608A, ANMUS467PP002832jdun20110615A, ANMUS467PP002832wdd29jun2011A, ANMUS467PP002832wdd6july2011A, and ANMUS467PP002832wdd13july2011B.

Marking of product

Marking shall:

1. Be reviewed and approved by the DNV 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 ISO 13628-7 §9.

Periodical assessment

Periodical assessments for type approvals will be required after two years (+/- 90 days) and after three-and-a-half years (+/- 90 days) in accordance with DNV-CP-0338.