Certificate no.:
TAD00001MU

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Coupling

with type designation(s)
5” 3M HPE Swivel P/N: SSS-136309

issued to
Sub Sea Services AS
STAVANGER, **Norway**

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:

See next page

Issued at **Høvik** on **2024-05-13**
This Certificate is valid until **2029-05-12**. for **DNV**
DNV local unit: **Oslo Drilling Systems & Lifting Appliances**

Approval Engineer: **Jan H. Hansen**

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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.

Reference Standards

[1] API 6A, Specification for Wellhead and Christmas Tree Equipment, 21tstEdition, October 2018
[2] API 6X, Design Calculations for Pressure- Containing Equipment, 2nd Edition, 2019
[3] API 16A, Specification for Drill-through Equipment, 4th Edition, April 2017
[4] API 16C, Specification for Choke and Kill Equipment, 3rd edition, February 2021
[5] ISO 15156/NACE MR0175 “Materials for use in H2S-containing environments in oil and gas production”, 4th Ed.

Product description

This swivel allows for smooth rotation between a rigid line and a flexible hose in the moonpool area of a Drilling Rig / Vessel. It reduces the stresses on the rigid line and prevents the flexible hose for being twisted and damaged/worn due to environmental loads such as wind and waves.

Application/Limitation

5” 3M HPE Swivel

Internal diameter /bore:	5-1/8”
Maximum internal working pressure:	3000 psi (207 bar)
Min./max. temperature rating:	-18 °C /121 °C (API 16C Rating U)
Maximum external pressure/water depth	0.2 bar / 20m
Maximum external tension/load:	118 kN / 12 mT
Maximum allowable bending moment:	30 kNm
Maximum torque at working pressure:	1.47 kNm
End connections:	6 GR62 Grayloc Hub
Corrosion allowance:	3.0 mm
Service medium:	Sour /Mud

Type Approval documentation

Drawing / Report No.	Rev.	Title

Prototype design validation

None.
Note that other sizes of similar SSS HPE swivels, all with higher pressure ratings, are covered by DNV Type Approval TAD00000W1 and have been used for similar applications over a decade.

Tests to be carried out on each swivel

Test Procedures:

1. Pressure testing to 1,5 x rated working pressure shall be performed according to DNV-OS-E101, Chapter 2 Section 8, 3.3 and API 16C 7.4.1. Testing shall be witnessed by a DNV surveyor.

2. Charpy impact testing shall be performed in accordance with DNV-OS-E101, Ch.2, Sec.8 3.2 and Sec.2, 2.6.

NDE Procedures:

3. NDE/NDT shall be performed according to DNV-OS-E101, Ch.2, Sec.8,3.1.

Welding Procedures:

4. Qualification of welders, and welding (CRA inlay), shall be in accordance with DNV-OS-E101, Ch.2, Sec.8, 2.3 and 2.4.

Materials

Components	Material	Min. Yield Strength	
Outer body	AISI 4130	75 ksi	517 MPa
Inner body	AISI 4130	75 ksi	517 MPa
Nut	AISI 420	80 ksi	552 MPa
Wear Sleeve	AISI 420	80 ksi	552 MPa
Locking Ring	S 174 PH	105 ksi	724 MPa
Upper Trust Ring	S 174 PH	105 ksi	724 MPa
Sleeve	S 174 PH	105 ksi	724 MPa
Upper Bearing	S 174 PH	105 ksi	724 MPa
Lower Bearing	S 174 PH	105 ksi	724 MPa
Lower Trust Ring	S 174 PH	105 ksi	724 MPa

Marking of product

For traceability the following marking is to be carried out on each product:

- Manufacturers Name or Mark
- Part No.
- Serial No.
- Size
- Pressure Rating
- Temperature Rating
- VL TAD00001MU

Comments

- Maximum listed external tension and bending moment includes environmental loads.

- Each product to be surveyed during fabrication in accordance with the requirements for equipment of Category 1 as defined in DNV-OS-E101 Ch.3 Sec.3, followed by issuance of a DNV Product Certificate.

- Fabrication records shall be maintained by the manufacturer in accordance with DNV-OS-E101 Ch.3, Sec.3 §2.

- Functional test reports (e.g. proof of swivels capability to limit torque to 1.47 kNm at maximum rated working pressure of 3000 psi and smooth rotation without jerking) shall be kept in the manufacturers record book in accordance with DNV-OS-E101, Chapter 3 Section 3, 2.1.2. Refer also API 16C, 7.4.6 and 7.4.1.

- Hardness testing shall be performed, with acceptable results, on all surfaces exposed to sour service as per ISO 15156/NACE MR0175.

Certification Retention Survey

For retention of the Type Approval Certificate, DNV AS's representative shall carry out surveys every second year in accordance with DNV Type Approval Scheme DNV-CP-0338.

END OF CERTIFICATE