DNV·GL

Certificate No:
TAD00000Z9

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Fitting

with type designation(s)
2" (P/No. HPI-909010, Rev A.1) and 6" (P/No. HPI-914010, Rev A.1) Swivels

Issued to
Dynamic Sealing Technologies, Inc.
Andover, MN, USA

is found to comply with
DNVGL-OS-E101 – Drilling facilities, Edition January 2018

Application :

See next page.

Issued at **Høvik** on **2018-07-26**
This Certificate is valid until **2023-07-25**.
DNV GL local station: **Oslo Drilling Systems**

Approval Engineer: **Nishant Koti**

for **DNV GL**

Per Esvall
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.

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Reference Standards

- API Spec 6A, "Specification for Wellhead and Christmas Tree Equipment", 20th Edition
- NACE MR0175 / ISO 15156, "Petroleum and natural gas industries - Materials for use in H2S containing environments in oil and gas production"

Product Description

The function of these swivels is to allow a flexible jumper to rotate at interface while maintaining fluids, gas and cuttings, effectively reducing the torsion in the flexible jumper.

Application/Limitation

Design Parameter	Value	(equivalent)
2 inch model:		
Max. operating pressure	344.7 bar	(5000 psi)
Max. operating temperature	+121.1°C	(+250°F)
Min. operating temperature (MDT)	-20°C	(-4°F)
Max. end load (axial)	40 kN	(9000 lbs)
Max. end bending moment	7.1 kNm	(63000 lb*in)
Max water depth	107 m	350 ft
Max. rotating speed	5 rpm	
Corrosion allowance	0.3 mm/year	(0.012 in/year)
Design life – Metal	10 years	
Design life – Non-Metal	2 years	
Material class (API Spec 6A)	DD	
Media	DRILL FLUID, OIL, GAS, WATER (SEA & FRESH), CUTTINGS	
6 inch model:		
Max. operating pressure	344.7 bar	(5000 psi)
Max. operating temperature	+121.1°C	(+250°F)
Min. operating temperature	-20°C	(-4°F)
Max. end load (axial)	140 kN	(31500 lb)
Max. end bending moment	21.35 kNm	(189000 lb*in)
Max water depth	107 m	350 ft
Max. rotating speed	5 rpm	
Corrosion allowance	0.3 mm/year	(0.012 in/year)
Design life – Metal	10 years	
Design life – Non-Metal	2 years	
Material class (API Spec 6A)	DD	
Media	DRILL FLUID, OIL, GAS, WATER (SEA & FRESH), CUTTINGS	

Type Approval documentation

Testing to be performed

- Each swivel shall be pressure tested at 1.5 times working pressure in accordance with DNVGL-OS-E101, 2018.

Marking of product

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

- Part No.
- Serial No.
- Fig. No.
- Rated Pressure capacity
- Manufacturers Name or Mark

Other conditions and comments

- The non-standard end connections, as defined in DNVGL-OS-E101, 2018, Ch.3, Sec.3,Table 15, shall be delivered with DNVGL Product Certificate.
- Elastomer seals exposed to drilling fluid to be qualified in accordance with API Spec 6A, Annex F.
- The wetted surfaces shall be tested for hardness in accordance with NACE MR-0175.
- This TAC is issued based on previous approval DVR-P22989-J-10113 Rev.1.
- Fatigue has not been considered in this Type Approval. The fatigue analysis is the ultimate responsibilty of the user.
- The design selection of the swivel shall meet the requirement of the Allowable Load Chart specified in the design report.
- Each product is to be surveyed during fabrication in accordance with the requirements for equipment of Category I as defined in DNV GL's Offshore Standard DNVGL-OS-E101 Drilling Plant, followed by issuance of Product Certificate. If the intended installation is DNV classed, then this automatically means DNV Product Certificate. Fabrication records are to be maintained in accordance with DNVGL-OS-E101 Ch.3, Sec.3, 1.1.4.
- This document may be used as part of the documentation required to comply with European Union (EU) Directives referenced in PSA's Acts, regulations and provisions for the petroleum activities. It should however be noted that the scope covered by this document does not necessarily cover all aspects required to issue the EU Declaration of Conformity and to affix the CE-mark. It is the manufacturer's/operator's responsibility to ensure compliance with relevant EU Directives.

Certificate Retention Survey

For retention of the Type Approval, DNV GL’s representative shall carry out biennial Product Audits in accordance with DNV GL Type Approval Scheme DNVGL-CP-0338, Chapter 4, dated Oct 2015.

END OF CERTIFICATE