

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Coupling**

with type designation(s)
HPE Swivels with size / pressure rating:

2-1/16" 5K
2-9/16" 5K
3-1/16" 10/15K
3-1/8" 5K
4-1/16" 5/7.5/10K

Issued to

SUB SEA SERVICES AS
STAVANGER, Norway

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

Application :

See next page.

Issued at **Høvik** on **2018-01-25**

This Certificate is valid until **2023-01-24**.

DNV GL local station: **Oslo Drilling Systems**

Approval Engineer: **Axel Janson**

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.



Reference Standards

- [1] API Specification 16C "Choke and Kill Equipment", 2nd edition, March 2015
- [2] ASME Boiler & Pressure Vessel Code, Section VIII, Division II, September 2004
- [3] API 6A, Specification for Wellhead and Christmas Tree Equipment, 20th Edition, October 2010
- [4] API 16A, Specification for Drill-through Equipment, 3rd Edition, June 2004
- [5] ISO 15156/NACE MR0175 "Materials for use in H₂S-containing environments in oil and gas production", first edition, 2001.

Product Description

The HPE-swivels are primary used to connect flexible moonpool hoses (C&K-, booster-, and hydraulic) to the marine riser auxiliary lines. The HPE Swivel allows for rotation between the rigid auxiliary lines and flexible hoses, reducing torsion and stress on the connection.

Application/Limitation

2-1/16 " 5K Swivel Couplings

<u>Design Parameter</u>	<u>Value</u>
Maximum working pressure:	5000 psi (345 bar)
Min./max. temperature rating:	-18 °C /121 °C (API 16C Rating U)
Maximum allowable tension:	12 mT
Maximum allowable bending moment:	22 kNm
Torque at working pressure:	1.50 kNm

2-9/16" 5K Swivel Couplings

Maximum working pressure:	5000 psi (345 bar)
Min./max. temperature rating:	-18 °C /121 °C (API 16C Rating U)
Maximum allowable tension:	12 mT
Maximum allowable bending moment:	22 kNm
Torque at working pressure:	1.50 kNm

3-1/16" 10/15K Swivel Couplings

<u>Design Parameter</u>	<u>Value</u>
Maximum working pressure:	10 000 psi (689 bar)/15 000 psi (1034 bar)
Min./max. temperature rating:	-18 °C /121 °C (API 16C Rating U)
Maximum allowable tension:	12 mT
Maximum allowable bending moment:	22 kNm
Torque at working pressure:	1.50 kNm

3-1/8 " 5K Swivel Couplings

Maximum working pressure:	5000 psi (345 bar)
Min./max. temperature rating:	-18 °C /121 °C (API 16C Rating U)
Maximum allowable tension:	12 mT

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Maximum allowable bending moment: 22 kNm
Torque at working pressure: 1.50 kNm

4-1/16" 5/7.5/10K Swivel Couplings

Maximum working pressure: 5 000 psi (345 bar)/7 500 psi (517 bar)/10 000 psi (689 bar)
Min./max. temperature rating: -18 °C /121 °C (API 16C Rating U)
Maximum allowable tension: 12 mT
Maximum allowable bending moment: 22 kNm
Torque at working pressure: 1.50 kNm

No	SSS P/N	Dim.	Max. WP [psi]	Material	End Connection Std. / Type	End Connection	Ring Groove	Sour Service
1	SSS-120571	2-1/16"	5000	17/4 PH	API 6B	Flange	RX-24	No
2	SSS-120602	2-1/16"	5000	17/4 PH	API 17SS	Flange	BX-152	No
3	SSS-120606	2-1/16"	5000	17/4 PH	API 16BX	Hub No. 1	BX-152	No
4	SSS-120529	2-9/16"	5000	17/4 PH	API 16BX	Hub No. 2	BX-153	No
5	SSS-120612	2-9/16"	5000	17/4 PH	API 17SS	Flange	BX-153	No
6	SSS-120622	3-1/16"	15000	F6NM	API 16BX	Hub No. 6	BX-154	Yes
7	SSS-124060	2-9/16"	5000	17/4 PH	API 16BX	Hub No. 4	BX-153	No
8	SSS-120627	3-1/16"	10000	17/4 PH	API 16BX	Hub No. 5	BX-154	No
9	SSS-120879	3-1/16"	15000	F22	API 6BX	Flange	BX-154	Yes
10	SSS-120029	3-1/16"	15000	AISI 4140	API 16BX	Hub No. 6	BX-154	Yes
11	SSS-120682	3-1/16"	10000	AISI 4140	API 16BX	Hub No. 5	BX-154	Yes
12	SSS-121219	3-1/16"	10000	F22	API 6BX	Flange	BX-154	Yes
13	SSS-120568	3-1/8"	5000	17/4 PH	API 16BX	Hub No. 4	BX-154	No
14	SSS-120886	3-1/8"	5000	17/4 PH	API 17SS	Flange	BX-154	No
15	SSS-120888	3-1/8"	5000	F22	API 17SS	Flange	BX-154	Yes
16	SSS-120669	4-1/16"	5000	17/4 PH	API 16BX	Hub No. 5	BX-155	No
17	SSS-120890	4-1/16"	10000	17/4 PH	API 16BX	Hub No. 6	BX-155	No
18	SSS-120537	4-1/16"	7500	AISI 4140	API 16BX	Hub No. 6	BX-155	Yes
19	SSS-120668	4-1/16"	5000	AISI 4140	API 16BX	Hub No. 5	BX-155	Yes
20	SSS-120891	4-1/16"	5000	F22	API 17SS	Flange	BX-155	Yes
21	SSS-120882	4-1/16"	7500	F22	API 6BX	Flange	BX-155	Yes
22	SSS-120895	4-1/16"	5000	F22	API 6B	Flange	RX-39	Yes
23	SSS-125408	3" Nom.	2000	F6NM	Grayloc	3 GR23 Hub	N/A	Yes



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Materials

Components	Service	Material	Min. Yield Strength	Min. Charpy (average)
Main Body (Flange/Hub)	Standard	17/4 PH	105 ksi	42 J @ -20 °C
Main Body (Flange/Hub)	H ₂ S (Sour)	AISI 4140 / 4130	75 ksi	
		F22	75 ksi	
		F6NM	75 ksi	

Marking of Product

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

- Part No.
- Serial No.
- Pressure Rating
- Manufacturers Name or Mark

Fabrication/Testing Procedures

Test Procedures:

1. Pressure testing shall be performed in accordance with Ch.2, Sec.6 of DNVGL-OS-E101 Drilling Plant / API 16C Table 25, with a test pressure of 1,5 x WP.
2. Charpy testing shall be performed in accordance with Ch.2, Sec.2 of DNVGL-OS-E101 Drilling Plant.

NDE Procedures:

3. NDE/NDT shall be performed in accordance with Ch.2, Sec.6 of DNVGL-OS-E101 Drilling Plant.

Welding Procedures:

4. Qualification of welding procedure and qualification of welders shall be in accordance with DNVGL-OS-E101, Ch.2 Sec.6.

Comments

- This certificate replaces Type Approval Certificate D-5233.
- Each product to be surveyed during fabrication in accordance with the requirements for equipment of Category 1 as defined in DNVGL-OS-E101 Ch.3 Sec.3, followed by issuance of a DNV GL Product Certificate.
- Fabrication records shall be maintained by the manufacturer in accordance with DNVGL-OS-E101 Ch.3, Sec.3 §2.
- If intended for sour service (H₂S), hardness testing shall be performed on equipment with wetted surfaces as per ISO 15156/NACE MR0175 1st Edition.

Certificate Retention Survey

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

END OF CERTIFICATE



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