

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Mud and Cementing Equipment**with type designation(s)
High pressure Mud and Cement Hose

Issued to

Gates Engineering & Services UK Ltd
Cramlington Northumberland, United Kingdomis found to comply with
DNVGL-OS-E101 – Drilling plant, Edition July 2015**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2017-09-21**This Certificate is valid until **2022-09-20**.DNV GL local station: **Oslo Pressure Equipment**for **DNV GL**Approval Engineer: **Mohsen Mohebbi**

Marianne Spæren Marveng
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

Mud and Cement Hoses with bonded coupling designed according to API 7K.
The hoses are fire tested according to API 16D (5 Min. Fire Test)

Hoses with C304 PCR FR Cover, were subjected to 30 minutes fire test according to API 16C clause B.12.4.

Reference standards:

- API 7K "Drilling and well servicing equipment; Sixth Ed. December 2015"
- API 16D clause 10.1.2 (5 min. Fire test) "Specification for control systems for drilling well control equipment and control systems for diverter equipment; Second Ed. July 2004"
- API 16C clause B.12.4 (30 Min. Fire test) "Choke and kill equipment; second Ed. March 2015"

Application/Limitation

Following hoses might be used as Rotary hose, vibration hose or jumper hose:

Hose Designation	Inside Diameter	Working pressure MPa (psi)	Temperature range	Numbers of wire layers	Wire Outer diameter	FSL
AP05E (DNR-717)	5"(127 mm)	51.7(7500)	-25 to 100°C	4	5 mm	1 and 2

End connectors:

Hose designation	End connector designation	End connector material	Comment
AP05E (DNR-717)	Integral flange 6BX	A182 F51 4130	- Dimensions of end connector shall be in line with API 6A Table 53 (69.0 MPa). - Only BX gaskets in accordance with API 6A Clause 10.4 shall be used.

Type Approval documentation

Tests carried out

Deformation test under pressure according to API 7K clause 9.7.10.2
Bending test according to API 7K clause 9.7.10.3.1
Low-temperature bending test according to API 7K clause 9.7.10.3.2
Low-frequency pulsation test according to API 7K clause 9.7.10.4
High-frequency pulsation test according to API 7K clause 9.7.10.5
Hydrostatic pressure test according to API 7K clause 9.7.10.6
Burst pressure test according to API 7K clause 9.7.10.7
Fire test (5 Minumtes) according to API 16D clause 10.1.2
Fire test (30 Minumtes) according to API 16C clause B.12.4

Other conditions and comments

- Each mud hose 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 Form No. 20.92a. Fabrication records are to be maintained in accordance with DNVGL-OS-E101 Ch.3 Sec.3, Clause 2.
- NDT of the coupling assembly shall be in accordance with API 7K, 6th edition, chapter 8.
- Material certificates for hose reinforcing cables and coupling assembly shall be in accordance with DNVGL-OS-E101 Ch.2 Sec.2, Clause 4.
- End connectors shall be of standard design according to API Spec. 7K 6th edition or they shall be delivered with DNV GL Product Certificate specific for the end connector.

- For all parts made of AISI 4130, the material used shall be in accordance with material specification PCD-001.
- 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.

Testing

- Each hose assembly is to be pressure tested to 1.5 x Max Working Pressure according to API Spec 7K, 6th edition.

Marking of product

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

- All equipment shall be clearly marked with identification and serial number which relates the equipment to certificates and fabrication documentation.
- Markings in accordance with API 7K, 6th ed.

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment every second year and before the expiry date of this certificate, to verify that the conditions for the type approval are complied with.

When possible, this assessment may be harmonised with normal surveys for product certification and / or other surveys and audits carried out.

The main elements of the certificate retention survey are:

- Verification of the TA applicant's production and quality system w.r.t. ensuring continued
- consistent production of the type approved products at the TA applicant's own premises
- Review of Type Approval documentation and assurance that it is still used as basis for production
- Review of possible changes in design, materials and performance
- Assurance of traceability between manufacturer's product type marking and Type Approval Certificate.

Renewal should be applied for in writing before the certificate expires.