Certificate No:
TAD00001JG

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Mud and Cementing Equipment

with type designation(s)
2" 5000psi AP02D, 2.5" 10000psi AP25F, and 4" 10000psi AP04F

Issued to
Gates Engineering & Services UK Ltd
Cramlington, Northumberland, United Kingdom

is found to comply with
DNV-OS-E101 – Drilling facilities, Edition July 2021

Application :

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

Issued at **Høvik** on **2023-04-17**
This Certificate is valid until **2028-04-16**.
DNV local unit: **UK & Ireland CMC & VMC**

Approval Engineer: **Andreas Hansen**

for **DNV**

Zeinab Sharifi
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.

Reference standard

API Spec 7K, Drilling and Well Servicing Equipment, 6th Edition 2015
API Spec 16A, Specification for Drill-through Equipment, 4th Edition 2017

Manufacturing location

Hose manufacturing and assembly plant
Gates Engineering & Services UK Ltd.
Bassington Drive, Cramlington
NE23 8AS, United Kingdom

Product description

Mud rotary and Cement hose assemblies including:
- Bonded flexible hose
- End termination
- End connection

2" Mud and Cement Hose AP02D Grade D

Maximum design pressure	:	5000 psi
Minimum burst pressure	:	12500 psi
Internal diameter (ID)	:	51 mm
Outer diameter (OD)	:	92 mm
Hose couplings	:	2" API 7K 5000psi Coupling x 3" BW Sch. XXS – AISI 4130
Ring type seal	:	API 6A Annex K
Design temperature range	:	-25°C to +100°C
Minimum bend radius (MBR)	:	900 mm
Flexible specification levels (FSL)	:	1 and 2
Sour service	:	No

2.5" Cement Hose AP25F

Maximum design pressure	:	10000 psi
Internal diameter (ID)	:	63.5 mm
Outer diameter (OD)	:	130 mm
Hose couplings	:	2.5" API 7K 10000psi x 3" BW Sch. XXS – A182 F51 / AISI 4130
Ring type seal	:	As per API 6A Annex K
Design temperature range	:	-25°C to +100°C
Minimum bend radius (MBR)	:	1200 mm
Flexible specification levels (FSL)	:	0
Sour service	:	No

4" Mud and Cement Hose AP04F

Maximum design pressure	:	10000 psi
Internal diameter (ID)	:	101.6 mm
Outer diameter (OD)	:	187mm
Hose couplings	:	4" API 7K 10000psi Coupling x 5" BW Sch. XXS – AISI 4130
Ring type seal	:	As per API 6A Annex K
Design temperature range	:	-25°C to +100°C
Minimum bend radius (MBR)	:	1422 mm
Flexible specification levels (FSL)	:	1 and 2
Sour service	:	No

Application/Limitation

The hoses covered in this Type Approval are compliant with requirements of DNV-OS-E101. Their suitability for service is established by having demonstrated compliance with API 7K requirements, with the following peculiars:

- All hose types have undergone individual testing as per their specific FSL
- The minimum bend radius of AP04F does not correspond to that specified in API 7K [Table 10].
- The hose types are qualified for a minimum operating temperature of -25°C through low-temperature bending tests, as per API 7K clause 9.7.2.2 (b).

Compliance with DNV-OS-E101, related to suitability for all internal and external loading, shall be proven for each individual hose. Certification of these end connectors shall be according to DNV-OS-E101 Edition 2021 Ch.3 Sec.3 [Table 15].

Type Approval documentation

Tests carried out

Design verification testing for FSL 2 performed according to API Spec. 7K 6th Edition Ch. 9.7.10.2, 9.7.10.3, 9.7.10.4, 9.7.10.5, 9.7.10.6, and 9.7.10.7 for 2” 5000PSI AP02D and 4” 10000PSI AP04F hoses.

Design verification testing for FSL 0 performed according to API Spec. 7K 6th Edition Ch. 9.7.10.2, 9.7.10.3, 9.7.10.6, and 9.7 10.7 for 2.5” 10000PSI AP25F hose.

Fire test performed according to API Spec. 16D 3rd Edition Ch. 14.6.2.

Marking of product

For traceability the following marking shall 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 Edition

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNV-CP-0338