DNV·GL

Certificate No:
TAD00000A7

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Mud and Cementing Equipment

with type designation(s)
2" to 4" (ID) Unbonded Flexible Pipes

Issued to
Flexi France
LE TRAIT, France

is found to comply with
DNVGL-OS-E101 – Drilling plant, Edition July 2015

Application :

Product(s) covered in this certificate are: Cement flexible pipes, Rotary Mud flexible pipes, Mud Booster flexible pipes & Glycol Injection flexible pipes.
Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2021-02-26**.

Issued at **Høvik** on **2016-02-25**

for **DNV GL**

DNV GL local station: **Le Havre**

Approval Engineer: **Eric van der Putten**

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.

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Reference standard

API Spec 7K, Drilling and Well Servicing Equipment, 5th edition.

Manufacturing locations

Manufacturing of body structures:
- FlexiFrance, LE TRAIT, France

Assembling of end fittings:
- FlexiFrance, LE TRAIT, France
- Technip Umbilical Inc., HOUSTON, USA

Product description

Cement and Mud hose assemblies including:
- unbonded flexible hose
- end termination
- end connector

Application/Limitation

Temperature range (API 7K): II
Min Design Temp: -20 deg C
Max Design Temp: +100 deg C

Structure No.	Internal diameter	Max design pressure.	Liner	MBR	FSL
50.60126	2”	10 000 PSI	Rilsan	0,64m	0
76.60414	3”	10 000 PSI	Rilsan	0,89m	0
76.60417	3”	15 000 PSI	Rislan	0,98m	0

Job Id: **262.1-018446-1**
Certificate No: **TAD00000A7**

Temperature range (API 7K): Custom
Min Design Temp: -20 deg C
Max Design Temp: +130 deg C *)

Structure No.	**Internal diameter**	**Max design pressure.**	**Liner**	**MBR**	**FSL****)
50.60127	2”	5 000 PSI	Coflon	0,68m	1
50.60127	2”	10 000 PSI	Coflon	0,68m	0
50.60134	2”	5 000 PSI	Coflon	0,74m	1
50.60134	2”	15 000 PSI	Coflon	0,74m	0
63.60059	2,5”	7 500 PSI	Coflon	0,90m	1
63.60059	2,5”	15 000 PSI	Coflon	0,90m	0
76.60435	3”	5 000 PSI	Coflon	0,88m	1
76.60413	3”	7 500 PSI	Coflon	1,01m	1
76.60413	3”	15 000 PSI	Coflon	1,01m	0
76.60474	3”	7 500 PSI	Coflon	1,09m	1
76.60474	3”	15 000 PSI	Coflon	1,09m	0
101.60416	4”	7 500 PSI	Coflon	1,22m	1
101.60416	4”	10 000 PSI	Coflon	1,22m	0
101.60415	4”	7 500 PSI	Coflon	1,12m	1
101.60415	4”	10 000 PSI	Coflon	1,12m	0

*)The hoses in this certificate have been tested with temperature of 130°C, API spec. 7K doesn’t have a temperature range up till 130°C, but DNVGL finds that the hoses in the certificate are fit for service up to 130°C.
**) For information but not affecting the approval; The Hoses in this certificate have been tested according API 7K FSL1 design verification testing with higher pressure rating than given in this table, but API Spec. 7K doesn't consider 2" FSL1 with ratings beyond 5000 psi and 3" & 4" FLS1 with ratings beyond 7500 psi.

Tests carried out

1. Design verification testing for FSL 0 performed according to Ch. 9.6.10.2, 9.6.10.3, 9.6.10.6 & Ch. 9.6.10.7 in API Spec. 7K 5th edition.

2. Design verification testing for FSL 1 performed according to point 1 and additional to Ch. 9.6.10.4 in API Spec. 7K 5th edition.

3. Fire testing performed according to Ch. 10.5.1 in API Spec. 16C 1st edition, with acceptance criteria of 5 min, and Ch. 10.1.2 in API Spec. 16D 2nd edition, for the transport of oil based mud or other flammable fluids.

Conditions and Comments

1. The end couplings that are NOT according to recognised international standard (such as API 6A or API 16A, etc.), for example, but not limited to, Hammer Lug unions and Grayloc hubs, will need to be in compliance with DNVGL-OS-E101. For this suitability for all internal and external loading, shall be proven for each individual hose. Certification of these end couplings shall be according DNVGL-OS-E101:2015 section 3 table 10. This type approval certificate does NOT cover compliance with DNVGL-OS-E101, for NOT standard end couplings, this shall be estabilished separately.

Manufacturing and Testing

1. Installation and binding of end terminations on hose bodies shall be according to procedures written and maintained by Flexifrance in Le Trait.
2. Production testing as described in API spec. 7K shall be followed.
3. DNV GL Product Certificate shall be issued for use on DNV GL class vessel and rigs with notation DRILL, DRILL(N), WELL-1, WELL-2, WELL(N).

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 spec. 7K, 5th ed.

Periodical assessment

For retention of the Type Approval, DNV GL's representative shall carry out biennial Product Audits.

Renewal assessment after 5 years:
Application for renewal shall be submitted to DNV not later than 3 months before expiry date of the certificate. Upon receipt of the application a periodical assessment will be carried out to verify the conditions for the type approval is still complied with. Any changes to the design are to be handled as for initial Type Approval, with regards to additional documentation and testing requirements.