DNV·GL

Certificate No:
TAD00000XF

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Mud and Cementing Equipment

with type designation(s)
High Pressure Cement Hoses

Issued to
Techfluid Yantai Limited
Yantai, Shandong Province, China

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

Application :

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

Reference standard:
API Spec. 7K "Drilling and Well Servicing Equipment", 6th edition, December 2015
API Spec. 16C "Specification for Choke and Kill Systems" 1st edition (used for fire testing requirements only)

Issued at **Høvik** on **2018-06-04**

This Certificate is valid until **2019-06-30**.
DNV GL local station: **Shanghai**

Approval Engineer: **Maheshraja Venkatesan**

for **DNV GL**

Digitally Signed By: Marveng, Marianne Spæren
Location: DNV GL Høvik, Norway

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

Cement hose assemblies including:
- bonded flexible hose
- coupling
- end connector

Application/Limitation

Hose used for conveyance of cement slurries at high pressure:-

Max design pressure	:	10000 psi
Internal diameter (ID)	:	2", 2.5", 3"
FSL level	:	0
Temperature range (API 7K)	:	II
Min Design Temperature	:	-25 deg C
Max Design Temperature	:	+100 deg C

Max design pressure	:	15000 psi
Internal diameter (ID)	:	2", 2.5", 3"
FSL level	:	0
Temperature range (API 7K)	:	II
Min Design Temperature	:	-25 deg C
Max Design Temperature	:	+100 deg C

Type Approval documentation

The following drawings are stamped "Type Approved":

Drawing No.	Title
SNG-SZ-51x69-05 Rev.1	Ø51x69 MPa Hose Construction
SNG-SZ-51x69-01 Rev.1	Ø51x69 MPa Hose Coupling
SNG-SZ-51x69-04 Rev.1	Ø51x69 MPa Hose End Finishing
SNG-SZ-51x103.4-05 Rev.1	Ø51x103.4 MPa Hose Construction
SNG-SZ-51x103.4-01 Rev.1	Ø51x103.4 MPa Hose Coupling
SNG-SZ-51x103.4-04 Rev.1	Ø51x103.4 MPa Hose End Finishing
SNG-SZ-64x69-05 Rev.1	Ø64x69 MPa Hose Construction
SNG-SZ-64x69-01 Rev.1	Ø64x69 MPa Hose Coupling
SNG-SZ-64x69-04 Rev.1	Ø64x69 MPa Hose End Finishing
SNG-SZ-76x69-05 Rev.1	Ø76x69 MPa Hose Construction
SNG-SZ-76x69-01 Rev.1	Ø76x69 MPa Hose Coupling
SNG-SZ-76x69-04 Rev.1	Ø76x69 MPa Hose End Finishing
SNG-SZ-64x103.4-05 Rev.1	Ø64x103.4 MPa Hose Construction
SNG-SZ-64x103.4-01 Rev.1	Ø64x103.4 MPa Hose Coupling
SNG-SZ-64x103.4-04 Rev.1	Ø64x103.4 MPa Hose End Finishing
SNG-SZ-76x103.4-05 Rev.1	Ø76x103.4 MPa Hose Construction
NSG-SZ-76x103.4-05 Rev.1	Ø76x103.4 MPa Fire Rated - Hose Construction
SNG-SZ-76x103.4-01 Rev.1	Ø76x103.4 MPa Hose Coupling
SNG-SZ-76x103.4-II-04 Rev.1	Ø76x103.4 MPa-II Hose End Finishing

Tests carried out

1. Design verification testing performed according to Ch. 9.10.10 in API Spec. 7K 4th edition, Addendum 2.
   Reference is made to DNV Survey Report SHA/80526516/TF/7K/0903-1.

2. Design verification testing performed according to Ch. 9.10.10 in API Spec. 7K 4th edition, Addendum 2.
   Reference is made to DNV Survey Report SHA/80526516/TF/7K/0903-2.

Other conditions and comments

- Each cement 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 Facilities, followed by issuance of Product Certificate Form No. CMC231. Manufacturing 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.3 Sec.2, Clause 3.2.
- 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.
- Connection between bonded flexible hose and coupling shall be according to "API 7K Hose End Coupling Method of Attachment to Hose Body" Drwg. No. SK-236, Rev.0. Epoxy resin shall be as specified in the document "Epoxy Physical indicators" No. TFY-095, Rev.1.
- MBR (minimum bend radius) for different hose sizes and ratings meets the requirements given in API Spec 7K, 6th edition, Table 10.
- Fire rating of cement hoses is not required in API Spec. 7K. However, it is confirmed that Ø76x103.4 MPa Fire Rated - Hose Construction (drawing NSG-SZ-76x103.4-05 Rev.1) has successfully undergone fire testing performed according to Ch. 10.5.1 in API Spec. 16C 1st edition.
  Reference is made to DNV Survey Report SHA/80550600/TF/R/1209-2.
- 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 according 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 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 DNVGL-CP-0338.