DNV·GL

Certificate No:
TAD000004H

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Mud and Cementing Equipment

with type designation(s)
High Pressure Cement Hoses GOLDENCEMENT
Flexible Specification Level: FSL0

Issued to
Manuli Hydraulics (Suzhou) Co., Ltd.
Suzhou Jiangsu, China

is found to comply with
DNV-OS-E101 Drilling Plant October 2013

Application :

Hose used for conveyance of cement slurries at high pressure

Reference standard:
API Spec. 7K "Specification for Drilling and Well Servicing Equipment", 5th edition, June 2010

This Certificate is valid until **2019-09-17**.

Issued at **Høvik** on **2015-09-18**

for **DNV GL**

DNV GL local station: **Shanghai CMC**

Approval Engineer: **Sinisa Sedlan**

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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Product description

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

Application/Limitation

Max design pressure:	10000 psi
Internal diameter (ID):	2"
FSL level:	0
Temperature range (API 7K):	II
Min Design Temp:	-20 deg C
Max Design Temp:	+100 deg C

Type Approval documentation
Tests carried out

1. Design verification testing performed according to Ch. 9.6.10 in API Spec. 7K 5th edition. Reference is made to DNV Survey Report MIL-14-0373-1.

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's Offshore Standard DNV-OS-E101 Drilling Plant, followed by issuance of Product Certificate Form No. 20.92a. Fabrication records are to be maintained in accordance with DNV-OS-E101 Ch.3 Sec.3, Clause 2.
- NDT of the coupling assembly shall be in accordance with API 7K, 5th edition, chapter 8.
- Material certificates for the hose reinforcing cables and coupling assembly shall be in accordance with DNV-OS-E101 Ch.2 Sec.2, Clause 4.
- End connectors shall be of standard design according to API Spec. 7K 5th 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 "Hose Assembling Procedure" DAS-006.
- MBR (minimum bend radius) for the hose meets the requirements given in API Spec 7K, 5th edition, Table 9.
- Production locations covered by this Type Approval are:
  - Hose manufacturer and assembly plant: Suzhou, Jiangsu, China
  - Fitting production plant: Myslowice, Poland
  - Hose assembly plant: Manuli Hydraulics UK, Halesowen, UK

Testing

- Each hose assembly is to be pressure tested according to 1,5 x Max Working Pressure according to API Spec 7K, 5th 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, 5th ed.

Periodical assessment

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

END OF CERTIFICATE