

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Mud and Cementing Equipment**

with type designation(s)

Triplex Piston Mud Pump, Type TPK 7 1/2" x 14" / 2200, Non-Welded Fluid End

Issued to

MHWirth GmbH**Erkelenz, Nordrhein-Westfalen, Germany**

is found to comply with

DNVGL-OS-E101 – Drilling facilities, Edition January 2018**DNVGL-SI-0166 – Verification for compliance with Norwegian shelf regulations, Edition July 2017**

Application :**See next page.**Issued at **Høvik** on **2018-05-24**This Certificate is valid until **2023-05-23**.for **DNV GL**DNV GL local station: **Essen**Approval Engineer: **Nishant Koti**

Per Esvall
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.



Reference Standards:

API Spec 7 K, 6th Edition, December 2015, Last amended October 2017.

Product description

Triplex Piston Mud Pump, Type TPK 7 1/2" x 14" / 2200.

Application/Limitation

Minimum design temperature: -20 °C (-4 °F).

(for steel structure and Fluid end)

Minimum operating temperature: -5 °C (+23 °F)

Maximum working pressure: 520 bar (7500 psi).

Note: No welding on HP-fluid end.

Type Approval documentation

Tests carried out

- Each high pressure fluid end shall be tested and qualified in accordance with API Spec 7 K clause 9.8.1.2 and 9.8.1.3.

Marking of product

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

- Part No.
- Serial No.
- Pressure rating
- Manufacturers Name or Mark

Other conditions and comments

- This TA covers only the "High pressure" side of the pump. (It is assumed, that precaution measures shall be taken to ensure that the function of the pump, and it's parts, remains unrestrained at MDT=-20 °C.)
- It is assumed that this pump shall always be used in presence of the following items, incorporated in the pump system:
 - Pulsation damper (which shall be delivered with a separate Product Certificate ¹⁾)
 - Motor (which shall be delivered with a separate Product Certificate ^{1,2)}).
 - Pressure safety valve, PSV (which shall be delivered with a separate Product Certificate ^{1,3)}).
 - The controll system shall also be delivered with a separate Product Certificate ¹⁾.

It is assumed that the "end product" (the whole pump unit) containing above mentioned parts, shall be issued a final product certificate after successful testing.

- Each product is to be surveyed during fabrication in accordance with the requirements for equipment of Category I as defined in DNVGL's Offshore Standard DNVGL-OS-E101 Drilling facilities, 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, §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.

1. If the intended installation is DNV classed, then this automatically means DNV product certificate.

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Certificate No: **TAD00000XY**

2. If the intended installation is DNV classed, then the documentation requirement shall be according to DNVGL-OS-E101, Ch.3, Sec.2.
3. This is valid for pumps intended for essential applications such as well kill, emergency circulation etc. For "secondary" applications such as chemical injection pumps etc, this demand can be waived.

Certificate Retention Survey

For retention of the Type Approval, DNV GL's surveyor shall perform a survey every second year in accordance with DNV GL Type Approval Scheme DNVGL-CP-0338, October 2015 Edition.

This certificate replaces the previously issued Type Approval Certificate No. D-4296 dated 2010-08-17.

END OF CERTIFICATE