

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hoisting, Rotation and Pipehandling Equipment

with type designation(s)
Top Drive TD-750-HT

Issued to
Bentec GmbH
Bad Bentheim, Niedersachsen, Germany

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

Application :

See next page.

Issued at **Høvik** on **2023-10-19**

This Certificate is valid until **2028-10-18**.

DNV local unit: **Hamburg Verification**

for **DNV**

Approval Engineer: **Axel Janson**

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.

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 Standards

API Spec 8C, Specification for Drilling and Production Hoisting Equipment, 5th Edition, October 2012

Product description

Main load-bearing components of the top drive model TD-750-HT.

Application/Limitation

<u>Design Parameter</u>	<u>Value</u>	<u>Equivalent</u>
Maximum Load Rating:	6 675 kN	750 sT
Maximum Load Rating - main shaft end connection:	5 940 kN	663 sT
Maximum drilling torque:	100 000 Nm	73 760 ft-lbs
Min./Max. design temperature:	-45 °C / 55 °C	-49 °F / 131 °F
Max. pressure rating:	517 bar	7 500 psi
Maximum Drilling Speed:	270 rpm	
Fatigue Lifetime:	20 years	

Type Approval documentation

Material specification

<u>Components</u>	<u>Material</u>	<u>Min. Yield Strength</u>	<u>Charpy impact values</u>
Gearbox	G22NiMoCr5-6	825 MPa	According to DNV-OS-E101, Ch.2, Sec.2
Main Shaft	30CrNiMo8	850 MPa	
Yoke	G22NiMoCr5-6	825 MPa	
Upper Link	S690QL	690 MPa	
Link Adapter	G22NiMoCr5-6	825 MPa	
Load Collar Nut	30CrNiMo8	800 MPa	
Load Collar Retainer	AISI4130	517 MPa	
Pin 160/120x383	30CrNiMo8	800 MPa	
Pin 160x292	30CrNiMo8	800 MPa	

Tests carried out

Design verification test according to API Spec 8C section 5.5 (Alternative Design Verification Test) was performed at DNV GL Bergen. Test load was 25,000 kN. Reference is made to DNV Report No.: 2014-5443 Rev. 0, Document No.: 1GJIMVA-3, dated 2014-08-11.

Tests to be carried out on each product

Test Procedures:

- Functional testing shall be performed in accordance with DNV-OS-E101 and witnessed by DNV surveyor.
- Charpy Impact testing shall be conducted according to the strictest requirements of API 8C Ch. 6.3/DNV-OS-E101, i.e. the required Charpy test results at -45 °C is 42 J.
- Pressure testing of mud circuit shall be performed in accordance with API Spec 8C ch. 8.7 and 9.9.

NDE Procedures:

- Non-destructive examination methods shall be in accordance with DNV-OS-E101 Ch.2 Sec.8.

Welding Procedures:

- Qualification of welding procedures and qualification of welders shall be in accordance with DNV-OS-E101 Ch.2 Sec.8.

Marking of product

For traceability, marking of each product shall be carried out in accordance with API Spec 8C Ch.10 and contain:

- Serial No.
- Rated Load capacity
- Manufacturers Name or Mark
- Product Specification Level (PSL)
- Primary load-carrying component shall be marked "SR2 -45 °C" as specified in API 8C Annex A.3

Other conditions and comments

- Materials shall be delivered with 3.1 certificates according to EN 10204
- Electric motors and control system is not within the scope of this design review and shall be separately approved
- PSL 2 units shall meet the stricter demands for welding, quality control (NDE) and materials as described in API Spec 8C Ch. 6/7/8
- This Type Approval Certificate replaces the previously issued certificate TAD00000XN

Periodical assessment

For retention of this Type Approval Certificate, biennial product audits shall be performed by a DNV surveyor.

END OF CERTIFICATE