DNV·GL

Certificate No:
TAD00000XE

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hoisting, Rotation and Pipehandling Equipment

with type designation(s)
D1213-Z-RD-028 - HydraRacker IV Normal Reach

Issued to
National Oilwell Varco Norway AS
KRISTIANSAND S, Norway

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 **2018-04-19**
This Certificate is valid until **2023-04-18**.
DNV GL local station: **Oslo Drilling Systems**

Approval Engineer: **Arne Handal**

for **DNV GL**

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.

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Product description

The Hydraracker operates as a vertical pipehandling system for handling of tubulars between fingerboard, well center and catwalk on drill floor. The Hydraracker has interchangable gripper heads and guide heads and various pick-up elevators to be mounted to the end of gripper head with a quick connection for pick-up/lay down of singular tubular from horizontal pipehandling unit.

Reference Standard

Standard for Offshore and Platform Lifting Appliances, DNVGL-ST-0378, May 2016.
NORSOK R-002 "Lifting Equipment", 2017.
F.E.M. 1.001 "Rules for the Design of Hoisting Appliances" 3rd edition, October 1998.

Application/Limitation

Design Parameter	Value
Minimum design temperature	-20ºC
Mass of Hydraracker	48 mT
Safe Working Load:	
0.9-2.7m outreach	14 mT – 15 mT
3.3 m outreach	10 mT – 12.5 mT
3.9 m outreach	6.9 mT – 10 mT
4.8 m outreach	4.5 mT – 7.0 mT
Dynamic factor (hydraracker)	1.15
Dynamic factor (gripper)	1.20
Design factor for lifting of pipe with friction	2
Friction coefficient for Gripper Head Dies	0.6
Friction coefficient for Gripper Head Rollers	0.25
Lower Trolley:	
Weight	3 mT
Dynamic/Static capacity trolley wheel	540 kN / 960 kN
Dynamic/Static capacity side roller	76 kN / 120 kN
Upper Trolley:	
Weight	3 mT
Dynamic/Static capacity main roller	285 kN / 405 kN
Dynamic/Static capacity track roller	63 kN / 82 kN
Dynamic/Static capacity guide roller	76 kN/ 120 kN
Dynamic/Static capacity bearing	17 010 kN / 28 350 kN
Winch:	
Wire diameter	34 mm
Number of layers	2
SWL	22 mT
Pick-up Elevators:	
PUE 14"	
SWL	3.6 mT
PUE 2 7/8"-9 3/4" / PUE 9 5/8"-14" / PUE 14"-20"	
SWL	5 mT
Fatigue classification according to FEM:	
Appliance Group	A4(Q1 + U5)
Component Group	E3(P1 + B5)
Environmental conditions	
Operational conditions:	
Horizontal/vertical acceleration	0.25g/0.2g
Wind	36 m/s
Survival condition:	

Horizontal/vertical acceleration	0.75g/0.4g
Wind	51.4 m/s

The hydraracker is not designed to operate during survival conditions. It shall be properly seafastened when not in use.

Type Approval documentation

Tests carried out

Test Procedures:

1. Charpy Impact testing is to be conducted at or below design temperature with acceptance criteria impact energy (in Joule) at 10% of yield strength (up to 42 Joule) according to DNVGL-OS-E101 Ch.2, Sec.2.
2. After installation the Hydraracker shall be functional and overload tested according to DNVGL-OS-E101 Ch.2, Sec.8. Testing shall be witnessed by DNV GL.
3. Failure testing shall be performed according to DNVGL-OS-E101 Ch.2, Sec.8, §3.6.1 and §4.1.2.2.

NDE Procedures:

4. Non-destructive examination methods, extent and acceptance criteria according to DNVGL-OS-E101Ch.2, Sec.8, Table 3.

Welding Procedures:

5. Qualification of welding procedures and qualification of welders shall be in accordance with DNVGL-OS-E101 Ch.2, Sec.8 and DNVGL-OS-C401 Ch.2, Sec.5.

Other conditions and comments

1. Each Hydraracker 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 a Product Certificate. If the intended installation is DNV GL classed this automatically means DNV GL Product Certificate.
2. Fabrication records are to be maintained in accordance with DNVGL-OS-E101 Ch.3, Sec.3, 2.1.2.
3. Gears, breaks and slewing ring are not part of this type approval. Gears, brakes and slewing ring used in hoisting operations are to be delivered with DNV GL Product Certificates in accordance with DNVGL-OS-E101.
4. Loose gear such as wire, shackles, etc. are not part of this type approval and shall be delivered with pertinent ILO certification.
5. Hydraulic cylinders are not part of this type approval. Hydraulic cylinders for lifting and compensating purposes shall be delivered with DNV GL Product Certificates.
6. The winch shall not be used for personnel lifting.
7. 3 turns of wire is always to remain on the winch drum.
8. Documentation for Ex components are to be compiled and made available for each delivery of the hydraracker according to actual configuration used for each delivery.
9. Testing of gripper capacity should preferably be done during testing before delivery and not confused with load testing of the lifting appliances. Ref. DNVGL-OS-E101, Ch.2, Sec.6, §4.2.3.

Marking of product

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

- Part No.
- Serial No.
- Rated Load Capacity
- Manufacturer's Name or Mark

Periodical assessment

For retention of the Type Approval, DNV GL Surveyor shall perform a survey – every second year and before the expiry date of this certificate. This is in order to verify that the conditions for the type approval are complied with, ref. DNVGL-CP-0338, DNVGL Type approval scheme.

This Type Approval Certificate replaces D-4975.

END OF CERTIFICATE