Certificate no.:
TAD00001N8

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Hoisting, Rotation and Pipehandling Equipment

with type designation(s)
Sheave E240168

issued to
Ropeblock B.V.
Oldenzaal, Overijssel, Netherlands

is found to comply with
DNV-OS-E101 – Drilling facilities, Edition July 2024

Application:

See next page

Issued at **Høvik** on **2024-09-10**
This Certificate is valid until **2029-09-09**.
DNV local unit: **Netherlands CMC**

for **DNV**

Approval Engineer: **Fredrik Per Olof Höglund**

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.

Product description

The Type Approval covers sheave:
78'' Drilling sheave – Shaft 14''/15'' – Wire 1-3/4'' / 2-1/4''
with drawing number:E240168 rev. 00
Casting drawing:
Sheave ø1822/ø444 – Casting
with drawing number: 04GR.1822.445.124 rev. 00

Reference standards

API Specification 8C, Drilling and Production Hoisting Equipment (PSL 1 and PSL 2), 5th Ed. 2012
F.E.M., Rules for the Design of Hoisting Appliances, 3rd Ed. 1998

Application/Limitation

Sheave variations are approved according to table below:

Sheave	**E240168 rev.00**					
Min design temperature [°C]	-20					
Product specification level, PSL	PSL 1					
Outer diameter [in]	78					
Wire rope diameter [in]	Min			Max		
	1-3/4			2-1/4		
Groove width [mm]	Min			Max		
	105			120		
Bore diameter [mm]	Min			Max		
	440			510		
Hub width [mm]	Min			Max		
	80			124		
Load condition						
Wrap angle [deg]	20	90	180	20	90	180
Fleet angle, in/out [deg]	2.5	2.5	2.5	4	4	4
Maximum dynamic line pull* [kN]	610	956	956	395	690	660
Design safety factor	3.0					

* Static line pull x dynamic factor shall not exceed maximum dynamic line pull.

Maximum dynamic line pull for component groups.

F.E.M. 1.001 component group	**E1-E6**	**E7**	**E8**
Load Case 1: Wrap angle 20deg Fleet angle, in/out, 1.25deg* Maximum dynamic line pull [kN]	610	572	340**
Load Case 2: Wrap angle 90deg Fleet angle, in/out, 1.25deg* Maximum dynamic line pull [kN]	956	859	540**
Load Case 3: Wrap angle 180deg Fleet angle, in/out, 1.25deg* Maximum dynamic line pull [kN]	956	818	500**
Load Case 4: Wrap angle 20deg Fleet angle, in/out, 2deg* Maximum dynamic line pull [kN]	395	361	212**
Load Case 5: Wrap angle 90deg Fleet angle, in/out, 2deg* Maximum dynamic line pull [kN]	690	629	387**
Load Case 6: Wrap angle 180deg Fleet angle, in/out, 2deg* Maximum dynamic line pull [kN]	660	584	350**

* Mean fleet angle values are considered
** E8 is based on spectrum factor: 1.0 & number of cycles: 50 million

1. All materials are to be delivered with 3.1 certificates, documenting mechanical properties and chemical composition in accordance with the Type Approval documentation.
2. Materials shall comply with API8C Sec.6.
3. The sheave bearings are not covered by this Type Approval.
4. Sheave bearings are to be delivered with manufacturer’s CoC, confirming sufficient strength and capacity. Proper lubrication of the bearings is to be guaranteed during operation and use of the sheaves.

Type Approval documentation

Tests to be carried out

1. Functional tests shall be conducted in accordance with DNV-OS-E101 Ch.2 Sec.8 §3.5.
2. NDT as specified in the Type Approval Documentation are to be carried out by certified personnel.
3. NDE shall comply with API8C Sec.8.
4. Testing shall be witnessed by DNV representative.

Note: sheaves are exempt from impact testing.

Marking of product

Each sheave shall be marked according to API Spec.8C Sec.9.2.6.

Periodical assessment

For retention of the Type Approval, a DNV 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 DNV-CP-0338.

This certificate is only valid if required periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com.

END OF CERTIFICATE