Certificate no.:
TAS00004NJ

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Lifting Gear

with type designation(s)
Sheaves SE.630.502X.X, SE.1415.5034.X, SE.1600.5034.X, SE.1601.5034.X, SE.1820.50XX.X, SEW.1600.5034.140-23,5

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

is found to comply with
DNV standard DNV-ST-0378 – Offshore and platform lifting appliances

Application:

See next page

Issued at **Høvik** on **2025-04-01**
This Certificate is valid until **2030-03-31**.
DNV local unit: **Netherlands VMC**

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 USD 300 000.

Product description

The sheaves covered by this Type Approval certificate are to be installed permanently on a lifting appliance. They shall not be used as sub-components for loose gear.

The Type Approval covers the following sheaves:

Sheave	Drawing numbers	
SHEAVE RANGE ø630/ø110-120	SE.630.502X.X rev.00	04G.630.502X.X rev.00
SHEAVE RANGE ø1415/ø170	SE.1415.5034.X rev.00	04G.1415.5034.X rev.00
SHEAVE RANGE ø1600/ø170	SE.1600.5034.X rev.00	04G.1600.5034.X rev.00
SHEAVE RANGE ø1600/ø170	SE.1601.5034.X rev.00	04G.1601.5034.X rev.00
SHEAVE RANGE ø1820/ø170-260	SE.1820.50XX.X rev.00-A	04G.1820.50XX.X rev.00
WIDE GROOVE SHEAVE ø1600/ø170 R140/R23,5	SEW.1600.5034.140-23,5 rev.00-A	04GW.1600.5034.140-23,5 rev.00-A

Reference standards

F.E.M., Rules for the Design of Hoisting Appliances, 3rd Ed. 1998

Application/Limitation

Sheave variations are approved according to tables below:

Sheave	**SE.630.502X.X rev.00**		
Min design temperature [°C]	-20		
Outer diameter [mm]	710		
	Min	Max	
Wire rope diameter, d [mm]	26	32	
Groove radius [mm]	0.52 x d	0.56 x d	
Hub bearing diameter [mm]	170	180	
Hub bearing width [mm]	62	65	
Load condition	Load Case 1	Load Case 2	Load Case 3
Wrap angle [deg]	90	180	90
Fleet angle, in/out [deg]	2	4	1.5
Maximum dynamic line pull* [kN]	520	375	584
Design safety factor	1.5		

* The maximum dynamic load shall include effects such as the weight of the hook/block, the weight of the wire rope and the lifting appliance's design dynamic factor.
Static line pull x dynamic factor shall not exceed maximum dynamic line pull. Minimum dynamic factor is 1.3.

Maximum dynamic line pull for component groups.

Sheave	**SE.630.502X.X rev.00**					
F.E.M. 1.001 component group	**E1-E3**	**E4**	**E5**	**E6**	**E7**	**E8**
Load Case 1: Wrap angle 90deg Fleet angle, in/out, 1deg* Maximum dynamic line pull [kN]	520	486	405	337	281	203**
Load Case 2: Wrap angle 180deg Fleet angle, in/out, 2deg* Maximum dynamic line pull [kN]	375	374	305	249	203	141**
Load Case 3: Wrap angle 90deg Fleet angle, in/out, 0.75deg* Maximum dynamic line pull [kN]	584	525	438	365	305	192***

* Mean fleet angle values are considered
** E8 is based on: P4 / 20 000 000 rotational cycles
*** E8 is based on: P4 / 58 000 000 rotational cycles

Sheave	**SE.1415.5034.X rev.00**	
Min design temperature [°C]	-20	
Outer diameter [mm]	1515	
	Min	Max
Wire rope diameter, d [mm]	28	35.1
Groove radius [mm]	0.52 x d	0.56 x d
Sheave groove diameter [mm]	1405	1415
Load condition		
Wrap angle [deg]	90	
Fleet angle, in/out [deg]	1.5	
Maximum dynamic line pull* [kN]	669	
Design safety factor	1.5	

* The maximum dynamic load shall include effects such as the weight of the hook/block, the weight of the wire rope and the lifting appliance's design dynamic factor.
Static line pull x dynamic factor shall not exceed maximum dynamic line pull. Minimum dynamic factor is 1.3.

Maximum dynamic line pull for component groups.

Sheave	**SE.1415.5034.X rev.00**					
F.E.M. 1.001 component group	**E1-E3**	**E4**	**E5**	**E6**	**E7**	**E8**
Load Case 1: Wrap angle 90deg Fleet angle, in/out, 0.75deg* Maximum dynamic line pull [kN]	669	646	537	446	370	249**

* Mean fleet angle values are considered
** E8 is based on: P4 / 32 500 000 rotational cycles

Sheave	**SE.1600.5034.X rev.00**	
Min design temperature [°C]	-20	
Outer diameter [mm]	1720	
	Min	Max
Wire rope diameter, d [mm]	28	38
Groove radius [mm]	0.52 x d	0.56 x d
Sheave groove diameter [mm]	1591	1600
Load condition		
Wrap angle [deg]	90	
Fleet angle, in/out [deg]	1	
Maximum dynamic line pull* [kN]	799	
Design safety factor	1.5	

* The maximum dynamic load shall include effects such as the weight of the hook/block, the weight of the wire rope and the lifting appliance's design dynamic factor.
Static line pull x dynamic factor shall not exceed maximum dynamic line pull. Minimum dynamic factor is 1.3.

Maximum dynamic line pull for component groups.

Sheave	**SE.1600.5034.X rev.00**					
F.E.M. 1.001 component group	**E1-E3**	**E4**	**E5**	**E6**	**E7**	**E8**
Load Case 1: Wrap angle 90deg Fleet angle, in/out, 0.5deg* Maximum dynamic line pull [kN]	799	715	591	489	404	275**

* Mean fleet angle values are considered
** E8 is based on: P4 / 28 500 000 rotational cycles

Sheave	**SE.1601.5034.X rev.00**		
Min design temperature [°C]	-20		
	Min	Max	
Outer diameter [mm]	1724	1764	
Wire rope diameter, d [mm]	44	56	
Groove radius [mm]	0.52 x d	0.56 x d	
Load condition	Load Case 1	Load Case 2	Load Case 3
Wrap angle [deg]	90	90	90
Fleet angle, in/out [deg]	3	1	2
Maximum dynamic line pull* [kN]	745	1182	917
Design safety factor	1.5		

* The maximum dynamic load shall include effects such as the weight of the hook/block, the weight of the wire rope and the lifting appliance's design dynamic factor.
Static line pull x dynamic factor shall not exceed maximum dynamic line pull. Minimum dynamic factor is 1.3.

Maximum dynamic line pull for component groups.

Sheave	**SE.1601.5034.X rev.00**					
F.E.M. 1.001 component group	**E1-E3**	**E4**	**E5**	**E6**	**E7**	**E8**
Load Case 1: Wrap angle 90deg Fleet angle, in/out, 1.5deg* Maximum dynamic line pull [kN]	745	745	709	596	501	352**
Load Case 2: Wrap angle 90deg Fleet angle, in/out, 0.5deg* Maximum dynamic line pull [kN]	1182	1123	949	802	677	480**

* Mean fleet angle values are considered
** E8 is based on: P4 / 28 500 000 rotational cycles

Sheave	**SE.1820.50XX.X rev.00-A**	
Min design temperature [°C]	-20	
	Min	Max
Outer diameter [mm]	1986	2046
Sheave rim width [mm]	150	170
Sheave groove diameter [mm]	1806	1820
Wire rope diameter, d [mm]	56	76
Groove radius [mm]	0.52 x d	0.56 x d
Hub bearing diameter [mm]	260	400
Hub bearing width [mm]	99	154
Load condition	Load Case 1	Load Case 2
Wrap angle [deg]	90	95
Fleet angle, in/out [deg]	2	2
Maximum dynamic line pull* [kN]	2338	2456
Design safety factor	1.5	

* The maximum dynamic load shall include effects such as the weight of the hook/block, the weight of the wire rope and the lifting appliance's design dynamic factor.
Static line pull x dynamic factor shall not exceed maximum dynamic line pull. Minimum dynamic factor is 1.3.

Maximum dynamic line pull for component groups.

Sheave	**SE.1820.50XX.X rev.00-A**					
F.E.M. 1.001 component group	**E1-E3**	**E4**	**E5**	**E6**	**E7**	**E8**
Load Case 1: Wrap angle 90deg Fleet angle, in/out, 1deg* Maximum dynamic line pull [kN]	2338	2338	2082	1765	1496	1107**
Load Case 2: Wrap angle 95deg Fleet angle, in/out, 1deg* Maximum dynamic line pull [kN]	2456	2456	2116	1791	1516	1119**

* Mean fleet angle values are considered
** E8 is based on: P4 / 21 000 000 rotational cycles

Sheave	**SEW.1600.5034.140-23,5 rev.00-A**	
Min design temperature [°C]	-20	
Outer diameter [mm]	1900	
	Min	Max
Wire rope diameter, d [mm]	44	260
Groove radius [mm]	23.5	140
Load condition	Load Case 1	Load Case 2
Wrap angle [deg]	90	90
Fleet angle, in/out [deg]	1	2
Maximum dynamic line pull* [kN]	1269**	980**
Design safety factor	1.5	

* The maximum dynamic load shall include effects such as the weight of the hook/block, the weight of the wire rope and the lifting appliance's design dynamic factor.
Static line pull x dynamic factor shall not exceed maximum dynamic line pull. Minimum dynamic factor is 1.3.
** Maximum dynamic line pull is only applicable to the small groove radius.

Maximum dynamic line pull for component groups.

Sheave	**SEW.1600.5034.140-23,5 rev.00-A**					
F.E.M. 1.001 component group	**E1-E3**	**E4**	**E5**	**E6**	**E7**	**E8**
Load Case 1: Wrap angle 90deg Fleet angle, in/out, 0.5deg* Maximum dynamic line pull [kN]	1269	1127	946	794	666	466**

* Mean fleet angle values are considered
** E8 is based on: P4 / 28 500 000 rotational cycles

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. The sheave bearings are not covered by this Type Approval.
3. 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. If a DNV Product Certificate is required, each sheave shall be subjected to overload testing as per DNV-ST-0378 Table 14-1 and 14.2.3.4.
2. NDT as specified in the Type Approval Documentation are to be carried out by certified personnel.
3. Testing shall be witnessed by DNV representative.

Note: sheaves are exempt from impact testing.

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