DNV·GL

Certificate No:
TAP000022Y

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hydraulic cylinders for steering and reversing of water jet units

with type designation(s)
SH-8865, SH-8866

Issued to
Arcos Hydraulik AB
Sävsjö, Jönköpings Län, Sweden

is found to comply with
DNV GL standard DNVGL-ST-0194 – Hydraulic cylinders
DNV GL rules for classification – Ships Pt.4 Ch.10 Steering gear

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.

Type	Max. working press. (push)	Max. working press. (pull)	Cylinder sizes
SH-8865	200	200	125/90x710
SH-8866	200	200	125/90x750

Issued at **Høvik** on **2020-07-13**
This Certificate is valid until **2025-07-12**.
DNV GL local station: **Sweden CMC**

Approval Engineer: **Renata Rossi**

for **DNV GL**

Zeinab Sharifi
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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Product description

2 types of the hydraulic cylinders for steering and reversing of water jet units.

Dimensional data:

Type	Tube outer diameter	Tube inner diameter	Rod diameter	Stroke
SH-8865	150 mm	125 mm	90 mm	710 mm
SH-8866	150 mm	125 mm	90 mm	750 mm

Materials:

Type	Cylinder tube	Piston Rod	Piston	End eye	End cover	Stuffing box
SH-8865 and SH-8866	1.4460/62 (EN 10088-3)	1.4460/62 (EN 10088-3)	S355J2+N (EN10025-2)	1.4460/62 (EN 10088-3)	1.4460/62 (EN 10088-3)	CC333G GC (EN 1982)

Application/Limitation

The hydraulic cylinders covered by this certificate are approved with below design data:

Working Pressure push/pull:	200 bar
Design Pressure push/pull:	250 bar
Test Pressure:	375 bar
Design temperature (min/max):	-20°C / 80°C

All welding is to be carried out by qualified welders and according to approved welding procedures. Non-destructive testing of all welds are to be performed according to DNVGL-ST-0194 - Hydraulic Cylinders. Minimum requirement to NDT is UT and MT.

As rolled material delivery condition is not acceptable for pressurized parts. All rolled round steel bars and forgings shall be heat-treated (see RU-SHIP Pt.2 Ch.2 Sec.6 [1.8.1])

Test unit size for tensile and impact test shall not exceed the requirements given in RU-SHIP Pt.2 Ch.2 Sec.2 for the corresponding VL steel grade.

Type Approval documentation

Production test and Certification

Each cylinder is to be hydraulically pressure tested to 1.5 times of the design pressure and be delivered with a DNV GL product certificate. The test pressure is to be applied on both sides of the piston in sequence. Testing are to be in accordance with to DNVGL Standard ST-0194 - Hydraulic Cylinders in presence of DNV GL surveyor.

The hydraulic cylinders are to be manufactured by a manufacturer holding a valid welding workshop approval (WWA).

The cylinder tube and piston rod shall be delivered with VL material certificate. The end covers, end eyes and pistons shall be delivered with W material certificate. Approval of manufacturer is required for VL and W material certificates.

Marking of product

Hydraulic cylinders shall be permanently marked in order to enable unique traceability to a product certificate or a type approval certificate. The marking shall at least consist of the following:

- manufacturers name or trade mark
- type designation
- DNV GL product certificate number, if applicable
- charge number for the materials used in the cylinder tube and the piston rod.

Periodical assessment

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