DNV·GL

Certificate No:
TAP00001N5

TYPE APPROVAL CERTIFICATE

This is to certify:

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

with type designation(s)
SH-7638 (Steering Cylinder), SH-7639 (Reverse Cylinder)

Issued to
Arcos Hydraulik AB
Sävsjö, Jönköpings Län, Sweden

is found to comply with
DNV GL class guideline DNVGL-CG-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	Design pressure (push)	Design pressure (pull)	Cylinder sizes
SH-7638 (Steering Cylinder)	200 bar	200 bar	80/50-230
SH-7639 (Reverse Cylinder)	200 bar	200 bar	80/50-180

Issued at **Høvik** on **2019-04-24**
This Certificate is valid until **2023-12-30**.
DNV GL local station: **Gothenburg**

Approval Engineer: **Zrinka Cizmek**

for **DNV GL**

Marianne Spæren Marveng
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

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

Type	Tube Outer diameter	Tube Inner diameter	Rod diameter	Stroke
SH-7638	95 mm	80 mm	50 mm	230 mm
SH-7639	95 mm	80 mm	50 mm	150 mm

Type	Cylinder tube, Piston rod, Piston, End eye, End cover	Stuffing box
SH-7638	1.4460/1.4462 (EN 10088-3)	CC333G (EN 1982)
SH-7639	1.4460/1.4462 (EN 10088-3)	CC333G (EN 1982)

Application/Limitation

Design temperature: -20°C / 80°C

Working pressures:

Type	Pull	Push
SH-7638	200 bar	200 bar
SH-7639	200 bar	200 bar

Test pressures:

Type	Pull	Push
SH-7638	375 bar	375 bar
SH-7639	375 bar	375 bar

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-CG-0194 - Hydraulic Cylinders. Minimum requirement to NDT is UT and MT.

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 class guideline CG-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 (WMA).

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.