



Certificate no.:
TAP00002U5

TYPE APPROVAL CERTIFICATE

This is to certify:

that the **Hydraulic Cylinders**

with type designation(s)
Hydraulic cylinder 200/110-1321

issued to

MacArtney Hydraulics A/S
Lemvig, Midtjylland, Denmark

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV standard DNV-ST-0194 – Hydraulic cylinders
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021

Application:

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

Design pressure (push) 207 bar
Design pressure (pull) 207 bar
Cylinder sizes 200/110-1321

Issued at **Høvik** on **2024-01-22**

This Certificate is valid until **2029-01-21**.

for **DNV**

DNV local unit: **Denmark CMC**

Approval Engineer: **Tobias Berntsen**

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.



Form code: TA 251

Revision: 2023-09

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Product description

Double acting hydraulic cylinder intended for A-frame crane.

Type	Tube		Rod		Stroke
	Outer diameter	Inside diameter	Outside diameter	Inside diameter	
200/110-1321	230 mm	200 mm	110 mm	0 mm	1321 mm

Type	Tube	Rod	End Cap/End Eye/Piston
200/110-1321	E355 + SR EN 10305-1 / EN 10297-1	1.4418 QT+900 EN 10088-3	S355J2G3 EN 10250-2

Application/Limitation

Hydraulic cylinders covered by this certificate are intended for below working conditions:

- 200/110-1321 cylinder.
- Design temperature range is -20°C to +80°C.

The cylinder is limited to 25200 number of full load cycles over the life span.

This certificate does not cover the following use of the cylinders:

- Subsea applications
- Steering gear / water jet steering
- Cleating applications where the rules require a mechanical lock of cleats.

If the cylinders are going to be used for above mentioned applications, they are subject to case-by-case approval

Materials shall meet the requirements in DNV-ST-0194. Structural steels may be accepted for pressurized parts if the steel is fully killed and fine grain treated. (See RU-SHIP Pt.2 Ch.2 Sec.2 [2.6.6], OS-B101 Ch.2 Sec.2 [1.4.7], RU-SHIP Pt.2 Ch.2 Sec.3 [1.5.3]). Otherwise, all materials for pressurized parts shall be of pressure vessel quality.

Cylinder tube material E355+SR according to EN 10305-2 must have an elongation of minimum 14%.

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

Cylinder tube, piston rod and end covers shall be Charpy tested. Transverse Charpy V-notch requirement (average) shall be 27J at minimum design temperature.

Type Approval documentation

Production test and Certification

The hydraulic cylinder is to be hydraulically pressure tested to 1.5 times design pressure before paint or any coating is applied on the cylinders and be delivered with a DNV 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 DNV standard ST-0194 - Hydraulic Cylinders in presence of DNV surveyor.

Materials for cylinder tube, piston rod, end cover, stuffing box and end connections shall be delivered with 3.1 material certificates, according to EN 10204 or equivalent.

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:

- Manufacturer's name or trademark
- Design pressure
- Type designation
- Charge number for the materials used in the cylinder tube and the piston rod

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.