

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pressure Vessel

with type designation(s)
Leakage tank, Connection fitting

Issued to

Anton Christophers GmbH & Co. KG
Bremen, Germany

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.7 Pressure equipment

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Type:	Max. working temp.:	Design pressure:	Operating Medium
Leakage tank	-10°C / +50°C	+6 bar	Methanol
Connection fitting	-10°C / +50°C	+16 bar	Methanol

Issued at **Hamburg** on **2023-01-27**

This Certificate is valid until **2028-01-26**.

for **DNV**

DNV local unit: **Hamburg – CMC North/East**

Approval Engineer: **Malta Frederik Niederstadt**

Jonathan Struwe
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 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

1 type of Methanol tressure tank ("Container") incl. 1 type of manifold ("Connection Fitting").

Place of production

Anton Christophers GmbH & Co. KG
Senator-Bömers-Straße 12
28197 Bremen

Application/Limitation

Applied Rules:

- DNV-RU-SHIP Pt.4 Ch.7 'Pressure Equipment' (Edition July 2021)

The pressure equipment shall be classified in pressure equipment class I (PEC) acc. to DNV-RU-SHIP Pt.4 Ch.7 Sec.1 Table 2.

The products are intended for Methanol.

Materials

The materials of Container and Connection Fitting shall be delivered by a material manufacturer holding a valid certificate acc. to:

- DNV-CP-0346 'DNV approval of manufacturer scheme'.

All used materials as well as pressure equipment which form part of the product assembly shall be delivered with product and material certificates acc. to DNV-RU-SHIP Pt.4 Ch.7 Sec.1 [3.2].

The corrosion allowance is 0mm.

The sealing rings (O-rings) shall be suitable for the design temperature and the intended media.

Welding

The welding work for pressure equipment graded as PEC I shall be carried out by a welding workshop holding a valid certificate acc. to following DNV class programmes:

- DNV-CP-0261 'Approval of manufacturers – Pressure equipment' and
- DNV-CP-0352 'Approval of manufacturers – Manufacture of welded products – Welding workshop'.

The welding joint efficiency is 0.85.

Remarks

The installation on board the ship shall be performed in a way, that for possible forced vibrations on the pressure vessel and their nozzles resulting from e.g. diesel engine or the propulsion chain will be adequately taken care for.

Each product assembly is to be:

- Constructional tested and hydraulic pressure tested with 1.5 times the design pressure,
- Certified by DNV and delivered with a product certificate.

Type Approval documentation

Tests carried out

Hydraulic pressure test at 1.5 times the design pressure in the presence of a DNV surveyor.

Marking of product

For traceability to this type approval (TA) the products are at least to be marked with:

- a. Name and domicile of the manufacturer
- b. Manufacturer's type designation and serial number
- c. Year of manufacture
- d. Maximum allowable working pressure
- e. Design temperature in °C
- f. Hydrostatic test pressure
- g. DNV's identifying mark

Periodical assessment

The objective of periodical assessments is to verify that the conditions for the TA have not been altered.

The main scope of the periodical assessment will normally include:

- Verification of the TA applicant's production and quality system with relation to ensuring continue consistent production of the type approved products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products,
- Review of the TA documentation and that this is still used as basis for the production,
- Review of possible changes to the design, the material and the performance of the product,
- Verification of the product marking.

Periodical assessments for TA with a validity period of five years will be required after two years (+/- 90 days) and after 3.5 years (+/- 90 days).

Unscheduled assessments for retention of the TA may be carried out when there is reason to believe that the TA applicant has not adhered to the obligations stipulated in the TA certificate or in the applicable requirements.

END OF CERTIFICATE