



Certificate No:
TAP00002C7

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Heat Exchanger

with type designation(s)
Ø159, Ø219.1, Ø273, Ø323.9, Ø406.4, Ø508, Ø355.6

Issued to

E. Prang & Co. Apparatebau GmbH & Co.KG
Bergisch Gladbach, Nordrhein-Westfalen, Germany

is found to comply with

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

Application :

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

Temperature range: **0 to 300°C**

Design pressure: **10, 12, 16 and 25 bar**

Operating media: **See the certificate**

Issued at **Hamburg** on **2021-06-07**

This Certificate is valid until **2025-12-30**.

DNV local station: **Essen**

for **DNV**

Approval Engineer: **Astrid Caschube**

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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.



Form code: TA 251

Revision: 2021-03

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Product description

Shell and tube heat exchangers in different sizes. Each size/type is designed with different end closure/channel variations as presented in the tables below:

The medium in the heat exchangers covered by this certificate may be delivered in below configurations, the Size ø508 mm has been delivered as a "U-Tube" type heat exchanger. For details see approved drawings (listed in Type Approval documentation below).

Sizes	Medium/End closure types	Steam	Water	Thermal oil	HFO, MDO, LO	
ø159, ø219.1, ø273, ø323.9 ø355.6, ø406.4 ø508	U-tube	X	X	X	X	In tubes
		X	X	X	X	In jacket
	Double - cover	X	X	X	X	In tubes
		X	X	X	X	In jacket
	Standard		X			In tubes
		X	X		X	In jacket
	One/more-flow cast cover		X			In tubes
		X	X		X	In jacket
	One-flow cam cover	X	X			In tubes
			X		X	In jacket

DNV GL Pressure Equipment Class: (Pt.4 Ch.7 Sec.1 Table 2) when considering different operating medium, maximum design- pressure (P) and temperature (T)

Medium	P =10 bar	P =12 bar	P=16 bar	P =25 bar
Steam, compressed air	Class II	Class II	Class II	Class I
Water, non-flammable hydraulic fluids	Class III (T≤200°C) Class II (T>200°C)	Class III (T≤200°C) Class II (T>200°C)	Class III (T≤200°C) Class II (T>200°C)	Class II
Lubricating oil, flammable hydraulic fluids	Class I	Class I	Class I	Class I
Thermal Oil	Class II	Class II	Class II	Class I

The heat exchangers are designed with different material combinations listed in submitted part lists specified in this certificate. Corrosion allowance acc. to DNV GL ship rules Pt.4 Ch.7 Sec.4 [2.7] has been considered.

Application/Limitation

Maximum allowable pressure/temperature (for details see approved drawings, listed in Type Approval documentation below):

Sizes	Design temperature °C (shell side/tube side):	Design pressure bar (shell side/tube side):
ø159, ø219.1, ø273, ø355.6	250/250 or 100/100 or 185/100	10/10 or 16/10
ø 406.4	185/250	10/10
ø323.9	185/250 or 185/100	12/12 or 16/10
ø273	180/200 or 185/100	25/16 or 16/10
ø508	300 or 250/300 or 100	10/10 or 16

- The nozzle flanges shall be selected for the design condition according to the design standard.
- Certification of materials shall be in accordance with DNVGL-RU-SHIP Pt.4 Ch.7 Sec.1 Table 5, Table 6 or Table 7 (depending on the governing pressure equipment class of the heat exchanger). Material certificates VL and W shall be issued by an approved material manufacturer of DNV GL for the type, grade and thickness of product being supplied.
- Walls in the region of supports or brackets shall be fitted with doubling plates (Pt.4 Ch.7 Sec.4 [2.3.2]).

- Each heat exchanger shall be subject to hydrostatic pressure on completion to 1.5 times the design pressure in the presence of a DNV GL surveyor if the manufacturer does not have an approved MSA (or similar certificate) with DNV GL (Pt.4 Ch.7 Sec.7 [4.6])
- Extent of non-destructive testing shall be in accordance with DNVGL-RU-SHIP Pt.4 Ch.7 Sec.7 [4.1.1] or [4.1.2] (depending on the governing pressure equipment class).
- Each heat exchanger shall be delivered with a DNV GL product certificate.

Type Approval documentation

Marking of product

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

- the name and domicile of the manufacturer,
- the manufacturer's type designation and serial number,
- the year of manufacture,
- the design pressure,
- the design temperature in °C,
- the hydraulic test pressure, and
- DNV GL's identifying mark.

Periodical assessment

The objective of the periodical assessment is to verify that the conditions for the type approval (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 w.r.t. ensuring continued consistent production of the TA products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products,
- review of TA documentation and that this is still used as basis for the production,
- review of possible changes in the design, the materials and the performance of the product, and
- verification of the product marking.

For retention of the TA certificate in its validity period the periodical assessments will be carried out bi-yearly.

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

End of Certificate