DNV·GL

Certificate No:
TAP00001WH

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plate Heat Exchanger

with type designation(s)
CB300/CBM300

Issued to
Alfa Laval Lund AB
Lund, Skåne Län, Sweden

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.
Temperature range: **-196°C / 225°C (see page 2)**
Design pressure: **27.5 bar (see page 2)**
Operating media: **See page 2**

Issued at **Høvik** on **2021-01-07**
This Certificate is valid until **2026-01-06**.
DNV GL local station: **Sweden CMC**

for **DNV GL**

Approval Engineer: **Maheshraja Venkatesan**

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.

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Job Id: **262.1-031636-1**
Certificate No: **TAP00001WH**

Product description

Brazed plate heat exchangers designed according to EN13445-3:2009 Annex T with DNV GL calibrated safety factors according to DNVGL-RU-SHIP Pt.4 Ch.7.

Material:

- Frame plate, Pressure plate & Adapter plate : 1.4301, 1.4401 or 1.4404 (EN 10028-7)
- Connection & Connection tube : 1.4401, 1.4301 or 1.4404 (EN 10028-7/EN 10272/ EN 10222-5/ EN 10216-5)
- Channel plates : 1.4301 or 1.4401 (EN 10028-7)
- Weld neck flanges : X2CrNiMo17-12-2, X5CrNiMo17-12-2, X5CrNi18-10, X6CrNiMoTi17-12-2 or X6CrNiTi18-10 (EN 10222-5/ EN 10272/EN 10028-7)
- Compact flanges : X2CrNiMo17-12-2, X5CrNiMo17-12-2, X5CrNi18-10, X6CrNiMoTi17-12-2 or X6CrNiTi18-10 (EN 10222-5/ EN 10272/EN 10028-7)
- Bolt/Welding stud : 1.4301, 1.4303 or 1.4307 (EN 10088/EN 10269/EN 10272)

Brazing material: Cu, min. 99.9%

Application/Limitation

Brazed plate heat exchangers covered by this certificate are approved for the media according to limitations referred in DNV GL ship rules Pt.4 Ch.7 Sec.1 Table 2 to specify the class for the heat exchanger. (Corrosion allowance : 0 mm)

Design data:

Side 1								
Minimum design Temperature °C	-196 (standard)/ -165 (IGC code)							
Maximum design Temperature °C	≤20	90	100	125	150	175	200	225
Standard design Pressure (bar)	27.5	23.2	22.4	21.2	20.1	19.3	18.4	17.7
IGC Code design pressure (bar)	23.6	19.9	19.2	18.2	17.3	16.5	15.8	15.2
Side 2								
Minimum design Temperature °C	-196 (standard)/ -165 (IGC code)							
Maximum design Temperature °C	≤20	90	100	125	150	175	200	225
Standard design Pressure (bar)	19.1	16.2	15.6	14.8	14.0	13.4	12.8	12.3
IGC Code design pressure (bar)	16.4	13.9	13.4	12.7	12.0	11.5	11.0	10.6

For LNG/LPG applications material requirements shall fulfil DNV GL Ship Rules Pt.5 Ch.7 Sec.6.

Following additional limitations are to be observed:

- the application of the brazed plate heat exchangers is limited to prevailing static pressure loading with a maximum number of 5500 full pressure cycles;
- the use of brazed heat exchangers as heater in fuel oil supply systems and mounted directly at the engine is not allowed;
- the use of the heat exchangers in refrigerant systems shall follow the requirements as defined in DNV GL Rules Ship Pt.4 Ch.6 Sec.6. The use of refrigerants belonging to Group 2 is not allowed;
- the heat exchangers shall not be used in seawater systems;
- Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions. Surface in contact with the medium shall be protected from corrosion by considering adequate corrosion allowance, and/or by applying suitable coatings. Surface preparation and coating shall be approved by the Society.

Type Approval documentation

Production Testing

Each heat exchanger shall be subjected to hydrostatic pressure test upon completion to at least 1.5 times the design pressure in the presence of a DNV GL Surveyor.
The hydrostatic pressure includes a differential pressure test between the chambers; each chamber is to be pressure tested.

Tests carried out

Cyclic load/burst test according to EN13445 Annex T

Certification

Materials used shall have certificates according to DNV GL Rules Pt.4 Ch.7 Sec.1 Table 5, 6 and 7, as applicable. DNV GL Approval of manufacturer is required for VL and W material certificates.

Each heat exchanger shall be certified by a DNV GL surveyor and to be delivered with a DNV GL product certificate

Manufacturing facility for heat exchangers of class I and II shall be approved by DNV GL in accordance with DNVGL-CP-0261.

Marking of product

Each heat exchanger shall be permanently and legibly marked on the pressure part or on a nameplate permanently attached to a principal pressure part to show its identity and origin. The marking of the heat exchanger shall show at least the following particulars:
— manufacturer's name and address
— type designation and serial number
— year of manufacture
— maximum allowable working pressure
— hydrostatic test pressure
— Design temperature range

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.