

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plate Heat Exchanger**with type designation(s)
CB30/CBM30, CB110/CBM110

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****DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018****Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.**

Type	Temperature range:	Design pressure:	Operating media:
CB30/CBM30	-196° C to 225° C	See Certificate	See Certificate
CB110/CBM110	-196° C to 225° C	See Certificate	See Certificate

Issued at **Høvik** on **2019-01-17**This Certificate is valid until **2022-06-30**.for **DNV GL**DNV GL local station: **Stockholm**Approval Engineer: **Mehdi Rowshan**

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.



Product description

Two types of brazed plate heat exchangers designed according to EN13445-3:2009 Annex T (experimental method with safety factor equal to 3)

- Material:
 - Frame Plate and Pressure Plate: EN10028-7/1.4401 or 1.4404 or 1.4301
 - Connection Plate: EN 10028-7 or EN 10272/1.4301 or 1.4401 or 1.4404
 - Connection : EN 10028-7, EN 10216-5, EN 10217-7, EN 10222-5 or EN10272/1.4301, 1.4401, 1.4404 or 1.4571
 - Channel plate: EN10028-7/1.4401 or 1.4301

Application/Limitation

Brazed plate heat exchangers of type series : CB30/CBM30, CB110/CBM110 approved for the medium 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.

Brazed plate heat exchangers in this type approval shall withstand and meet the requirements of the operating media and temperature.

Stainless steel channel plates grades SUS304, 316 and 316L shall not be used in seawater systems.

Corrosion allowance: 0 mm

- Design Data for CB30/CBM30:

Minimum design Temperature °C	-196							
Maximum design Temperature °C	≤20	90	100	125	150	175	200	225
Standard: Max.Design Pressure (bar) @side 1	34,0	28,8	27,8	26,4	25,0	23,9	22,8	21,9
Standard: Max.Design Pressure (bar) @side 2	33,0	28,5	27,5	26,1	24,7	23,7	22,6	21,7
IGC Code: Max.Design Pressure (bar) @side 1	29,0	24,7	23,8	22,6	21,4	20,5	19,6	18,8
IGC Code: Max.Design Pressure (bar) @side 2	28,0	24,5	23,5	22,4	21,2	20,3	19,3	18,6

- Design Data for CB110/CBM110:

Minimum design Temperature °C	-196							
Maximum design Temperature °C	≤20	90	100	125	150	175	200	225
Standard: Max.Design Pressure (bar) @side 1	24,0	21,0	20,2	19,2	18,2	17,4	16,6	16,0
Standard: Max.Design Pressure (bar) @side 2	27,0	23,0	22,2	21,1	20,0	19,1	18,2	17,5
IGC Code: Max.Design Pressure (bar) @side 1	21,0	18,0	17,3	16,5	15,6	14,9	14,2	13,7
IGC Code: Max.Design Pressure (bar) @side 2	23,0	19,7	19,0	18,1	17,1	16,4	15,6	15,0

Type Approval documentation

Drawing No	Rev.	Title	Status
34566196			
34566197			
TR12041	1	Burst test report, CB30/CBM30	For Information
PC CHE 1303-13	-	Plim report, CB30/CBM30	For Information
34566488	4	Calculation drawing, CB110/CBM110	For Information
34566489	4	Calculation report, CB110/CBM110	For Information
TR12121	0	Burst test report, CB110/CBM110	For Information
PC CHE 1303-14	-	Plim report, CB110/CBM110	For Information
PC CHE 1502-10	-	Media list (general)	For Information

Tests carried out

Cyclic load/burst test according to EN13445 Annex T

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.

Certification

Materials used shall have certificates according to DNV GL Rules Pt.4 Ch.7 Sec.1 [3.2.2].
Materials for heat exchangers contain LPG/ LNG shall comply with Part 5 Chapter 7 Section 6 Table 3.
Each heat exchanger shall be certified by a DNV GL surveyor and to be delivered with a DNV GL product certificate
Approval of manufacturer is required for VL and W material certificates.
For class I and class II pressure vessels: Manufacturer of pressure vessels of class I and II shall be approved manufacturer.

Marking of product

For traceability to this Type Approval the products should at least be marked with:

- Manufacturer's name and address
- Type designation and serial number
- Year of manufacture
- Maximum allowable working pressure
- Hydrostatic test pressure
- 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.