

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plate Heat Exchanger**with type designation(s)
ALFANOVA HP 400 / ALFANOVA M HP 400

Issued to

Alfa Laval Lund AB
Lund, Skåne Län, Swedenis found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment
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.****Temperature range:** See Certificate**Design pressure:** See Certificate**Operating media:** See CertificateIssued at **Høvik** on **2019-11-08**This Certificate is valid until **2024-07-20**.DNV GL local station: **Sweden CMC**for **DNV GL**Approval Engineer: **Mehdi Rowshan**

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.



Product description

- Fusion bonded plate heat exchangers designed according to EN13445-3:2009 Annex T.
- Certified according to DNVGL ship rules Pt.4 Ch.7
- Material
 - Frame Plate and Pressure Plate: 1.4301, 1.4401 and 1.4404 (EN 10028-7)
 - Reinforcement Plate: 1.4301, 1.4401 and 1.4404 (EN 10028-7)
 - Adapter plate: 1.4301, 1.4401 and 1.4404 (EN 10028-7)
 - Connection: 1.4301, 1.4401 and 1.4404 (EN 10028-7,
EN 10222-5, EN 10216-5, EN 10217-7, EN 10272)
 - Connection tube: 1.4301, 1.4401 and 1.4404 (EN 10216-5)

Application/Limitation

PHE types ALFANOVA HP 400 / ALFANOVA M HP 400 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 of the heat exchanger.

Design Pressure and temperature :

Side 1														
	-196													
	≤20	90	100	125	150	175	200	225	250	300	400	450	500	550
Design pressure (bar)	25.7	21.7	20.9	19.9	18.8	18.0	17.2	16.5	15.9	14.8	13.7	13.3	13.1	13.1
IGC Code Design Pressure (bar)	19.9	16.7	16.1	15.3	14.5	13.9	13.3	12.7	12.2	11.4	10.6	10.3	10.1	10.1
Side 2														
	-196													
	≤20	90	100	125	150	175	200	225	250	300	400	450	500	550
	19.6	16.6	16.0	15.2	14.4	13.7	13.1	12.6	12.1	11.3	10.4	10.2	10.0	10.0
	15.2	12.8	12.3	11.7	11.1	10.6	10.1	9.7	9.3	8.7	8.1	7.9	7.7	7.7

Heat exchanger plates shall withstand and meet the requirements of the operating media and temperature.

Materials used shall have certificates according to DNV GL Rules Pt.4 Ch.7 Sec.1 [3.2].

Each heat exchanger is to be:

- Hydraulic pressure tested to minimum 1.5 x design pressure. The hydraulic pressure test is to include a differential pressure test between the chambers; each chamber is to be pressure tested.
- Certified by DNV GL and delivered with a product certificate when required by the DNV GL rules or by the purchaser.

Type Approval documentation

Tests carried out

Cyclic load/burst test according to EN13445 Annex T

Marking of product

For traceability to this Type Approval the products should at least be marked with:
the name and domicile of the manufacturer

- the manufacturer's type designation and serial number

Job Id: **262.1-019482-2**
Certificate No: **TAP00001YZ**

- the year of manufacture
- the design pressure
- the design temperature (s) in °C
- the hydraulic test pressure
- DNV GL's identifying mark.

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.