

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plate Heat Exchanger**with type designation(s)
M10-FG

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
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 all vessels classed by DNV GL.****Temperature range:** -50 °C to +200 °C**Design pressure:** 15.5 bar to 20 bar (Dependent on maximum design temperature)**Operating media:** See certificate.Issued at **Høvik** on **2019-01-17**This Certificate is valid until **2023-06-30**.DNV GL local station: **Stockholm**for **DNV GL**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

Plate heat exchanger type M10-FG with tie bolted frame plates designed according to DNV GL ship rules Pt.4 Ch.7 (Parts not covered by Pt.4 Ch.7 are designed in accordance with EN13445)

Material Designations:

Frame & Pressure Plate: P265GH (EN 10028-2), P355NL2 (EN 10028-3),
P275NL2 (EN 10028-3)
Tightening Bolts: Class 8.8 (EN ISO 898-1), 42CrMo4 (EN 10269)
Gasket Material: Non asbestos fiber Gaskets
Channel Plates: Stainless Steel or Titanium

Application/Limitation

Gasketed plate heat exchanger (PHE) with tie bolted frame plates of series type M10-FG 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.

Heat exchanger plates and gaskets 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.

Design Pressure and Life cycle for different maximum design Temperatures are resulted as below:

Maximum design Temperature	Design Pressure	Life Cycle
50°C	20 bar	1436
100°C	18 bar	1841
150°C	17 bar	2039
180°C	16 bar	2226
200°C	15.5 bar	2304

Corrosion allowance: 0 mm
Frame Plate thickness: Min. 39.7 mm

Type Approval documentation

3490019260	0	Calculation drawing	Approved
3490019262	0	Calculation report	For Information
3490019263	0	Finite Element Analysis report	For Information
PC CHE 1701-10	3	Report on calculation methodology	For Information
PC CHE 1502-10	-	Media list (general)	For Information

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].
Each heat exchanger shall be certified by a DNV GL surveyor and to be delivered with a DNV GL product certificate
Manufacturer of pressure vessels of class I and II shall be approved manufacturer by DNV GL.
DNV GL Approval of manufacturer is required for VL and W material certificates.

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.