

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plate Heat Exchanger**with type designation(s)
PHE TL10-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**Application :****Products approved by this certificate are accepted for installation on vessels classed by DNV GL.****Temperature range:** -10°C to 200°C**Design pressure:** -1 barg to 17.8 barg (see limitations in certificate)**Operating media:** See certificateIssued at **Høvik** on **2018-04-17**This Certificate is valid until **2022-12-31**.for **DNV GL**DNV GL local station: **Gothenburg**Approval Engineer: **Morten Engnestangen**

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 with tie bolted frame plates
Design code: EN 13445
Corrosion allowance: 0 mm
Thickness of frame and pressure plates: minimum 39.7 mm

Material:

- Frame & Pressure Plate: P265GH (EN10028-2)
- Tightening bolts: 42CrMo4 (EN10269)
- Nuts: 42CrMo4 (EN10269) / Class 8 (EN ISO 898-2)
- Channel plates: Stainless steel / Titanium.
- Channel plate gasket: Rubber (e.g. NBR, EPDM, FKM)

Permissible pressure-temperature range:

Operating temperature °C	Max. allowable pressure bar
50	17.8
100	17.8
150	16.9
180	15.9
200	15

Application/Limitation

The plate heat exchangers covered by this certificate are approved for operating fluids according to DNVGL Pt.4 Ch.7 Sec.1 Table 2. The table shall also be considered as the basis for classification.

The gasket materials are to be suitable for the media and operating temperature.

The media are not to have a degenerative or corrosive effect on materials in direct contact with the media.

Traditional types of stainless steels, including types like 304, 304L, 316, 316L, etc., shall not be used in direct contact with seawater. Refer DNVGL Pt.4 Ch.7 Sec.2 [1.1.1].

Materials shall be delivered with material certificates as required by DNVGL Ship rules Pt.4 Ch.7 Sec.1 Table 5 to 7.

The type approval is limited to the main pressure envelope. Type approval does not cover evaluation of environmental loads, nozzle loading, supports, ship movements, etc. For applications where such loadings are relevant these are to be subject to separate case by case approval. Refer DNVGL Pt.4 Ch.7 Sec. 4 [2.3].

Fatigue resistance (number of cycles) for plates and bolts are limited to values specified in "Design Report, Analysis of PHE TL10-FG frame-/pressure plates and tightening bolts – EN13445-3/DNVGL, reference number 3490018750 rev.1".

The frame and pressure plates are to be painted so they are suitably protected towards corrosion for the environment in which the heat exchanger will be installed. The media are not to be in contact with the painted frame and pressure plates.

Each heat exchanger is to be hydraulic pressure tested to minimum 1,5x design pressure.

Each heat exchanger is to be certified by DNV GL and delivered with a product certificate when required by DNVGL Rules or by the purchaser.

Job Id: **262.1-008784-3**
Certificate No: **TAP00001A4**

Type Approval documentation

Drawing: "Gasketed plate heat exchanger TL10-FG, Calculation drawing", dwg no. 3490018748 rev.1 dated 2017-09-13

Design report: "Analysis of PHE TL10-FG frame-/pressure plates and tightening bolts – EN 13445/DNVGL", ref no.3490018750 rev.1, dated 2017.09.08

Pressure Vessel Calculation of Plate Heat Exchanger, doc no.3490018749, rev.1, dated 2017.09.13

Marking of product

Each product delivered according to this certificate shall be permanently and legibly marked on the vessel or on a nameplate permanently attached to a principal pressure part to show its identity and origin.

The marking shall show the following particulars:

- Manufacturer's type designation and serial number
- Year of manufacture
- Design pressure
- Design temperature

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.