DNV·GL

Certificate No:
TAP00001XZ

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Plate Heat Exchanger

with type designation(s)
GBS, WP, GNS and NP

Issued to
Kelvion Brazed PHE GmbH
Nobitz-Wilchwitz, Germany

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

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Temperature range:	**-196 to 200°C**
Design pressure:	**GBS and WP: 31 bar; GNS and NP: 16 bar**
Operating media:	**exemptions see Application/Limitation**

Issued at **Hamburg** on **2019-09-17**
This Certificate is valid until **2022-12-31**.
DNV GL local station: **Magdeburg**

for **DNV GL**

Approval Engineer: **Thies-Hinnerk Thaele**

Harald Pauli
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

Brazed plate heat exchangers qualified according to EN13445-3: 2014 Annex T, Method C with DNV GL calibrated safety factors.

Heat exchanger materials:

- Nozzles: EN 10272-1, 1.4301 or 1.4404 or 1.4507
- Heat transfer plates: EN 10028-7, 1.4401
- Top and bottom cover plate EN 10028-7, 1.4301
- Seal plates, internal parts EN 10028-7, 1.4401 and 1.4301

Brazing consumables:
Types GBS and WP: Cu 99.95 %
Types GNS and NP: Nickel alloy foil, ISO15672-Ni 660 and 661

Application/Limitation

Applied Rules and Design Codes:

- DNV GL SHIP Pt.4 Ch.7 'Pressure Equipment' (Edition July 2019)
- EN13445-3: 2014 Annex T, Method C.

The brazed plate heat exchangers of type series GBS, WP, GNS and NP are approved for a design temperature range from -196°C up to 200°C with the maximum allowable working pressure (MAWP) as defined in the table underneath:

Heat Exchhanger Type	Approved Drawing	MAWP Side 1	MAWP Side 2
GBS100 / WP1	1/100-DNVGL-1	31 bar	31 bar
GBS200 / WP2	2/200-DNVGL-1	31 bar	31 bar
GBS 300 / WP 3	3/300-DNVGL-1	31 bar	31 bar
GBS 400 / WP 4	4/400-DNVGL-1	31 bar	31 bar
GBS500 / WP 5	5/500-DNVGL-1	31 bar	31 bar
GBS 700 / WP 7	7/700-DNVGL-1	31 bar	31 bar
GBS 800 / WP 8	8/800-DNVGL-1	31 bar	31 bar
GBS 900 / WP 9	9/900-DNVGL-1	31 bar	31 bar
GBS 1000H/M/L / WP 10	10/1000-DNVGL-1	31 bar	31 bar
GNS 100 / NP 1	1/100-DNVGL-4	16 bar	16 bar
GNS 200 / NP 2	2/200-DNVGL-4	16 bar	16 bar
GNS 300 / NP 3	3/300-DNVGL-4	16 bar	16 bar
GNS 400 / NP 4	4/400-DNVGL-4	16 bar	16 bar
GNS 500 / NP 5	5/500-DNVGL-4	16 bar	16 bar
GNS 700 / NP 7	7/700-DNVGL-4	16 bar	16 bar
GNS 800 / NP 8	8/800-DNVGL-4	16 bar	16 bar

Depending on the specific media and individual design conditions of the given application the heat exchangers are to be classed according to DNV GL Rules Ship Pt.4 Ch.7 Sec.1 Table 2.

The applicable pressure equipment class defines the scope of the certification requirements for the materials used (see DNV GL Rules Ship Pt.4 Ch.7 Sec.1 Table 5 / 6 / 7).

Manufacturers of welded and/or brazed pressure equipment according DNV GL Class I and II need to hold a valid approval in accordance with DNV GL Class Programme CP-0261.

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 500 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,
- applications as cargo process pressure vessel for liguefied gas systems as definded in DNV GL Rules Ship Pt.5 Ch.7 Sec.5 and DNV GL Rules Ship Pt.6 Ch.2 Sec.5 are excluded from the approval,
- the heat exchangers shall not be used in seawater systems,
- generally the heat exchangers shall be capable for the intended environmental and specific service conditions and shall be resistant to corrosion and wear during the intended life time.

Type Approval documentation

Production Testing

Each heat exchanger shall be subjected to a 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.

Marking of product

For traceability to this type approval the products are at least to be marked with:
- the name and domicile of the manufacturer,
- the manufacturer's type designation and serial number,
- the year of manufacture,
- the design pressure,
- the design temperature in °C,
- the hydraulic test pressure, and
- DNV GL's identifying mark

Periodical assessment

The objective of the periodical assessment is to verify that the conditions for the type approval (TA) have not been altered.

The main scope of the periodical assessment will normally include:

- verification of the TA applicant's production and quality system w.r.t. ensuring continued consistent production of the TA products at the TA applicant's own premises and at other companies that are given the responsibility for manufacturing of the products,
- review of TA documentation and that this is still used as basis for the production,
- review of possible changes in the design, the materials and the performance of the product,
- verification of the product marking.

For retention of the TA certificate in its validity period the periodical assessments will be carried out biyearly.

Unscheduled assessments for retention of the certificate may be carried out when there is reason to believe that the type approval applicant has not adhered to the obligations stipulated in the type approval certificate.