Certificate no.:
TAP000032V

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Plate Heat Exchanger

with type designation(s)
PSHE 3HH-236/2/2, PSHE 5WH-106/1/1

issued to
Vahterus Oy
Kalanti, **Finland**

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

Application:

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

Temperature range:	**See second page**
Design pressure:	**See second page**
Operating media:	**See second page**

Issued at **Høvik** on **2025-12-09**

This Certificate is valid until **2030-12-08**.

for **DNV**

DNV local unit: **Finland CMC**

Approval Engineer: **Jane Lozanov**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

Two types of plate and shell heat exchangers designed according to ASME VIII Div.1 and DNV-RU-SHIP Pt.4 Ch.7

Materials:

	PSHE 3HH-236/2/2	**PSHE 5WH-106/1/1**
Shell, end plate	SA-516 Gr.70	SA-240-316L
Plate	SA-240 316L	SA-240-316L
Flange	SA-350 LF2, SA-182-F316/F316L	SA-182-F316/F316L
Nozzle	SA-312-TP316L, SA-333 Gr.6	SA-312-TP316L

Application/Limitation

Model	**PSHE 3HH-236/2/2**		**PSHE 5WH-106/1/1**
	Plate side	Shell side	
Medium	Water	CH4+N2	CH4 90% + N2 10%
Design pressure (bar)	Full vacuum to 11 bar	Full vacuum to 16 bar	Full vacuum to 16 bar
Test pressure (bar)	16.5 bar	24 bar	24 bar
Design temperature (°C)	0°C to +210°C		-196°C to +210°C
Pressure vessel class	I		I
Joint efficiency	1		1
Corrosion allowance (mm)	Carbon steel 1.5 mm, Stainless steel 0 mm		0

Materials and material protection chosen for the specific system shall be suitable for the intended medium and environmental conditions. Surface in contact with the medium shall be protected from corrosion by considering adequate corrosion allowance, and/or by applying suitable coatings. Surface preparation and coating shall be approved by the Society.

Requirements for manufacturing, materials, welding, testing and heat treatment shall follow DNV-RU-SHIP Pt.4 Ch.7 Section 1 table 4.

Type Approval documentation

Production testing and Certification

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 Surveyor.

Marking of product

Minimum marking requirements shall be as outlined in the edition of the Rules (as mentioned on the front page of this certificate).

Periodical assessment

This certificate is only valid if required periodical assessments are carried out with satisfactory results.

For retention of the Type Approval, a DNV 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 DNV-CP-0338.

To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com