

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Plate Heat Exchanger**

with type designation(s)

633L-M, 633-Y, 320HT-M, 320 HT-S

Issued to

**SWEP International AB
LANDSKRONA, 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: -20 to 150 °C (dep. on matr. in end conn., see cert.)****Design pressure: See Certificate****Operating media: See Certificate**Issued at **Høvik** on **2019-08-13**This Certificate is valid until **2024-08-12.**DNV GL local station: **Gothenburg FIS**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

Standard brazed type heat exchangers with two circuits and D-type with flow 3 circuits with threaded, soldered or flanged end connections.
Design according to EN13445-3:2009 Annex T (experimental method)

Material	EN / DIN	ASME
Plates	EN 10028-7: 1.4401/1.4404/1.4301/1.4307	SA-240/SA-240M 316,316L,304,304L
Connections	EN 10272: 1.4401/1.4404/1.4435/1.4436 EN 10222-5: 1.4404 EN 10213: 1.4409 EN 10028-7:1.4401/1.4404 EN 10272 1.4301/1.4307 EN 10028-7 1.4301/ 1.4307	SA-479/SA-479M 316,316L,304,304L SA-312/SA-312M TP316,TP316L SA-240/SA-240M 316,316L304,304L SA-105/SA-105M; SA-181/SA-181M class 60/70 SA-351/M TYPE CF3M
Brazing Material	DIN 1787 SE/ETP-Cu	SB-152/SB152M 10300/SFA 5.8-BCu-1

List of manufacturers:

- SWEP INTERNATIONAL AB, Box 105 26122 Landskrona, Sweden

Application/Limitation

Brazed plate heat exchangers are 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.

Brazed plate heat exchangers in this type approval shall withstand and meet the requirements of the operating media and temperature.

Stainless steel plates grades SUS304, 304L, 316 and 316L shall not be used in seawater systems.

Plate heat exchangers with threaded joints connections shall not be used for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur. Otherwise:

- Plate heat exchangers with threaded joints connections in CO₂ systems shall be allowed only inside protected spaces and in CO₂ cylinder rooms.
- Plate heat exchangers with tapered threaded joints connections are only allowed for:
 - Class I, outside diameter not more than 33.7 mm
 - Class II and class III, outside diameter not more than 60.3 mm.
- Plate heat exchangers with parallel threaded joints connections are only allowed for class III, outside diameter not more than 60.3 mm.

Maximum working pressure and temperature and materials references shall be as per following tables:

BPHE Type	320HT-S		633L-M		633-Y		320HT-M	
Ref Drawing	00035723		00019285		CR633001		00036472	
	Max Pressure (bar) @circuit		Max Pressure (bar) @circuit		Max Pressure (bar) @circuit		Max Pressure (bar) @circuit	
T (°C)	1	2	1	2	1	2	1	2
-20	40	35	30	30	20	20	55	38
20	40	35	30	30	20	20	55	38
135	33	29	27	27	17	17	45	31
150	32	28	26	26	17	17	44	31

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.

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.

Type Approval documentation

Document Number	Document Name	Rev	Status
20170807-320-M	320HT-M PED Int Test Report	00	For Information
00036472	320HT - M - CALCULATION DRAWING	00	Approved
20170804-320-S	320HT-S PED Int Test Report	00	For Information
00035723	320HT - S - CALCULATION DRAWING	00	Approved
	633L-M PED test Report dated 15.10.2014	-	For Information
00019283	633L-M Calculation Drawing	02	Approved
CR000032	Temperature/Pressure Table, 30 bar	01	For Information
20170628-633-Y	633-Y PED test report	04	For Information
CR633001	633-Y Calculation drawing	06	Approved

Tests carried out

Cyclic load/burst test according to EN13445 Annex T

Marking of product

Each heat exchanger shall be permanently and legibly marked on the pressure part or on a nameplate permanently attached to a principal pressure part to show its identity and origin.

The marking of the heat exchanger shall show at least the following particulars:

- manufacturer's name and address
- type designation and serial number
- year of manufacture
- maximum allowable working pressure
- hydrostatic test pressure
- design 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.