

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Condenser**

with type designation(s)
CB219, CB273, CB356 and CB458

Issued to

PROVIDES METALMECCANICA SRL
Latina, LT, Italy

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 vessels classed by DNV GL.

Max. working temp.: Shell side (Refrigerants): 120°C, Tube side (water): 80°C
Design pressure: Shell side (Refrigerants): 35 bar, Tube side: (water): 16 bar

This Certificate is valid until **2023-12-03**.

Issued at **Høvik** on **2018-12-04**

DNV GL local station: **Milan**

for **DNV GL**

Approval Engineer: **Zeinab Sharifi**

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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.

Job Id: **262.1-012036-2**
Certificate No: **TAP00000B8**

Product description

Shell and tube condenser for refrigerants.

Materials for all models:

Shell	SA 106 Gr. B
Tubesheet	SA 516 Gr. 60N/70N
Tubes	SB 359 C12200 H55 or C70600/C71500
Nozzles	SA 516 Gr. 60N or SA 105

Manufacturing locations:

Chengdu Provides Air Conditioning Technology Co., Ltd
Chengdu, Sichuan, China

Application/Limitation

Technical design data:

Shell side	
Models	CB219/ CB273/ CB356/ CB458
Medium	HFC Refrigerant
Design pressure (barg)	35
Pneumatic test pressure (barg)	52.5
Design temperature (°C)	-10/120
Mean metal temperature (°C)	38.5
DNVGL pressure vessel class	II
Joint efficiency	0.85
Corrosion allowance (mm)	1
Tube side	
Models	CB219/ CB273/ CB356/ CB458
Medium	Water
Design pressure (barg)	16
Hydrostatic test pressure (barg)	24
Design temperature (°C)	-10/80
DNVGL pressure vessel class	III
Joint efficiency	0.85
Corrosion allowance (mm)	1

Design evaluation of the water side chamber is not included in this certificate. Manufacturer shall ensure that this part is complying with requirements in DNVGL-RU-SHIP Pt.4 Ch.7.

The condensers are evaluated for internal pressure, including nozzle loads. This certificate is limited to loads listed in document no.: Datasheet for CB2145NSDNV Rev.0, dated 2018-10-03.

Materials shall be subjected to Charpy V-notch impact testing as following:

SA-106 Gr. B: tested at -15°C with minimum average energy value of 27J transverse and 41J longitudinal.

SA 105: tested at -15°C with minimum average energy value of 27J.

SA 516 Gr. 60N/70N (thickness ≤ 25 mm): tested at -15°C with minimum average energy value of 27J transverse and 41J longitudinal. For thickness > 25 mm, see DNVGL-RU-SHIP Pt.2 Ch.2 Sec.2 Table 14.

Type Approval documentation

Production Testing

Each heat exchanger shall be subjected to hydrostatic/pneumatic testing upon completion to at least 1.5 times the design pressure in presence of a DNV GL Surveyor.

Certification

Materials for pressure retaining parts are to be delivered with material certificates according to DNVGL-RU-SHIP Pt. 4 Ch. 7 Sec. 1 Tables 6 for the shell side and Table 7 for the tube side, and shall meet the requirements of relevant parts of DNVGL-RU-SHIP Pt. 2 Ch. 2. Approval of manufacturer is required for VL and W material certificates.

Certification of the water side chamber is based on requirements in DNVGL-RU-SHIP Pt. 4 Ch. 7 Sec. 1 [3.1.4].

Approval of manufacture is required for pressure vessel class I and II.

Each heat exchanger shall be certified by DNV GL surveyor and delivered with DNV GL product certificate.

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
- temperature range.

Periodical assessment

For retention of the Type Approval, 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.