

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Hot Water Driven Absorption Chiller for Marine Applications

with type designation(s)

HWAR -L & LH & LHH Series / 30usRT - 1,300usRT (105kW -4,571kW)

Issued to

World Energy Co., Ltd.

Mungyeong-si, Gyeongsangbuk-do, Republic of Korea

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

Products approved by this type approval certificate are accepted for installation on all vessels classed by DNV GL.

Temperature range: see certificate

Design pressure: see certificate

Operating media: Water

Issued at **Hamburg** on **2021-03-11**

This Certificate is valid until **2026-03-10**.

for **DNV GL**

DNV GL local station: **Seoul**

Approval Engineer: **Ana Cristina Do Carmo Insfran**

Olaf Drews
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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 300,000 USD.



Product description

Hot Water Driven Absorption Chiller for Marine Applications series: HWAR – L & LH & LHH
type 30usRT - 1,300usRT (105kW-4,571kW)

Performance Test of Hot Water Driven Absorption Chiller:

Model: L50HH

Cooling Capacity: 176 [kW]

Electric Power: 208[V]; 60 [Hz]; 3 phases

Application/Limitation

Main Components:

Evaporator, Absorber, Solution Heat Exchanger, Generator, Condenser, Purge unit, Refrigerant Pump, Absorbent Pump, Operating Devices and Gauges, Chilled Water Freeze Prevention Unit, Absorbent Crystallization Prevention Unit.

Media:

Chilled water: -2° to 30°C

Cooling water: 15° to 45°C

Hot water: 60° to 135°C

Absorbent solution:

- 55% of LiBr (Lithium Bromide)
- 44.97% of water
- 0.03% of corrosion inhibitor
- Lithium molybdate (LiMoO4)

Refrigerant: Water

Design pressure: 10 [bar] chilled/cooling water, 10 [bar] hot water

Type Approval documentation

Tests carried out

Performance Test

Job Id: **262.1-035321-1**
Certificate No: **TAP00002AE**

Marking of product

For traceability to this type approval each Absorption Chiller shall be marked:

Scope	Example
Driving Energy	Hot Water
Model	L30(H, HH) -L1300(H, HH)
Cooling Capacity	xxxx kW / xxxx usRT
Chilled Water Inlet/Outlet Temp.	xx / xx [°C]
Flow rate	xxx [m³/h]
Design Pressure	xx [MPa]
Cooling Water Inlet/Outlet Temp.	xx / xx [°C]
Flow rate	xxxx [m³/h]
Design Pressure	xx [MPa]
Hot Water Inlet/Outlet Temp	xxx/xxx [°C]
Flow rate	ton/h
Design pressure	xx [MPa]
Power Supply	x ø xxx [V] xx [Hz]
Manufacturing Date	XXXX-xx.
Serial Number	YYYYYYYYY
Manufacturer Name	WORLD ENERGY Co., Ltd. Made in Korea

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform periodical assessment as per DNVGL-CP-0338, Sec.4 to verify that the conditions for the Type Approval are complied with.

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

End of certificate