Certificate no.:
TAK00002CR

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Support Materials

with type designation(s)
CFRP Floating Capture

issued to
HD Hyundai Heavy Industries Co., Ltd.
Ulsan, **Republic of Korea**

is found to comply with
DNV rules for classification – Ships

Application:

CFRP Floating Capture for independent tanks for liquefied gas.

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

Issued at **Hamburg** on **2024-06-14**
This Certificate is valid until **2029-06-13**.
DNV local unit: **Ulsan**

for **DNV**

Approval Engineer: **Gisle Hersvik**

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 300,000 USD.

Product description

CFRP Floating Capture
- made by Carbon Fiber Reinforced Plastics in accordance with HD HHI's Product Specification, Rev. 0. 2024-03-25.

Materials: $TAK_{PREPREG}$ using HS Carbon Fibre: Torayca T700SC

A component of the anti-floating function system for Type A, B & C independent tank support system.

Properties of CFRCP Floating Capture
Minimum specified tensile strength: 1664 MPa

The following tests are performed on the CFRP Floating Capture:

Tensile strength, Dry, RT 19°C, 5 parallels	Average: 1771 MPa Standard deviation: 52 MPa Lowest single result: 1714 MPa
Tensile strength, Seawater, RT 19°C, 7 parallels	Average: 1784 MPa Standard deviation: 88 MPa Lowest single result: 1701 MPa
Tensile strength, LN2, -52°C, 3 parallels	Average: 1710 MPa Standard deviation: 78 MPa Lowest single result: 1664 MPa

Manufactured by

LACOMTECH Co., Ltd., 167-11, Techno 2-ro, Yuseong-gu, Daejeon 34025, Republic of Korea

DNV local station: Seoul

Responsibility

The Company (stated on the front page of this Certificate) takes the responsibility that both design and production are in compliance with Rules, Standards and/or Regulations listed on page 1 of this certificate.

Application/Limitation

CFRP Floating Capture is intended for capturing rising tank and preventing damage to inner hull and tank.

The CFRP Floating Capture is to be installed, maintained and operated in accordance with manufacturer's instructions.

This approval does not cover the long-term characteristics of the CFRP Floating Capture (service life, degradation, environmental issues, etc.).

Any significant changes in design and / or quality of the material will render the approval invalid.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

Marking of product

Product/package shall be marked with *manufacturer's name*, *place of production* and *lot number* with the following details (example):

FCA – 231205 – 1 – 2 – 15 – 1

FC:	Floating Capture
A:	USN300B/USN120B/USN300B/ USN300B/USN120B/USN300B
231205:	Production Date (year month date)
1	1: for production in the day shift. 2: for production in the night shift.
2	2: for auto-clave no. 2. 1: for auto-clave no. 1.
15	Shipment quantity, i.e. total number of products per shipment.
1	Product no.: 1,2…15)

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

This certificate is only valid if required Periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com

END OF CERTIFICATE