



Certificate no.:
TAS00004J1

TYPE APPROVAL DESIGN CERTIFICATE

This is to certify:
that the Chain Stopper

with type designation(s)
Fairlead Chain Stopper

issued to
DHMC Co., Ltd. (Jillye)
Gimhae, Korea, Republic of

is found to comply with
DNV-OS-E301 – Position mooring, Edition December 2024

Application:
Floating offshore wind turbine

Issued at **Høvik** on **2025-01-10**

This Certificate is valid until **2027-01-09**.

for **DNV**

DNV local unit: **Gimhae Station**

Approval Engineer: **Chenyu Sun**

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

The fairlead chain stopper(FCS) is used for the disconnectable mooring system to be used in floating offshore wind turbine project. The mooring system is not covered in the type approval certificate. The component for the FCS is listed below:

- Chain wheel
- FCS housing
- FCS arm
- Chain stoppers (Upper and lower)
- FCS guide

Application/Limitation

Minimum design temperature: -10°C

Operation working range: 50°

Design Working range (DWR): 70° (Operation working range + 20°)

Vertical design inlet angle (DIA): 10°, 29.5° from the integrated load analysis

Maximum design load/Minimum breaking load: 2160tonnes

Mooring chain size: 147mm

Towing load: 3434kN

Towing angle in horizontal: 0°

Towing angle in vertical plane: 26° for the wheel and 46° for the arm

The FCS is assumed to be installed above the splash zone. The material of NV F650AW shall be ordered according to DNV-OS-B101 Ch.2 Sec.4 from DNV approved manufacturer, with additional requirements for impact test at -40°C for min. avg. 32J(L) or 22J(T), meeting DNV-OS-C101 Ch.2 Sec.3 [3.1.2.]. For example, in drawing DMS-KO-FCS-DWG-DET-3004 Rev.4, the impact test shall be performed at -40°C, and the material certificate shall be 3.2 witnessed by DNV surveyor.

Cathodic protection is excluded from this certificate and shall be addressed separately for each project. Fatigue calculations shall be performed for each project.

This certificate does not include the upper and lower brackets connected to the floater. The certificate does not cover the review of the integrated load analysis report. Design angles, including towing angles, are accepted as input without verification.

This Type Approval covers design(s) only. i.e. the Type Approval is not valid for the final product, but may be used as basis for obtaining a product certificate.

Type Approval documentation

Tests carried out

The fairlead chain stopper shall be manufactured, and function tested in accordance with offshore standard DNV-OS-401 "Fabrication and testing of offshore structures" July 2023 and DNV-OS-E301 "Position Mooring" July 2021. Individual product certificate is to be issued for each delivery.

For every order the chain stopper shall be function tested according to DNV-OS-E301 July 2021.

Marking of product

For traceability to this type approval, each FCS shall be marked with:

- Manufacturer's name or brand
- DNV Type approval certificate No.
- DNV Stamp

Manufactured by:

Manufacturers/production sites not listed here shall be assessed by DNV in accordance with DNV-CP-0338 prior to manufacturing of products to this TA certificate, and a request for update of the TA certificate shall be submitted to DNV for addition/change of production sites as relevant.