Certificate no.:
TAS000049Y

TYPE APPROVAL DESIGN CERTIFICATE

This is to certify:

that the In-line Tensioner

with type designation(s)
Submergible Mooring Pulley

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 **2025-01-28**
This Certificate is valid until **2027-01-27**.
DNV local unit: **Gimhae Station**

for **DNV**

Approval Engineer: **Tomasz Kapella**

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 submergible Mooring Pulley (hereinafter called 'the SMP') is to be used in the Floating Offshore Wind Turbine Project to be installed near Ulsan as a part of the "MW Class Floating Offshore Wind Turbine Disconnectable Mooring System Research and Development Project.
The major components of the SMP are:

- Welded body made up of: Wall plate; Shackle Pin block, Chain Stopper block, and Guide plate.
- Chain stopper
- Chain wheel.

Application/Limitation

Service life: 1 yr.
Minimum design temperature: -10°C (for manufacturing, transportation and installation)
Operation working range:

- Mooring line length: 850 m.
- Water depth: 150 m
- SMP depth: 50 m

Maximum design load/Minimum breaking load: 2160 tonnes
Mooring chain size: 147mm R5.

For single prototype construction only, it is allowed to use equivalent materials to DNV-OS-B101 Ch.2, and a gap analysis shall be carried out, per DNV-OS-B101 Ch2. Sec.1 [2.5].
Use of material NV F1000A+QT is allowed if impact tests are conducted at -15 degC according to DNV-OS-B101.

Cathodic protection effectiveness was not demonstrated. Until further updates are presented the service life of the SMP is limited to 1 yr.

Case-by-case fatigue life calculations shall be supported by improved weld details as per Plan Comment Form [DMS] SMP Type Approval, DMS-KO-SMP-DOC-SPC-0001, item 3.

A case-by-case mooring analysis and fatigue assessment shall be provided.

This Type Approval certificate is not valid for designs, components, equipment, systems or products which are subject to classification by DNV.

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

Drw No	Rev	Title
DMS-KO-SMP-DOC-SPC-0001	2	Submergible Mooring Pulley Specification
DMS-KO-SMP-DWG-DET-1007	1	Guide Plate
DMS-KO-SMP-DWG-DET-1004	2	Chain Stopper
DMS-KO-SMP-DWG-DET-1003	2	Chain Stopper
DMS-KO-SMP-DWG-DET-1005	2	Chain Wheel
DMS-KO-SMP-DWG-DET-1003	2	Chain Stopper
DMS-KO-SMP-DWG-DET-1006	2	Chain Wheel Pin
DMS-KO-SMP-DWG-DET-1002	2	Shackle Pin Block
DMS-KO-SMP-DWG-DET-1001	1	Wall Plate Details
DMS-KO-SMP-DWG-DET-1009	1	Chain Protection Details
DMS-KO-SMP-DWG-DET-1009	1	Chain Protection Details
DMS-KO-SMP-DWG-DET-1008	1	Locking Plate Details
DMS-KO-SMP-DWG-GEN-1000	2	General Arrangement
DMS-KR-SMP-DOC-CAL-0012	2	Fatigue Analysis for the Submergible Mooring Pulley
DMS-KR-SMP-DOC-CAl-0002	1	Strength Analysis for the Submergible Mooring Pulley

Tests carried out

The Submergible mooring pulley 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.

Marking of product

For traceability to this type approval, each SMP 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.

Periodical assessment

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