

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Quick Connecting Coupling for LNG / LPG**with type designation(s)
DDCCoupling (Dry Disconnect/Connect Couplings)

Issued to

Mann Teknik AB
MARIESTAD, Sweden

is found to comply with

DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers**Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.****Max. working temp.:** -196°C to +85°C**Max. working press.:** See page 2**Sizes:** DN25, DN50, DN65, DN80, DN100, DN150 and DN200Issued at **Høvik** on **2020-06-26**This Certificate is valid until **2025-06-25**.for **DNV GL**DNV GL local station: **Sweden CMC**Approval Engineer: **Sinisa Sedlan**

Zeinab Sharifi
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

The DDCCoupling consist of a "tank unit" which is a type of non-return valve and a "hose unit" with a valve driven by an internal cam curve to open both valves at the same time. An initial push and turn action on the hose unit provides engagement with the tank unit, thus locking and sealing the two units together.

End connections: Flanges PN16/PN25 acc. to EN 1092-1
Flanges Class 150/300 acc. to ASME B16.5
NPT threaded connection acc. to ASME B1.20.1 (size 2" Class 150 only)

Material: Stainless steel 1.4404 (EN 10272)

The coupling interfaces are in accordance with ISO 21593:2019.

Application/Limitation

Components covered by this certificate may be used for transfer of LNG/LPG into tanks within limits of maximum working pressure and temperature range.

Max. working pressure:

- As per pressure-temperature ratings of end connection (for couplings with flanges PN16/PN25 acc. to EN 1092-1 and flanges/threaded ends Class 150 acc. to ASME B16.5/ASME B16.34)
- 25 bar (for couplings with flanges Class 300 acc. to ASME B16.5)

Components covered by this certificate may be installed where fire safe applications are required.

The couplings shall always be installed according to the manufacturer's instructions.

The couplings shall not be installed in systems where vibration may occur.

Type Approval documentation

Tests carried out

Strength test, tightness test, cryogenic test, bending test, fire test

Production Testing

Before delivery, each coupling shall be subjected to:

- hydrostatic pressure test at 1.5 times the maximum working pressure at room temperature.
- seat leakage testing at 1.1 times the maximum working pressure.

In addition to the above tests, cryogenic testing consisting of functionality and leakage verification for a minimum 10% of each type and size of coupling intended to be used at working temperature below -55°C shall be undertaken. (Reference is made DNV GL ship rules Pt.5 ch.7 Sec.5 [13.1.2])

Certification

Products covered by this certificate shall be delivered with DNV GL product certificate when $T_{min} < -55^{\circ}\text{C}$ or $DN \geq 100$. Otherwise manufacturer's product certificate may be accepted.

Coupling bodies shall be delivered with material certificates in accordance with DNVGL-RU-SHIP Pt.5 Ch.7 Sec.1 Table 8. Approval of manufacturer is required for VL and W material certificates.

Marking of product

For traceability to this type approval each product is at least to be marked with:

- Manufacturer's name
- Type designation
- Maximum working pressure
- Size



Job Id: **262.1-032617-2**
Certificate No: **TAP000024A**

Periodical assessment

For retention of the Type Approval, a 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.