



TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP00001F4
Revision No:
2

This is to certify:

that the **Bulk Loading Hoses with Permanently Fitted Couplings**

with type designation(s)
MULTI-LNG WHITE STS

issued to

Gutteling B.V.
Rotterdam, Zuid-Holland, Netherlands

is found to comply with

DNV rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV class programme DNV-CP-0183 – Type approval – Flexible non-metallic hoses

Application:

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

Temperature range: -196°C to +50°C
Max. working press.: 10 bar
Sizes: 4", 6", 8" and 10"

Issued at **Høvik** on **2024-03-11**

for **DNV**

This Certificate is valid until **2028-06-30**.

DNV local unit: **Netherlands West FIS**

Approval Engineer: **Maheshraja Venkatesan**

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

Flexible hose assemblies for transfer of LNG designed and constructed according to EN 1474-2 and tested as HQC A+B. The hoses are constructed of the following materials:

Part	Material
Inner wire	AISI 316
Inner cover	Polyamide fabrics HaTe C 10.241
Outer cover	Polyamide fabrics / film, HaTe C 10.241 / Mylar A 36
Outer wire	AISI 316
Coupling	AISI 316L

End connection (to the hose): according to manufacturer's drawing listed in this certificate.

End connection (to ship): Slip-on welded flange, lapped flange, weld neck flange and TTMA fixed flange (according to ASME B16.5 or EN1092-1).

Hoses and couplings are manufactured by Gutteling B.V., Rotterdam, Netherlands

Application/Limitation

This certificate is valid for the specific assembly of hose and coupling type as specified, assembled and delivered by the holder (named as manufacturer) of this certificate.

The hoses may be used for ship-to-ship transfer of LNG (systems according to ISO16904 & EN1474-3).

The hoses covered by this certificate shall not be used in floating or subsea assembly configurations.

The hoses may be used for temporary filling and discharge only. The hoses are approved for intermittent operation towards filling and discharge only.

The hoses covered by this certificate shall be used in accordance with manufacturer's instruction manual.

The scope of approval does not cover the hose handling device(s) (padeye or lifting lugs, collars, etc.)

Materials chosen for the specific system shall be suitable for the intended medium and environmental conditions.

Production testing and Certification

Each hose assembly shall be hydrostatically tested at a hydrostatic pressure of 1.5 times the maximum working pressure. Production Testing and Certification for the actual intended application shall follow EN 1474-2 and the latest applicable edition of the Rules (as mentioned on the front page of this certificate), as appropriate.

Type Approval documentation

Manufacturer's drawing:

GUT/HOSE/05-102, GUT/HOSE/05-103, GUT/HOSE/05-104/rev01, GUT/HOSE/05-105/rev01

GUT/STUB/01-00, GUT/MALE NIPPLE/01-00, GUT/FERRULE/01-00, GUT/FERRULE/02-00

Reports:

- Leakage, change in length, twisting, electrical conductivity, and dimensional check test, dated 2006-08-+3
- 114322421_a, witnessed by DNV Surveyor, dated 2003-09-24
- 1432421_b, witnessed by DNV Surveyor, dated 2003-09-24
- 11432421_c, witnessed by DNV Surveyor, dated 2003-09-24
- 11432421_e, witnessed by DNV Surveyor, dated 2003-09-24
- 11432421_g, witnessed by DNV Surveyor, dated 2003-09-24
- 11432421_i, witnessed by DNV Surveyor, dated 2003-09-24
- Gutteling test report no. 080420/SV1
- TNO test report TNO-034-DTM-2009-00733, dated December 2009
- TNO test report TNO 2016 R10624, dated 2016-05-13
- Renewal test report no. GSO18000894, witnessed by DNV Surveyor, dated 2018-06-15
- TNO test report TNO 2016 LNG 21BAR Test Report, dated 2016-05-13
- TNO test report TNO-034-DTM-2009-02942, dated 2009-10-15
- TNO test report TNO 2019 R10480, Heat ingress test, dated 2019-03-28
- TNO test report TNO-034-DTN-2009-02944, dated September 2009
- TNO test report TNO 2019 R10283 Impact test, dated 2019-02-20

- TNO test report TNO 2019 R11944, dated 2019-12-09
- Renewal burst pressure test report(s) reviewed by DNV dated 2024-02-13

Tests carried out

Burst pressure test, cyclic test (according to IGC code [5.11.7]), cryogenic pressure cycle test, maximum allowable applied twist, minimum bending radius test, vacuum test, cold flexibility test, change in length test, electrical conductivity test, dimensional test

Tests carried out according to EN 1474-2: Pressure and leak testing ambient, Pressure and leak testing cryogenic, Pressure cycle test ambient, Burst test ambient, Burst test cryogenic, Axial stiffness ambient and cryogenic, Tensile MWL+MWAP ambient, Tensile MWL+MWAP cryogenic, Torsional stiffness ambient and cryogenic, Twist to MAAT ambient, Twist to MAAT cryogenic, Impact testing ambient, Impact testing cryogenic, Crush testing ambient, Crush testing cryogenic, Bend stiffness ambient and cryogenic, Bend to MBR ambient, Bend to MBR cryogenic, Thermal fatigue, Bending fatigue cryogenic, Wear test, Flow rate test, Insulation test, Electrical test, Damping test, and Thermal Insulation test.

Marking of product

Each end fitting shall bear a permanent identification, showing, as a minimum:

- name of manufacturer;
- hose assembly serial number;
- internal diameter of the hose;

The hose shall be permanently marked with:

- the date of the proof pressure testing,
- its specified MAWP,
- its maximum and minimum service temperature;

Periodical assessment

For retention of the Type Approval, a DNV 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 DNV-CP-0338.