

TYPE APPROVAL CERTIFICATE

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 GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV GL class programme DNVGL-CP-0183 – Type approval – Flexible hoses**Application :****Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV GL.****Temperature range:** -196°C to +50°C**Max. working press.:** 10 bar**Sizes:** 4", 6", 8" and 10"Issued at **Høvik** on **2018-07-10**This Certificate is valid until **2023-06-30**.DNV GL local station: **Rotterdam**for **DNV GL**Approval Engineer: **Adel Samiei**

Marianne Spæren Marveng
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.



Job Id: **262.1-007657-3**
Certificate No: **TAP00001F4**

Product description

Flexible hose assemblies for transfer of LNG designed and constructed according to EN 1474-2:2008 (Design and testing of transfer hoses) with the following constructional features:

Wire reinforced hoses constructed of inner wire of stainless steel AISI 316, inner cover of polyamide fabrics, inner layer of polyamide fabrics and polyester films, outer cover of polyamide and outer wire of stainless steel AISI 316 with permanently fitted couplings.

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)

Coupling material: Stainless steel AISI 316L

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 ISO16904:2016 & EN1474-3)

The hoses may be used for temporary filling and discharge only. They are not to be permanently fitted.

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

Each hose covered by this certificate shall be hydrostatically tested at ambient temperature to a pressure equal to 1.5 times maximum working pressure before being placed in service. In addition, production tests as specified in clause 6.4.2 of EN 1474-2 shall be carried out.

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

Hoses covered by this certificate shall not be subject to axial load during operation.

Type Approval documentation

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.

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



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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.