DNV·GL

Certificate No:
TAP00001AF

TYPE APPROVAL CERTIFICATE

This is to certify:

That the LNG/LPG Loading hoses

with type designation(s)
Dolphinflex LNG White

Issued to
SangBong Corporation
Pyeongtaek-si, Gyeonggi-do, Republic of Korea

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:	**see page 2**
Max. working press.:	**10.5 bar(g)**
Sizes:	**1", 2", 3", 4", 6", 8", 10" and 12"**

Issued at **Høvik** on **2020-11-25**

This Certificate is valid until **2022-12-31**.

for **DNV GL**

DNV GL local station: **Seoul**

Approval Engineer: **Maheshraja Venkatesan**

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.

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Product description

Wire reinforced hoses of non-metallic material with permanently fitted couplings carrying liquefied natural gas complying to IGC Code Chapter 5.11.7 with the following construction:

- inner wire of stainless steel AISI 316
- inner cover of polyamide fabrics
- inner layer of polyamide fabrics and polyester films
- outer cover of polyamide
- outer wire of stainless steel AISI 316

End coupling (to the hose body) : according to manufacturer's drawing listed in this certificate.
End connection (to ship) : Slip-on weld flange, lapped flange and weld neck flange (according to ASME B16.5 or EN1092-1)

Coupling material: Stainless steel AISI 316/ 316L

Hoses and end fittings are manufactured by:
SangBong Corporation, Pyeongtaek-si, Gyeonggi-do, Republic of Korea

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.

Hose size (inch)	Internal diameter (mm)	Maximum working pressure (bar)	Temperature range
1	25	10.5	-196°C to +50°C
2	50	10.5	
3	80	10.5	
4	100	10.5	-196°C to +80°C
6	150	10.5	
8	200	10.5	
10	250	10.5	
12	300	10.5	

The transfer hoses may be used for temporary filling and discharge of LNG and not to be permanently fitted.

The hoses are to be mounted in accordance with the manufacturer's instructions.

The scope of approval does not cover the external axial loads acting on the hoses during operation.

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 vacuum condition during operation.

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

Production testing

Each hose assembly 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.

Type Approval documentation

Tests carried out

Dimensional check, cold flexibility, proof pressure, change in length, Cyclic test followed by burst testing at min. & max. design temperatures (IGC Code Ch. 5.11.7.3), LNG exposure testing on hose materials (IGC Code Ch. 5.11.7.1)

Marking

Each hose assembly shall be permanently marked by the manufacturer with the following details:

- Hose manufacturer's name or trademark;
- Date of manufacture (month/year);
- Designation type reference;
- Nominal diameter;
- Pressure rating;
- Temperature rating

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.