Certificate No: LR25189071TA
Issue Date: 10/08/2025
Expiry Date: 09/08/2030

Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	**Sang Bong Corporation**
Address	90, Seonghae 2-gil, Anjung-eup, Pyungtaek, Gyeonggi, 17815, South Korea
Type	Flexible Hoses
Description	Non-metallic composite flexible cargo hose with permanent couplings
Trade Name	Dolphinflex Cryogenic Hoses
Application	Marine use in cargo piping systems for ship-to-shore or ship-to-ship transfer connections of liquefied gas
Specified Standard	Lloyd's Register Rules and Regulations for the Classification of Ships (July 2024), Part 5, Chapter 12 Lloyd's Register Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquefied Gases in Bulk (August 2024), Chapter 5, Section 7 "Ship's cargo hoses" incorporating the IMO IGC Code. EN1474-2:2020 "Installation and equipment for liquefied natural gas – Design and testing of marine transfer system – Part 2: Design and testing of transfer hoses".
Ratings	Nominal Size : 1 to 10 inch Max. working pressure : 21 bar

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Design temperature : -196 to +100 °C

Additional Tests

The following tests carried out on a representative sample in accordance with EN1474-2:2020 with satisfactory results:-

1) Tensile stiffness test for 10”,4”,1” at ambient& cryogenic temperature
2)Torsional stiffness test for 10”,4”,1” at ambient& cryogenic temperature
3) Bending stiffness test for 10”,4”,1” at ambient& cryogenic temperature
4) Hose damping test for 10”,4”,1” at ambient &cryogenic temperature
5) Thermal Insulation test for 10”,4”,1”at inside cryogenic temperature & outside ambient temperature
6) Pressure leak test for 10”,4”,1” at ambient &cryogenic temperature
7) Pressure and temperature cycle test for 10”,4”,1”at ambient & ambient - cryogenic temperature
8) Burst test for 10”,4”,1” at ambient & cryogenic temperature
9) Impact test for 10”,4”,1” at ambient & cryogenic temperature
10) Crush test for 10”,4”,1” at ambient & cryogenic temperature
11) Creep test for 10”,4”,1”
12)Tensile and torsional axial operational load test for 10”,4”,1” at ambient & cryogenic temperature
13) Bending radius test for 10”,4”,1” at ambient &cryogenic temperature
14) Fatigue test for 10”,4”,1” at cryogenic temperature
15) Flow rate test for 10”,8”,6”, 4”,3”, 2” at ambient temperature
16) Electrical properties test for 10”,4”,1” at ambient temperature

In accordance with IGC code, burst test after 200 cycle at ambient/upper temperature/low temperature for 10”,4”,1”.

Other Conditions

1) Where the hoses are intended to be fitted in cargo piping systems for ships classed with LR, the following conditions are applicable.
   a) The hoses are to be used for ship-to shore or ship-to-ship transfer connection only and not to be used for a permanent connection between fixed piping systems.
   b) Each new length of cargo hose produced should be hydrostatically tested

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at ambient temperature toa pressure not less than 1.5 times its specified maximum working pressure.

c) The hoses are not to be led through on board for transfer of cargo or vapour, unless fire resistance tests are to be carried out in accordance with a recognised standard acceptable to LR.

2) Where the hoses are intended to be fitted in cargo piping systems in ships for the carriage of liquefied gases in bulk classed with LR, the following conditions are applicable:-

a) The hoses are to be used for ship-to-shore or ship-to ship transfer connection only and not to befitted permanently in cargo systems on board ship.

b) Each new length of cargo hose produced should be hydrostatically tested at ambient temperature toa pressure not less than 1.5 times its specified maximum working pressure nor more than two fifths its bursting pressure.

c) Each hose should be stencilled or otherwise marked with its specified maximum working pressure and its maximum and minimum service temperatures.

d) Hoses used in cargo transfer should be compatible with the cargo and suitable for the cargo temperature in accordance with the manufacturer's instructions.

The hoses are not to be led through on board for transfer of cargo vapour, unless fire resistance test are to be carried out in accordance with a recognised standard acceptable to LR.

3) The requirements for design temperatures below -165°C shall be specially agreed with the Administration.

4) Type Approval does not eliminate the need for normal inspection survey procedures required by the Rules and Regulation.

5) If the specified standards are amended during the validity of this certificate, the product is to be re-approved prior to it being supplied to vessels to which the amended standards apply.

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This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register Asia of any modification or changes to the equipment in order to obtain a valid Certificate.

Previous Version: LR2020598TA

The Design Appraisal Document BTS/ENG/M252898 and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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