DNV·GL

Certificate No:
TAP000024H

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Ball Valve

with type designation(s)
Trunnion Ball Valves

Issued to
Hy-Lok Corporation (Kangseo Factory)
Busan, 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-0186 – Type approval – Valves

Application :

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

Temperature range:	**-196°C to +80°C**
Max. working press.:	**19 bar to 148.9 bar (see page 2)**
Sizes:	**1/2", 1", 2", 3" & 12"**

Issued at **Høvik** on **2020-07-09**

This Certificate is valid until **2025-07-08**.

for **DNV GL**

DNV GL local station: **Gimhae Station**

Approval Engineer: **Adel Samiei**

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.

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Product description

Ball valves with body thickness designed according to ASME B16.34 and end connections flanges according to ASME B16.5 or buttwelding ends according to ASME B16.25

Material:	Body & Bonnet:	ASTM A351 CF8M/CF3M
	Ball & Stem:	Stainless Steel grade 316
	Seat:	PCTFE
	Bolt:	ASTM A320 B8M

Application/Limitation

Valves covered by this certificate may be used in LNG/LPG applications - Cryogenic Service.

Size	Maximum working pressure (at room temperature)	Pressure-temperature rating (ASME B16.34)
½"	49.6 bar	Class 300
1"	99.3 bar	Class 600
2"	148.9 bar	Class 900
3" & 12"	19.0 bar	Class 150

The approval does not include actuator and/or other equipment for remote control of the valves.

The valves covered by this certificate are not to be considered fire safe and therefore shall not be installed wherever fire safe application is required; e.g. as Emergency shut down valves.

Type Approval documentation

Tests carried out

Pneumatic and Hydrostatic leakage test (seat and body), Cryogenic leakage test (seat and body), Burst pressure test

Production Testing

Each valve body 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 the valve flow direction.

Testing shall follow procedures and acceptance criteria in EN12266-1 (leakage rate A).

In addition to the above tests, cryogenic testing consisting of valve operation and leakage verification (to BS6364) for a minimum 10% of each type and size of valve 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 [13.1.1])

Production testing for valves that require DNV GL product certificate shall be witnessed by DNV GL surveyor.

Certification

The valves shall be delivered with DNV GL product certificate when minimum design temperature is less than -55°C or DN≥100. Otherwise manufacturer's product certificate may be accepted.
Valve bodies shall be delivered with material certificates in accordance with DNVGL-RU-SHIP Pt.5 Ch.7 Sec.1 Table 8. Approval of manufacture is required for VL and W material certificates.

Marking of product

For traceability to this type approval the valves are to be marked as a minimum with:

- manufacturer's name or trademark
- valve type designation
- size
- maximum design pressure and minimum design temperature

- arrow to indicate direction of flow

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.