

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Globe Valve**with type designation(s)
FCGBARF1 series

Issued to

BMT Co., Ltd.**Yangsan-si, Gyeongsangnam-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-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****Sizes: 4", 6", 8"**Issued at **Høvik** on **2020-04-23**for **DNV GL**This Certificate is valid until **2025-04-22**.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.



Product description

Globe Valves designed according to ASME B16.34 and API602.

End connections: Class #150 Flanges (ASME B16.5)

Material: Body & Bonnet: ASTM A351-CF8M
Stem & Disc: ASTM A276-316
Bolt / Nut: ASTM A193 B8M / ASTM A194 8M

Sealing/packing (Non-ferrous Material):

- Elastomerseals: Hydrogenated Nitril, VITON, Kalrez Elast-O-Lion-101, Elast-O-Lion-985
- Thermoplasticseals: PTFE + graphite (10 to 25%), KEL F(PCTFE), NYLON 12, PEEK, PTFE +15% fiberglass + incoloy 825, RGD PTFE +elgiloy, PTFE+graphite 10%, Graphite +Corrosion inhibitor

Application/Limitation

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

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

Temperature range is to be limited based on sealing material used:

	Material	Tempearture range
Elastomerseals	Hydrogenated Nitril	-40°C to +150°C
	VITON	-30°C to +180°C
	Kalrez	-20°C to +250°C
	Elast-O-Lion-101	-29°C to +150°C
	Elast-O-Lion-985	-55°C to +150°C
Thermoplasticseals	PTFE + graphite (10 to 25%)	-80°C to +200°C
	KEL F(PCTFE)	-150°C to +100°C
	NYLON 12	-20°C to +100°C
	PEEK	-80°C to +160°C
	PTFE +15% fiberglass + incoloy 825	-150°C to +250°C
	RGD PTFE +elgiloy	-200°C to +250°C
	PTFE+graphite 10%	-200°C to +250°C
	Graphite +Corrosion inhibitor	-240°C to +550°C

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 shut off or quick closing valves.

Type Approval documentation

Drawing number 170403-01-119-01 Rev.B dated 2020-02-27

Calculation reports for each size

Cryogenic type test report numbers: BMT-CTR-1801P-01,02,03 dated 2018-01-25

Document number BMT-GP-NMS-01 Rev. 2 dated 2015-11-24

Tests carried out

Hydrostatic test, Cryogenic leakage 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])

Job Id: **262.1-027655-1**
Certificate No: **TAP000022G**

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

Certification

The valves covered by this certificate shall be delivered with DNV GL product certificate.
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 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.