DNV·GL

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00001YC
Revision No:
1

This is to certify:

That the Ball Valve

with type designation(s)
Ball valve [Instrument Valves] / IB - Series

Issued to
PBM, Inc.
Irwin, PA, USA

is found to comply with
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV GL class programme DNVGL-CP-0186 – Type approval – Valves

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Temperature range:	**-165°C to +37°C**
Max. working press.:	**370 bar**
Sizes:	**DN 3/4"**

Issued at **Hamburg** on **2019-10-14**

This Certificate is valid until **2024-10-13**.
DNV GL local station: **Certification & Inspection Services**

Approval Engineer: **Guido Friederich**

for **DNV GL**
Digitally Signed By: Drews, Olaf
Location: DNV GL SE Hamburg, Germany
Signing Date: 2019-11-14

Olaf Drews
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.

Product description

Ball valves designed for high pressure service conditons up to ANSI Class 2500.
Valve design and use for isolation of pressure gauges and measuremet equipment.
Valves actuators including additional accessories and mounting parts (positioner, limit switches) are not covered within this type approval.

Ball valve design

Design standard:	ASME B 16.34
Minimum design temperature:	-165°C (-196 °C) [1]
Maximum design temperature:	+ 37°C

Valve end connections

Butt welded ends

Materials

Valve item	Material	Additional description
Valve body	ASTM A 479 316	Stainless steel
Bonnet	ASTM A 479 316	Stainless steel
Ball	ASTM A 564 S17400	Stainless steel
Seat	V-TEF	Modified PTFE, testing acc. USP 88 Class VI
Stem	ASTM A 564 S17400	Stainless steel

Material certification

Material certificates for cryogenic valves shall provide material properties for the relevant minimum design and test temperature, in particular charpy impact test results according to

DNV GL Rules Pt. 5 Ch. 7 – Liquefied gas tankers, Section 6 – Materials of construction, quality control and marking.

Materials for fabrication of pressure retaining valve items such as valve body and bonnet shall be supplied by DNV GL Approved Material Manufacturers.

Application

Operating media include flammable gases, gaseous and liquid nitrogen (LIN) and cryogenic liquefied gases including LNG.

Limitation

Note 1
If the type approved ball valves are intended for use and installation on board of a vessel with a cargo and/or media temperature below -165°C, the requirements for design temperatures below -165°C shall be specially agreed with the flag state administration.

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Tests carried out

Test standards DNV GL Pt.5 Ch. 7 – Liquefied gas tankers ASME B16.34 DNV GL CP 0186 - Valves Type of test	Test pressure [bar g]
Hydrostatic pressure test	1,5 times the design pressure
Seat and stem tightness test	1,1 times the design pressure
Cryogenic tightness tests using liquid nitrogen at –196 °C	
Cryogenic functional test	Design / working pressure

Production testing

I. Application for Liquefied gas tankers

1. Certification of valves [DN ≥ 100 **or** Working temperature < -55°C]
For all valves having a nominal Diameter DN ≥ 100 or a working temperature below -55°C a product certificate has to be issued by DNV GL based on the following scope of tests and according to:
DNV GL Rules Part 5, Chapter 7 – Liquefied gas tankers, Section 5, Item 13.1

Type of test	Test pressure
Shell strength	1,5 times the design pressure
Seat and stem tightness test	1,1 times the design pressure
Functional test	Design / work pressure

Pt. 5 Ch. 7, Section 1, Table 7 – Certification of components

DN ≥ 100 or Working temperature < -55°C	Type of certificate / Issued by VL Certificate / DNV GL

2. Additional cryogenic testing – 10 % of the batch
In addition, cryogenic testing consisting of valve operation and leakage verification for a minimum of 10% of each type and size of valve intended to be used at a working temperature below -55°C shall be carried out.

3. Material certification of valves working temperature < -55°C
DNV GL Rules Part 5, Chapter 7 – Liquefied gas tankers

Pt. 5 Ch. 7, Section 1, Table 8 – Certification of material quality and testing
Material certificates of valve bodies

Valve nominal diameter	Type of Certificate / Issued by
DN > 100	VL Certificate / DNV GL
DN ≤ 100	W Works Certificate / Manufacturer

4. Certification of valves [Working temperature ≥ -55°C]
For all valves intended for use at a working temperature ≥ -55°C a works certificate has to be issued based on the tests listed above and according to
DNV GL Rules Part 5, Chapter 7 – Liquefied gas tankers, Section 1 – Table 7

Valve nominal size	Type of certificate / Issued by
DN < 100 mm	W Works Certificate / Manufacturer

Marking of product

Each valve shall be clearly marked for identification. The identification marking may be performed on the body or on a plate of non-corrosive material. When a metallic plate is used, the plate shall be permanently fixed to the body.
Identification marking on the body shall be located to non stressed areas and shall be clearly legible.
The identification marking shall as a minimum include the following:

- Manufacturers name or trade mark
- Valve type designation
- Size
- Maximum design pressure and temperature
- Arrow to indicate direction of flow on one way flow valves

Type Approval documentation

Valve assembly drawing no. IBH-F5EEGEE-66--R332 , IB-Series,
Quality Plan Template – IM valves, doc. no.: ITP-106704-IB
pbm Valve brochure
pbm Material specification for austenitic stainless steel and carbon steel material for DNV Gl Certification
Material certificates
IBH hydrostatic and cryogenic valve test reports, doc no.:106704
Type Approval Assessment Report (Audit), dated 2019-08-30

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 Type Approval are complied with. Refer to DNVGL-CP-0338, Sec.4.

This certificate is only valid if required periodical assessments are carried out with satisfactory results.
To check the validity of this certificate, please look it up in https://approvalfinder.dnvgl.com

End of Certificate