

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Valve for Liquefied Gas**

with type designation(s)

Bestobell Globe Valves and Check Valves (Swing and Lift Type)

Issued to

**Parker Hannifin Manufacturing Ltd (Sheffield)
Sheffield, United Kingdom**

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems**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.**Issued at **Høvik** on **2018-09-21**This Certificate is valid until **2023-08-30**.for **DNV GL**DNV GL local station: **Manchester**Approval Engineer: **Mehdi Rowshan**

**Marianne Spæren Marveng
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.



Job Id: **262.1-016382-5**
Certificate No: **TAP00001J4**

Product description

Globe valves and Check valves (swing and lift type) designed to BS ISO 21011 intended for LNG service. Valves features with butt welded, threaded or flanged connections.

Sizes:

Globe valves:

Class 150: DN15, 25, 40, 50, 65, 80, 100, 150, 200, 350

Class 300: DN15, 25, 40, 50, 65, 80, 100

Class 1500: DN25

Lift Check: DN25, DN40, DN50, DN65, DN80, DN100, DN200

Swing Check: DN25, DN50, DN80, DN100, DN150, DN200, DN300, DN350

Materials:

	<i>Globe Valves</i>	<i>Lift Check</i>	<i>Swing Check</i>
Body	ASTM A351 CF3M or CF8M		
Cover	EN10088-3 1.4401/1.4404 (316/316L dual cert) or ASTM A351 CF8M/CF3M		
Seat	N/A	ASTM A351 CF3M or CF8M	EN10088-3 1.4404 (316L) or ASTM A351 CF8M
Disc	EN10088-3 1.4401 (316/316L dual cert.)	EN10088-3 1.4401 (316) or ASTM A351 CF8M	
Gasket	316 reinforced graphite		
Stem	EN 10088-3 1.4404 (316/316L dual cert.)	N/A	

Note that the DN350 swing check valve features a hole in the disc to allow backflow through the valve.

Application/Limitation

Maximum Allowable Working Pressure (depending on class):

Class 150 – 19 bar

Class 300 – 50 bar

Class 1500 – 170 bar

Design temperature: -196 °C to +150 °C (Globe valves)/+80 °C (Check valves)

The following pressure reduction factors apply at elevated temperatures:

<i>Temperature °C</i>	<i>Pressure reduction factor</i>
20	1,00
50	0,95
100	0,85
150	0,77

This type approval does not cover the valve actuators or operating gear for remote control of the valves.

Production Testing

Each valve housing shall be subjected to production testing (hydrostatic testing of valve body plus seat leakage) according to the procedure and requirements of EN12266-1:2012 (rate A).

Certification

Valve bodies shall be delivered with material certificate issued by society.

Type Approval documentation

Tests carried out

Cryogenic prototype testing

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 nonstressed areas and shall be clearly legible. The identification marking shall as a minimum include the following:

- manufacturer's name or trade mark
- valve type designation
- size
- maximum design pressure or pressure class
- arrow to indicate direction of flow on one way flow valves

Periodical assessment

For retention of the Type Examination, 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.