

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Butterfly Valves**

with type designation(s)

CRYOSEAL Type BB66, CRYOSEAL Type BF66, CRYOSEAL Type BBE7, CRYOSEAL Type BFE7

Issued to

Westad Industri AS
Geithus, Norway

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.**

Type:	Temperature range:	Max. working press.:	Sizes:
CRYOSEAL Type BB66	-196 °C to 210 °C	Class 150	Sandcast: DN150 to 800 (see page 2); Replicast: DN150 to 600 (see page 2)
CRYOSEAL Type BF66	-196 °C to 210 °C	Class 150	Sandcast: DN150 to 750 (see page 2); Replicast: DN150 to 600 (see page 2)
CRYOSEAL Type BBE7	-196 °C to 210 °C	Class 300	DN200
CRYOSEAL Type BFE7	-196 °C to 210 °C	Class 300	DN200

Issued at **Høvik** on **2018-06-27**This Certificate is valid until **2019-06-30**.for **DNV GL**DNV GL local station: **Oslo Maritime and CAP**Approval Engineer: **Maheshraja Venkatesan**

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.



Product description

Butterfly valves with extended bonnet for cryogenic service designed according to ASME B16.34 with the following types & sizes:

Casting Type	Model	Pressure rating	Sizes
Sandcast	BB66	Class 150	DN150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750 & 800
	BF66	Class 150	DN150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700 & 750
Replicast	BB66	Class 150	DN150, 200, 250, 300, 350, 400, 450, 500, 550 & 600
	BBE7	Class 300	DN200
	BF66	Class 150	DN150, 200, 250, 300, 350, 400, 450, 500, 550 & 600
	BFE7	Class 300	DN200

Material of construction:-

Body	: ASTM A351 CF3M/CF8M
Disc	: ASTM A351 CF8M (Stellite)
Bonnet	: ASTM A351 CF8M
Shaft	: AISI 316
Seal	: PTFE

Valve end construction:

- Flanged ends (BF66/BFE7) : ASME B16.5/ ASME B16.47
- Butt-welding ends (BB66/BBE7) : ASME B16.25

Application/Limitation

The valves under scope are approved to be used in systems for LNG & LPG applications.

Maximum valve differential service pressure over seat shall not exceed the intended pressure rating (class 150/ 300) of the valve.

The maximum output torque from actuators used on butterfly valves must not exceed the limit at which the valve spindle or disc can be damaged if the disc is restrained in any position.

The approval does not include any gear operating gear for remote control of the valves.

The valve shall not be used as shut off or quick closing valve.

Type Approval documentation

Tests carried out

Fire test, cryogenic: seat leakage, valve body leakage and functional testing.

Production Testing

All valves are to be tested in the presence of the DNV GL surveyor as below:

- Hydrostatic test of the valve body at a pressure equal to 1.5 times the design pressure for all valves
- Seat and stem leakage test at a pressure equal to 1.1 times the design pressure
- Cryogenic testing consisting of valve operation and leakage verification for a minimum of 10% of each type and size of valve for valves intended to be used at a working temperature below -55°C
Cryogenic test procedure shall be in accordance with BS6364.

Certification

All valves covered by this type approval certificate shall be delivered with product certificate.

Job Id: **262.1-013033-4**
Certificate No: **TAP00000V9**

The material used in bodies of valves shall be delivered with VL certificate when the minimum design temperature is less than -55°C; otherwise work certificates is accepted. In any case, material of bodies shall be made at foundries approved by the Society.

Marking of product

For traceability to this type approval each valve is at least to be marked with:

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

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.