

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Butterfly Valves

with type designation(s)
AV - F

Issued to

ACE VALVE CO., LTD
Kyungnam Korea, Republic of Korea

is found to comply with

Det Norske Veritas' Rules for Classification of Ships Pt.4, Ch.6 "Piping Systems"
Det Norske Veritas' Standards for Certification 2.9 No. 5-794.40

Application :

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

Temperature range: -20°C to 260°C (see certificate for limitations)
Max. working press.: JIS 5K/10K/16K - ANSI 150/300
Sizes: DN50 to 1000 mm (2" to 40")

This Certificate is valid until **2016-06-30**.

Issued at **Høvik** on **2015-12-01**

for **DNV GL**

DNV GL local station: **Gimhae MC & FIS**

Approval Engineer: **Adel Samiei**

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 in four types: Wafer (DN50 to DN 250)
Semi-lug, Lug, Flanged (DN50 to DN1000)

Materials:

Body: Carbon Steel ASTM A216 (JISG 5101.SC)
Nodular Cast Iron ASTM A395 (JISG 5502.FCD) (ferritic type)
Aluminium Bronze ASTM B148 (JISH 5114 Al- Bronze)
Stainless Steel ASTM A351 (JISG 5121.SCS)

Disc: Aluminium Bronze ASTM B148 (JISH 5114 Al- Bronze)
Stainless Steel ASTM A351 (JISG 5121.SCS)

Seat: Stainless steel with Teflon (PTFE/RTFE)

Application/Limitation

Valves may be used in ship piping systems, machinery piping systems and cargo piping systems onboard ships.

Valves covered by this certificate can be considered fire safe.

The maximum allowable working pressure shall follow the pressure-temperature tables in the flange standard.

The maximum design temperature of valves covered by this certificate is 260°C.

Valves made by ASTM A395 may be used in class II and III piping and in pipes and valves located on the ship's side and bottom and valves on the collision bulkhead. They shall not be used in Class I piping & temperature below 0°C of fluid media.

When used as shipside valves the disc must not extend outside the hull plating in open position.

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

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

These valves can be used for bilge suction when fitted in connection with a non-return valve.

Ship side valves located in dry compartments, bilge valves and valves on the fuel oil and lubricating oil tanks which are situated higher than the double bottom tanks, shall be arranged for local manual operation even if these valves are remote controlled. For ship side valves a portable hand pump is not accepted as equivalent to manual operation.

Type Approval documentation

Report on burst pressure and fire test signed by DNV Pusan

List of Drawings of High Performance Butterfly valves

Wafer Type JIS 10 Kg/cm²

270204BB0 page 1 dated 2003.08.18
270203BC0 page 2 dated 2003.08.18
270410BC0 page 3 dated 2003.08.18
302040BC0 page 8 dated 2003.08.18

Full Lug JIS 10 Kg/cm²

280204BB0 page 9 dated 2003.08.18
280203BC0 page 10 dated 2003.08.18
280410BC0 page 11 dated 2003.08.18

Semi Lug JIS 10 Kg/cm²

300204BB0 page 4 dated 2003.08.18
300203BC0 page 5 dated 2003.08.18
300410BC0 page 6 dated 2003.08.18
301218BC0 page 7 dated 2003.08.18

Flanged Type JIS 10 Kg/cm²

290204BB0 page 14 dated 2003.08.18
290203BC0 page 15 dated 2003.08.18
290410BC0 page 16 dated 2003.08.18

Job Id: **262.1-004965-3**
Certificate No: **TAP000006N**

281218BC0 page 12 dated 2003.08.18
282040BC0 page 13 dated 2003.08.18

291218BC0 page 17 dated 2003.08.18
292040BC0 page 18 dated 2003.08.18

Report: "Fire Safe Type Butterfly Valve" rev. A dated 2003.07.02 & 2004-01-26

Retention survey report dated 2012-05-21

Tests carried out

Fire Test according to API 607

Production testing

The valve housing of each valve shall be subjected to a hydrostatic pressure test at minimum 1.5 times the design pressure. The test pressure need not be more than 70 bar in excess of the design pressure. For valves intended for ship's side or bottom the test pressure is not to be less than 5 bar.

Holding time: 2 min. for sizes up to 100 mm (4")
5 min. for sizes 125 - 250 mm (5" -10")
10 min. for sizes 300 mm - 450 mm (12" - 16")
15 min. for sizes 500 mm (20") and larger

No leakage is permitted.

The valve assembly shall be subjected to a hydrostatic seat leakage test. The test pressure shall at least be equal to the design pressure. The test shall be performed with closed valve with the other end open to atmosphere. The pressure shall be applied independently on each side. For valves intended for ship's side or bottom the test pressure is not to be less than 5 bar.

Holding time: 5 min. for all sizes

Acceptable leakage range: Drop tight

Certification

Each valve is to be surveyed and certified by DNV GL when required by Rules, or by the Purchaser. A product certificate is required for all valves with DN > 100 mm having a design pressure $p > 16$ bar and for ship side valves with DN > 100 mm regardless of pressure rating.

Material certificates are required in line with DNV Rules for Ship Pt.4 Ch.6 Sec.2 Table A2.

All materials delivered with NV or works (W) certificate shall be made at works approved by the Society for the type, grade and dimension of steel being supplied and for the relevant steelmaking and processing route.

Marking of product

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

- Manufacturers name or trade mark
- Type designation
- Maximum design pressure or pressure class

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey every second year and before the expiry date of this certificate to verify that the conditions for the type approval are complied with.