DNV·GL

Certificate No:
TAP000005J

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Butterfly Valves

with type designation(s)
FIG.360, FIG 362, FIG 364

Issued to
Keystone Valve Korea LLC
Anseong-si Gyeonggi-do, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems

Application :

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

Temperature range:	**Dependent on body and seat material see certificate**
Max. working press.:	**20 bar**
Sizes:	**DN50 - DN900 see certificate**

This Certificate is valid until **2020-12-31**.

Issued at **Høvik** on **2016-02-15**

for **DNV GL**

DNV GL local station: **Seoul**

Approval Engineer: **Tom Berg-Nielsen**

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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Product description

Butterfly valves. Metal and soft seated.

Type Designation	Size
FIG.360, Wafer	DN50 - 900 (2”-36”)
FIG.362, Lugged	DN50 - 900 (2”-36”)
FIG.364, Double Flanged	DN50 - 900 (2”-36”)

Materials:

Part	Material
Body	JIS G5502 FCD, ASTM A536
	JIS G5101 SC480, ASTM A216 Gr WCB
	ASTM A351 CF8, CF8M, CF3, CF3M
	ASTM A352 Gr LCB, LCC
	ASTM B148 C95500, C95800
Disc	ASTM B148 C95200
	ASTM B148 C95500, C95800
	ASTM A351 CF8, CF8M, CF3, CF3M
	MONEL
Stem	ASTM A276 Gr 304, Gr 304L, Gr 316, Gr 316L
	ASTM A564 Type 630
	MONEL
Seat	NBR, RTFE, EPDM, FKM, Fire Safe Seat with RTFE, Stainless Steel

Application

The approval is valid for ship, machinery & cargo piping systems onboard DNV GL classed ships and mobile offshore units

Limitations

Nodular & Grey cast iron shall not to be used for piping subject to pressure shock, excessive strains and vibration.

Nodular & Grey cast iron shall not be used for class I and II piping.

Nodular & Grey cast iron can in general be used for class III piping, with the following exceptions:

- valves fitted on ship sides and bottom and on sea chests
- valves fitted on collision bulkhead
- valves under static head fitted on the external wall of fuel tanks, lube. oil tanks and tanks for other flammable oils
- valves for fluids with temperatures in excess of 120°C.

Nodular cast iron of the ferrittic type, with specified minimum elongation of 12%, may be used in class II and III piping and in valves located on the ship's side and bottom and valves on the collision bulkhead.

Nodular cast iron shall not be used for media having a temperature exceeding 350°C or below 0 °C.

SEAL/LINING MATERIALS TEMP RATING:

Working temperature range depending on seat material:

Type of rubber	Minimum temperature	Maximum temperature		
		Dry air	Sea water/steam	Hydrocarbons
EPDM	-35°C	+121°C	+130°C	N/A
NBR	-18°C	+100°C	+90°C	+90°C
FKM	-20°C	+176°C	+80°C	+80°C
PTFE	-40°C	+190°C	+150°C	+150°C
316SS	-40°C	+230°C	+150°C	+150°C
MONEL 400	-40°C	+230°C	+150°C	+150°C
Fire tested seat with RTFE (A240 Type 316 + RTFE, MONEL 400 + RTFE)	-40°C	+230°C	+150°C	+150°C

EPDM may not be used for hydrocarbon services.

- Installation of the valves shall comply with the Rule requirements.
- The approval does not include any remote operating device.
- Hand lever for valves with steel body shall be steel.
- Lining material used shall be compatible with the fluid in the system. This shall be documented.

Type Approval documentation

- Application for Type Approval
- Drawings:
  F.360 Wafer type: 360-000-001 to 109
  F.362 Lug type: 362-000-001 to 107
  F.364 Double Flanged: 364-000-001 to 364-000-020
- Report on Fire Safe Testing acc. to API 607 6th witnessed by LRS
- Manufacturer's document no K1511127 for DNV GL type approval renewal dated 2015-11-27

Fabrication Testing

- Each valve is to be tested according to EN 12266-1
- Each valve body is to be subjected to a hydrostatic pressure test at minimum 1,5 times the design pressure at room temp, or in combination with test of valve assembly.
- Each valve assembly is to be subjected to a seat leakage test at minimum 1,1 times the design pressure.
- Each valve shall be subjected to an operability test.
- Butterfly valves fitted on ship's side and bottom are also to be hydraulically pressure tested to 5 bar applied independently on each side of the closed disc.

All testing and acceptance criteria ref. EN 12266-1

Tests carried out

Fire test on RTFE seated valves

Delivery Conditions

- DNV GL product certificates are required for valves with DN>100mm and PN>16 bar, and for ship side valves with DN>100 regardless of pressure rating. Other valves may be delivered with manufacturers certificate.
- Valves shall be delivered with material certificates according to Pt. 4, Ch. 6, Sec. 2 Table 3.
- For materials required with DNV GL or Works material certificates the foundry has to be a DNV GL approved foundry

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
- Size
- Maximum design pressure or pressure class

Periodical assessment

Periodical assessment after 2 years:
For retention of the Type Approval, DNV GL Surveyor shall perform an assessment 2 years after issue of the Type Approval Certificate, to verify that the conditions for the type approval are complied with.

Renewal assessment after 5 years:
Application for renewal shall be submitted to DNV GL not later than 3 months before expiry date of the certificate.Upon receipt of the application a periodical assessment will be carried out to verify the conditions for the type approval is still complied with. Any changes to the design are to be handled as for initial Type Approval, with regards to additional documentation and testing requirements.