DNV·GL

Certificate No:
TAP000006M

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Butterfly Valves

with type designation(s)
Wafer types, Lug types, Double flange

Issued to
LK Valves AB
HELSINGBORG, Sweden

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
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment

Application :

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

Type:	Temperature range:	Max. working press.:	Sizes:
Wafer types	**Dependent on the rubber materials, see certificate**	**PN10, PN16, PN25**	**DN40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600**
Lug types	**Dependent on the rubber material, see certificate**	**PN6, PN10, PN16, PN25**	**DN40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800**
Double flange	**Dependent on the rubber material, see certificate**	**PN10, PN16**	**DN40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500**

This Certificate is valid until **2017-12-31**.
Issued at **Høvik** on **2016-04-28**

DNV GL local station: **Malmö**

Approval Engineer: **Adel Samiei**

for **DNV GL**

Digitally Signed By: Marveng, Marianne Spæren
Location: DNV GL Høvik, Norway
Signing Date: 28.04.2016

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 – wafer type / lug type / Double flange - with rubber lining
Face to face standard: EN558 - series 13
Flange standard according to EN 1092-2

Types:

Type (*)	Product Group
Wafer types:	700701, 700702, 700703, 701701, 701702, 701703, 702701, 702702, 702703, 700901, 700902, 700903, 701901, 701902, 701903, 702901, 702902, 702903
Lug types:	710700, 710701, 710702, 710703, 711700, 711701, 711702, 711703, 712700, 712701, 712702, 712703, 710900, 710901, 710902, 710903, 711900, 711901, 711902, 711903, 712900, 712901, 712902, 712903
Double Flange:	730701, 730702, 730901, 730902, 731701, 731702, 731901, 731902, 732701, 732901, 732702, 732902

(*) Configuration according to "Configuration Chart Butterfly" document no. 34570

One piece stem, centric located. Disc is secured to the stem by pins. Seat is mechanically retained in the body.

Materials in the valves:

Body:	Ductile iron EN-JS1030 (GGG40)
Disc:	Aluminum bronze CC333G (AB2)
	Stainless steel: W.no: 1.4408 (AISI316)
Stem:	Stainless steel W.no: 1.4436 (AISI316)
	Stainless steel W.no: 1.4057 (AISI431)
Seat:	NBR, EPDM, FKM/FPM

Application/Limitation

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

Type	Size	Maximum working pressure
Wafer	DN40 to DN300	PN10 – PN16 – PN25
	DN350 to DN600	PN10
Lug	DN40 to DN300	PN10 – PN16 – PN25
	DN350 to DN600	PN10 – PN16
	DN700 & DN800	PN 6 – PN10
Double flange	DN40 to DN500	PN10 – PN16

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

Temperature range based on seat material:

NBR:	-35ºC to 95ºC
EPDM:	-40ºC to 110ºC
FKM/FPM:	-30ºC to 180ºC

The stainless steel AISI316 is not considered seawater resistant. Valves with parts made of AISI316L shall not be used in seawater applications.

The valves covered by this certificate are not considered fire safe.

The valves covered by this certificate are not to be used as closing valves on fuel oil tanks.

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

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 valves covered by this certificate shall not to be used for piping subject to pressure shock, excessive strains and vibration. (Refer to DNV Ship rules Pt.4 Ch.6 Sec.2 A401)

The valves covered by this certificate shall not be used for class I and II piping. (Refer to DNV Ship rules Pt.4 Ch.6 Sec.2 A402)

The valves covered by this certificate can in general be used for class III piping (Refer to DNV Ship rules Pt.4 Ch.6 Sec.2 A403), 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, lub. oil tanks and tanks for other flammable oils
- Valves for fluids with temperatures in excess of 120°C.

Type Approval documentation

Drawings:

- 34530 rev D "Butterfly valve Lug"
- 34531 rev C "Butterfly valve Wafer"
- 34532 rev A "Butterfly valve Double Flange"
- Brochure "Butterfly valve wafer type"
- Brochure "Butterfly valve lug type"
- Brochure "Butterfly valve double flange type"
- Burst pressure test report dated 04/17/2013 witnessed by DNV local station NANJING.
- Burst pressure test report dated 08/06/2014 witnessed by DNV local station NANJING.
- Configuration Chart Butterfly document no. 34570

Tests carried out

Burst pressure test

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

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. For other valves a manufacturer's certificate may be accepted.

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.