DNV·GL

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP000002V
Revision No:
2

This is to certify:

That the Butterfly Valves

with type designation(s)
CompoSeal Resilient Seated Wafer Type, Optiseal Wafer and lug types, Double flanged type

Issued to
Emerson Automation Solutions Final Control Netherlands B.V.
Breda, Noord-Brabant, Netherlands

is found to comply with
DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
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:
CompoSeal Resilient Seated Wafer Type	**-40°C to +150°C**	**10 bar**	**DN40,50,65,125,150,200,250,300**
Optiseal Wafer and lug types	**-40°C to +160°C**	**10/16 bar**	**DN40-900 (19 sizes)**
Double flanged type	**-40°C to +120°C**	**10/16 bar**	**DN100-1200 (17 sizes)**

Issued at **Høvik** on **2018-06-10**

This Certificate is valid until **2021-12-31**.
DNV GL local station: **Rotterdam**

Approval Engineer: **Adel Samiei**

for **DNV GL**

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

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: **262.1-027206-1**
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Revision No: **2**

Product description

KEYSTONE CompoSeal Resilient Seated**:** Wafer type made of non-metallic composite material.

Flanges: PN10/16 EN 1092-1
Class150 ASME B16.5
10K JIS B2210
Face to Face dimension: API609
Sizes approved: DN40, DN50, DN65, DN125, DN150, DN200, DN250, DN300.
Materials:

Body:	Composite XP1600 and XP1620;
Disc:	Composite XP1600
Stem:	Stainless Steel 1.4057
Lining/seat:	EPDM, NBR or Fluoro rubber (FPM)

KEYSTONE Double flanged wafer type valves:
Face to Face dimension: API609
Wall thickness according to EN12516-2
Fig.55:DN80-1200

KEYSTONE Optiseal: wafer and lug types
Face to Face dimension: API609
Wall thickness according to EN12516-2

Fig.14: DN40-300	Fig.15: DN350-900
Fig.16: DN40-300	Fig.17: DN350-900

Materials:

Body:	Cast Iron:EN-JS 1040/ GG 25 stoff no. 0.6025
	Ductile Cast Iron: EN-GJS 400-15/ GGG 40 stoff no. 0.7040
	Ductile Cast Iron: EN-GJS 400-18/ GGG 40.3 stoff no. 0.7043
	Cast Steel: GS-C 25/ stoff no. 1.0619/ ASTM A216 WCB
Disc:	Ductile Cast Iron: EN-GJS 400-15/ GGG 40 stoff no. 0.7040
	Stainless Steel: G-XCrNiMo 18-10/ stoff no. 1.4408
	Nickel Aluminium Bronze: G-CuAlNi/ stoff no. 2.0975-01/BS 1400 AB2
Shaft:	Stainless Steel, X17CrNi 16-2/ stoff no. 1.4057/ SS431
	Stainless Steel, X35CrMo 17/ stoff no. 1.4122
	Stainless Steel: G-X5CrNiMo17 12 2/ stoff no. 1.4401/SS316
Seat:	EPDM, PTFE lined EPDM, NBR, FPM

Application/Limitation

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

Austenitic stainless steels 304, 304L, 316 & 316L are not seawater resistant and shall not be used in direct contact with seawater.

Grey cast iron shall not be used for class I and II piping with the following exceptions: valves in hydraulic piping systems where failure would not render the system inoperative or introduce a fire risk

Grey cast iron may 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, lub. oil tanks and tanks for other flammable oils
- valves for fluids with temperatures in excess of 120°C.

Nodular cast iron of the ferritic 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.

Valves made of nodular cast iron shall not be used for media havinga temperature below 0°C.

EPDM sealing shall not be used in Hydrocarbon applications.

Valves covered by this certificate are not to be considered fire safe and shall not be installed in systems where fire safe applications are required.

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

This certificate does not cover valves installed in LNG/LPG applications.

The composite valves are subject to the same limitations as those for plastic piping. Refer to DNV GL Ship Pt.4 Ch.6 Sec.2 [1.7]. Fire endurance requirements may be found in DNV GL Ship Pt.4 Ch.6 Sec.2 [1.7] Table 1. The valves are not considered fire safe.

Temperature range depending on seat material:

PTFE /EPDM	-30°C to +120°C
NBR	-10°C to +90°C
Fluoro rubber (FPM):	-40°C to +160°C

Maximum working pressure for ferrous Valves based on material:

Grey Cast Iron:	10 bar
Nodular Cast Iron:	16 bar
Cast Steel:	16 bar

Type Approval documentation

Drawings for "Keystone Composeal Resilient Seated Butterfly Valves Wafer Type"
Letter dated 2017-10-09 for the change of ownership to Emerson automation Solutions
Burst test of DN50, DN150 trim 441 valves, dated 2011-12-06
Burst test of DN300 trim 441 valves, dated 2012-01-27
Data sheets: EBPJD-0031-EN-0207, EBPJV-0723-EN-0211
Test report number 15-005-061
Drawings:

Type	Dwg. No. Rev/Date
Optiseal (F14)	SB-0250 000815
Optiseal (F14)	SB-0251 000815
Optiseal (F14)	SB-0252 000815
Optiseal (F14)	SB-0253 000815
Optiseal (F14)	SB-0254 000815
Optiseal (F14)	SB-0255 000815
Optiseal (F14)	SB-0256 000816
Optiseal (F14)	SB-0257 000816
Optiseal (F14)	SB-0258 000816
Optiseal (F14)	SB-0259 000816
Optiseal (F15)	SB-0073 950510
Optiseal (F15)	SB-0074 950410
Optiseal (F15)	SB-0075 950510
Optiseal (F15)	SB-0076 950410
Optiseal (F15)	SB-0077 950410
Optiseal (F15)	SB-0078 950410
Optiseal (F15)	SB-0079 950410
Optiseal (F15)	SB-0080 950410
Optiseal (F15)	SB-0081 950410
Optiseal (F16)	SB-0260 000816
Optiseal (F16)	SB-0261 000816
Optiseal (F16)	SB-0262 000816

Type	Dwg. No. Rev/Date
Optiseal (F16)	SB-0267 000825
Optiseal (F16)	SB-0268 000817
Otpiseal (F16)	SB-0269 000818
Optiseal (F17)	SB-0082 950411
Optiseal (F17)	SB-0083 950411
Optiseal (F17)	SB-0084 950413
Optiseal (F17)	SB-0085 950413
Optiseal (F17)	SB-0086 950413
Optiseal (F17)	SB-0087 950413
Optiseal (F17)	SB-0088 950413
Optiseal (F17)	SB-0089 950413
Optiseal (F17)	SB-0090 950413
Fig. 55	SB-0438 051002
Fig. 55	SB-0437 050510
Fig. 55	SB-0158 960820
Fig. 55	SB-0159 960820
Fig. 55	SB-0160 960820
Fig. 55	SB-0161 960820
Fig. 55	SB-0162 960820
Fig. 55	SB-0163 960820
Fig. 55	SB-0164 960820
Fig. 55	SB-0165 960820

Optiseal (F16)	SB-0263 000816
Otpiseal (F16)	SB-0264 000817
Optiseal (F16)	SB-0265 000817
Optiseal (F16)	SB-0266 000817

Fig. 55	SB-0166 960820
Fig. 55	SB-0431 050529
Fig. 55	SB-0432 050502
Fig. 55	SB-0433 050503
Fig. 55	SB-0434 050504
Fig. 55	SB-0435 050509
Fig. 55	SB-0436 050503

Tests carried out
Burst testing

Production Testing
Each valve body shall be subjected to a hydrostatic pressure test at 1,5 times the allowable pressure at room temperature.

In addition each valve shall be subject to seat leakage testing as follows:
- 1,1 times the design pressure in the valve flow direction.
- 5 bar applied independently on each side of the disc (only applicable when intended for ship's side or bottom).

Testing shall follow procedures and acceptance criteria in EN 12266-1 with leakage rate A .

Certification
Valves body (with ferrous material) shall be delivered with material certificate in accordance with DNV GL ship Rules Pt.4 Ch.6 Sec.2 Table 3.

DNV GL product certificates are required for valves with DN>100mm and PN>16 bar, and for ship side valves with DN>100. Other sizes and rating may be delivered with manufacturers certificate.

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
- Pressure rating
- Size
- Maximum design pressure and temperature
- Arrow to indicate direction of flow on one way flow valves.

Periodical assessment
A condition for retention of this certificate in its validity period is that periodical assessments are successfully carried out. Periodical assessments are required after two years (+/- 90 days) and after 3.5 years (+/- 90 days).