DNV·GL

Certificate No:
TAP000001R

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Butterfly Valves

with type designation(s)
20, 21, 22, 23, 30, 31, 31H, 31U, 3A, 3AH, 32, 33, 35, 36, 36H, 40, 41, 42, 43, 44, 45, 4A, 4B

Issued to
BRAY CONTROLS (UK) Ltd.
Renfrew, United Kingdom

is found to comply with
DNV GL rules for classification – Ships
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment

Application :

Butterfly valves approved for use in ship piping and machinery piping systems according to DNV GL Ship Pt.4 Ch.6.

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

Temperature range:	**See cert.**
Max. working press.:	**See cert.**
Sizes:	**See cert.**

This Certificate is valid until **2019-12-31**.

Issued at **Høvik** on **2015-11-06**

for **DNV GL**

DNV GL local station: **Glasgow**

Approval Engineer: **Simon Ratcliffe**

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.

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Product description

Butterfly valves: Wafer, lug and double flanged types designed according to the following standards:

Series 20/21/22/23	ASME VIII Div.1 UG-27
Series 30/31/31H/32/33/35/36/36H	ASME VIII Div.1 UG-27
Series 31U	ASME B16.34 Class 150
Series 40/41/4A	ASME B16.34 Class 150
Series 42/43/4AH	ASME B16.34 Class 300
Series 44/45	ASME B16.34 Class 600

Part	Material
Body	
Grey Cast Iron	ASTM A126 Grade B
Nodular Ductile Iron (non-ferritic)	ASTM A536 Grade 65-45-12
Nodular Ductile Iron (ferritic)	ASTM A395 Grade 60-40-18
Aluminium	ASTM B26 Alloy 356.0-T6
Aluminium Bronze	ASTM B148 Grade 954
Nickel Aluminium Bronze	ASTM B148 UNS 95800 / 95500
Carbon Steel	ASTM A216 WCB ASTM A352 LCB, LCC
Stainless Steel	ASTM A351 CF3M, CF8M
Super Duplex	ASTM A995 4A, 5A
Disc	
Nodular Ductile Iron (Nylon Coated)	ASTM A536 Grade 65-45-12
Stainless Steel	ASTM A351 Grade CF8M
Aluminium Bronze	ASTM B148-954
Nickel Aluminium Bronze	ASTM B148 UNS 95800 / 95500
Titanium	ASTM B348 Grade II
Super Duplex	ASTM 890 Grade 5A / A995
Hastelloy	ASTM B575 Alloy N10276
Carbon steel	ASTM A216 WCB
Stem	
Stainless Steel	304, 316, 416 or 17-4PH
Titanium	ASTM B348 Grade II
Super Duplex	ASTM UNS S32750 / A995
Monel K500	UNS N 05500
Hastelloy	ASTM B-575 Alloy N10276

Seat: EPDM, Buna-N, Viton (FKM), RTFE, PTFE, UHMWPE, RPTFE, RTFE-Inconel, TFM1700, Inconel, Polar®

Other manufacturing locations:

Bray Controls - USA
13333 Westland East Blvd.
Houston,
Texas 77041
USA

Bray Controls - China
98 Gaoxin #6 Road
Xiao Shan Economic and
Development Zone
Hangzhou,
Zhejiang,
China 311225

Bray Controls – India
14, Alindra
Savli GIDC Estate
Savli
Vadodara 391775
Gujarat
India

Application/Limitation

Maximum working pressures:

Series	Sizes	Max Pressure	
		Bar	Psi
20	DN25 – DN500	10	150
21	DN25 – DN500	10	150
22	DN50 – DN500	10	150
23	DN50 – DN600	10	150
30	DN50 – DN300	12	175
	DN350 – DN500	10	150
31	DN50 – DN300	12	175
	DN50 – DN300 Lugged *	16	250
	DN350 – DN500	10	150
31U	DN50 – DN300	20	285
31H	DN50 – DN500	16	250
3A	DN50 – DN300	12	175
	DN350 – DN500	10	150
3AH	DN50 – DN500	16	250
32	DN600 – DN900	5	75
33	DN600 – DN900	10	150
35	DN600 – DN1800	5	75
36	DN600 – DN1800	10	150
36H	DN600 – DN1500	16	232
40	DN65 – DN1200	20	285
41	DN65 – DN1200	20	285
42	DN65 – DN900	50	740
43	DN65 – DN900	50	740
44	DN80 – DN600	102	1480
45	DN80 – DN600	102	1480
4A	DN80 – DN500	20	285
4AH	DN80 – DN500	50	740

* Nodular Ductile Iron (ferritic) ASTM A395 Grade 60-40-18

Maximum allowable temperatures depending on seat material:

Seat material Series 20 to Series 36H	**Temperatures**
EPDM	-40°C to +121°C
Buna-N	-18°C to +100°C
Viton (FKM)	-18°C to +160°C
Polyurethane	-29 °C to +80 °C
PTFE-lined EPDM	-29 °C to +150 °C
Virgin & Conductive PTFE	-40°C to +200°C
UHMWPE	-18°C to +85°C
Seat material Series 40 to Series 4AH	**Temperatures**
UHMWPE	-18°C to +85°C
PTFE	-29°C to +260°C
RTFE	-29°C to +260°C
RTFE-Inconel	-29°C to +260°C
Polar®	-51°C to +38°C
TFM 1700	-52°C to +205°C
Inconel	-52°C to +482°C

Valves having EPDM lining are not to be used for hydrocarbon service.

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

S40, S41, S42 and S43 valves can be used where "fire safe" application is required by DNV Rules for Ships Pt.4 Ch.1 Sec.3 B500 by the use of a primary seat and then the back up metal seat (Inconel)

Other valves may not be used for sea water systems or hydrocarbon services where "fire safe" application is required ref. DNV Rules for Ships Pt.4 Ch.1 Sec.3 B500.

Restrictions on grey cast iron
Grey cast iron valves shall not to be used for piping subject to pressure shock, excessive strains and vibration.

Grey cast iron shall not be used for class I and II piping with the following exceptions:

- components in hydraulic piping systems where failure would not render the system inoperative or introduce a fire risk.
- pump and filter housings in fuel and lubrication oil systems where the design temperature does not exceed 120°C.

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.

Restrictions on nodular ductile cast iron
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.

Non-ferritic nodular iron shall be treated as grey cast iron and subject to the same restrictions.

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

Type Approval documentation

Tests carried out
S40/S41 and S42/S43 fire tested according to API607 and BS EN ISO 10497 as applicable.

Production testing
The valve housing of each valve shall be subjected to a hydrostatic pressure test at minimum 1.5x design pressure. The test pressure need not be more than 70 bar in excess of the design pressure.

Holding time and acceptance criteria may be according to API 598 or EN 12266-1.

The valve assembly shall be subjected to a hydrostatic seat leakage test. The test pressure shall at least 1.1x 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 of the closed disc.

Holding time and acceptance criteria may be according to API 598 or EN 12266-1.

Certification
Valves shall be delivered with material certificates in accordance with DNV GL Ship Pt.4 Ch.6 Sec.2 Table 3.

DNV GL product certificates are required for 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 manufacturers certificate may be accepted.

Marking of product
For traceability to this type approval, each valve is to be marked with:

- Manufacturer's name:
- Type designation
- Size
- Max. design pressure(s) or pressure class
- Direction of flow
- Serial numbers on each valve, as relevant

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.