Certificate No:
TAP00002CV

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Butterfly Valves

with type designation(s)
S643 and S573

Issued to
AFFCO Flow Control (Shanghai) Co., Ltd
Fengxian District, Shanghai, P.R.C

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 :

Products approved by this certificate are accepted for installation on all vessels classed by DNV.

Temperature range:	**see certificate**
Max. working press.:	**JIS 5K, JIS 10K, JIS 16K, PN6, PN10, PN16 and CL 150**
Sizes:	**DN 50 to DN 600**

Issued at **Hamburg** on **2021-06-11**
This Certificate is valid until **2026-06-10**.
DNV local station: **Shanghai**

for **DNV**

Approval Engineer: **Ana Cristina Do Carmo Insfran**

Olaf Drews
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

Valve design:
- Wafer Type Butterfly Valve: S573
- Lug Type Butterfly Valve: S643

Flange connections according to:
- EN 1092 PN6, PN10, PN16
- JIS B2239/JIS B2220 JIS 5K, JIS 10K, JIS 16K
- ASME B16.5 Class 150

Design Standard: EN 593, API 609, JIS 7480

Top Flange: ISO 5211

Face to Face: JIS F7480, EN 558, API 609

Testing Standard:
- EN 12266-1
- API598
- JIS F7400

Butterfly valve nominal sizes:
- S643 – DN 50 to DN 600
- S573 – DN 50 to DN 600

Pressure ratings: JIS 5K, JIS 10K, JIS 16K, PN 6, PN 10, PN 16, Class 150

Design temperature: Depending on seat materials

Seat design type	Temperature range [°C]
NBR	-15° to 80°
EPDM	-23° to 120°
VITON	-15° to 200°
PTFE	-20° to 180°

Butterfly valves may be equipped with manual, pneumatic or electric actuator hydraulic[1].

Note 1:
Actuators, remote operating control devices and additional mountings are not included in this type approval.

Materials:

Valve	Material type	EN Standard	ASTM Standard	JIS Standard
Body	Ductile Iron	JS1030 EN 1563 (GGG40 DIN1693)	Gr.65-45-12 ASTM A536	FCD450 JIS G5502
	Carbon Steel	-	WCB ASTM A216	SCPH2 JIS G5151
	Stainless Steel	1.4408 EN 10213	CF8, CF8M, CF3, CF3M ASTM A351	-
	Aluminium Bronze	AB2 BS 1400	C95500, C95800 ASTM B148	-
Disc	Ductile Iron 300um Rilsan coated/Halar coating	JS1030 EN 1563 (GGG40 DIN1693)	Gr.65-45-12 ASTM A536	FCD450 JIS G5502
	Stainless Steel	1.4408 EN 10213	CF8M ASTM A351	-
	Duplex	1.4470 EN 10213	Gr.4A,5A,6A ASTM A890	-
	Aluminium Bronze	AB2 BS 1400	C95500, C95800 ASTM B148	-
Shaft	Stainless Steel	1.4122 EN 10088-3	431 ASTM A276/ F316, F316L ASTM A182	-
	Duplex	1.4462 EN 10088-3	F51, F53, F55 ASTM A182	-
	Alloy steel	-	Monel (K500) UNSN05500 ASTMB865	-
Seat	NBR(NITRILE)			
	EPDM			
	VITON			
	PTFE			

Application

The butterfly valves of type S643 and S573 are type approved for the following operating media:

Non-flammable gases, sea water, fresh water, air, oil.[2]

Note 2:
Fuel oil, lubrication oil, hydraulic oil and thermal oil are in this context regarded as “Flammable liquids”.
See DNV GL Rules, Pt. 4 Ch. 1, Section 3 – Design principles

Limitation

Butterfly valves may not be used for flammable gases and applications with flowing media specified as dangerous and toxic fluids.

Body material of copper and copper alloys are subjected to requirements according to DNV GL Rules Pt.2, Ch.2 – Metallic Materials, Section 10 and 11 and to operating temperatures limits specified in DNV GL Rules Pt.4, Ch. 6 – Piping Systems, Section 2 – Materials.

Valves fabricated of copper and copper alloy shall not be used for media having temperature above the following limits:

- Copper and aluminum brass: 200°C
- Copper Nickel: 300°C

Tests carried out

The butterfly valves have been tested in accordance with the following standards:

Test standard: JIS F7400, API 598, EN 12266-1 DNVGL Pt.4 Ch.6 DNV GL CP 0186		Purpose
Title	Test reference	
Hydrostatic Pressure Test	Valve Body	To confirm the pressure containing capability of the shell against internal pressure Test pressure = 1,5 times the design pressure No leakage is permitted.
Hydrostatic/Pneumatic Seat tightness	Valve seat	To confirm the capability of the seats to comply with the specified leakage rate At the manufacture In the direction(s) for which the valve is designed No visible leakage.
Functional test	Valve assembly	Function test of completed assembled valve.

Type Approval documentation

Certification

Application in machinery and piping systems
Valves intended to be installed in piping system listed in DNVGL Rules Pt.4, Ch.6 – Section 1 shall be certified according to DNV GL Rules Pt.4 Ch.6 – Piping systems, Section 9

Valve nominal size / Pressure rating	Type of Product Certificate (PC) / Issued by
DN > 100 mm / PN > 16 bar	VL Certificate / DNV GL
DN ≤ 100 mm / PN ≤ 16 bar	W Works Certificate / Manufacturer
Ship side valves DN > 100 mm regardless of pressure rating	VL Certificate / DNV GL

Material certificates (valve bodies)
In accordance with DNV GL Rules Pt.4 Ch.6 – Piping systems, Section 2 – Table 3

Marking of product

For traceability to this type approval the products are to be marked in particular with:

- Manufacturer's name or trademark
- Valve type designation
- Size
- Maximum design pressure and temperature
- Arrow to indicate direction of flow

Production Place

AFFCO Flow Control (Shanghai) Co., Ltd
Building 3, No. 99, Desheng Road, Fengcheng Town, Fengxian District, Shanghai, P.R.C.

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the Type Approval are complied with. Refer to DNVGL-CP-0338, Sec.4.

- The certificate is only valid if required periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com

END OF CERTIFICATE