



Certificate No:
TAP00002MG

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Butterfly Valves

with type designation(s)
S960, S961, S970, S971, S980, S981)

Issued to
AFFCO Flow Control (Shanghai) Co., Ltd
Shanghai, China

is found to comply with

Application :

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

Temperature range: see certificate
Max. working press.: PN6/PN10/PN16/JIS5K/JIS10K/JIS16K/CLASS150
Sizes: DN50 - DN650

Issued at **Hamburg** on **2022-11-03**

This Certificate is valid until **2027-11-02**.

DNV local unit: **Shanghai**

for **DNV**

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

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Sven Klinger
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.



Form code: TA 251

Revision: 2022-09

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Product description

High Performance Butterfly Valve Type (Double Eccentric Butterfly Valve):
S960, S961, S970, S971, S980, S981 for installations in piping systems.

Valve design:

- EN593 Industrial valve – Metal butterfly valve
- API609 Double flange, Lug- and Wafer Type Butterfly Valve

Flange connections according to:

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

Top Flange: ISO 5211

Face to Face:

- EN558 Table 2 Series 20
- ISO 5752 Table 1 Series 20
- API 609 Table 2
- JIS B2002-1987 Series 46

Testing Standard:

- EN 12266-1
- API598
- API607
- JIS F7400

HP Butterfly valve nominal sizes:

- S960 – DN 50 to DN 650
- S961 – DN 50 to DN 300
- S970 – DN 50 to DN 650
- S971 – DN 50 to DN 300
- S980 – DN 50 to DN 650
- S981 – DN 50 to DN 300

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]
PTFE or PTFE + Metal	-20° to 180°
RPTFE or RPTFE + Metal	-40° to 230°
Metal / SS316 or other)	-40° to 450°

Butterfly valves may be equipped with manual, pneumatic or electric actuator hydraulic¹.

Note 1:

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

Materials:

Parts	General Material	EN Standard	ASTM Standard	JIS Standard
Body	Ductile Iron	JS1030(GJS-400-15) EN1563	65-45-12 ASTM A536	FCD450 JIS G5502
	Carbon Steel	1.0619(GP240GH) EN10213	WCB ASTM A216	SCPH2 JIS G5151
	Stainless Steel	1.4408 EN10213	CF8M/CF3M ASTM A351	SCS14A/16A JISG5121
	Duplex	1.4470 EN10213	4A/5A ASTM A995	
	Aluminium Bronze	AB2 BS1400(CC333G EN1982)	C95500/C95800 ASTM B148	

Disc	Stainless Steel	1.4408 EN10213	CF8M/CF3M ASTM A351	SCS14A/16A JISG5121
	Duplex	1.4470 EN10213	4A/5A ASTM A995	
	Monel		M35-2 ASTM A494	
	Aluminium Bronze	AB2 BS1400(CC333G EN1982)	C95500/C95800 ASTM B148	
Shaft	Stainless Steel	1.4122 EN10088-3	F431/F316/F316L ASTM A182 S17400(17-4PH) ASTM A705	
	Duplex	1.4462 EN10088-3	F51/F53/F55 ASTM A182	
	Monel		UNS N05500(Monel K500) ASTM B865	
	Aluminium Bronze		UNS C63000 ASTM B150	
Seat	Soft Seat	PTFE (-20~180°C)/RPTFE (-40~230°C)		
	Fire Safe Seat	RPTFE (-40~230°C) + S.S.316L ASTM A240/S31803 ASTM A240/Inconel 625		
	Metal Seat	S.S.316L ASTM A240/ S31803 ASTM A240/Inconel 625(-40~450°C)		

Application

The HP butterfly valves of type S960, S961, S970, S971, S980, S981 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 Rules, Pt. 4 Ch. 1, Section 3 – Design principles

Limitation

HP 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 Rules Pt.2, Ch.2 – Metallic Materials, Section 10 and 11 and to operating temperatures limits specified in DNV 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 DNV Pt.4 Ch.6 DNV 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.
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Type Approval documentation

Certification

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

Valve nominal size / Pressure rating

DN > 100 mm / PN > 16 bar
DN ≤ 100 mm / PN ≤ 16 bar

Ship side valves DN > 100 mm
regardless of pressure rating

Type of Product Certificate (PC) / Issued by

VL Certificate / DNV
W Works Certificate / Manufacturer

VL Certificate / DNV

Material certificates (valve bodies)

In accordance with DNV 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 DNV 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